

**A COMPARISON OF HUMAN ENERGY FIELDS  
BEFORE AND AFTER STIMULATION  
OF DR. C. NORMAN SHEALY'S RINGS  
OF FIRE, EARTH, WATER, AIR, AND CRYSTAL**

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The work reported in this dissertation is original and carried out by me solely, except for the acknowledged direction and assistance gratefully received from colleagues and mentors.

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Barbara A. Haydon

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## ABSTRACT

The present research explores the human energetic field change in the human body after the electrical stimulus of Dr. C. Norman Shealy's Rings of Fire, Earth, Air, Water, and Crystal are applied, using the SheLi TENS stimulator. In addition, a control group of non-acupuncture points is also compared to the rings' analysis. The Gas Discharge Visualization Bioelectrography (BEO-GDV) instrument was used to measure the change in the human energy field. The rings of acupuncture points produce specific hormones in the body with stimulation of the points with the SheLi Tens. The present study compares the five rings and their respective electro magnetic energy fields. A group of non-acupuncture points was administered as a test to establish a control group. Stimulation of each ring was evaluated separately, with at least one week between testing. The GDV camera did a measurement of the fingertips with and without a filter, which resulted in a diagram of the JS integer. Then the SheLi TENS stimulator device was used to stimulate the acupuncture points of the rings for five minutes. Only one ring was administered on a given day for each volunteer. After all the electrodes were removed, the energy field was again tested, using the same technique as the baseline. Fifty-five to sixty volunteers were tested in each ring. Sixty-one volunteers participated in the control test of non-acupuncture points. The age range was 21 to 80 years. Each subject was given a personal health history questionnaire and symptom index questionnaire to determine their current health status. The pre-treatment numbers were compared to the post-treatment numbers. A statistical change was detected in the Rings of Water, Earth, Crystal, and Air without a filter both right and left hands. No statistical change was detected for the Ring of Fire with or without a filter. Statistically significant changes in the energy field with a filter included the Ring of Crystal left hand and Ring of Earth right hand. The rings of Air and Water had no statistical significant change with a filter. The control showed no statistical significant change with or without a filter. The electrical stimulation of the acupuncture points moved the electromagnetic energy toward a balance point. Another analysis showed the tendency of the electromagnetic field in the body to move toward homeostasis or a balance point after stimulation of the acupuncture points.

## **CHAPTER 1**

### **INTRODUCTION**

The introduction consists of three sets of materials. The first set contains an overview of the research project. The second set characterizes Bioelectrography and the evolving concepts of the human energy field. The third set contains a description and explanation of the rings and stimulator, taken from the work of Dr. C. Norman Shealy.

### **THE RESEARCH PROJECT**

The objective of this research is to detect change in the human energy field of the body after the stimulation of Dr. Shealy's Rings of Fire, Earth, Water, Air, and Crystal. A control group of non-acupuncture points was also administered. The acupuncture points were stimulated electrically using the SheLi Tens Stimulator. The Gas Discharged Visualization (GDV) device was used to measure the change in the human energy field. This study used a comparison of the five rings, plus the control group of points to examine the respective human energy field as displayed by the photon emission of the electrical magnetic field on the GDV.

Eighty volunteers between the ages of 21 to 80 were tested. The subjects were given a personal health history questionnaire and symptom index to determine their individual health status. When utilizing the GDV as a measurement tool, the goal is to detect a statistical electro magnetic energy shift before and after stimulation of the acupuncture points established for the Rings of Fire, Earth, Water, Air, and Crystal, with a one-time stimulation of each ring. Each ring was administered one week apart to preclude confounding effects of the previous week's stimulation. After evaluation of the data, the researcher began noticing the tendency of the energy around the body moving toward a balance point or homeostasis. Previous research done by Dr. Shealy showed that stimulation of the different rings over time created physical effects in the body toward balance and homeostasis. The condition of health is a regulated balanced flow of energy through the body.

## **WHAT IS A BIOLOGICAL ENERGY FIELD?**

In contemporary science we are becoming more aware that the human organism is not just a physical structure made up of molecules, but we also constitute an electromagnetic field. Part of the problem is there are multiple perspectives on this idea of what is a "Biological Energy Field"; and there is not yet a consensus among researchers. In this section, several representative approaches are discussed. The Biological Energy Field is another term to refer to human energy field.

A Biological Energy Field is a complex consequence of the interactions among physical fields and radiations of known and unknown origin, including electromagnetic fields (EMF), the gravitational field, acoustic fields, and fields of molecules. The Biological Energy Field is formed by the body in space, produced by the body's emissions and interactions with the processes of the environment. The Biological Energy Field provides information exchange between a particular subject, the environment and other subjects (edited by Berney Williams, Ph.D.).<sup>1</sup>

The human energy field has been the subject of debate from antiquity.

Often it is observed as a luminous radiation surrounding the body depicted, for example, in pictures of haloed Christian saints. It has also been shown in Chinese and Japanese art in the images of bodhisattva or Buddha. The Jewish mystical theosophy referred to the energies of astral light around 538 BC.<sup>2</sup>

Many authors – such as Barbara Brennan, Valerie Hunt, and Rosalyn Bruyere – believe spinning vortices, commonly known in the south Asian tradition as chakras, generate the human energy field. The chakra system is part of the ancient lost mysteries. The energy pattern around each chakra is viewed as a vortex predominantly of a certain color. The definition of a chakra is an energy center within the body whose spinning is proposed to generate a subtle energetic field around the body. The word chakra comes from the Sanskrit work meaning “wheel of light.”<sup>3</sup> To date there is no known instrument to measure these fields consistently.

These energy systems are sensed in relation to the midline and to the human spine, from the base of the tailbone to the area above the top of the head. They are known in differing form in many human cultures, having their roots in

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native healing traditions for thousands of years, long before written communication developed. The chakras themselves seem to act like energy transfer stations. Theoretically they allow the inflow of Qi from an unlimited supply of energy in the universe to enter the human organism.

Experiments done by Valorie Hunt and Dr. Andria Puharich indicated correlations between the measured “biofield” and the perceived “human energy field.” Hunt computed direct correlations between frequency and wave patterns of alternating electrical currents measured on the body surface as compared to colors perceived by different healers. Dr. Puharich consistently measured 8 Hz magnetic pulse from the hands of healers. He found the more intense the signal, the greater the effect of healing.<sup>4</sup>

Dr. Martha Rogers, a nursing theorist, published her concepts of the human energy field in the *Science of Unitary Human Beings* in 1970. Her ideas are based on extensive study of quantum physics.

An energy field identifies the conceptual boundaries of (a human being.). This field is electrical in nature, is in a continual state of flux, and varies continuously in its intensity, density, and extent...the human field is postulated to have its boundary continuous with the boundary of the environment. The environment is itself, an energy field electric in nature. The interaction between the human field and the environmental field takes place across the conceptual boundaries of these two fields, which together are co-extensive with the universe. (Rogers, 1970, p.90)<sup>5</sup>

Dr. Robert O. Beck, a nuclear physicist, did extensive studies on the brain waves of healers to include charismatic Christian faith healers, Hawaiian kahunas, and psychics. He found that all healers exhibited a brain wave pattern of 7.8 to 8

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Hz during times of healing. The earth's magnetic field also fluctuates at the same frequency, known as Schumann waves. He found that the brain waves of the healers were the same frequency and were phase synchronized with the Schumann waves at the time of a healing process. Beck inferred that the healer was able to take energy from the magnetic field of the earth to heal the patients. This is called "field coupling."<sup>6</sup>

The British physicist Faraday saw with intuitive perception the lines of stress or "force fields" surrounding magnets and used this perception to describe the action of electric currents in space over a hundred years ago. Faraday believed the entire universe is made up of forced lines and perceived light as electromagnetic radiation. This was long before the nature of light as wave and particle was proven. Since then, science has proved the theory to be mathematically and empirically correct.<sup>7</sup>

Contemporary science suggests that human organisms are more than just a physical structure. In addition to being composed of molecules, we are also composed of energy fields. Over time, science has delivered numerous ways to measure the human energy field; for example, electrically (electrocardiogram, electroencephalogram), magnetically (magnetocardiogram, magnetoencephalogram), acoustically (crystallography, lithography), and thermally (photometry, thermograph imagery, spectroscopy).

We are learning to measure these subtle changes in our human energy field such as with electrocardiograms and electroencephalograms. Kirlian

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photography and the GDV camera are also equipment built to visualize and graph the human energy field. This particular study uses the Gas Discharge Visualization machine to explore the electro magnetic field of the human body. A discussion of how this works is found in chapter two.

## DESCRIPTION OF THE RINGS AND STIMULATOR

We have often heard the expression of being in tune with, or being attuned to, the flow of life. We can think of acupuncture meridians as the pathways that allow this life force to flow through us in a harmonious manner. There appears to be a type of electricity or some form of energy, also known as Qi or Chi, which flows through the acupuncture meridians. A meridian may be thought of as a pathway through which subtle energy flows. These channels can be tapped into externally through acupuncture needles or stimulated electrically. Acupuncture and meridians are addressed more completely in chapter two.

The question is often raised, why stimulate the points with a Tens unit instead of the traditional needles? The greatest advantage is that subjects without extensive acupuncture training can be taught to do the procedure and may use it on themselves daily or as needed at home. Another major advantage is that, compared to needles, it is less invasive.

Electrotherapy or electrical stimulation has been used since 2751 BC.<sup>8</sup> Modern use of electrotherapy became better known with the introduction of the Electreat for pain control in 1919.<sup>9</sup> Working with engineers, Dr. Shealy has been introducing modern versions of the TENS units for pain control since 1971. However, the beginning TENS (Transcutaneous Electrical Nerve Stimulators) did not produce the effects for the desired quality of stimulation. Many versions of the TENS unit exist today and have multiple applications in modern medicine.

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Most TENS units emit square wave pulses of 2 to 100 pulses per second (Hertz or Hz) and a maximum current of 60 milliamps.<sup>11</sup> Depending on the frequency or wavelength used, different effects occur. Bone stimulation to repair a fracture or muscle stimulation for pain control would require different frequencies from the wavelength needed to stimulate acupuncture points to stimulate hormones in the body.

In Russia and the Ukraine, quantum physicists have studied extensively the higher frequencies of 54 to 78 gigahertz. They believe that the human DNA resonates at 54 to 78 gigahertz. In those countries, many physicians have treated patients by using those frequencies through application to specific and non-specific acupuncture points. They have reported successes in drug addiction, arthritis, and many other diseases.<sup>12</sup> Dr. Shealy observed this in his travels to the area, and subsequently conducted research with his TENS units to determine the best frequency to stimulate the body's response to his rings. As a result of Dr. Shealy's research, the SheLi TENS was designed to resonate at the same frequency as DNA. It is logical to use this same instrument in this study to stimulate acupuncture points.

The science of bioelectromagnetics and interaction of the electromagnetic fields has been emerging over the past few decades. It deals with endogenous electromagnetic fields of life such as brain waves, biological rhythms, and physiological states. Some medical applications of biological effects are stimulation using electromagnetic fields to promote repair of non-union bone

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fractures, and transcranial electro stimulation in which very low currents are applied via two electrodes to the head for behavior modification, to relieve depression, anxiety, or insomnia.<sup>13, 14, 15</sup>

The body-mind connection can be compared to hardware and software. The hardware can be compared to the neural connections in the central nervous system (brain and spinal cord) that connect throughout the body. Hormones are stimulated by the neural and chemical activity of the hypothalamus and pituitary, and affect the activity of all the glands. Chemical messengers convey images throughout the body-mind via the bloodstream, lymphatic system, and meridians. These messengers are analogous to a computer's software. Often these messengers are described as neurotransmitters, hormones, and neuropeptides.<sup>16</sup> Neurotransmitters are small molecules whose function is to transmit nerve signals or impulses from one nerve cell (neuron) to another. The neurotransmission allows the body and brain to take the hormones stimulated by the rings (circuit of acupuncture points) and utilize them for balancing the body, state of mind, consciousness, emotions, and behavior. Since the rings involve stimulation of hormones in the body, shown in previously published studies by Dr. Shealy, it is logical to use electro stimulation for the test in this experiment. It is non invasive and safe.

Dr. Shealy discovered and defined the naturally existing circuit with specific acupuncture points using the five basic elements of fire, air, water, earth, and crystal. He has a patent on all of these processes. Through his research Dr. Shealy has shown statistically significant results utilizing the acupuncture points

in his rings. A discussion now follows for each ring and the neuro-chemicals and hormones stimulated to provide a basic understanding of what each ring does.

### **Ring Of Fire**

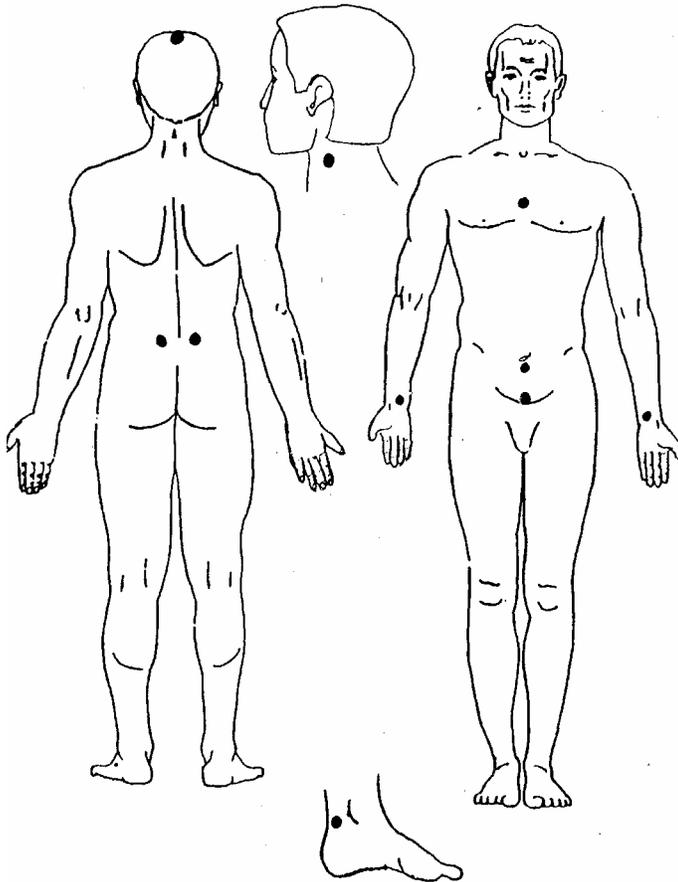
Dr. Shealy's research has indicated that DHEA is elevated by use of the electrical stimulator on the acupuncture points identified as the Ring of Fire. A table of these points is shown in Figure 1.1. The Ring of Fire was Dr. Shealy's first circuit of acupuncture points. It was the result of his asking what could be done beyond natural progesterone cream to assist in DHEA restoration. Studies of the Ring of Fire have documented statistically significant improvements with symptom reduction for medical problems such as migraines, diabetic neuropathy, depression, and rheumatoid arthritis. Dr. Shealy's research has demonstrated. The following findings were found utilizing the Ring of Fire with patients:

1. Reduction by 75 percent of the frequency and intensity of migraine;
2. A marked improvement in 70 percent of patients with rheumatoid arthritis;
3. Reduction of pain in 80 percent of patients with diabetic neuropathy; and
4. Reduced depression in 70 percent of patients.<sup>17</sup>

Figure 1.1 shows each of the acupuncture points for the Ring of Fire. An electrode is placed at each acupuncture point, which is connected to the stimulator. A Velcro band holds each electrode in place. Each point is stimulated

for five minutes except for Governing Vessel 20, which is connected and stimulated throughout the stimulation of all the other points.

## Ring of Fire



IC - Midway between the tip of medial malleolus and tendo calcaneus.

CV2 - In the superior border of the pubic symphysis, on the midline of the abdomen.

CV6 - 1.5 cun below the umbilicus, on the midline of abdomen.

B22 - 1.5 cun lateral to the lower border of the spinous process of the 1st lumbar vertebra.

MH6 - On the ulnar side of the wrist, on the radial side of the tendon

M. flexor carpi ulnaris, below pisiform bone.

LI18- 3 cun lateral to the thyroid cartilage, between the sternal head and the clavicular head of the sternocleidomastoid muscle.

CV 18 -On the midline of abdomen, 1.6 cun above line of two nipples, at the level of 3<sup>rd</sup> intercostal rib.

GV20 -7 cun above the posterior hairline, midway on a line connecting apex of both ears.

**Figure 1.** Ring of Fire acupuncture points

To understand the importance of the Ring of Fire, we need to understand the importance of DHEA in the body. A decrease in DHEA is often seen with findings of chronic illness. Dr. Shealy's clinical experience suggests that if the DHEA is below 130 in women or 180 in men, the individual is in adrenal exhaustion. As a result they are on the verge of developing a chronic debilitating illness.<sup>18</sup>

Depletion of DHEA often occurs as a result of adapting to stress. Hans Selye's theory postulates that, as we adapt to a stress, we lower our threshold for any additional stressors, thus allowing disease to attack the human body. We are exposed to a multitude of stressors every day, including but not limited to food pollutions, sugar, caffeine, herbicides, pesticides, air pollution, electromagnetic pollution, and emotional stress. DHEA can be increased by use of the SheLi TENS as well as by exposure to natural sunlight, natural progesterone, stress reduction, meditation, and physical exercise.<sup>19</sup> An appropriate amount of DHEA helps keep the body in balance.

To further understand the Ring of Fire, let us continue the discussion about DHEA. The hormone DHEA, dehydroepiandrosterone, has been found to be the most critical adrenal hormone from which testosterone, estrogen, and other hormones are made. It is the most prevalent and considered the most essential hormone. It is commonly known that DHEA levels decrease with age. Extensive literature suggests that DHEA levels are maximum during the 20s, decreasing as one ages. Ideally the normal range of DHEA is between 400 and 600. The

majority of Americans lose 80 to 90 percent of the optimal level of DHEA between ages thirty and eighty.<sup>20</sup>

DHEA is produced by the adrenal glands in both men and women. Men produce more because the testes also produce DHEA. Cholesterol is also involved in the production of DHEA. Our bodies produce cholesterol naturally. It is when we produce too much cholesterol due to stress that the body blocks the normal mechanism of balance of testosterone, estrogen, and thyroid hormones, and thus DHEA is also blocked. Other factors that deplete DHEA are inactivity, obesity, anger, anxiety, depression, pollution, electromagnetic excess, and deficiency in any nutrient.<sup>21</sup>

DHEA counterbalances the effects of cortisone and lowers cholesterol. It also enhances the immune system and is an antioxidant. It has an effect of helping people cope in stress by bringing the increased cortisone production back down to a baseline level. DHEA enhances the effects of insulin as cortisol raises the blood sugar. It enhances the immune function by protecting the body against cancer.

Low levels of DHEA have been found in women up to nine years before breast cancer was detected. Dr. Shealy has also found low levels of DHEA in men four years prior to the detection of prostate cancer. DHEA also has an anti-obesity effect, but diets high in animal fats and obesity generally lead to low levels of DHEA. Often low thyroid production leads to low DHEA levels. Prolonged stress raises blood sugar, insulin, and cortisol and will lead to low levels of DHEA. Low levels of DHEA have been reported in cases of AIDS,

Alzheimer's, heart disease, hypertension, psoriasis, rheumatoid arthritis, and viral infections, just to name a few. All of the above diseases are major reflectors of stress to overall health.<sup>22</sup> It is a known fact that traveling on an airplane can temporarily deplete the DHEA. However, a healthy individual will rebound to normal within a few days.

As a clinical physician and researcher, Dr. Shealy continued to work on ways to raise DHEA safely and non-invasively. His research on the Ring of Fire using either the Liss TENS or the She-Li TENS showed that DHEA level was increased 30 to 100 percent.<sup>23</sup>

### **Ring Of Air**

In Dr. Shealy's studies, electrical stimulation of the 13 points of the Ring of Air with the SheLi Tens has increased neurotensin levels as much as five fold. The average increase has been 300 percent. Serum blood tests have indicated that stimulating this ring raises neurotensin in the body. Neurotensin is found in the central nervous system. It is found in the hypothalamus, amygdala, basal ganglia, gray matter of spinal cord, and is also produced in the intestine. It is a 13 amino acid peptide neurotransmitter.

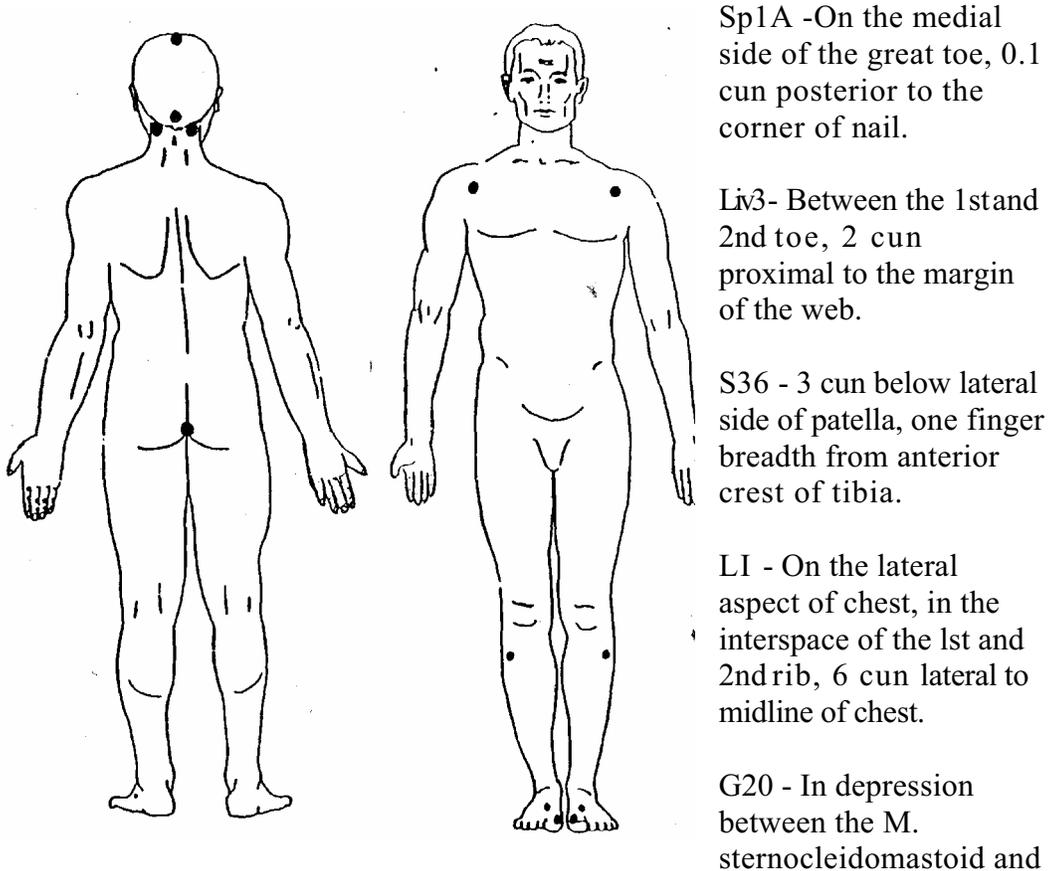
Neurotensin affects the pituitary hormone release. It has analgesic effects and plays a role in pain perception. It also has been shown to help regulate fat metabolism. It is best known for its anti-inflammatory properties. When blood sugars are low, neurotensin stimulates the release of insulin. Glucagons and

somatostatin, which are neurochemicals stimulated by glucose or arginine, are inhibited by neurotensin. There is a close metabolic relationship between neurotensin and histamine. Histamine receptors block reverse the neurotensin effects.<sup>24</sup>

Dr. Shealy's intuitive perception of the Ring of Air is that it increases emotional and mental detachment, and helps stimulate holographic thinking, simultaneity of thought, and intuition. Dr. Shealy has done the stimulation of the Ring of Air with visualization and massage to the acupuncture points in classroom settings with hundreds of participants. Many individuals report subjective feelings of increased connectedness that is often accomplished with higher levels of meditative practice.<sup>25</sup> This demonstrates the cognitive dissociation ability of neurotensin.

Below in figure 1.2 are the anatomical locations for the Ring of Air acupuncture points.

## Ring of Air



Sp1A - On the medial side of the great toe, 0.1 cun posterior to the corner of nail.

Liv3 - Between the 1st and 2nd toe, 2 cun proximal to the margin of the web.

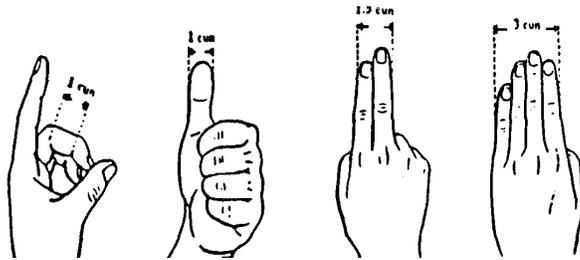
S36 - 3 cun below lateral side of patella, one finger breadth from anterior crest of tibia.

LI - On the lateral aspect of chest, in the interspace of the 1st and 2nd rib, 6 cun lateral to midline of chest.

G20 - In depression between the M. sternocleidomastoid and

the upper portion of the M. trapezius. Specifically, between the depression directly inferior to the occipital protuberance and the mastoid.

GV1 - Midway between the top of coccyx and the anus.



GV16 - Directly below the occipital protuberance, in the midline, in a depression 1 cun above the hairline.

GV20 - 7 cun above the posterior hairline, midway on

a line connecting apex of both ears.

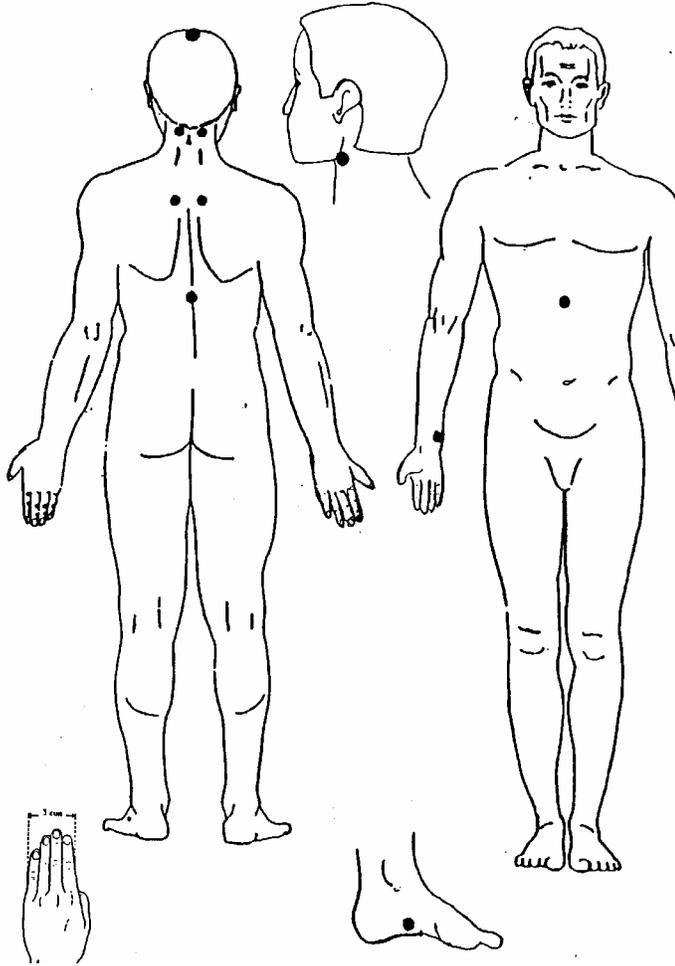
**Figure 2.** Ring of Air acupuncture points

## **Ring of Water**

Stimulation of the acupuncture points for Ring of Water raises aldosterone in the body. This hormone is secreted by the adrenal cortex and regulates water and mineral metabolism. The elderly are prone to problems with water metabolism as a result of low aldosterone levels.<sup>26</sup> Diseases sometimes associated with aldosterone imbalance include kidney stones, bladder infections, obesity, cholesterol metabolism, and edema. Based on Dr. Shealy's research and clinical experience, use of this ring has improved health benefits for all of the diseases listed above. Other benefits found by Dr. Shealy include emotional balance and weight loss when combined with the Ring of Fire.<sup>27</sup>

Figure 1.3 shows the 13 acupuncture points for the Ring of Water.

## Ring of Water



SP4 - On the medial aspect of foot, in a depression at the anterior and inferior border of 1 metatarsal bone, at the junction of the "red and white" skin.

H7 - On the ulnar side of the wrist, on the posterior border of the pisiform bone, in the depression at the radial side of the tendon M. flexor carpi ulnaris.

B10 - 1.3 cun lateral to midline of 1<sup>st</sup> and 2<sup>nd</sup> cervical vertebrae, on the lateral side of M. trapezius.

B13 - 1.5 cun lateral to the lower border of the spinous process of the 3<sup>rd</sup> thoracic vertebra.

CV14 - 6 cun above the

umbilicus, on midline of the abdomen.

TH16 - Posterior and inferior to the mastoid process, in the posterior border at M. sternocleidomastoid, at the level of the angle of the mandible.

GV8 - Below the spinous process of the 9<sup>th</sup> thoracic vertebra.

GV20 - 7 cun above the posterior hairline, midway on a line connecting apex of both ears.

**Figure 3. Ring of Water acupuncture points.**

## **Ring of Earth**

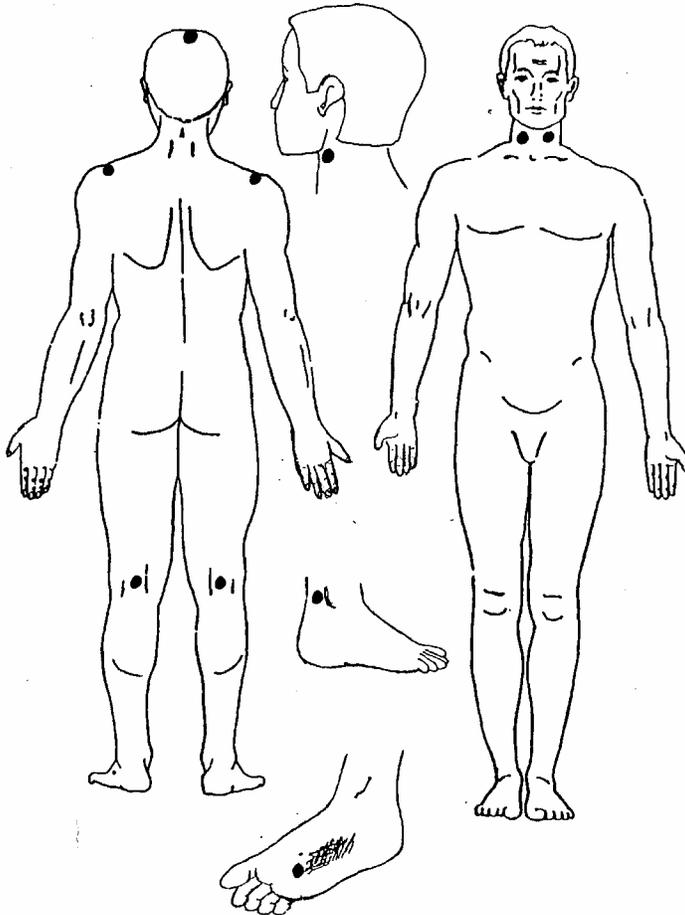
The Ring of Earth has been shown to activate Calcitonin. Clinical testing by Dr. Shealy showed Calcitonin would increase within one hour after stimulation of the acupuncture points. The drug Calcitonin is clinically used for the treatment of Padgett's disease, hypocalcaemia, osteoporosis, phantom limb pain, and bone pain. It is also used to help patients with osteopenia and juvenile idiopathic arthritis. Even space flights have been shown to decrease Calcitonin in the body.<sup>28</sup>

Calcitonin is a 32 amino acid polypeptide hormone produced primarily by the c-cells of the thyroid gland, the neuro-endocrine cells of the pituitary and other tissue sources. It is responsible for stimulating cartilage growth, responsible for controlling the plasma calcium concentration, and increasing bone density.<sup>29</sup>

In 1992 over \$900 million was spent on Calcitonin, mostly for the treatment of osteoporosis. Older adults, menopausal women, and patients taking steroids frequently have osteoporosis. This often leads to fractures, decreased mobility, and Dowager's Hump, a form of hunchback, commonly known as kyphosis. Many medical doctors, especially orthopedic surgeons, recommend high doses of calcium and vitamin D. However, the human body does not absorb the mineral. FDA has approved the drug Calcitonin as a nasal spray, but it has several possible side effects such as ulceration, inflammation of the nose, rhinitis, nosebleed, and even sinusitis.<sup>30</sup>

Electrical stimulation of the thirteen acupuncture points with the Ring of Earth can raise Calcitonin up to 80 percent. This is a safer way to raise Calcitonin without the side effects of drugs.<sup>31</sup> Figure 1.4 shows the acupuncture points for the Ring of Earth.

## Ring of Earth



K1 - In the depression at the junction of anterior and middle third of the sole in a depression between the 2<sup>nd</sup> and 3<sup>rd</sup> metatarso-phalangeal joint when the toes are plantar flexed.

B54- Exact midpoint of the popliteal transverse crease.

B60 - Between the posterior border of the external malleolus and the medial aspect of tendo calcaneus at the same level as the tip of the malleolus.

LI16 - In the depression between the clavico-

acromial extremity and the spine of the scapulae.

ST9 - Posterior to the common carotid artery on the anterior border of M. sternocleidomastoid, lateral to the thyroid cartilage.

S117 - Posterior to the angle of the jaw on the anterior border of M. sternocleidomastoid

GV20 -7 cun above the posterior hairline, midway on a line connecting apex of both ears.

**Figure 4.** Ring of Earth Acupuncture points.

## **Ring of Crystal**

Simulating the Ring of Crystal results in the reduction of free radicals in the body. The Ring of Crystal also appears to enhance natural antioxidant levels or allows the body to produce its own antioxidants. In research done by Dr. Shealy, in just two to three days of stimulation of the Ring of Crystal, free radicals were reduced by 80 percent. In 50 percent of these individuals free radicals were eliminated.<sup>32</sup>

What are free radicals? On the most basic level, going back to physiology 101, we are all made up of atoms. Free radicals are atoms or group of atoms with an odd number (unpaired) of electrons and can be formed when oxygen interacts with certain molecules. Normally bonds do not split in a way that leaves a molecule with an unpaired electron, but when a weak bond splits, free radicals are formed. Free radicals are very unstable, and will quickly react to capture the needed electron for stability.

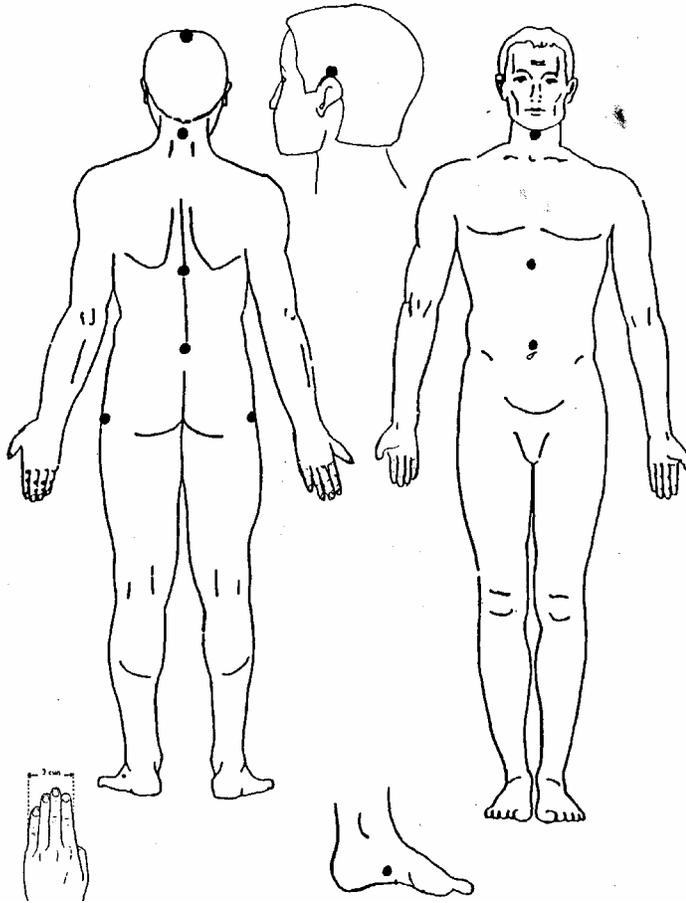
Generally, the free radical molecule looks to the nearest stable molecule to steal an electron. When the stable molecule is attacked, it then becomes a free radical itself, thus creating a chain reaction. The chief danger is that they may react with important cellular components like DNA. The body's normal metabolism, as well as other stressors such as environmental pollutants, radiation, and poor health habits, produces free radicals.<sup>33</sup>

Much has been written about free radicals and use of antioxidants. The most commonly recommended antioxidants are Vitamin A, Vitamin C, Vitamin

E, beta-carotene, flavonoids, glutathione, uric acid, and taurine. These antioxidants in high doses can be harmful. At this time there is no clear consensus on the correct amounts of the dosage. It is best to be mindful of the delicate balance between the production of free radicals and production of antioxidants. The best sources of antioxidants are still found in natural sources such as fresh fruits and vegetables.<sup>34</sup>

The diseases associated with stress exemplify other indications of too many free radicals in the body. They include but are not limited to Alzheimer's disease, myocardial infarction, arteriosclerosis, Parkinson's disease, autoimmune diseases, radiation injury, emphysema, sunburn, glomerular disorders, schizophrenia, sickle cell disease, leukemia, osteoporosis, infertility, cancer, and retinopathy.<sup>35</sup> The accumulation of free radicals and stress is also associated with aging. Therefore, reduction of free radicals could produce increased longevity and healthier tissues and organs.

## Ring of Crystal



SP4 - On the medial aspect of foot, in a depression at the anterior and inferior border of 1<sup>st</sup> metatarsal bone, at the junction of the "red and white" skin.

G1330.5 - 2 cun lateral of greater trochanter to major trochanter, lateral side of upper leg.

CV8.5 - .5 cun? above umbilicus.

GV4.5 - On spinous process of 2<sup>nd</sup> lumbar vertebra.

CV 14.5 - 6.5 cun above the umbilicus

on midline of abdomen.

GV7.5 - On spinous process of 9<sup>th</sup> thoracic vertebra.

GV14.5 - On spinous process of 3<sup>d</sup> cervical vertebra.

CV23 -Midline of neck, midway between tip of the cricoid cartilage and the border of the mandible.

GB 11 -In depression 1 cun posterior of the horizontal line of the auricle.

GV20 -7 cun? above the posterior hairline, midway on a line connecting apex of both ears.

**Figure 5.** Ring of crystal acupuncture points.

With that introduction, you are invited to proceed to Chapter 2, in which a review of the more relevant literature is presented. Chapter 3 presents the research design, while Chapter 4 presents the results. Then Chapter 5 includes a discussion of the analysis and its applications. Chapter 6 then presents a summary and conclusion. There is a bibliography, and five Appendices. Inside the back cover is a compact disk which contains the entire dissertation in electronic form. An electronic copy is also available on the website of Holos University Graduate Seminary, [www.hugs-edu.org](http://www.hugs-edu.org).

*“It is the glorious privilege of academics to know that they are on the track of knowing everything. It is the humble gloom of the practitioner to know that nearly everything remains uncertain and paradoxical*

*---Edward Whitmont*

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## **CHAPTER 2**

### **REVIEW OF LITERATURE**

In this chapter, previous studies in Bioelectrography are described as well as other ongoing scientific studies. The second section describes the GDV and how it is used in evaluations. Ideally it will help the reader understand its function in this study. The last section describes the history of acupuncture and its current applications.

#### **STUDIES AND APPLICATIONS OF GDV BIOELECTROGRAPHY**

The GDV Bioelectrography has a long history of scientific studies conducted in Russia and 21 other countries. Clinical and scientific studies are growing in leaps and bounds. There are several studies in particular worth mentioning. Studies with the GDV can be broken down into four categories: medicine, consciousness studies, sports, as well as material and water testing. The discussion below places the emphasis on medicine.

Dr. Suzanne Gibson's doctoral dissertation for HOLOS Graduate Seminary for the degree of Doctor of Theology in Energy Medicine explored the effect of music and focused meditation on the human energy field. Her

measurement tool was the GDV Technique and the Profile of Mood State. She demonstrated a statistically significant improved mood state using these tools. Her study gave credibility to the use of music and meditation, as well as to the tools used. Music and focused meditation were found to improve and maintain wellness in the human energy field. Dr. Suzanne Gibson concluded: “This study suggest that the GDV technology can measure subtle shifts in the energy field after listening to music and after listening to a focused guided meditation with music. The GDV Area parameter and GDV brightness both increased significantly as a result of the interventions. When the GDV Area increases after an intervention, this is an indication of increased energy emitting from the fingertip. A decrease in anxiety as measured by the GDV indicates a calming of the energy field, which is an important quality for immune system enhancement.”<sup>1</sup>

Dr. Nancy Rizzo Roberts conducted a very interesting study which compared the MSA 21 to the GDV Technique. Real acupressure points were compared to a sham treatment to determine the shift in the human energy field. Again, there was a statistically valid shift in the human energy field when real acupressure points were administered. As a result of her research, it was confirmed that the GDV is useful in conducting a comprehensive meridian assessment as well as validating ways to achieve a healthier energetic balance. She observed the following with use of the GDV: it offers an opportunity to screen and monitor energy-entropy homeostasis for the whole organism or separate functions of organs and systems; it is non-invasive, deriving the data

from only the extremities; it utilizes non-linear mathematical methods for processing of fractal images to evaluate the data; and it gives direct visualization of results for interpretation, and convenience of storing the data for longitudinal analysis and processing. She, too, is a graduate of HOLOS Graduate Seminary.<sup>2</sup>

An International Scientific Congress is held every year in Russia at the St. Petersburg University. Topics presented include applications of GDV Bioelectrography in medicine, consciousness studies, sports, and engineering. The newest studies for that year are presented at the conference.

The BEO-GDV technique has enormous potential in the area of medicine. In one of Dr. Korotkov's conference, he stated that many European physicians utilized the GDV as a screening tool to determine which invasive tests are needed to diagnose patients. Every physical organ and every function of the mind body has an effect on the human energy field. A skilled technician can read the field of energy around the fingers and determine where the malfunction is surfacing, before the physical symptoms become evident. The BEO-GDV camera was officially registered in Russia as a certified medical device.<sup>3</sup>

Many universities are currently doing research with the BEO-GDV camera. In depth studies are beginning to surface in places like St. Petersburg State Pavlow Medical University, St. Petersburg Academy of Medico-Social Management, Rostov Research Institute of Obstetrics and Pediatrics, Academy of Space Science, and State Oncological Center of Georgia. Twenty-one countries are utilizing the GDV technique in Complementary and Alternative Medicine to include the United States. Several people have done academic investigation and

research on aspects of the GDV sciences and techniques that have resulted in a Ph.D.<sup>4</sup>

A study done by R. Alexandrova, G. Fedoseev, K. Korotkov, N. Philippova, S. Zayzev, M. Magidov, and I. Petrovsky, titled “Analysis of the Bioelectrograms of Bronchial Asthma Patients,” presented a practical medical application of the gas discharge (GDV) Bioelectrography. They specifically compared patients with bronchial asthma with healthy individuals. Their study showed how the GDV Bioelectrography techniques and software analysis could enrich and expand the medical practice in clinical assessment tools beyond present diagnostic modalities.<sup>5</sup>

Another study, “Health quality evaluation on the basis of GDV parameters” by P. Bundzen and K. Korotkov, was a study of healthy individuals. It provides a good discussion on the many parameters available to determine health indices.<sup>6</sup> More studies of this nature are needed to establish the normal range of parameters for other researches to compare disease entities.

## **DESCRIPTION OF THE GDV**

In recent years, gas discharge visualization (GDV) technique has been developed as a scientific tool by Dr. Konstantin Korotkov to study the mind-body function by reading the human energetic field. His instrument has been used in the application and many research studies in complementary and alternative

medicine diagnostics, consciousness studies, sports, as well as material and water testing in Russia and other countries.

What is the GDV camera by Dr. Korotkov? It is an instrument tool that measures the distribution of energy levels of biological objects. The GDV camera works by using a special electrode system that creates a high intensity electric field around an object, which produces a gas discharge, whose glow is the result of the discharge of photons and electrons on a dielectric plate. Data collected has lead to naming the GDV process as Biological Emission and Optical radiation, stimulated by electromagnetic field, amplified by Gas Discharge with Visualization through computer data processing (BEO-GDV). This process can be described as follows:

“1. The subject is placed on a dielectric plate; 2. A transparent conductive grid of special design is applied to reverse side of this plate. Voltage impulses are then applied by the generator of electromagnetic field (EMF) between the subject and the dielectric plate.” This burst of electrons and photons develops into the subject’s emission. The video signals are recorded into GDV grams or AVI files in the computer. It is a specialized software complex with possible calculations of 30 different parameters.<sup>7</sup>

The BEO-GDV analysis has been shown to be useful in determining the following information: (quote from *Human Energy Field: Study with GDV Bioelectrography*)

1. Analysis of the psycho emotional state and psycho physiological potential of an individual.
2. Assessment of the energy state of systems and organs according to both Eastern and Western medicine.

3. Analysis of the health quality and level of anxiety.
4. Monitoring of patient's reaction to various interventions, such as: medical treatments, medications, etc.
5. Analysis of dynamics of energy state under the influence of specially designed test loads.
6. Effects of homeopathy, wave therapy and low-intensity treatments.
7. Investigation of the influence of one or more people upon one another.
8. Selection of optimal times of day for a specific individual to receive medications and treatments.<sup>8</sup>

Mastering the challenge of acquiring the data accurately for scientific studies is a must for optimal results. Attention must be placed on subtle reproducibility. As described in Dr. Korotkov's book, to insure proper results the following steps must be followed: correct positioning of the finger; correct angle of the elbow; clean fingers for minimal sweat on the glass, to avoid skewing the results; lightness or heaviness of touch; and correctly setting the range and exposure of the GDV camera.<sup>9</sup>

The tool enables a quantitative data analysis of the fingertips. This measurement of the fingertips can then be depicted in a BEO gram – a graphic representation of the sector analysis of zones defined around each fingertip. The design was modeled after the Su jok system. Professor Dr. Jae Woo Park of Korea developed the acupuncture system in which the hands and feet result in the corresponding field around the body. Su jok literally mean “hand and foot.”<sup>10</sup>

Figure 6 shows an example of the ten fingers and the corresponding body system. The fingers can then be displayed on a graph showing the field around the body as seen in Figure 7 and 8. A discussion of acupuncture is done later in Chapter Two.

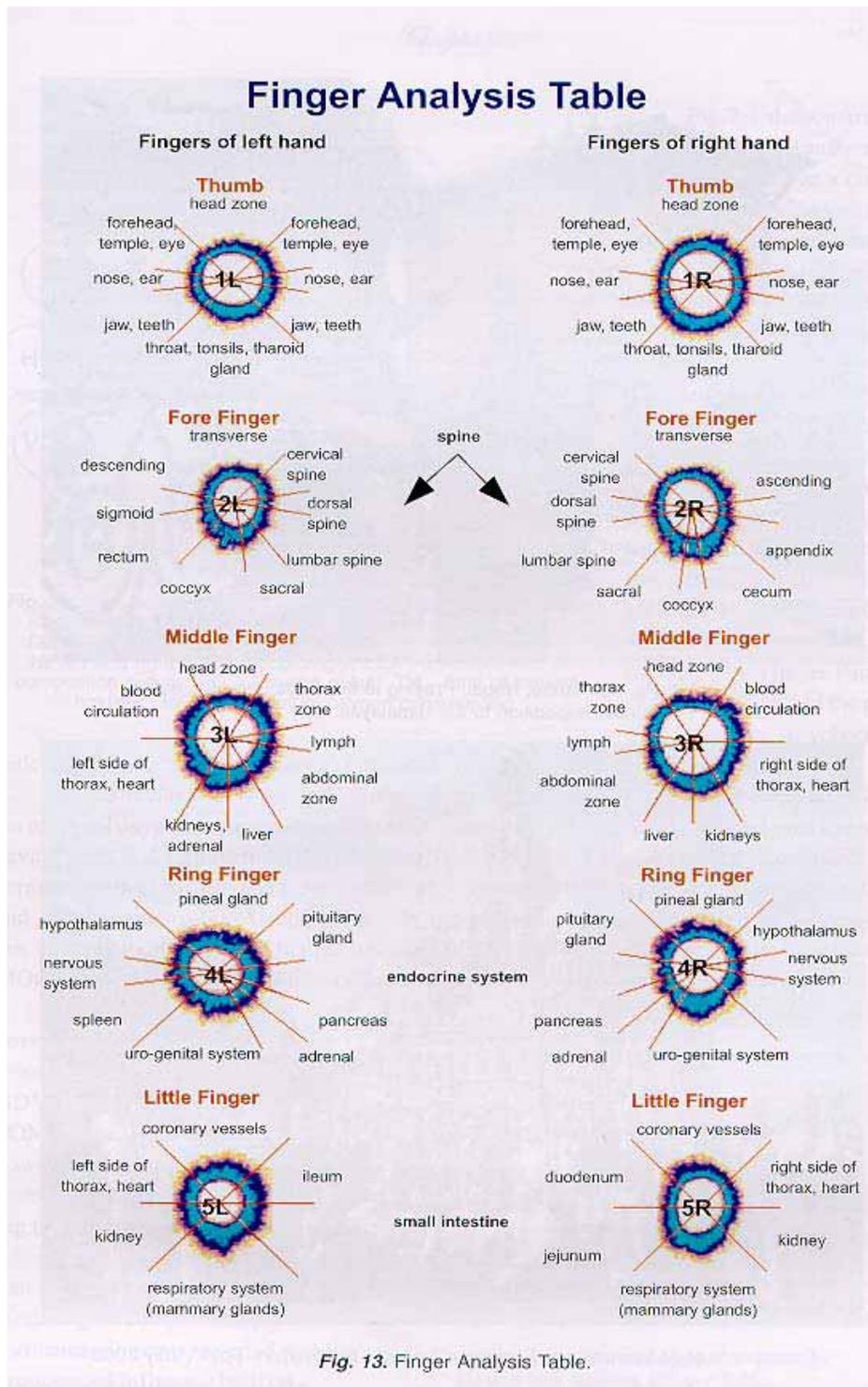
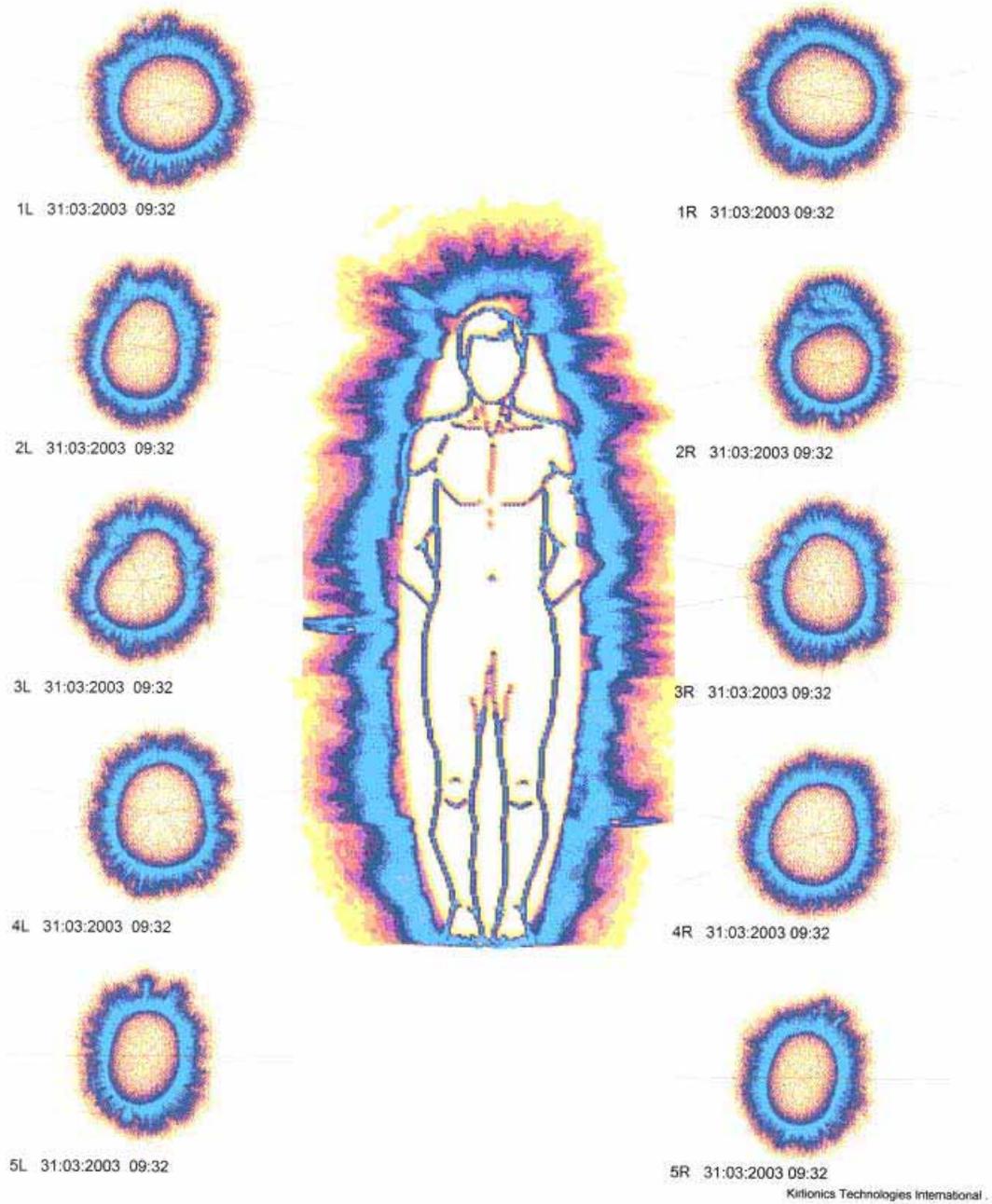
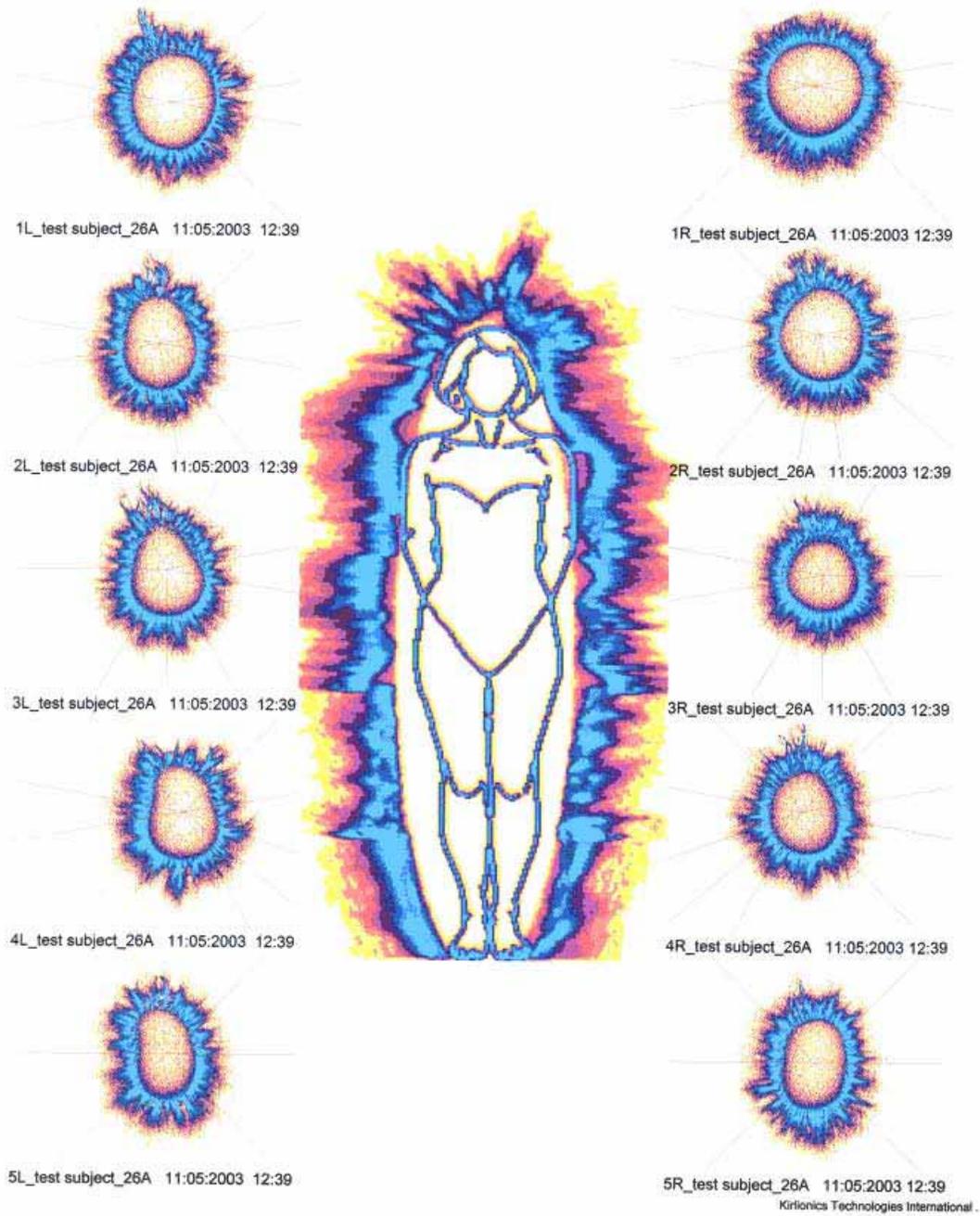


Fig. 13. Finger Analysis Table.

**Figure 6.** Taken from the book *Human Energy Field: Study with GDV Bioelectrography*. It shows the fingertips and the related body organs and systems.



**Figure 7.** Example of fingertips capture of a male and the corresponding field around the body.



**Figure 8.** This is an example of a fingertip capture of a female volunteer and the corresponding field around the body.

During three conferences presented by Dr. Korotkov and attended by the researcher, the importance was emphasized of first recording all ten fingertips without a filter, followed by recording with a filter in the GDV capture program. Depending on the goal of the exam, i.e. psycho-physical or only physical, one can then choose which set of GDV-grams to evaluate.

This raises the question of what does "with" or "without" a filter mean? The use of the filter eliminates the problem of perspiration. Any material placed on the glass would create an additional dielectric change in the plate. Through numerous experiments, a special plastic was determined to be the best filter to use. It is a well-known fact that perspiration is an activity of the sympathetic nervous system. Therefore, it has been determined through studies by Dr. Korotkov that to analyze the psycho-physiological field, you take the GDV-grams without the filter. To remove the psychological, you would then measure with a filter.

Dr. Korotkov and his colleagues concluded that the filter distinguishes between the activity of the sympathetic and parasympathetic nervous system. The studies in Russia concluded that measurements without the filter represent the sympathetic nervous system and the parasympathetic nervous system is represented with measurements with the filter.<sup>11</sup>

As a review, we will now briefly discuss the difference between the sympathetic and parasympathetic nervous system.

“The autonomic nervous system is composed of two opposing systems—the sympathetic or adrenergic nervous system, and the parasympathetic or

cholinergic system. If the sympathetic nervous system speeds the heart up, the parasympathetic nervous system will slow it down. If the sympathetic nervous system bronchodilates, the parasympathetic nervous system bronchoconstricts. One might compare it to the proverbial tug-of-war—one pulling to the left, the other pulling to the right to maintain a ‘middle-of-the-road’ homeostasis. For the routine day-to-day activities the parasympathetic nervous system predominates. Should a stressful event enter that routine, the sympathetic nervous system will kick into gear, and give the needed acceleration to the system. Once the stressful situation has been resolved, the parasympathetic system takes over again.”<sup>12</sup>

“How do these opposing systems perform their functions? The two systems have specific messengers, known as neurotransmitters, and these neurotransmitters must interact with specialized receptors on target tissues. The sympathetic nervous system uses neurotransmitters known as catecholamines. The three catecholamines are dopamine (DA), norepinephrine (NOR), and epinephrine (EPI). Digression: The oh-so British name for epinephrine is adrenalin; hence the ‘nickname’ for the sympathetic nervous system is ‘adrenergic’. The parasympathetic nervous system uses the neurotransmitter acetylcholine (ACh); hence the term cholinergic nervous system.”<sup>13</sup>

“The catecholamines interact with specialized receptors on target tissues. Dopamine interacts with dopamine receptors, of which there are 4 types. Norepinephrine and epinephrine interact with receptors known as alpha and beta. There are two types of alpha receptors and two types of beta receptors, cleverly known as alpha-one ( $\alpha_1$ ), alpha-two ( $\alpha_2$ ), beta-one ( $\beta_1$ ), and beta-two ( $\beta_2$ ). Alpha

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receptors and beta receptors are located on numerous target tissues throughout the body. For example, alpha-one receptors are located on the smooth muscle lining the peripheral arterioles. When norepinephrine interacts with alpha-one receptors, the smooth muscle contracts and the arteriole vasoconstricts. This results in a rise in blood pressure due to peripheral vasoconstriction. When epinephrine interacts with beta-one receptors on the SA node of the heart, the heart rate accelerates. When epinephrine interacts with beta-two receptors on the bronchioles, the bronchioles will dilate. Acetylcholine, the neurotransmitter of the parasympathetic nervous system, interacts with another set of receptors—muscarinic and nicotinic. Similar to the receptors for the adrenergic nervous system, the muscarinic and nicotinic receptors are also located on target tissues. When acetylcholine interacts with the muscarinic receptors on the bowel wall, peristalsis will commence. When acetylcholine interacts with receptors on the SA node, the heart rate slows.”<sup>14</sup>

As stated earlier, perspiration is an action of the sympathetic or adrenergic nervous system. As a result our skin carries significant importance in the interpretation of the BEO-grams about the client’s condition.

Another interesting component of the GDV-grams is the importance of the left and right hand correlation. The left hand represents the right side of the brain and right hand represents the left hemisphere activity in the BEO grams. It is a well known fact that the right hemisphere of our brain is responsible for our creativity, intuition, imagination, and a holistic comprehension of the world. And, that the left hemisphere is responsible for logic, speech, and objectivity. Other

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findings from the studies indicate the right hand represents the right side organs and the left hand represents the left side organs. This information becomes very important with the evaluation of the fingertip readings. Special attention needs to be paid to readings when the left hand and right hand are different.<sup>15</sup>

A researcher who uses the GDV for analysis of the energy field on a regular basis found early kidney cancer in her father. Repeated tests showed inconsistencies in the right hand and left hand specifically in the kidney sector. A more thorough investigation with traditional MRI and Cat scans revealed early kidney cancer without symptoms. Use of the GVD-BEO grams resulted in early detection of a curable disease process.

This study does not compare each sector within the diagram; however, these would be interesting and desirable studies in the future. It is mentioned here to alert the reader that the GDV-BEO grams have a multitude of possible variations for analysis that can be geared to the practitioner's individual needs.

The GDV software program also uses a circle graph or diagram to summarize each hand and identifies the correlating organs and systems in the body. The two circle graphs representing the right and left hand are based on the measurements of the ten fingers. See Figure 9 for an example. The circle graphs correspond to the left and right side of the body (figure 6).

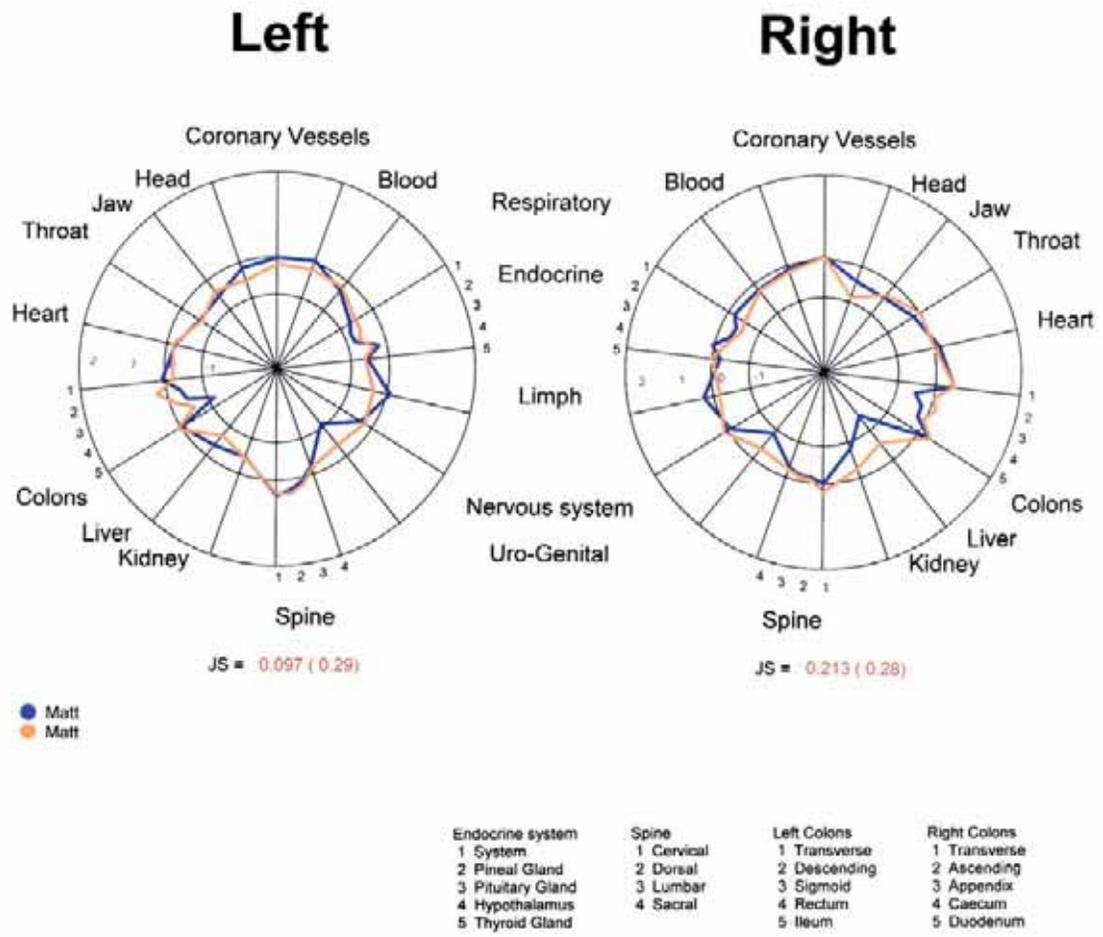
Each circle contains three rings. The outer circle reflects an excess amount of energy, the inner circle reflects low energy, and the center circle reflects normal range for optimum health. The sectors reflect the corresponding

parameter of each organ or system. They are plotted in relationship to the normal values for each sector.<sup>16</sup>

The JS-integer represents the integration of the fractal coefficient over the area for each meridian sector measured per finger. The balanced state is seen in the range of JS values from -0.6 to + 1.0. This range is considered a good health index. It is the measure of the deviation of the data from the GDV-grams as compared to the ideal condition. The coefficient characterizes the condition of the corresponding organ. A comparison is made between the right and left sides of the body to assess the symmetry of the measurement.<sup>17</sup> With repeated testings small deviations are considered normal, associated with subtle normal changes in the human energy field. The pre-treatment numbers are compared to the post-treatment numbers in this study to detect a change in the energy field after stimulation of the acupuncture points. The circle diagrams will allow up to six measurements to be displayed on top of each other at one time (see Figure 9).

Other parameters that can be calculated by the GDV are the following: Form coefficient, fractal dimension, length of median, beta coefficient, area S, and an S/Soval inner. Any or all of these can be used in the analysis of data. Figure 9 gives an example of the diagram of the JS integer, which was used for analysis to compare the rings and control ring before and after stimulation.

## Diagram / JS Integer



Kirionics Technologies International .

**Figure 9.** GDV diagram of one of volunteers in study. The blue ring is the before stimulation and the red ring is the reading after stimulation.

## **PURPOSE OF ACUPUNCTURE**

Acupuncture is based on the concept that certain channels called meridians extend internally throughout the body in a fixed network. There are 365 points on the skin where the meridians emerge on the surface. Insertion of needles into strategic points in the body is designed to diminish an “abundance” or excess or to replenish a “deficiency,” depending on a particular need of a person. Hence, the puncture points may be considered the “gate keepers” for their affected meridians and organs.

Acupuncture is traditionally the insertion of tiny needles at specific points on the body known to have a desired effect. Stimulation of acupuncture points treats distal regions of the body. Each internal organ is in close affinity with its own spots or points on the skin, including the head and limbs. Insertion of the needles in these respective points is said to exert stimulating or equalizing effect. They will restore order and harmonious balance within the disturbed energy of the body, better known as the Yin and Yang. The application goes back to ancient times.<sup>18</sup>

For optimum health, we must maintain and harmonize all the pathways within the body systems. Acupuncture treatments harmonize the Qi flow within the acupuncture meridians. Being in tune with life indicates the Qi within the acupuncture meridians is also flowing smoothly. We might think of acupuncture treatments as one way to assist us in staying in tune with the flow of our life, as well as balancing the yin and yang within.

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One of the basic purposes of acupuncture is to move Qi or Chi throughout the body. Stagnation of Qi or Chi over a period of time usually leads to an undesirable condition. Many Chinese acupuncture texts teach that Qi or Chi flowing smoothly throughout all of the acupuncture meridians is an indication that one is in good health. If our Qi or Chi channels are open, harmonious, and strong, then it is much more difficult for exogenous or endogenous pathogens to take hold within any of our body systems.<sup>19</sup>

James Oschman, Ph.D., describes the meridian system, which acupuncture theory visualizes as branching into every part of the organism and, therefore, into the interior of every cell in the body. Meridians are main channels of transmission. His hypothesis is as follows: “Every part of the body, including all of the molecules so thoroughly studied by modern science, as well as the acupuncture meridians of traditional East Asian or Oriental medicine, forms a continuously interconnected semiconductor electronic network. Each component of the organism, even the smallest part, is immersed in, and generates, a constant stream of vibratory information. This is information about all the activities taking place everywhere in the body. Complete health corresponds to total interconnection. Accumulated physical and or emotional trauma impairs the connections (Oschman & Oschman 1995). When this happens, the body’s defense and repair systems become impaired and disease has a chance to take hold. Acupuncture and other energy therapies restore and balance the vibratory circuitry, with obvious and profound benefits. The body’s defense and repair systems are able to repair themselves. Many individuals, both scientists and

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therapist, have contributed valuable insights to this emerging picture of how the body functions in health and disease. Phenomena that previously seemed disconnected and unrelated are now complementing one another, giving us a more complete understanding than we could have obtained by any single approach.”<sup>20</sup>

Robert O. Becker, M.D., in his book *The Body Electric: Electromagnetism and the Foundation of Life*, suggests that acupuncture meridians are electrical conductors that carry an injury message to the brain, which responds by sending back the appropriate level of direct current to stimulate healing in the troubled area.<sup>21</sup> His studies showed that the meridian’s electroconductivity was significantly higher compared to non-meridian regions of the skin. Becker considered the acupuncture meridians as direct current (DC) communication channels, transducers for pain and regeneration, and the acupuncture sites as amplifier stations.<sup>22</sup>

Often acupuncture has been used for analgesia. It is indeed effective in treating pain. It works 70 to 80% of the time, far greater than placebo, which has only about 30% efficacy. The neurological mechanisms are becoming apparent. Acupuncture activates small myelinated nerve fibers in the muscle that send impulses to the spinal cord. From there, three centers are activated to cause analgesia: the spinal cord, midbrain, and pituitary-hypothalamus.<sup>23</sup>

The genesis of the complex acupuncture system is unknown. Various theories have from time to time been presented to explain its development. There

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are literally hundreds of acupuncture points, each with multiple functions. With this organization of complex meridian pathways, it lends itself to the notion that this system came to us from a higher source.<sup>24</sup> An understanding of acupuncture in terms of Western science would undoubtedly help build a bridge to mainstream medicine and increase its acceptance.

In this chapter we have addressed the functioning of the GDV and its many uses, as well as a brief history and explanation of acupuncture and its application in today's world. An in-depth look of how each acupuncture point works is another opportunity for study and analysis in another paper. We have begun to explore the application of complementary alternative modalities in combination with conventional medicine. Now that we have laid the groundwork by introducing the GDV camera and the theory behind acupuncture, we can move on to describe the experiment.

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24. Ibid, 1-34.

## **CHAPTER 3**

### **RESEARCH DESIGN**

In this chapter guides the reader into a visualization of how the research design was developed and followed, and describe in detail the process of the experiment. The types of subjects are described, as well as criteria for the inclusion or exclusion from the study.

#### **STUDY DESIGN, METHODS, AND TECHNIQUES**

The object of this dissertation show any change in the human energy field of the subjects after administration on each of the five rings after a one time stimulation. The GDV camera was the assessment tool to determine the change in the human energy field. The researcher provided a quiet, comfortable room that insured privacy for the testing. The researcher responded to all subjects in a polite and calm manner.

Each participant was asked to read and sign the consent form for research at the initial visit. The health questionnaire and Symptom Index, described in the appendix, were administered to determine the health status prior to beginning the study. The participant sat in a chair in front of the GDV camera for the interview.

The researcher clarified any questions that arose as a result of the initial interview or at any time later in the study.

Participants were not encouraged to wash their hands prior to the study. If a volunteer did wash his hands, the experimenter waited fifteen minutes before the actual measurements were taken. Both locations for collecting data were in an air-conditioned room with a constant temperature of 72 degrees, and participants were indoors for at least 15 minutes before taking the GDV grams.

For the pre test or baseline, each fingertip was placed onto the dielectric plate touching the lens for a recording. A cover over the fingertip restricted any light from entering the field. The fingertips of the right hand were measured first. Each fingertip was placed on the dielectric plate, beginning with the thumb and ending with the little finger. The same process was repeated with the left hand. The measurements were taken without a filter and with a filter. After the baseline of the GDV was measured, the participant then was asked to lie down on the patient examination table.

Electrodes were held in place with Velcro closures at each acupuncture point. The sponges inside each electrode were wet with water. The SheLi Tens Stimulator device was then used to stimulate the acupuncture points of a specific ring for 5 minutes each. The electrodes for each acupuncture point were attached to each point for five minutes. The one exception was GV20, located on the top of the head. This point was connected for the entire stimulation of the experiment. The participants were placed on a massage table for comfort during the stimulation of acupuncture points and sham points.

Only one ring was administered on a given day for each volunteer. The order of the administration of the rings was random for all participants. The control of non-acupuncture points was administered randomly also. The participant was asked to return for a different ring to be administered and tested once every week. The distance of one week was to preclude any confounding effects of the previous stimulation in the study. Ideally, they would be able to return at the same time each day for testing. However, for many participants that was not possible; however, for the majority of participants the same time was accommodated. Past studies with the GDV state that it is best to test participants at the same time and same conditions for consistent and accurate results of the energy field.

After all the electrodes are removed, the energy field was again tested using the GDV, following the same technique as the baseline. The time interval for the post measurements of the GDV was 20 minutes. Previous research has suggested that after a stimulus has been applied, the human energy field changes with time. Based on verbal information given by others in previous studies on the human energy field, the researcher used 20 minutes as the optimal time to detect a change in the electromagnetic field from the baseline test. There was not any change in technique implemented or otherwise deviated from this protocol during the study.

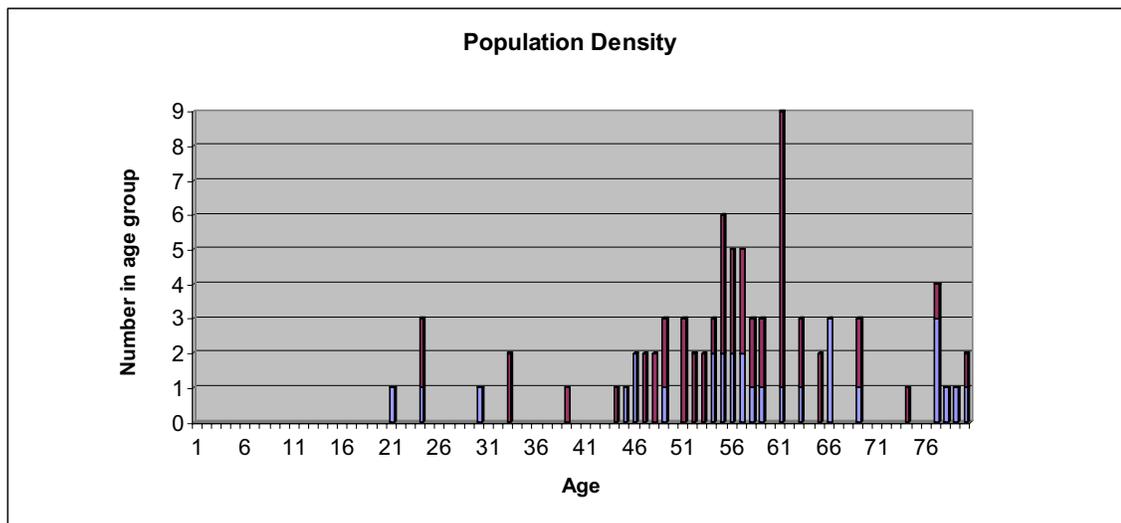
## **SUBJECTS**

All subjects were volunteers. Eighty clinically healthy individuals, ranging from age 21 to 80 years of age were available for testing. Sixty of the participants were in the age range of 45 to 65; however, there were a few subjects in the twenties, thirties, seventies, and eighties. Twenty-three of the volunteers were male and fifty-seven were female. There was a variety of educational background. It ranges from high school level to PhD. See figure 3.1 for a graph showing the age range.

Not all of the subjects completed the whole set of six tests. Sixty-one participants completed the Ring of Fire and control test. Fifty-nine participants completed Ring of Water. Fifty-seven completed Ring of Earth. Fifty-six completed the Ring of Air, and fifty-five participants completed the Ring of Crystal. Over 30 subjects completed the whole set of the five rings and a set of sham points.

Flyers were placed in public places to call for volunteers in the study. However, the majority of volunteers were derived by word of mouth. They generally would call themselves metaphysical and were interested in the human energy field.

## Age Range of Volunteers



**Figure 10.** There were 80 volunteers. Twenty-three were male. Fifty-seven were female. The blue bar represents the volunteers in Murphy/Hayesville, North Carolina and the maroon bar represents the volunteers in Oak Ridge/Knoxville, Tennessee.

The study ran for ten weeks consecutively. The major incentive to follow through the entire set rose from the reward system. Each participant was given a copy of his or her field before and after without the filter for each test. A few of the subjects dropped out of the study due to work issues or other stressors in their life that required their time.

Each subject was given a personal history questionnaire and Symptom Index to determine their health status prior to beginning the study (See appendices C and D). This allowed the researcher to ask any questions about their health prior to the testing. The principal investigator reviewed the medical history and Symptom Index to determine if there were any contraindications for the testing of the acupuncture points with the SheLi TENS stimulator or use of the GDV device

on the individual. Any health issues were discussed at the first meeting with each subject.

Contraindications for the study were:

- Cardio-vascular system diseases in decomposition phase
- Bleedings or tendencies to bleedings
- Epilepsy with frequent attacks, hysteria with poor convulsive attacks, psychosis with psychomotor excitation phenomena
- Skin sensitivity disorders
- Acute disturbance of cerebral circulation
- Heightened sensitivity to ionized air, presence of implanted stimulators (cardio stimulators, pacemakers, etc.)
- Pregnancy

The appendix lists the questionnaire for the participants. It helped the researcher determine any possible pre existing health issues both pre and post testing. All information is strictly confidential and the files are secured. Two laboratories were set up for testing. Both places were air-conditioned and provided privacy to work. The Hayesville/Murphy, North Carolina, volunteers were assigned numbers ranging from 101 to 199. The Oak Ridge/Knoxville, Tennessee, group was assigned numbers 200 to 299. The same number was kept for each subject for the entire testing of the different sessions.

A post interview was conducted by telephone to most of the volunteers three weeks later. It subjectively reflected that many of the subjects felt more balanced and energetic. Five of the participants reported that they felt the need to

take fewer vitamins and supplements during the study. Four of the subjects liked the experiment well enough that they ordered their own SheLi TENS unit for use on a regular basis. Approximately one third could feel no difference at all. Very few could remember which ring they liked the best. The entire group verbalized they enjoyed the experience very much.

The collection of data was a long and tedious process; however, the delight was in getting to know the volunteers as individuals, having spent approximately seven hours with each one. The experimenter began to realize the multiple variations in the human energy field that can be displayed as a group and as individuals from week to week. Subjectively all participants expressed appreciation in participation in the study. They found the information and the copies of their energy field interesting as well as useful information. Everyone found the data fascinating and wanted to know more about how to interpret them.

## **CHAPTER FOUR**

### **DATA ANALYSIS**

The data in this chapter reflects a moment in time for each individual before and after stimulation of a specific ring. In this study the left and right hand before and after stimulation were used in the analysis. A statistically significant change is defined as  $p > .05$ .

The first set of data to be discussed is the paired t-test in which the JS integer for the right and left hand before stimulation were compared to the right and left hand after stimulation. The data will reflect each ring separately. Each ring and control group will be discussed and diagrammed with tables and graphs.

In addition, bar graphs of all the rings plus control group together will demonstrate the variation in the electromagnetic field from one set to the other using the data measurements of the GDV.

For further explanation of the change in the energy field, scatter graphs made using the Excel program will show that the farther the magnetic field was from the normal balanced point, the more the electromagnetic field changed toward the average following stimulation of the acupuncture points. The closer the electromagnetic field was to normal values before stimulation, the less it changed following stimulation. This set of analysis was to determine if the

electromagnetic field that was outside the “normal value” would move toward the normal (-0.06 to 1.0) after stimulation of the acupuncture points. These graphs portray the “least best square fit.”

Before we look at the graphs, following is a summary of the conclusions for each of the rings in which the GDV measurements are used in a paired t-test which compares the JS integer of the right and left hand before stimulation to the right and left hand after stimulation. The p value represents the measure of change in the measured electromagnetic field:

Conclusion for the Ring of Water:

Repeated measures t-tests showed that there were statistically significant increases from pre to post test on the left and right hands without the filter ( $p=.013$  and  $p<.001$ , respectively), but neither hand showed a corresponding change from pre to post test with the filter ( $p=.775$  and  $p=.496$ ).

Conclusion for the Ring of Fire:

Repeated measures t-tests showed that there were minute changes in mean results from pre to post test on the left and right hands with and without the filter, but the changes were too small to be statistically significant ( $p>.05$ ).

Conclusion for the Ring of Crystal:

Repeated measures t-tests showed that there were statistically significant increases from pre to post test on the left and right hands without the filter ( $p=.02$ ; and  $p=.004$ , respectively) and on the left hand with the filter ( $p=.05$ ). However, no difference was shown from pretest to posttest for the right hand with filter.

Conclusion for the Ring of Earth:

Repeated measures t-tests show that there were statistically significant increases from pre to post test on the left and right hands without the filter ( $p<.001$ ,  $p=.023$ ), and on the right hand with the filter ( $p=.005$ ). However, no significant change was shown from pretest to posttest for the left hand with filter.

Conclusion for the Ring of Air:

Repeated measures t-tests show that there were statistically significant increases from pre to post test on the left and right hands without the filter ( $p < .001$ ; and  $p < .001$ , respectively). However, no significant change was shown from pretest to posttest for the right or left hand with filter.

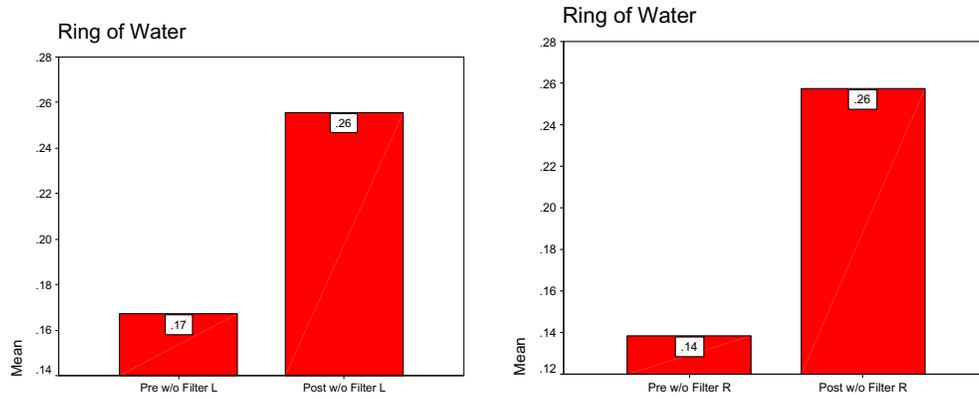
Conclusion for the Control Group:

Repeated measures t-tests show that there were no statically significant increases from the pre to post test on the left and right hands without or with a filter.

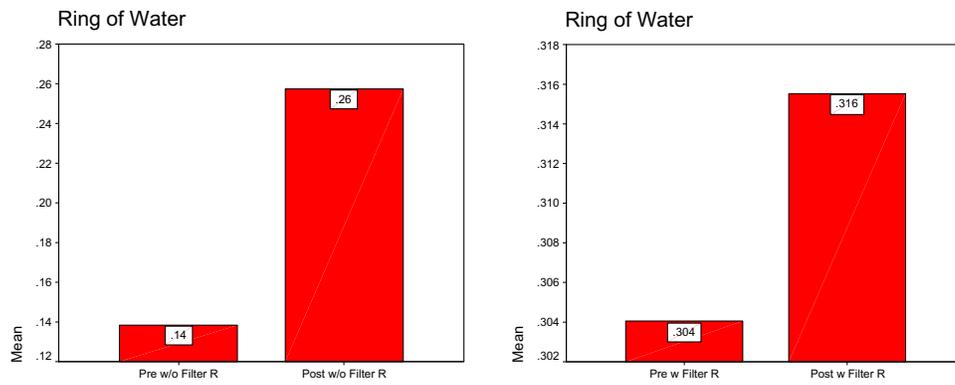
The exact statistical change is listed after each set of graphs and sample analysis. The appendix shows the JS integer numbers and standard deviations for each ring. The last set of graphs show a comparison of all of the rings at once for each hand with their respective variations. Below in Table 1 is a summary of the data presented in the paired t-tests previously discussed.

	Left hand Without filter	Right hand Without filter	Left hand With filter	Right hand With filter
Ring of Water	Yes $p = .013$	Yes $p < .001$	No	No
Ring of Fire	No	No	No	No
Ring of Crystal	Yes $p = .02$	Yes $p = .004$	Yes $p = .05$	No
Ring of Earth	Yes $p < .001$	Yes $p = .023$	No	Yes $p = .005$
Ring of Air	Yes $p < .001$	Yes $< .001$	No	No
Control	No	No	No	No

**Table 1.** This is an overview of the data analysis in the paired t-test.



**Figure 11.** Ring of Water without filter left and right hand



**Figure 12.** Ring of Water with filter left and right hand

Be aware that the beginning vertical axis numbers vary from bar graph to bar graph in this set as well as all the other sets that follow.

**Paired Samples Statistics**

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest w/o Filter Left	.16715	60	.348755	.045024
	Post w/o Filter Left	.25573	60	.299767	.038700
Pair 2	Pretest w/o Filter Right	.13862	60	.342010	.044153
	Post w/o Filter Right	.25758	60	.271516	.035053
Pair 3	Pretest w Filter Left	.3389	60	.25673	.03314
	Post test w Filter Left	.3333	60	.21761	.02809
Pair 4	Pretest w Filter Right	.30403	60	.260586	.033642
	Post test w Filter Right	.31553	60	.247334	.031931

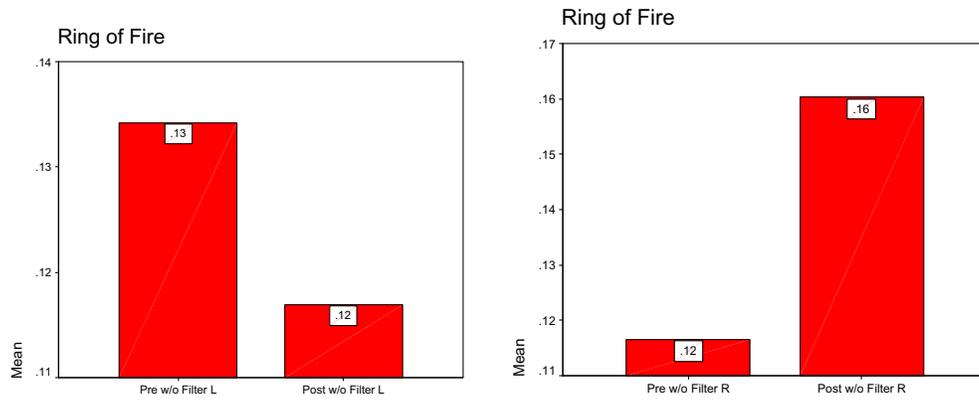
**Table 2.** Paired Sample Statistics for Ring of Water

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest w/o Filter Left - Post w/o Filter Left	-.08858	.266702	.034431	-.15748	-.01969	-2.573	59	.013
Pair 2	Pretest w/o Filter Right - Post w/o Filter Right	-.11897	.234246	.030241	-.17948	-.05845	-3.934	59	.000
Pair 3	Pretest w Filter Left - Post test w Filter Left	.0055	.14922	.01926	-.0330	.0441	.287	59	.775
Pair 4	Pretest w Filter Right - Post test w Filter Right	-.01150	.130166	.016804	-.04513	.02213	-.684	59	.496

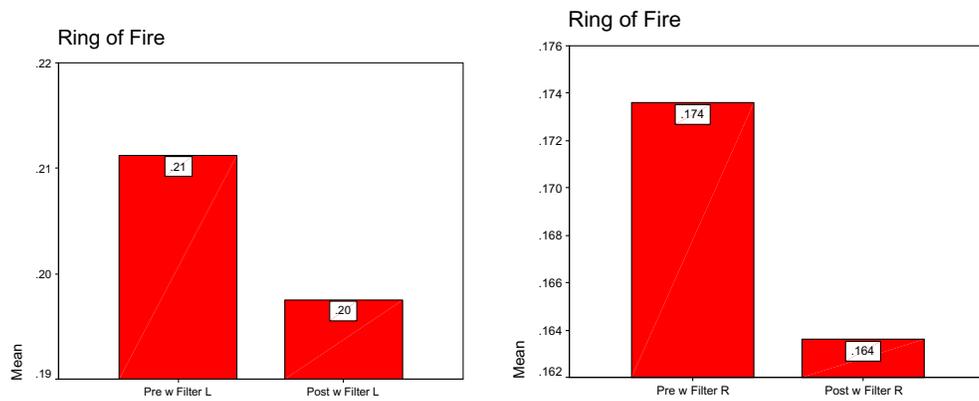
**Table 3.** Paired Samples test for Ring of Water

Statistical Conclusion for the Ring of Water:

Repeated measures t-tests showed that there were statistically significant increases from pre to post test on the left and right hands without the filter ( $p=.013$  and  $p<.001$ , respectively), but neither hand showed a corresponding change from pre to post test with the filter ( $p=.775$  and  $p=.496$ ).



**Figure 13.** Ring of Fire without filter right and left hand



**Figure 14.** Ring of Fire with filter right and left hand

**Paired Samples Statistics**

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest w/o Filter Left	.13420	61	.337806	.043252
	Post w/o Filter Left	.11692	61	.308038	.039440
Pair 2	Pretest w/o Filter Right	.11652	61	.343320	.043958
	Post w/o Filter Right	.16026	61	.293311	.037555
Pair 3	Pretest w Filter Left	.2112	61	.32403	.04149
	Post test w Filter Left	.1975	61	.24716	.03165
Pair 4	Pretest w Filter Right	.17359	61	.238980	.030598
	Post test w Filter Right	.16359	61	.259087	.033173

**Table 4.** Paired Sampled Statistics Ring of Fire

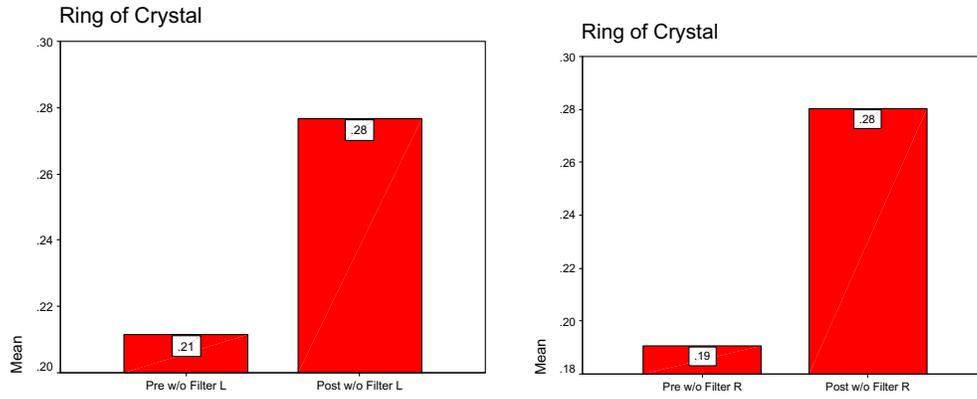
**Paired Samples Test**

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest w/o Filter Left - Post w/o Filter Left	.01728	.363245	.046509	-.07575	.11031	.372	60	.712
Pair 2	Pretest w/o Filter Right - Post w/o Filter Right	-.04374	.340352	.043578	-.13091	.04343	-1.004	60	.320
Pair 3	Pretest w Filter Left - Post test w Filter Left	.0137	.21381	.02738	-.0411	.0685	.501	60	.618
Pair 4	Pretest w Filter Right - Post test w Filter Right	.01000	.168159	.021531	-.03307	.05307	.464	60	.644

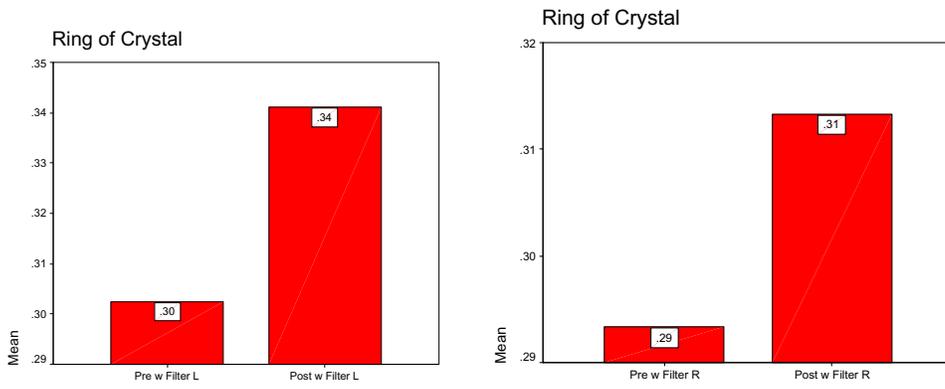
**Table 5.** Paired Sample Test for Ring of Fire

Statistical Conclusion for Ring of Fire

Repeated measures t-tests showed that there were minute changes in mean results from pre to post test on the left and right hands with and without the filter, but the changes were too small to be statistically significant ( $p > .05$ ).



**Figure 15.** Ring of Crystal without filter left and right hand



**Figure 16.** Ring of Crystal with filter for left and right hand

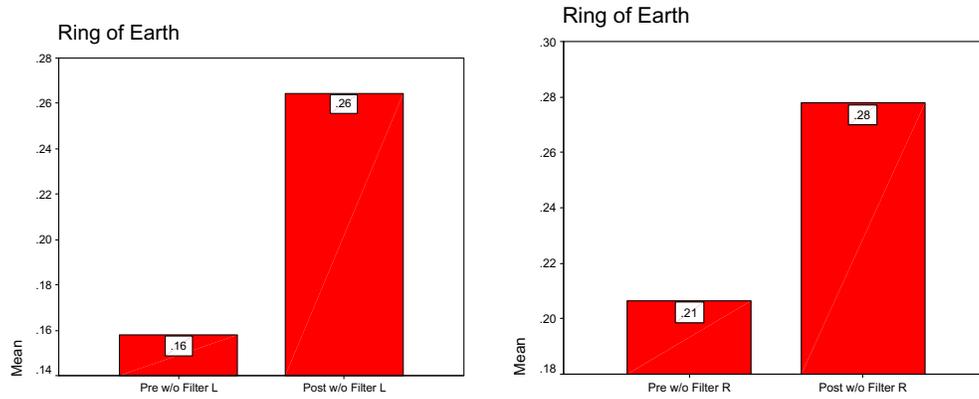
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest w/o Filter Left	.21146	56	.298731	.039920
	Post w/o Filter Left	.27670	56	.300246	.040122
Pair 2	Pretest w/o Filter Right	.19079	56	.350148	.046791
	Post w/o Filter Right	.28036	56	.292879	.039138
Pair 3	Pretest w Filter Left	.3025	56	.23654	.03161
	Post test w Filter Left	.3411	56	.22399	.02993
Pair 4	Pretest w Filter Right	.29336	56	.213980	.028594
	Post test w Filter Right	.31332	56	.213591	.028542

**Table 6.** Paired Sample Statistics for Ring of Crystal

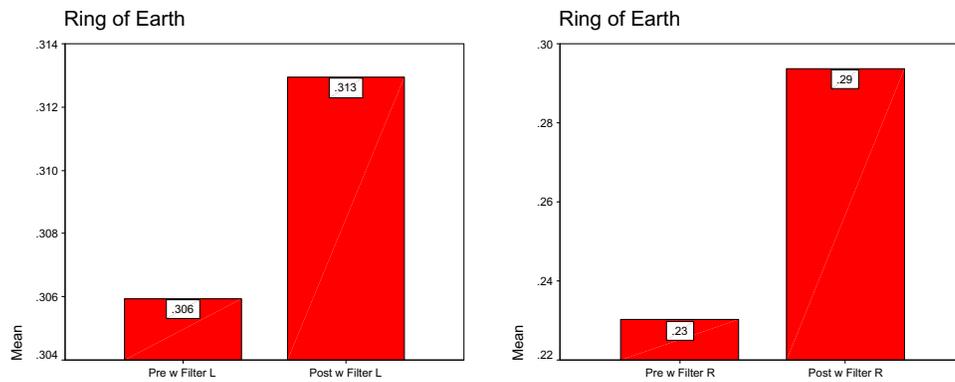
		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Pretest w/o Filter Left - Post w/o Filter Left	-.06523	.203246	.027160	-.11966	-.01080	-2.402	55	.020
Pair 2	Pretest w/o Filter Right - Post w/o Filter Right	-.08957	.223321	.029843	-.14938	-.02977	-3.001	55	.004
Pair 3	Pretest w Filter Left - Post test w Filter Left	-.0386	.14692	.01963	-.0780	.0007	-1.966	55	.054
Pair 4	Pretest w Filter Right - Post test w Filter Right	-.01996	.102407	.013685	-.04739	.00746	-1.459	55	.150

**Table 7.** Paired Samples Test for Ring of Crystal

Conclusion for the Ring of Crystal: Repeated measures t-tests showed that there were statistically significant increases from pre to post test on the left and right hands without the filter ( $p=.02$ ; and  $p=.004$ , respectively) and on the left hand with the filter ( $p=.05$ ). However, no difference was shown from pretest to posttest for the right hand with filter.



**Figure 17.** Ring of Earth without filter right and left hand



**Figure 18.** Ring of Earth with filter for left and right hand

**Paired Samples Statistics**

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest w/o Filter Left - Post w/o Filter Left	.15797	58	.295168	.038757
Pair 2	Pretest w/o Filter Right - Post w/o Filter Right	.20641	58	.327563	.043011
Pair 3	Pretest w Filter Left - Post test w Filter Left	.3059	58	.28204	.03703
Pair 4	Pretest w Filter Right - Post test w Filter Right	.23016	58	.236398	.031041

**Table 8.** Paired Samples Statistics for Ring of Earth

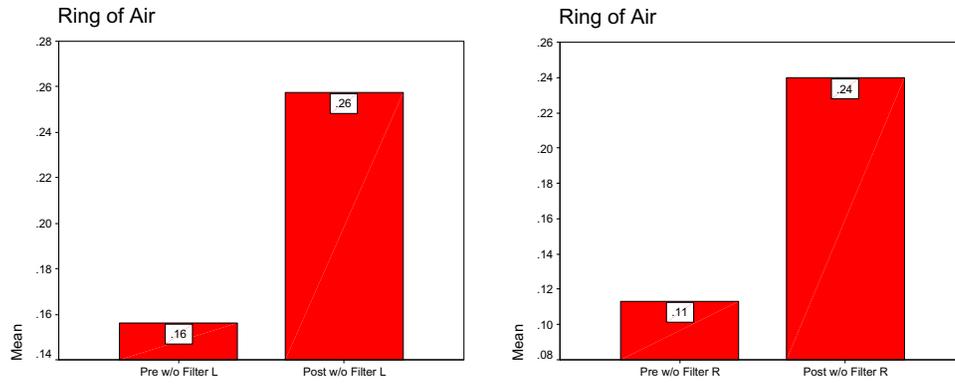
**Paired Samples Test**

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest w/o Filter Left - Post w/o Filter Left	-.10653	.198807	.026105	-.15881	-.05426	-4.081	57	.000
Pair 2	Pretest w/o Filter Right - Post w/o Filter Right	-.07129	.231707	.030425	-.13222	-.01037	-2.343	57	.023
Pair 3	Pretest w Filter Left - Post test w Filter Left	-.0070	.19753	.02594	-.0589	.0449	-.270	57	.788
Pair 4	Pretest w Filter Right - Post test w Filter Right	-.06364	.167667	.022016	-.10772	-.01955	-2.891	57	.005

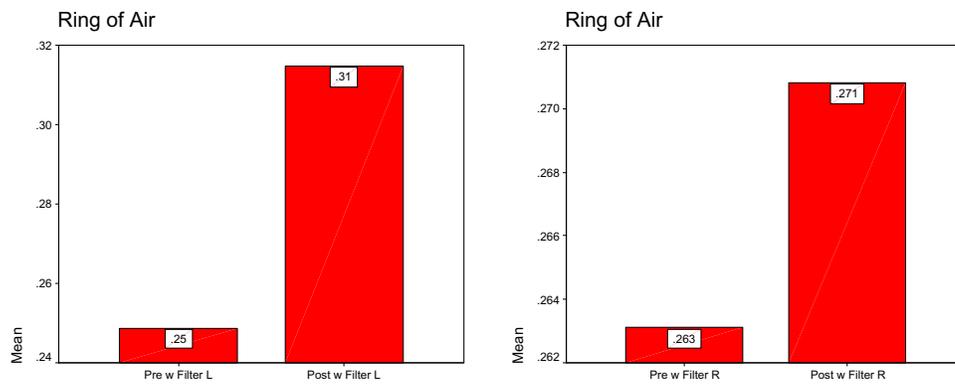
**Table 9.** Paired Samples Test for Ring of Earth

Statistical Conclusion for the Ring of Earth:

Repeated measures t-tests show that there were statistically significant increases from pre to post test on the left and right hands without the filter ( $p < .001$ ,  $p = .023$ ), and on the right hand with the filter ( $p = .005$ ). However, no significant change was shown from pretest to posttest for the left hand with filter.



**Figure 19.** Ring of Air without filter left and right hand



**Figure 20.** Ring of Air with filter for left and right hand

**Paired Samples Statistics**

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre w/o Filter L - Post w/o Filter L	.15607	56	.376760	.050347
Pair 2	Pre w/o Filter R - Post w/o Filter R	.11309	56	.342757	.045803
Pair 3	Pre w Filter L - Post w Filter L	.2488	56	.42127	.05629
Pair 4	Pre w Filter R - Post w Filter R	.26311	56	.247013	.033009

**Table 10.** Paired Samples Statistics Ring of Air

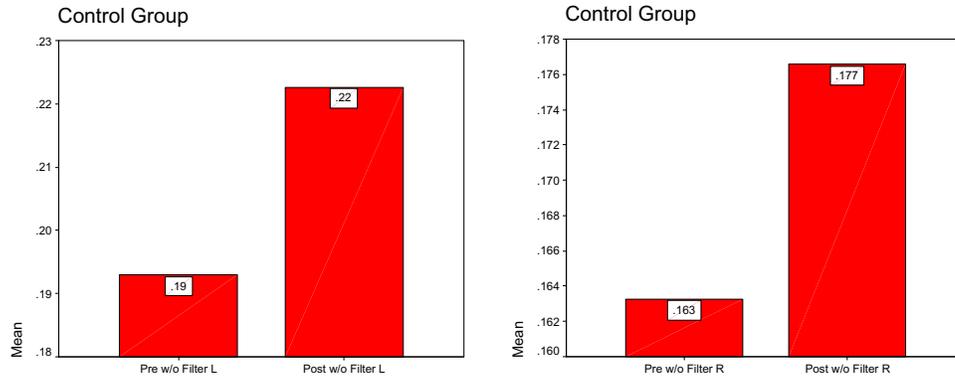
**Paired Samples Test**

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre w/o Filter L - Post w/o Filter L	-.10146	.196336	.026236	-.15404	-.04889	-3.867	55	.000
Pair 2	Pre w/o Filter R - Post w/o Filter R	-.12671	.244419	.032662	-.19217	-.06126	-3.880	55	.000
Pair 3	Pre w Filter L - Post w Filter L	-.0660	.32781	.04381	-.1538	.0218	-1.506	55	.138
Pair 4	Pre w Filter R - Post w Filter R	-.00771	.181302	.024228	-.05627	.04084	-.318	55	.751

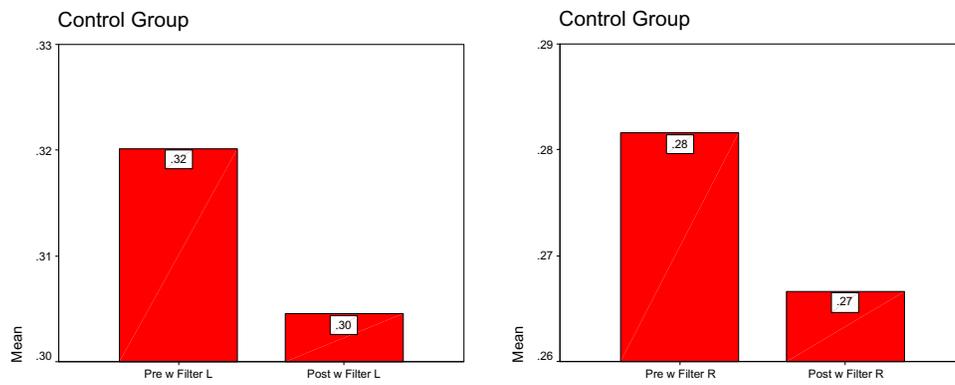
**Table 11.** Paired Samples Test for Ring of Air

Statistical Conclusion for the Ring of Air:

Repeated measures t-tests show that there were statistically significant increases from pre to post test on the left and right hands without the filter ( $t(55)=3.88$ ,  $p<.001$ ; and  $t(55)=3.87$ ,  $p<.001$ , respectively). However, no significant change was shown from pretest to posttest for the right hand with filter.



**Figure 21.** Control group without filter left and right hand



**Figure 22.** Control group with filter left and right hand

**Paired Samples Statistics**

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest w/o Filter Left - Post w/o Filter Left	.19293	61	.318990	.040842
Pair 2	Pretest w/o Filter Right - Post w/o Filter Right	.16326	61	.286871	.036730
Pair 3	Pretest w Filter Left - Post test w Filter Left	.3202	61	.23880	.03058
Pair 4	Pretest w Filter Right - Post test w Filter Right	.28157	61	.185666	.023772

**Table 12.** Paired Samples Statistics for Control group

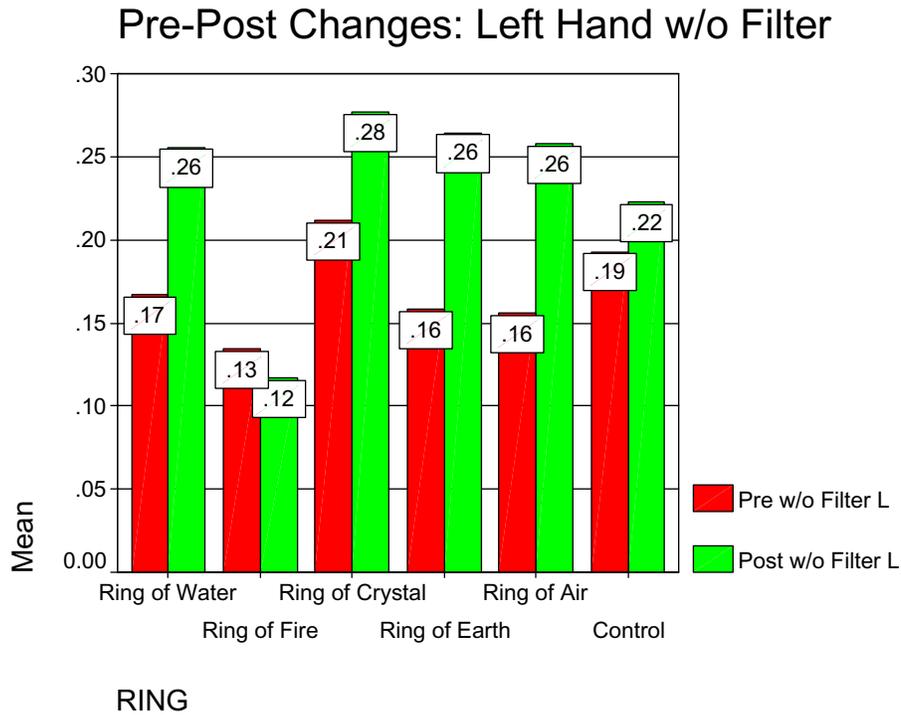
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest w/o Filter Left - Post w/o Filter Left	-.02969	.187437	.023999	-.07769	.01832	-1.237	60	.221
Pair 2	Pretest w/o Filter Right - Post w/o Filter Right	-.01330	.170037	.021771	-.05685	.03025	-.611	60	.544
Pair 3	Pretest w Filter Left - Post test w Filter Left	.0157	.13063	.01673	-.0178	.0491	.937	60	.353
Pair 4	Pretest w Filter Right - Post test w Filter Right	.01495	.105716	.013536	-.01212	.04203	1.105	60	.274

**Table 13.** Paired Samples Test for Control group

Statistical Conclusion for the control group:

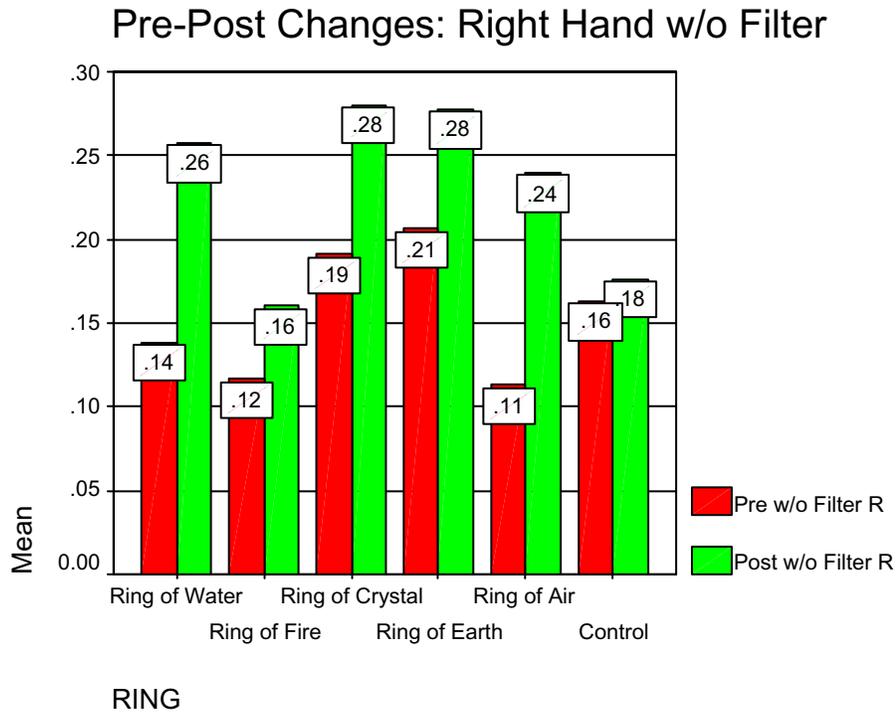
Repeated measures t-tests revealed that, in the control condition, none of the changes from pre test to post test were statistically significant.

To put this all together for the reader, the following bar graphs show the rings combined with their respective changes.



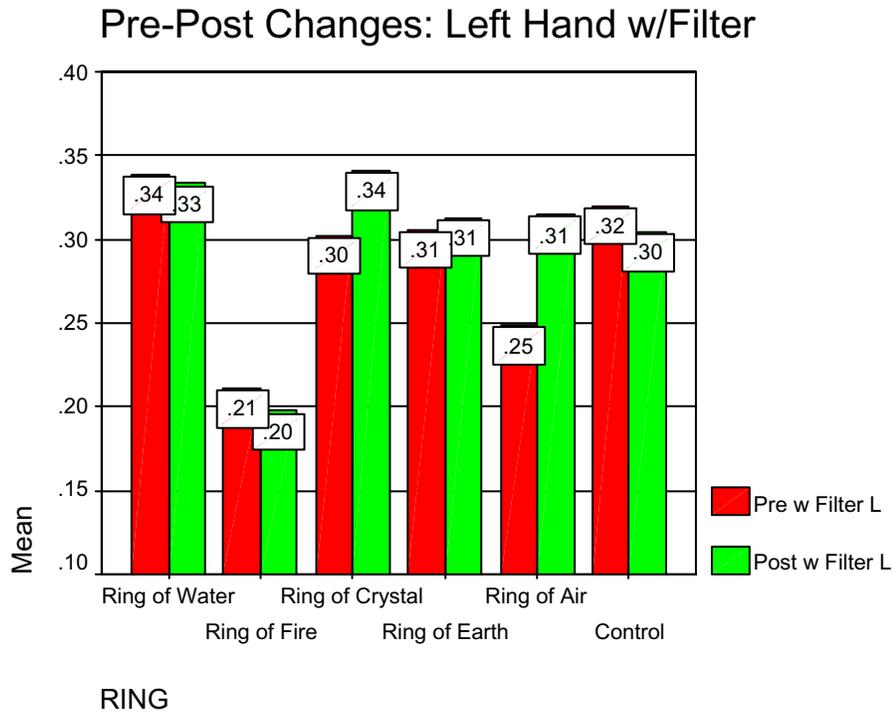
**Figure 23.** Cumulative graph (all six rings) left hand without filter.

This graph shows the cumulative average of all rings left hand pre and post changes without filter. Notice the variation from one ring to the other. The post reading obviously shows an increased JS integer for the fingertips except in the Ring of Fire. Again the statistical change was in the rings of Water, Crystal, Earth and Air. It was not found in the Ring of Fire or the control test. Note these are changes in overall average value of the JS integer.



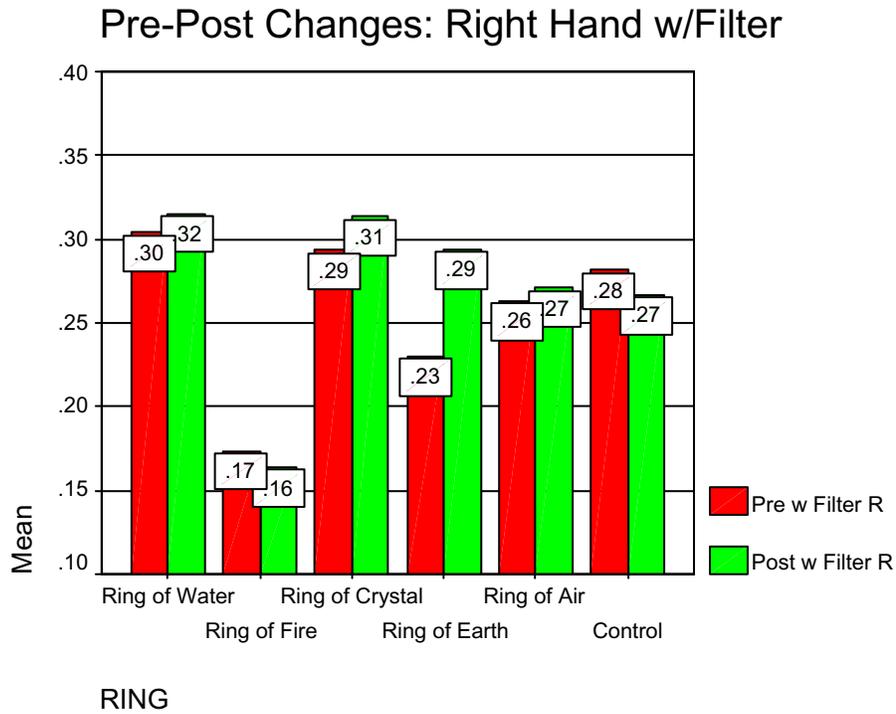
**Figure 24.** Cumulative graph (all six rings) right hand without filter.

This graph reflects the cumulative average of all rings pre and post changes right hand without filter. In this measurement reading, all of the post measurements are elevated. Again the significant statistical changes are in the rings of Water, Crystal, Earth, and Air. None was found in the Ring of Fire or control.



**Figure 25.** Cumulative graph (all six rings) left hand with filter.

This graph shows the cumulative average of all rings pre and post changes left hand with filter. In this graph, it is seen that the biggest change is in the Ring of Air. You will also notice the Ring of Water and Ring of Fire go slightly down in numeric value and all the rest go up on the post reading. Again, the significant statistical change occurred only in the Ring of Crystal. The reason the Ring of Air has a larger numerical difference or change but is not considered a significant change is because of the larger range in the standard of deviation in that ring.



**Figure 26.** Cumulative graph (all six rings) right hand with filter.

This graph shows the cumulative average change of all rings pre and post changes right hand with filter. Here the reader will notice that all post changes go up except in the Ring of Fire and control test. Again, the significant statistical change occurred in the Ring of Earth only.

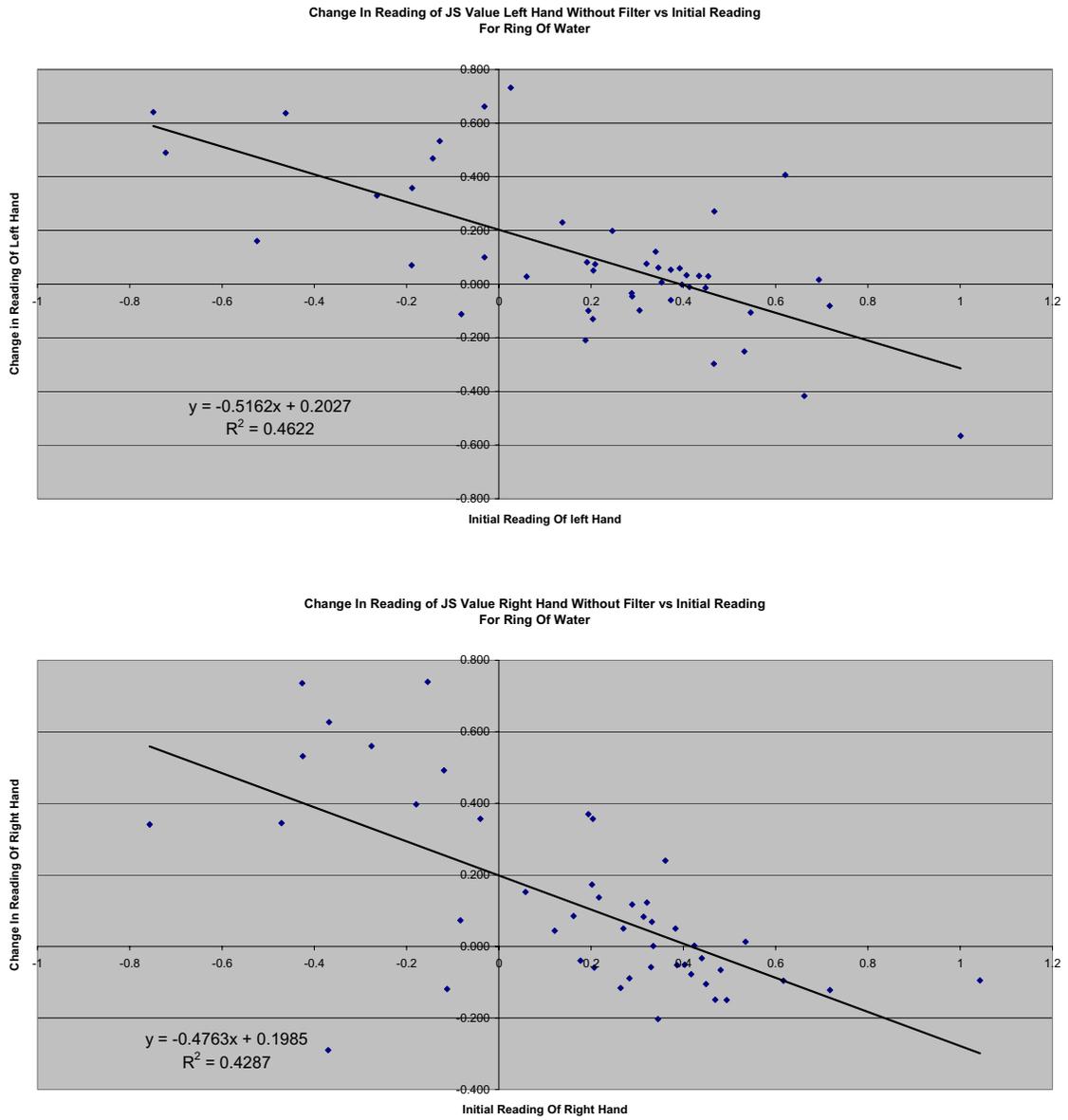
Next we will examine the data in a slightly different format. The following graphs plot the change in the JS reading produced by the GDV versus the starting JS value. All of the previous plots were of the average value. Here we want to examine the change in the reading related to the starting JS value. The formula for the straight line drawn on the graph has the form  $M \cdot x + B$  where  $M$  is the slope of the line and  $B$  is the Y-intercept (a formula in Excel). This line is the least-squares best fit of the data. However, another form of the very same line is  $M \cdot (x - C)$  where  $M$  is the same but  $C$  is now the X-intercept. For this work we will call  $C$  the "balance point" or homeostasis. We are using the term balance point to indicate the norm or point that is approached by the stimulation of the rings.

It's easy to identify  $C$ , as that is the position on the X-axis (horizontal axis or abscissa) where the line crosses. If a person were to start out at this value, then statistically there would be no measurable change in the average reading. Therefore, if we assume that the rings are producing a positive effect at all times as measured by the JS value of the GDV, then this value would be the ideal health point.

The plots show that people who start out on either side of this point are pulled toward it. So it seems that the term "balance point" is a good one. Especially since the X-axis scale is arbitrary and the Y-axis (ordinate) is the *difference* of the before and after readings. So positive  $Y$  would indicate that the reading went up and a negative  $Y$  value would indicate that the reading went down, and near the point would be "in balance."

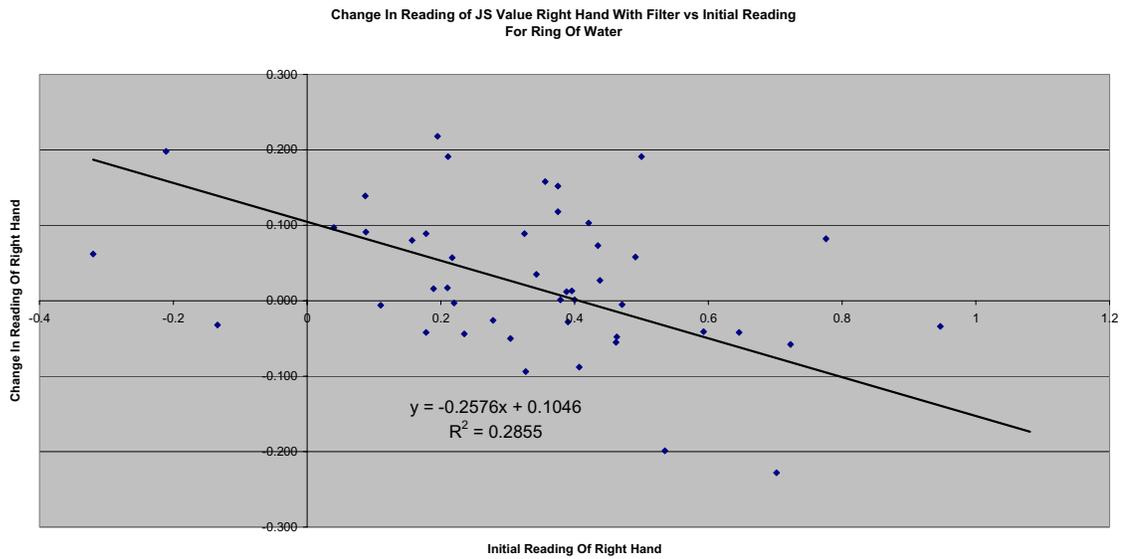
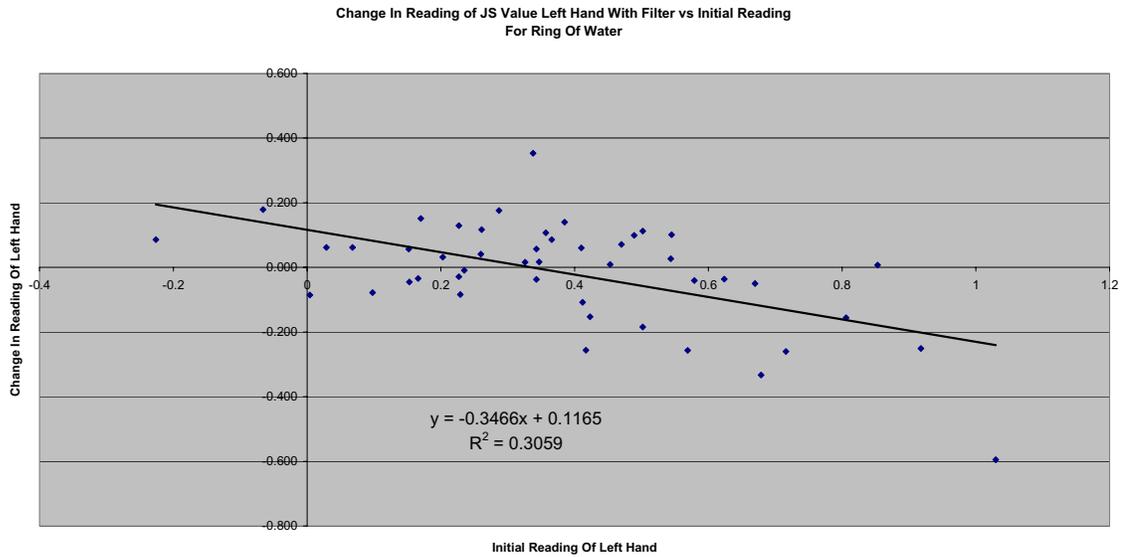
The emphasis "on average" is because there is a very large scatter, but here the straight line is the least-squares fit to the data, and plots the *trend* of the measurement produced by the GDV. In most cases (except for the Ring of Crystal and the control) we see the trend is easily identifiable and significant.

Least-squares fit is a mathematical approach where the sum of the squares of the vertical distance between the fitted line and the actual point is minimized. It is based on statistical variations where it is the square of the difference that counts. And since the square is always positive whether the point is above or below the line, then the sum of these squares is always positive. But there will only be one line, which produces the smallest sum of these values, and it is considered to be the "best" fit of a line to a set of data points. While this line is the most pleasing to the human eye, it can also be shown to be the statistically correct form to use.



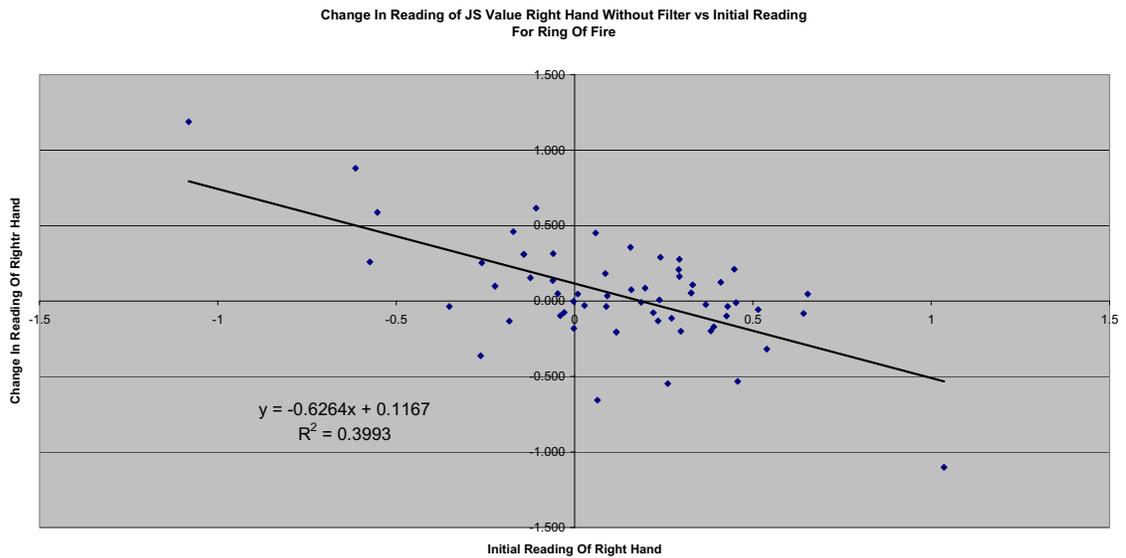
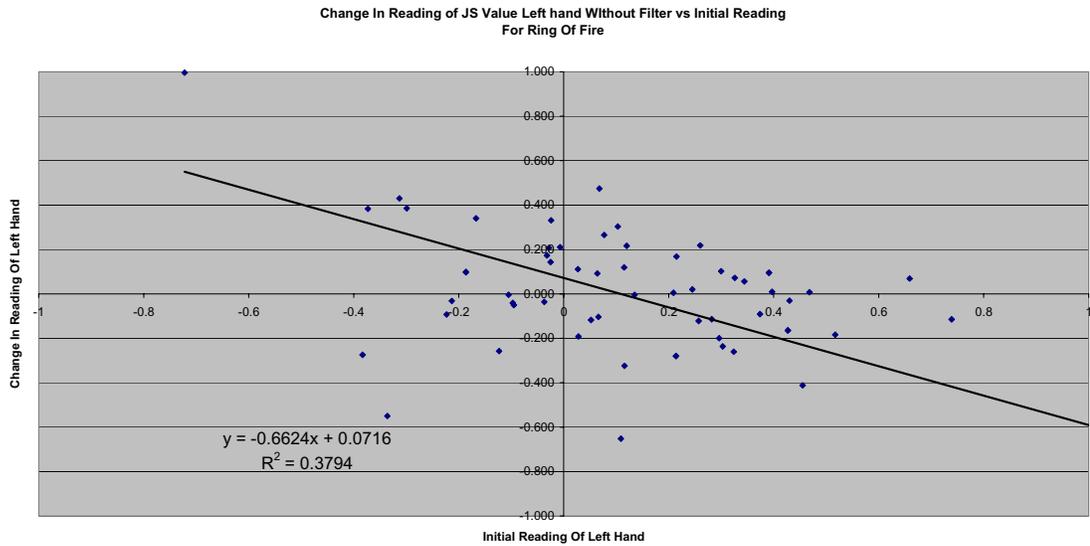
**Figure 27.** Scatter graphs Ring of Water left and right without Filter

These two plots without filter indicate that there is an overall proportional improvement of about 50% in the JS reading for initial values below the neighborhood of 0.4 and an average decrease above.



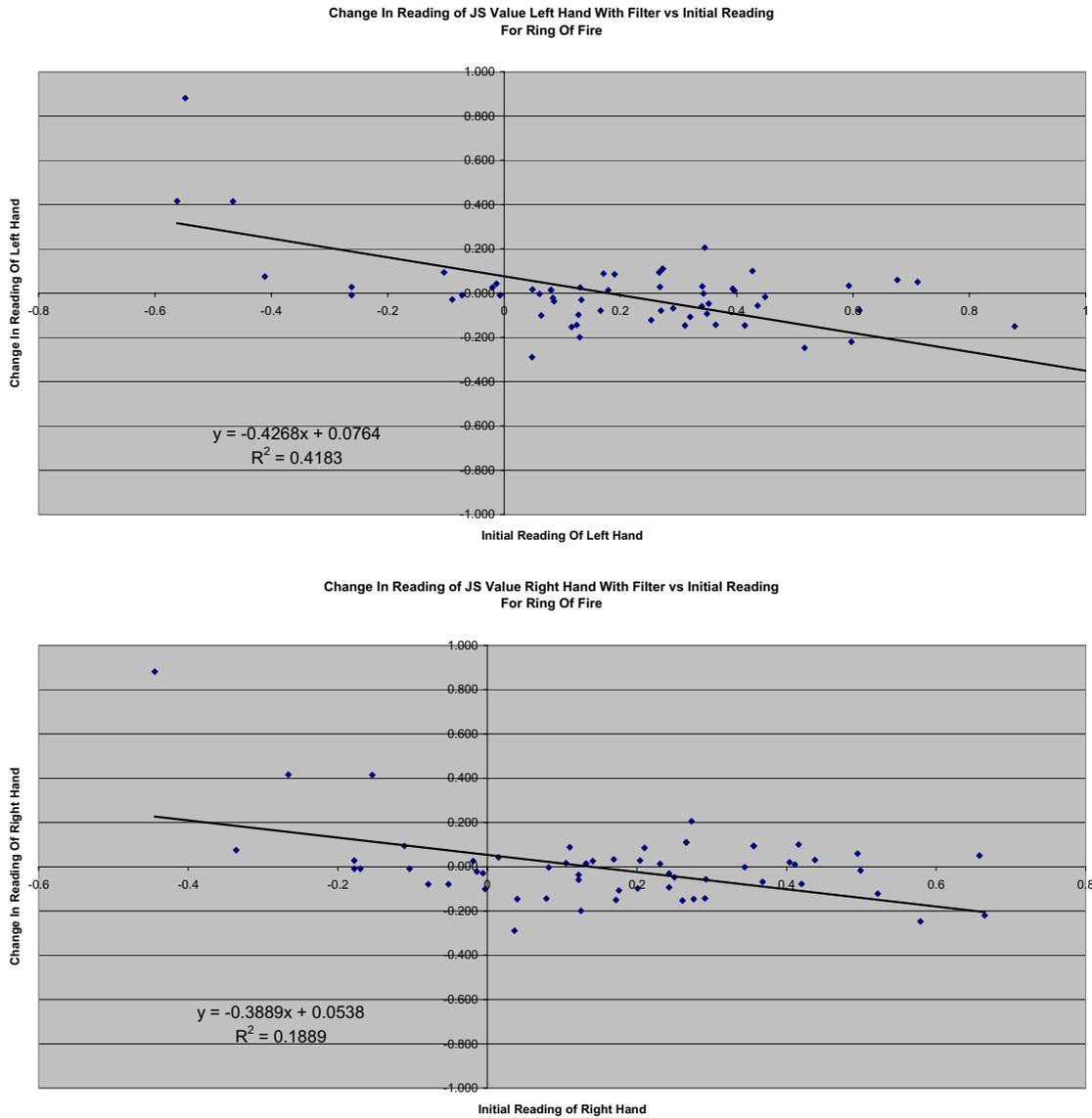
**Figure 28.** Scatter graphs Ring of Water left and right with Filter

These two plots with filter indicate that there is an overall proportional improvement of about 30% in the JS reading for initial values below the neighborhood of 0.4 and an average decrease above.



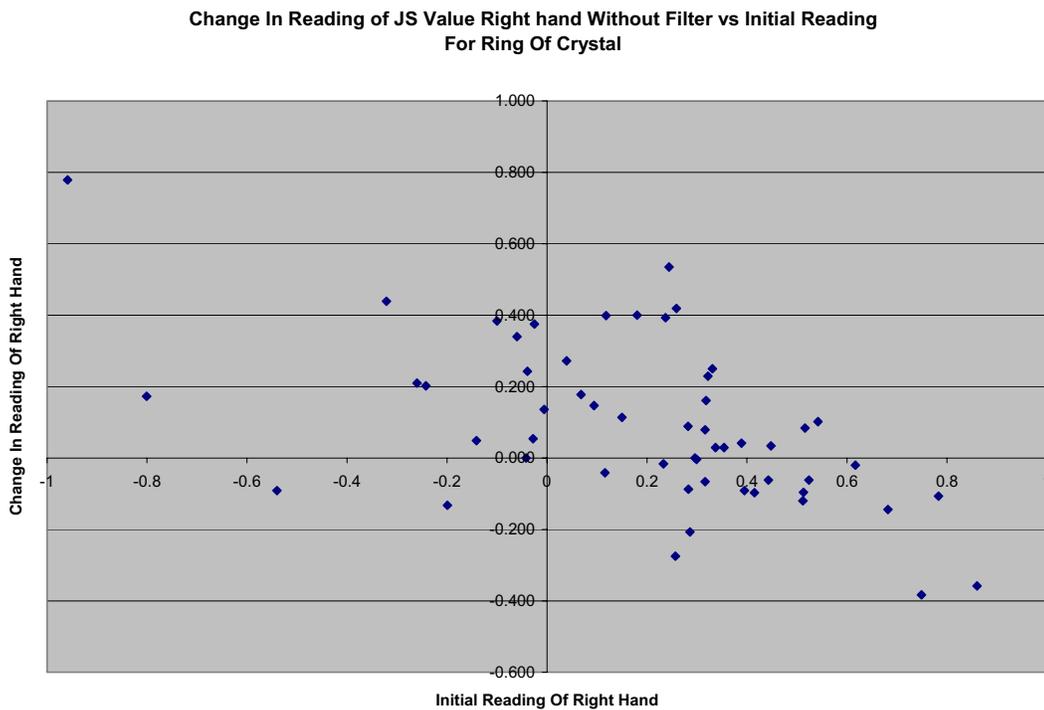
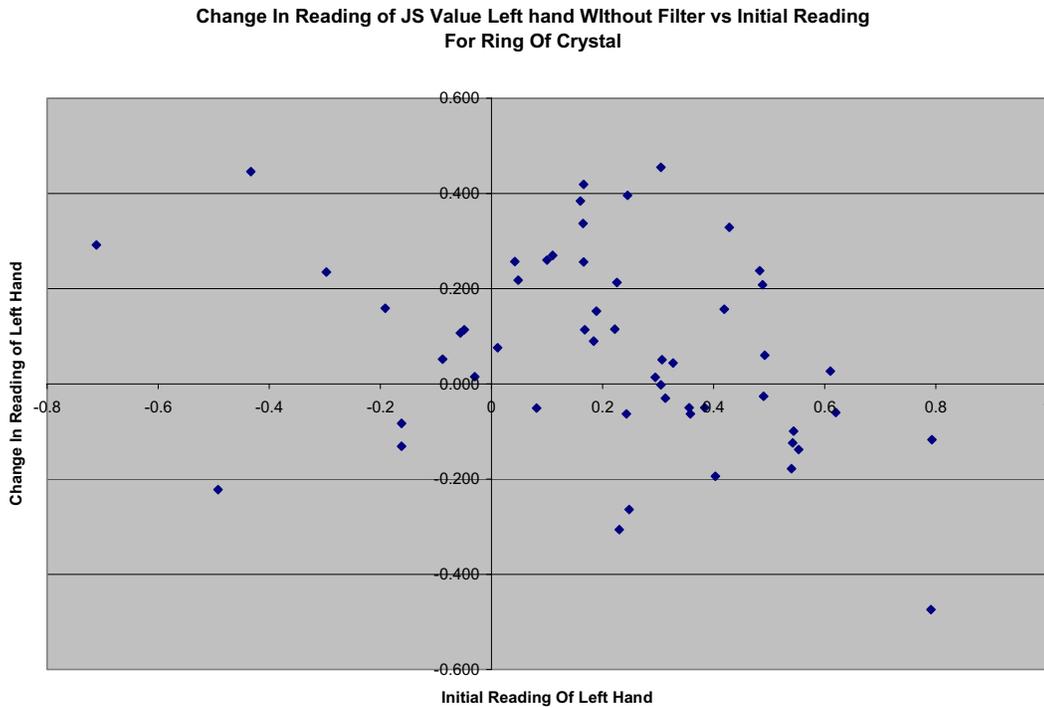
**Figure 29.** Scatter graph Ring of Fire left and right without Filter

These two plots without filter indicate that there is an overall proportional improvement of greater than 60% in the JS reading for initial values below the neighborhood of 0.2 and an average decrease above.



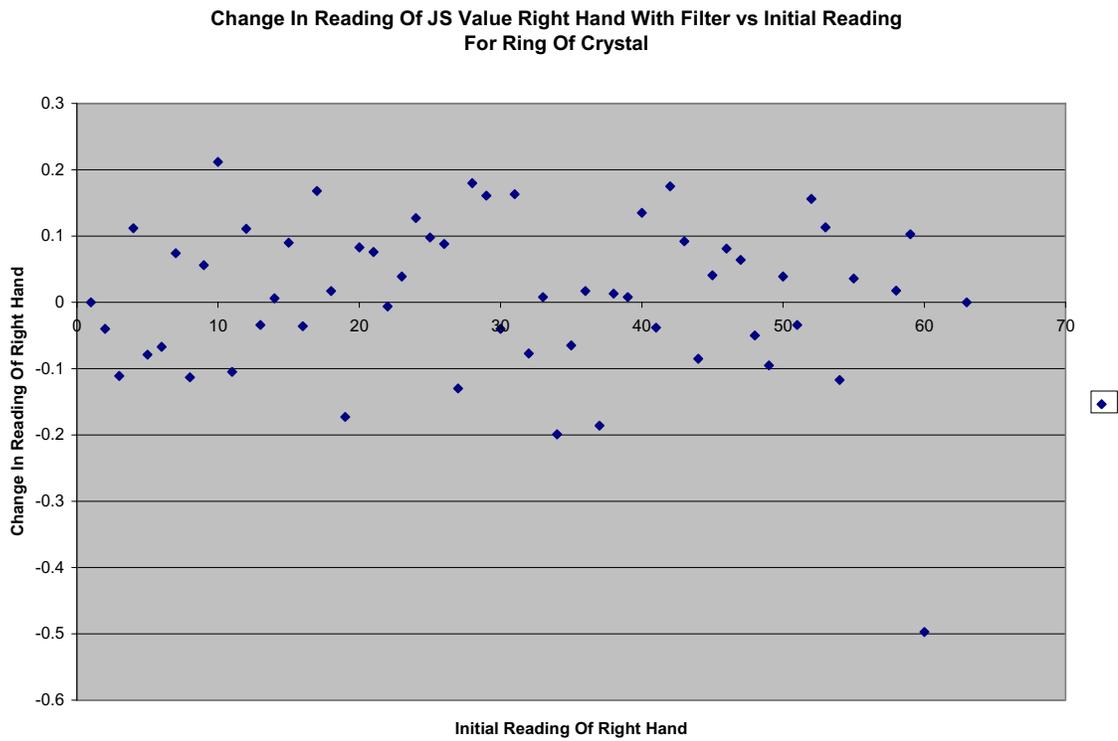
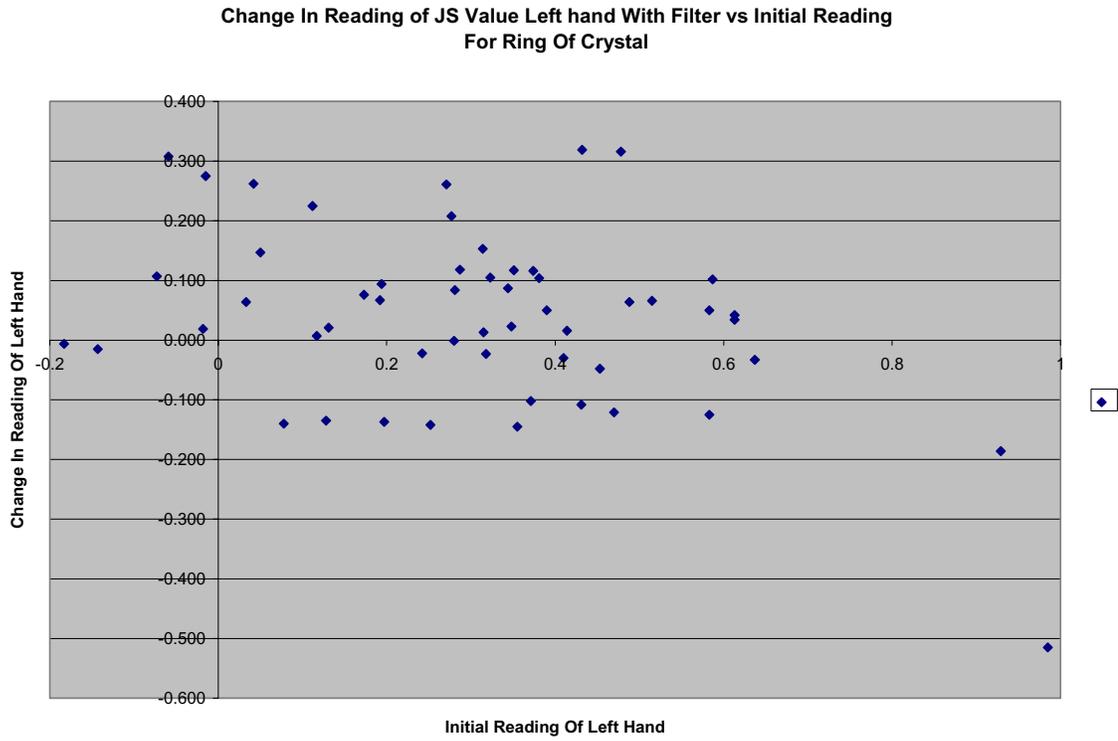
**Figure 30.** Scatter graphs Ring of Fire left and right with Filter

These two plots with filter indicate that there is an overall proportional improvement of about 40% in the JS reading for initial values below the neighborhood of 0.2 and an average decrease above. As one can see from these plots this is more pronounced for the extreme values than for initial readings in the neighborhood of the norm.



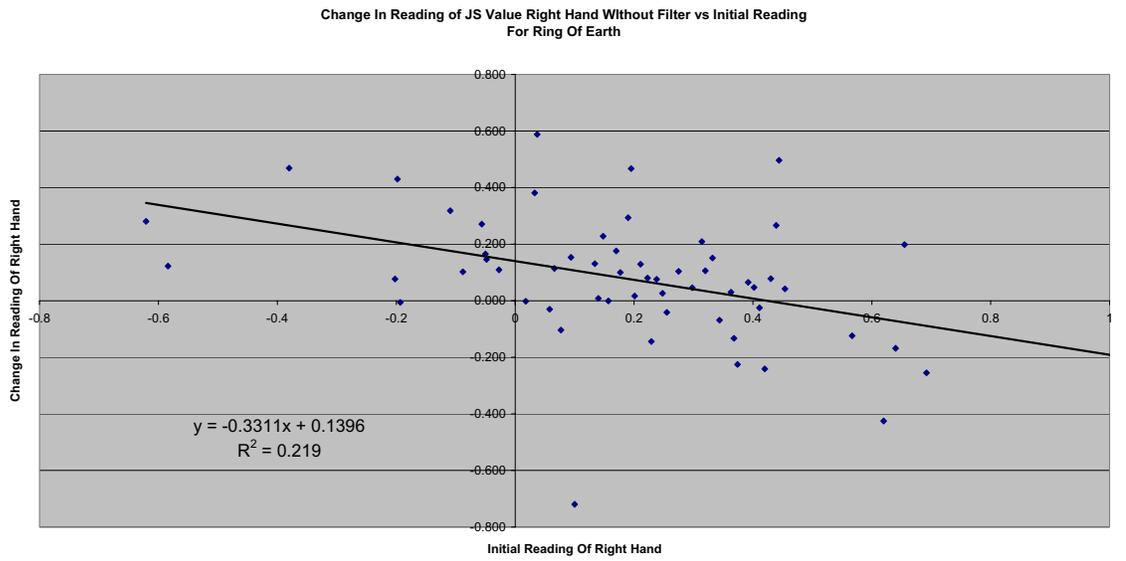
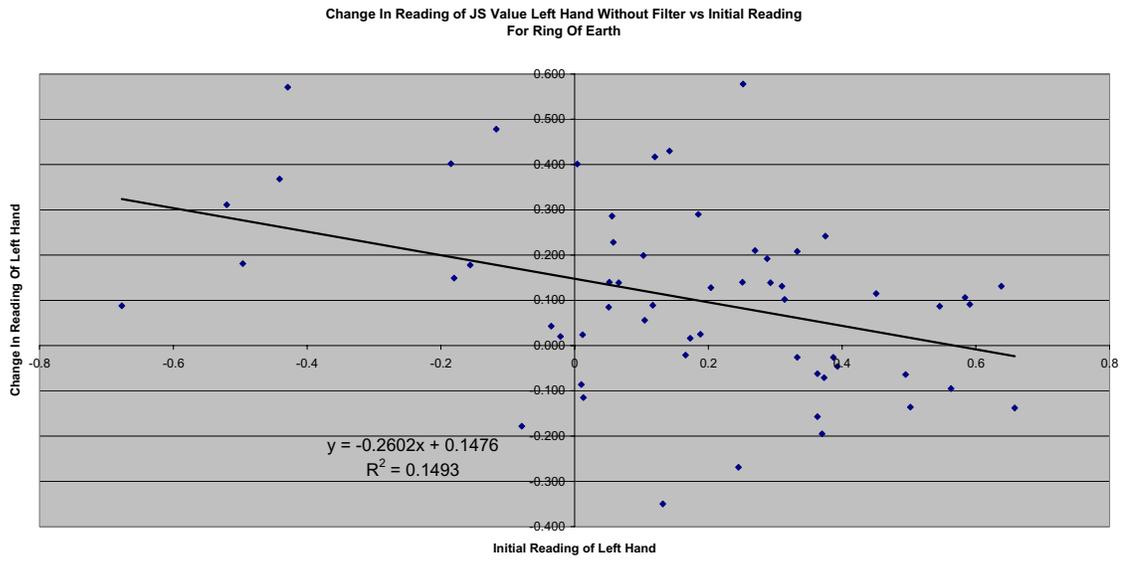
**Figure 31.** Scatter graphs Ring of Crystal left and right without filter

In these graphs the scatter is too great for a “best fit” line to be calculated.

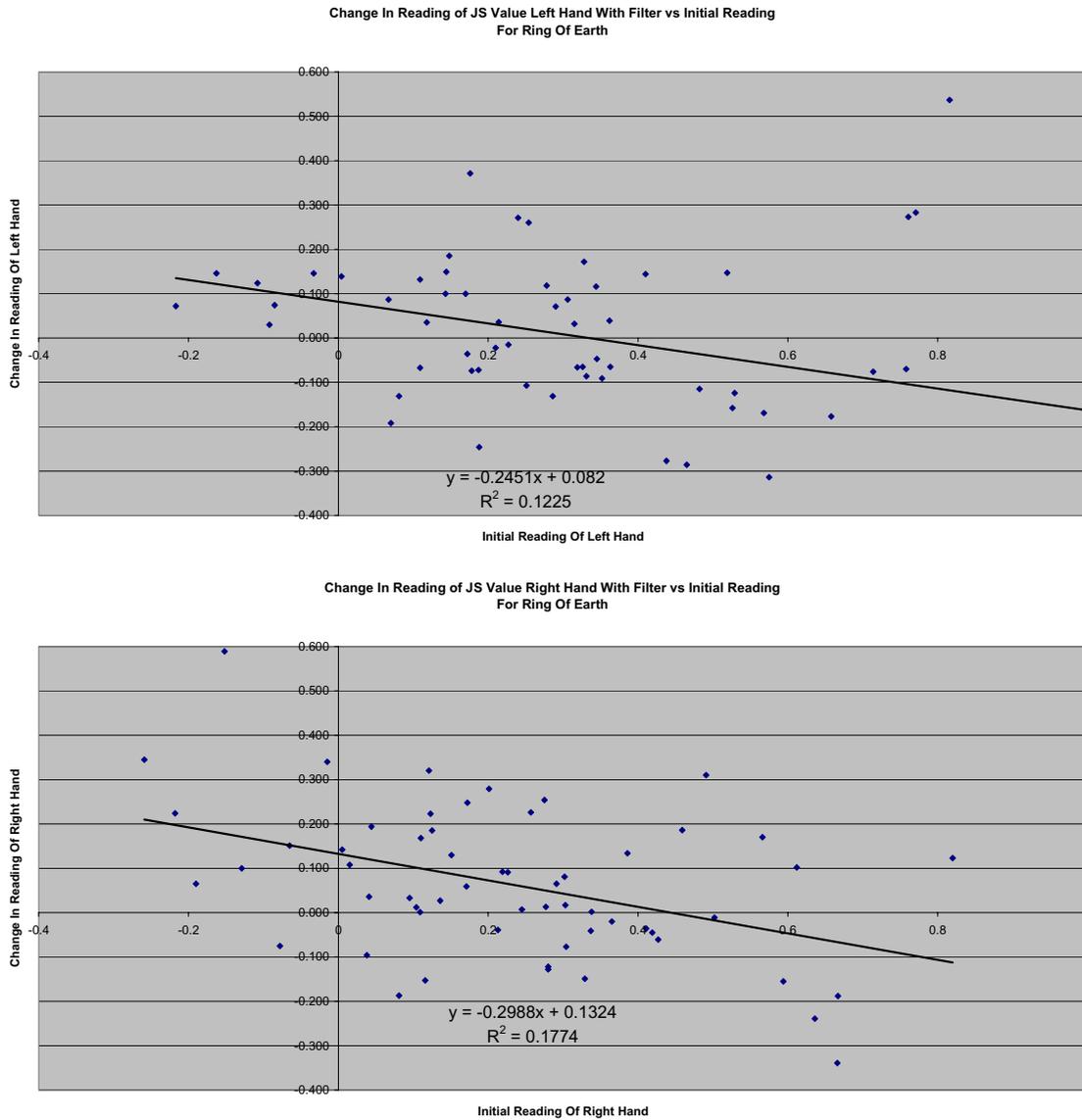


**Figure 32.** Scatter graphs Ring of Crystal left and right with filter

Again, there is no “best fit” for this data.

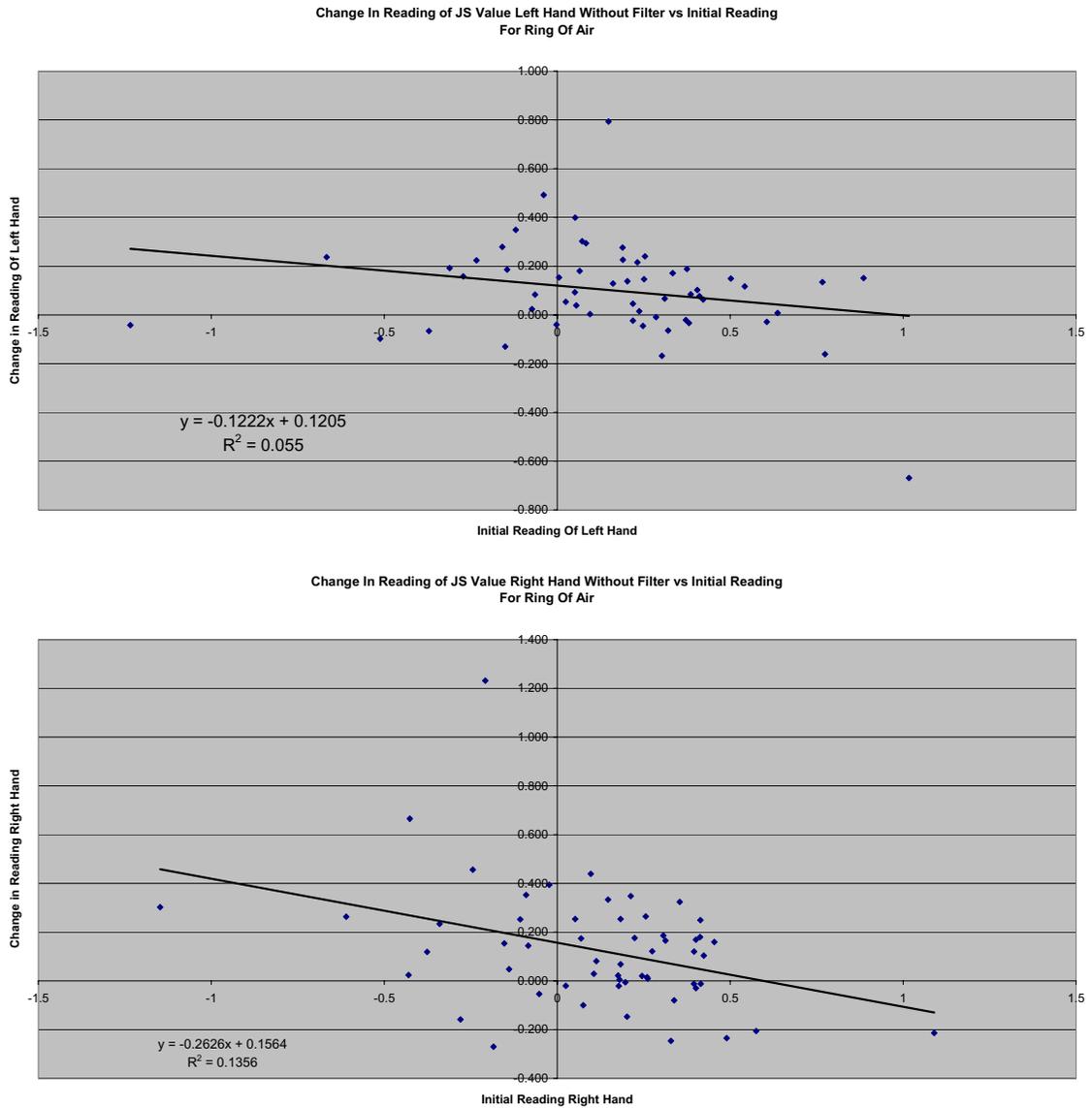


**Figure 33.** Scatter graphs Ring of Earth left and right without filter



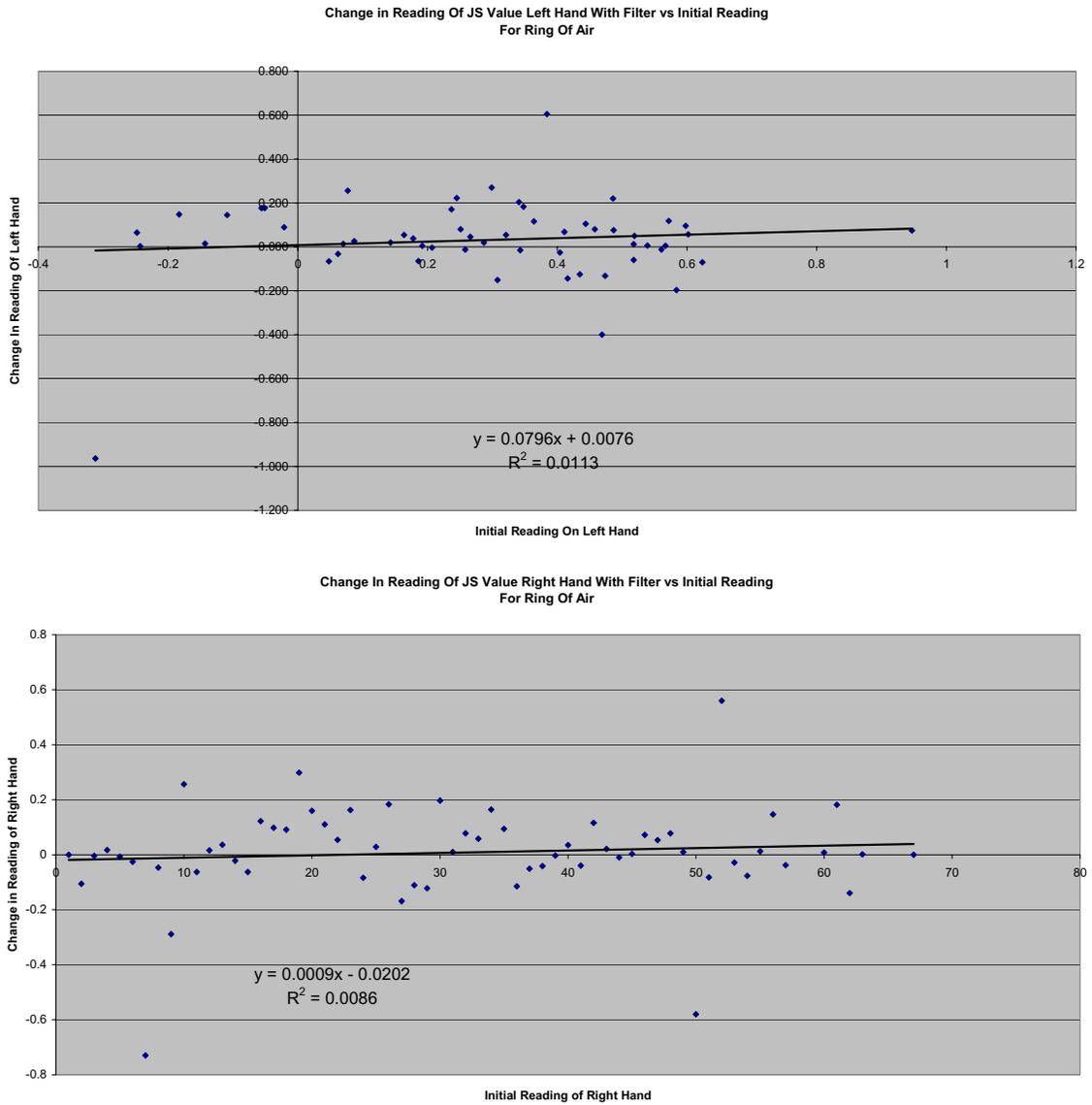
**Figure 34.** Scatter graphs Ring of Earth left and right with filter

All four of these plots indicate that there is an overall proportional improvement in the JS reading for initial values below the neighborhood of 0.5 and an average decrease above. As one can see from these plots this is just a general trend for the total sample and in no way represents the results for any one individual.



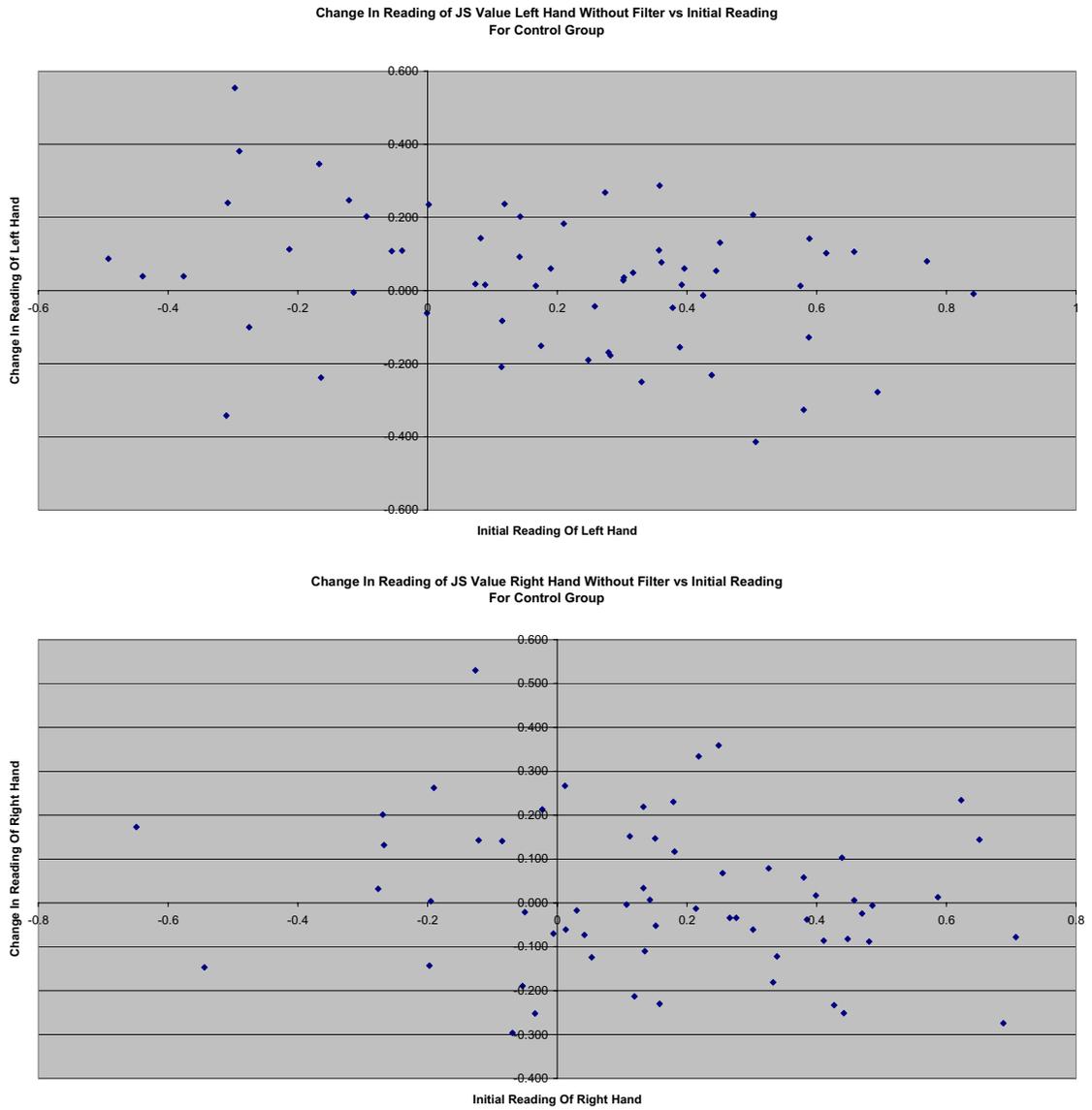
**Figure 35.** Scatter graphs Ring of Air left and right without filter

The above plots imply that the lower the initial reading, the greater the improvement. The linear line in the figures indicates that the tendency is to improve the reading by about 20%.

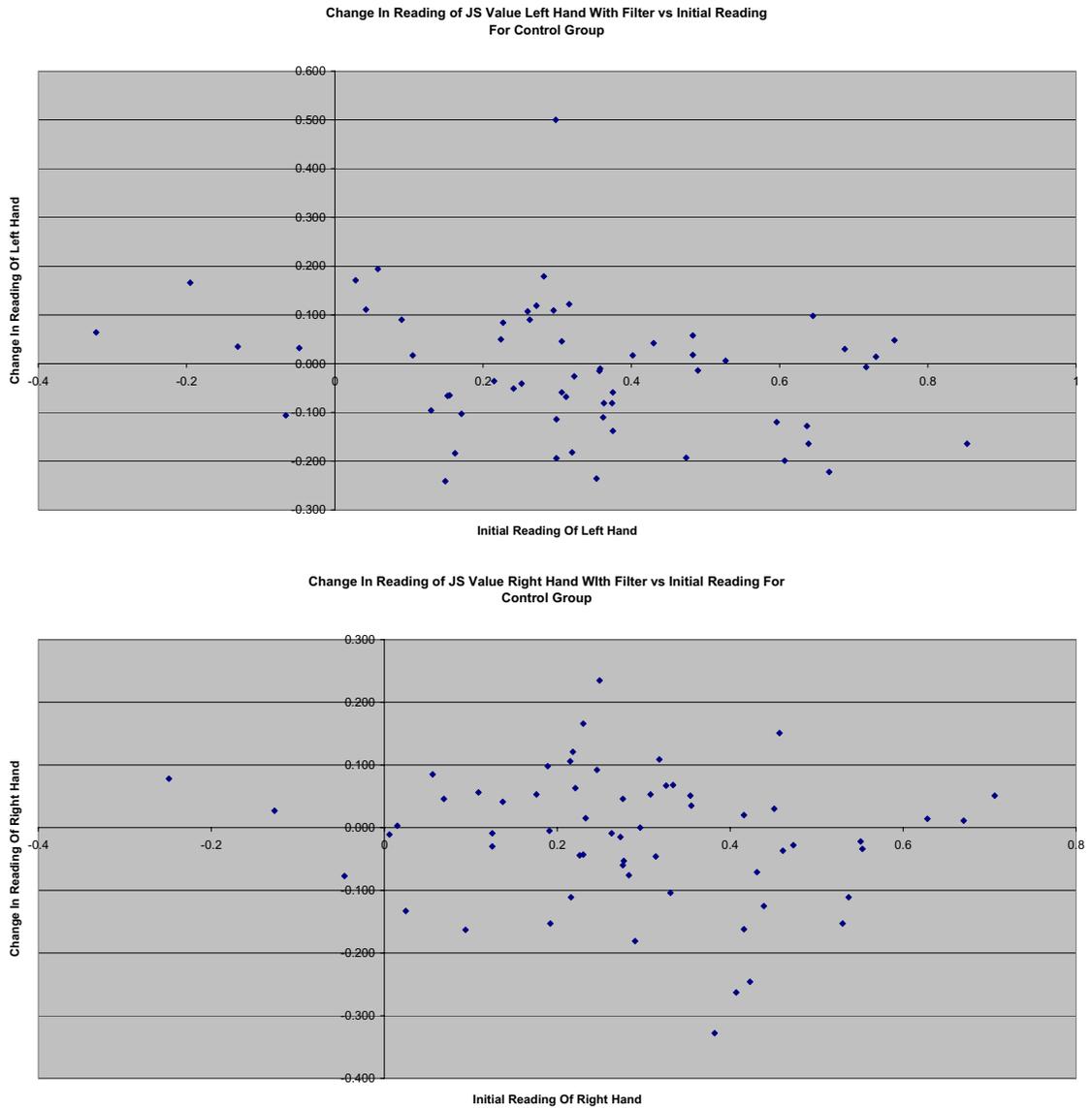


**Figure 36.** Scatter graphs Ring of Air left and right with filter

These two plots also indicate the change in reading versus the initial reading and these show no significant improvements for any initial reading. Therefore the JS parameter measured by the GDV is unaffected when using a filter with the Ring of Air.

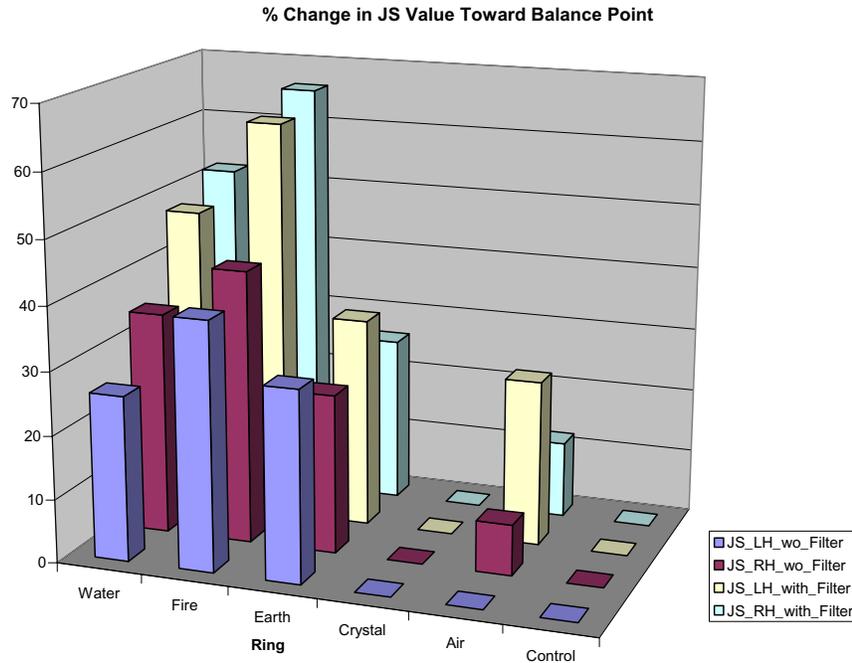


**Figure 37.** Scatter graphs Control Ring left and right without filter



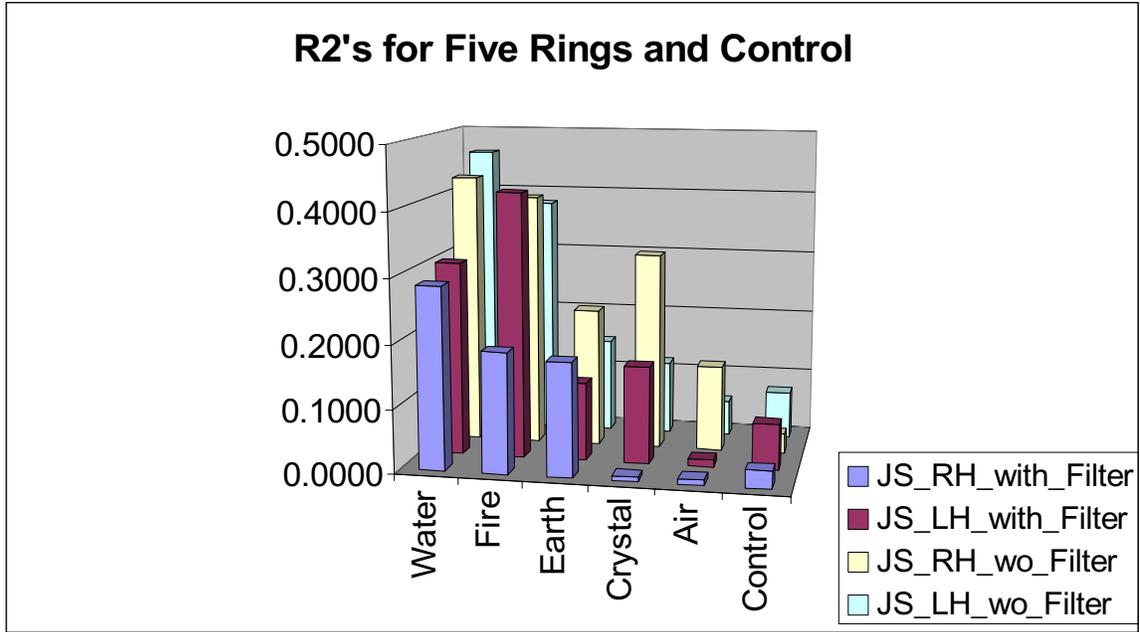
**Figure 38.** Scatter graphs Control Ring left and right with filter

These plots displaying the uniform scatter of the control group verify that there is no correlation between the before and after reading of the process. Therefore we can conclude that the results of the rings are indeed due to the stimulation of the particular points and not due to the testing process itself.



**Figure 39.** Percent Change in JS value toward the balance point. This is a measurement of how far the initial JS value moves toward the balance point.

From this chart it is easily seen that the Ring of Fire (2nd from left) has the greatest pull toward a balance point (most effective) with the Ring of Water (1st set) a close second. The Ring of Earth (3rd from left) is third in line for this effect. The Rings of Crystal (4th from left) and Control (far right) have no such effect in any instance. In the Rings of Water, Fire and Air, the change without filter was significantly greater than with filter. The Ring of Earth showed no difference between with and without a filter.



**Figure 40.** Regression coefficients for the above scatter plots for all rings.

This chart is a plot of the overall scatter of the data to the straight line fits in the scatter plots. So a larger value here indicates a smaller scatter or more consistent result of pulling the JS value to a balance point. While the previous chart showed that the Ring of Fire had a greater effect, this chart demonstrates that the Ring of Water has less scatter in the end result. While the Rings of Crystal and Control did not show any pull toward a balance point (trend) as indicated in Figure 39, one can see the actual scatter in these sets of data is not zero as expected.

A further analysis of the numbers done by the statistician, Dr. Paul Thomlinson, reflected a very few number of volunteers fell out of the normal range, usually 1 or 2 in any group. Therefore, it was impossible to evaluate the theory that the more out of range from the normal value, the greater the change toward the normal values. However, the few tests that were out of the normal healthy range reflected movement of the energy field toward the normal value ranges on the posttest. The data in this study would serve as a good control group of healthy individuals to compare to another group of unhealthy volunteers, i.e. high blood pressure, cancer, etc. Below is the quote from his analysis done by statistician Dr. Paul Thomlinson:

“Participants in the study, across all conditions (i.e., pretest, posttest, control, all six rings, each hand, and each filter setting) demonstrated extraordinary consistency in their energy readings, with nearly all readings falling within the normal range (i.e., -0.6 to +1.0). Clearly, this data set, drawn as it was from very healthy persons, is characterized by the statistical condition known as ‘restriction of range.’ That is, there is so little variability in the range of energy readings that any significant changes from pre- to posttest, or any significant differences between left and right hands are essentially precluded.”

“Taking the Ring of Air results as a typical example, results show the following from pretest to posttest (without the filter, with readings from the left hand):

- Only 2 of 56 readings (3.6%) were measured in the sub-normal range on the pretest, and of these, 1 (1.8%) remained in this range on the posttest, and 1 (1.8%) moved into the normal range on the posttest.
- 53 of 56 readings (94.6%) were measured in the normal range on the pretest, and of these, 2 (3.6%) moved lower into the sub-normal range, 50 (89.3%) remained in the normal range, and 1 (1.8%) moved above the normal range.
- One of 56 readings (1.8%) began above the normal range on the pretest, and moved into the normal range on the posttest.”<sup>2</sup>

An alternate study for the future could be the comparison of the left hand to the right hand before as well as after. Dr. Korotkov and others who use the camera in their practice believe that asymmetry of the BEO gram is important in the analysis of an individual health status, primarily due to the difference between the brain hemispheres.<sup>1</sup>

Another potential study would be to compare the rings for each individual. Because stimulation was at least one week apart, many variations occurred between the rings for each person. For example, one volunteer experienced the death of a child during the study. In one session one person who normally had high average energy, had a very low depressed diagram. Upon questioning, he admitted to drinking a few beers the night before his testing. One person

displayed a very high pre test compared to her other tests, after working in her flower garden all morning.

## ENDNOTES

1. Korotkov, Konstantin G. *Human Energy Field: Study with GDV Bioelectrography*, (2002): 37.
2. Thomlinson, Paul Ph.D. Statistician employed to verify results of GDV data (five hours of data analysis summary.)

## CHAPTER 5

### DISCUSSION

This chapter discusses both the objective and subjective observations made by the researcher.

In the Ring of Fire, there was no statistically significant change ( $p > .05$ ) with or without a filter in the readings before and after stimulation of the *average* value as shown in the paired t-test. However, the scatter graph shows stimulation of this ring creates the most significant change when compared to all the other rings. This is due to the “balance point” being right in the middle of the sample, where half of the people went up in JS value and the other half went down, thus canceling any change on the average JS value. This concurs with Dr. Shealy’s research which indicates that the Ring of Fire is the most important ring, as it raises DHEA to a normal level in the body.

The other oddity between the paired t-test and the scatter graphs occurs with the Ring of Crystal. The paired t-test is statistically significant on the left and right hand without a filter, as well as with a filter on the left hand. Here, we surmise that the “balance point” would be well above the starting JS value for our sample, since the average value went up for all participants. Dr. Shealy’s research demonstrates that the Ring of Crystal removes free radicals from the body. This

implies that everyone moves in the same direction. In fact, this research demonstrates that, on average, everyone moves up on JS value. If indeed there exists a balance point for this graph it is not determinable from our sample, since there is entirely too much variation in the data to extrapolate and point beyond the range of the data.

Dr. Shealy's research for the Ring of Earth shows that for pre menopausal subjects there is a minimal increase in Calcitonin. However, post menopausal subjects show a significant increase in Calcitonin. This research in the paired t-test showed a significant change in three out of four categories. Only the left hand with a filter showed no significant change. In this study two thirds of the subjects were post menopausal. Therefore we would expect to see a change as indicated by the data in this study.

Again, Dr. Korotkov believes that the measurements with the GDV without the filter measure both the psychological and the physical. With a filter it measures just the physical. Note that there was no significant change for the rings of Water and Air in the "with filter" tests for the left and right hand. Therefore, if this is indeed true, then these results indicate that a one time stimulation of the rings of Water and Air only affects the psychological.

Generally speaking, the changes in all the numbers were higher in the "without filter" data than the "with filter" data. The filter definitely did eliminate something in its data. Exactly what this subtle energy is, merits more study in this researcher's opinion.

More studies are needed with abnormal values in the pretest to see if the energy will move toward the normal healthy values, because 98% of the data collected in this study fell within the normal range on the pretest. As stated in the last analysis, the two percent which fell within the abnormal range did move into the normal range. A higher percentage of abnormal baseline data is needed to verify this hypothesis.

An observation noted by the researcher was the fact that all volunteers were expecting a change in their fields. Many of them said they felt an immediate effect. A few volunteers were spouses encouraged to participate in the study because their partners wanted them to do it. These individuals were the ones who verbalized that they did not feel any change from the stimulation within the 24 hours following the stimulation.

Many studies by the humanistic side of psychology document that any group that is being watched – even if it is the placebo group – will improve. However, the fact that this study's control group of acupuncture points did *not* show a statistical change is a positive indication of the GDV instrument's reliability in obtaining qualitative measurements. Whether this deduction is correct will require repeated studies of this nature, as well as more reproducible test measurements.

Of course, as in all modern technology, each year ushers in a new, more refined version, just as we see new and improved computers on the market each year. It is to be expected that Dr. Korotkov and his team of scientists will

continue to offer improved models as studies reveal more data, enabling refinement of the GDV as a tool of evaluation.

Another observation made by the researcher in her study was the wide range of ages and age-related health status which provided numerous variables that could not be measured or compared. Even though none of her volunteers had any major diseases or were in any extreme degree of crisis, the researcher admits that 21-year-old volunteer experiences and responses varied greatly from those expressed by the 80-year-old. Also, the volunteers acknowledged a large variety of healthy and unhealthy diets; some exercised or had no exercise plans, and many had other stressors in their life, adding up to a variety of healthy and unhealthy lifestyles. These variables may very well have had an additional effect on the readings before and after stimulation on any given week. Again, when you look at the cumulative graph of the readings of figures 4.13 and 4.14, it reflects a wide range of numbers in the pretests on the same individuals. Each set of data was separated by a week full of life's daily living variables.

On the plus side, the large population and wide range of ages make this study an excellent broad spectrum of a sampled population. The researcher's design of the experiment provided exact parameters at the time of data collection as defined in her design protocol. The room was the same, the temperature was the same, and the technique for collection was consistent every week. As seen in the analysis of movement toward the balance point or normal health value, approximately 98% of all the volunteers' data fell in the normal range. However,

each person's field varied from one week to the next depending on their individual stresses and life style.

Around the fourth session, volunteers were offered to choose by name (Fire, Earth, Water, Air, Crystal, or Chi) which ring they wanted to experience that day. The researcher used that to facilitate the random distribution of testing. The Ring of Crystal was the most popular, followed by the ring of Chi. The control group of points was named Chi by the researcher to hide its identity as the placebo. The Ring of Fire was the least popular one picked. The linguistic verbiage and personal perception of the titles of the rings may have affected the volunteer's expectations as to whether a change would occur after a one-time stimulation of points. None of the volunteers had prior experience with Dr. Shealy's rings of stimulation. Such expectation based on word interpretation is an unmeasurable variable in this study.

The GDV camera can be an excellent biofeedback tool. The volunteers revealed it in the interaction and responses. Everyone wanted copies of the testing and was anticipating the change in his before and after graphs. This suggests that, if one physically sees the feedback, he may be able to create a lifestyle that contributes to better mental and physical health. It might also enhance better health to see the change before and after such activities as hypnotherapy, exercise, or massage therapy.

The GDV technique is non-invasive and painless; however, the major drawback is finding someone properly trained in its use and interpretation. There does not seem to be much written information to date on the specifics of

interpretation of the GDV images. The GDV tells how the person is reacting to an illness or stressful situation either with a surge or reduced level of energy in that area. However, high and low levels of energy mean different things for different individuals. Just like a headache has a multitude of meanings as a symptom, low or high energy in the body can mean many things. The energy field is constantly in motion and many readings over different times are needed to determine any consistency of the pattern for each individual.

Further research and refined applications are needed to validate this tool in medicine. It is not a diagnostic tool; however, is very useful to indicate further investigation is needed by the more traditional modalities in modern medicine such as x-rays and blood analysis. The GDV is an inexpensive screening tool compared to the highly sophisticated devices found in hospitals.

A multitude of studies are being performed in Russia with the GDV. However, much more research is needed on the use of the GDV with the SheLi Stimulator and the Rings. As in any science, the more a device or theory is tested, the more information becomes available by which more discoveries and improvements may be made and refined.

## CHAPTER 6

### SUMMARY AND CONCLUSIONS

This study can be considered an overview of the state of the electromagnetic field as measured by the BEO-GDV both before and after stimulation of Dr. Shealy's five rings. Change could be seen in each participant's data both individually and collectively as a group. To reiterate, the qualitative data of the paired t-test using the left and right hand before and after measurements shows the following:

#### Conclusion for the Ring of Water:

Repeated measures t-tests showed that there were statistically significant increases from pre to post test on the left and right hands without the filter ( $p=.013$  and  $p<.001$ , respectively), but neither hand showed a corresponding change from pre to post test with the filter ( $p=.775$  and  $p=.496$ ).

#### Conclusion for the Ring of Fire:

Repeated measures t-tests showed that there were minute changes in mean results from pre to post test on the left and right hands with and without the filter, but the changes were too small to be statistically significant ( $p>.05$ ).

#### Conclusion for the Ring of Crystal:

Repeated measures t-tests showed that there were statistically significant increases from pre to post test on the left and right hands without the filter ( $p=.02$ ; and  $p=.004$ , respectively) and on the left hand with the filter ( $p=.05$ ). However, no difference was shown from pre test to post test for the right hand with filter.

#### Conclusion for the Ring of Earth:

Repeated measures t-tests show that there were statistically significant increases from pre to post test on the left and right hands without the filter

( $p < .001$ ,  $p = .023$ ), and on the right hand with the filter ( $p = .005$ ). However, no significant change was shown from pre test to post test for the left hand with filter.

Conclusion for the Ring of Air:

Repeated measures t-tests show that there were statistically significant increases from pre to post test on the left and right hands without the filter ( $t(55) = 3.88$ ,  $p < .001$ ; and  $t(55) = 3.87$ ,  $p < .001$ , respectively). However, no significant change was shown from pre test to post test for the right and left hand with filter.

Conclusion for the Control Group (non acupuncture points):

Repeated measures t-tests show that there were no statically significant increases from the pre to post test on the left and right hands without and with a filter.

A summary and comparison of the above conclusions is more easily demonstrated in Table 1.

The analysis of the JS Integer was used as the primary comparison using right and left hand data before and after, with a paired t-test. This parameter was chosen because it reflects the cumulative change or fractal coefficient in the electromagnetic field. Comparisons of the pre test or base line were made with measurements 20 minutes post administration of the stimulator. The statistical results definitively show a change in the pre and post test. The implication is that stimulation of the acupuncture points, defined as the rings, produces measurable results and is reflected with the use of the GDV camera in quantitative numbers. More testing and analysis would help define the variables outside the stimulation that also affect the imaging, as well as what the images indicate.

While the initial approach focused on the change of the average JS value, the final analysis showed that the most significant effect for all rings except the

Ring of Crystal was a movement of the reading toward what we have defined as a balance point. So on average, those who started out above this JS value were pulled down toward it, and those who started out below this value were pulled up toward it. For the Ring of Crystal all subjects were pulled up in JS value on average. All the other rings were stimulating the body for a specific chemical or hormone, whereas the Ring of Crystal was removing free radicals from the body. Therefore, the most significant result of this study was this movement toward homeostasis in the body for all rings, not just an overall increase or decrease in average value as was initially thought.

There were many other variables that were not known such as outside stressors of daily living and time. Future studies using only one ring per study would give a deeper analysis of the data gathered by the GDV. Different amounts of time could be used for measurement before and after, e.g., 15 minutes, 30 minutes, 1 hour, and 2 hours. Comparison of these numbers would give a researcher a better idea of the optimum collection time for each ring.

One hypothesis, deduced by the variation of change in the collected data in this study, is that the optimal time for collection was not 20 minutes for each ring. The wide variation of results from ring to ring indicates to the researcher that optimal time for post testing needs further investigation. The researcher believes that the time for the maximum change may very likely be different from ring to ring since they have different effects on the human body.

The experiment did show an electromagnetic change from the before and after data sets in all cases; however, the range varied from ring to ring as

described in the data analysis. Except for the Ring of Fire and the control group, statistically significant differences ( $p>0.05$ ) were found in all rings without a filter. In the Ring of Fire, the standard deviation is almost twice that of any other ring, which may suggest that the reason the Ring of Fire did not show a significant statistical change was because of that variance. The mean in this analysis did show the Ring of Fire was the most volatile of all the rings. Changes did occur in the filter analysis of the Rings of Fire, Water, and Air, as seen in the bar graphs in the previous chapter; however, not at the standard statistical norm of  $p>0.05$ .

Just as some medicines have a cumulative effect on the body, multiple stimulations by the SheLi TENS may prove to have a greater effect on the electromagnetic field. Future studies of each ring after daily stimulation for a week or month might be a better indication of the change in electromagnetic field. The researcher believes this is particularly true for the Ring of Fire. Dr. Shealy routinely suggests the Ring of Fire be done daily for at least one month before a retest is done to determine the change, as in the level of DHEA in the body. Often Dr. Shealy will recommend the Ring of Fire be used with another ring to maximize its effect, which suggests to the researcher that it acts as a catalyst or synergetic booster to the effect of other rings.

In the researcher's opinion, as stated in the previous chapter, the measurements of the electromagnetic field by the GDV after stimulation of the rings by the SheLi Tens unit evidence a change toward balance in the electromagnetic field and the normal values of good health (-0.6 to 1.0). Figures

17 through 28, showing the change in the post test reading versus the pre test value, demonstrate this conclusion. Figure 29 summarizes the percent change toward the balance point. The plots show that people who start out below the balance point (-0.6 to 1.0) are pulled up toward it and people who start out above this point are pulled down to it. The greater the distance the electromagnetic field measured from the normal value in the pre test, the more the field would move after stimulation toward normal values. On the other hand, the closer the pre-measured value was to the norm, the less change was seen on the post testing. This confirms the principle that the rings of stimulation do in fact balance the body toward a healthy state of functioning.

The standard statistical approach which just compares pre and post tests failed to indicate what was really happening in all cases. In some cases the people being pulled up were cancelled by those who were pulled down toward the balance or normal healthy range.

It was observed that many volunteers were subjectively looking for an increased field after the stimulation of the acupuncture points. It was pointed out to them that in a healthy individual, the balance curve in the GDV diagram is situated in the middle circle. Most of the volunteers were hoping to see an expansion of the electromagnetic field between the pre and post readings. They were reminded that balancing existing energy around the body may be more important than changing the volume of electromagnetic energy to a larger amount.

The data presented in this study is merely a capture in a moment in time. However, a realistic conclusion to be drawn from this study is that the

electromagnetic field may be much more important to health and growth process than previously suspected. An imbalance or distortion in the field could eventually indicate a potential disease in the psychological or physical body. Balancing these distortions would bring about healing and/or prevent illness in the physical body. Knowing where one's field lies gives valuable information to maintaining and evaluating good health. The researcher concludes that this feedback is the greatest advantage of the BEO-GDV. If one can visually see a picture of himself, it can help validate a feeling about a treatment he has received, such as massage therapy, healing touch, etc. The BEO-GDV has a tremendous potential in its use in Complementary Alternative Modalities.

The GDV technique is non-invasive and painless; however, the major drawback remains finding someone properly trained in its use and interpretation. There does not seem to be much written information to date on the specifics of interpretation of the GDV images. Perhaps more workshops will become available for training as the usage of the BEO-GDV imaging machine continues to grow.

The GDV tells how the person is reacting to an illness or stressful situation either with a surge or reduced level of electromagnetic field in that area. However, high and low levels of energy mean different things for different individuals. Just like a headache has a multitude of meanings as a symptom, low or high energy readings in the body can mean many things. The electromagnetic field is constantly in motion and many readings over different times are needed to determine any consistency of patterns. Further research and refined applications

are needed to validate this tool in medicine. One must be reminded that the BEO-GDV is not the tool to use for a diagnosis. It only gives the user information that something exists in the electromagnetic field that warrants further investigation; or, that the measurement reflects that the field appears in balance based on the normal values learned in previous studies.

The GDV device offers numerous ways to compare and conduct an analysis of the numbers within all the parameters discussed in the earlier sections. This lends itself to a detailed analysis and the potential for several papers to emerge from this research, although it is very important to have a diligent practitioner in the approach for the interpretation of data. This study provides a basis and lays the groundwork for more intensive studies comparing the change in the energy field before and after stimulation of Dr. Shealy's Rings of Fire, Earth, Water, Air and Crystal.

The researcher of this study suggests the following for future studies:

1. The amount of time of 20 minutes allowed between pre and post readings may not have been the optimal time for measuring maximum change in the electromagnetic field after one stimulation for the Ring. Further testing is needed to verify this.
2. Human energy fields are dynamic and are believed to expand with time after stimulation of acupuncture points. Because the rings of stimulation do increase and balance the body, it would be valuable to pursue a regular stimulation of the acupuncture points. An excellent research project would be to study the change in the field

using the GDV as a measure long term, testing either daily or weekly for 4-6 weeks.

3. There are other variables at work that have not been detected that explain why the shift was not statistically significant in this study.
4. Since the Ring of Fire has the most significant change toward the balance point of any of the rings, it is the best candidate for the next longer term studies.
5. Since this study only has two percent of the participants out of the normal range, better results might be obtained by studying more subjects outside this range. This study could be a baseline to contrast with an unhealthy population, or disease process.
6. Since this study considered only the overall JS integer, a breakdown of sectors utilizing this data could show considerably more detailed analysis. However, while that is beyond the scope of this study, the data is available for those who have the resources to pursue it.

*Every particle of matter in the universe is connected with every other particle of matter by electric charging poles, which are the controls of opposing electromagnetic cones of energy.*

*Walter Russell*

## APPENDIX A

### THE SACRED RINGS

by C. Norman Shealy, MD PhD

<b>ROF</b> RING OF FIRE <b>K 3</b> <b>CV 2,6,18</b> <b>B 22</b> <b>MH 6</b> <b>LI18 GV 20</b>	<b>USEFUL FOR DHEA RESTORATION, Treatment of Migraine, Diabetic Neuropathy and Rheumatoid Arthritis</b>
<b>ROE</b> RING OF EARTH <b>K 1</b> <b>B 54, 60</b> <b>LI 16</b> <b>S 9</b> <b>SI 17</b> <b>GV 20</b>	<b>USEFUL FOR MAGNETIC CONTACT WITH EARTH; OVERCOMING PHOBIC REACTION, SKIN DISORDERS, ALS, REDESIGN OF PHYSICAL BODY, OVER- COMING SEDUCTIONS, INCLUDING DRUG ADDICTIONS, ILLUSIONS, POSSESSION CEREBRAL PALSY, CONFUSION, PHYSICAL PAIN. FOR NEUROLOGICAL DISORDERS, NEED ALSO THE ROC</b>
<b>ROA</b> RING OF AIR <b>SP 1A</b> <b>LIV 3</b> <b>S 36</b> <b>L 1</b> <b>G 20</b> <b>GV 1, 16,20</b>	<b>FOR SIMULTANEITY OF THOUGHT, HOLOGRAPHIC THINKING, TINNITUS TO ADVANCE CONSCIOUSNESS, MENTAL CREATIVITY, SYMBOLIC THOUGHT, MYSTICAL INSIGHT, AUTISM, INTEGRAT- ION, DOWN'S (WITH ROE) , TO HEAL RAGE</b>
<b>ROW</b> RING OF WATER <b>SP 4 CV 14</b> <b>HEART TH 16</b> <b>H 7 GV 20</b> <b>B 10, 13</b>	<b>BALANCING EMOTIONS, FORGIVENESS CONTACTING CHRISTOLOGICAL  OBESITY, LOWERING CHOLESTEROL ALL EDEMA AND CONGESTION</b>
<b>ROC</b> RING OF CRYSTAL <b>SP 4</b> <b>CV 8,5</b> <b>GV 4.5</b> <b>GV 14.5</b> <b>CV 23</b> <b>GB 30.5</b> <b>GB 11</b> <b>GV 20</b>	<b>NEUROLOGICAL DISEASES, PARALYSIS, ASSISTS IN REGENERATION REGULATES OVERALL ENERGETIC SYS.</b>

MAY 2000

**APPENDIX B**  
**CONSENT FORM**

Holos University supports the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish to participate in the present study. You should be aware that even if you agree to participate, you are free to withdraw at any time without penalty.

The purpose of this study is to see the change in the human energy field after stimulation of certain acupuncture points with a TENS. The length of the study is for seven sessions. If you are selected as a participant, you will be measured by an instrument that measures the human energy field (or GDV) before and after the treatment with a She-Li-Tens stimulator (TENS) for each set of acupuncture points. The points will be stimulated for 5 minutes. The follow up visits will be at least 5 days apart from each other. Approximately one hour will be needed for each session.

You may or may not receive any benefit from the treatments. Possible risks associated with your participation may include skin redness or irritation at the site where the SheLi-Tens is in contact.

As a volunteer, you will be participating in the study of your own free will, without any pressure, and you may quit the study any time you wish without penalty. Any new information that is developed during the course of the study will be made available to you.

Your identity as a part of this study will be kept confidential. For your safety, your name, address will be filed in a secure place by the researcher. Results of the study may be reported in scientific presentations or publications, but you will not be identified.

If you would like additional information concerning this study before or after it is complete, please feel free to contact me by phone, mail, or email.

Barbara Haydon  
P.O. Box 159  
Brasstown, North Carolina 28903  
(828) 837-2176  
Email *barbh4847@earthlink.net*

Participant's Signature \_\_\_\_\_  
Date: \_\_\_\_\_ Print Name \_\_\_\_\_  
Witness \_\_\_\_\_

**APPENDIX C**

**MEDICAL HISTORY**

Below is a medical history questionnaire. It is needed to determine if there are any reasons why you may or may not wish to be a participant in the study. The researcher will review the form before the beginning the project with you. She will answer and clarify any questions you may have.

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone: \_\_\_\_\_  
Sex \_\_\_\_\_ Race \_\_\_\_\_  
Occupation \_\_\_\_\_  
Year of birth \_\_\_\_\_

Do you have any current health condition? Yes \_\_\_ NO \_\_\_  
If yes please explain:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Are you currently taking any medications prescription or non-prescription?  
Please list.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Do you have any cardio-vascular disease? Stroke? Heart attack? If yes, please explain.

Do you have any bleeding or tendencies to bleeding? If yes, please explain.

Do you have any of the following?

- Epilepsy
- Hysteria
- Psychosis
- Skin sensitivity disorders

Acute disturbance of cerebral circulation  
Heightened sensitivity to ionized air  
Presence of implanted stimulators (cardio stimulators, pacemakers, etc)

If yes to any of the above questions, please explain.

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Is there any other health problems, not listed above, that you currently have?  
Please explain.

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What diagnosis have any of your physicians given you in the past?

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Is there anything else that is important about your medical status that is important  
for the research to know?

## APPENDIX D

### SYMPTOM INDEX

Name: \_\_\_\_\_ Date: \_\_\_\_\_

When people are chronically ill, they often have other symptoms. Do you have any of the following? PLEASE CHECK ONLY THOSE THAT YOU HAVE NOW OR HAVE HAD WITH YOUR CURRENT ILLNESS.

- Depressed mood.
- Loss of interest or pleasure in things you used to enjoy.
- Significant weight change (loss or gain).
- Frequent eating between meals.
- Insomnia.
- Hypersomnia.
- Sleep walking.
- Agitation
- Sluggishness, slow to function.
- Fatigue, low energy, feeling tired a lot the time.
- Feelings of worthlessness or guilt.
- Difficulty concentrating, thinking, and remembering.
- Indecisiveness.
- Recurrent thoughts of death or suicide.
- Suicide attempts.
- Nervous exhaustion.
- Worrying excessively or being anxious.
- Frequent crying.
- Being extremely shy or sensitive.
- Lumps or swelling in your neck.
- Blurring of vision.
- Seeing double.
- Seeing colored halos around lights.
- Pains or itching around the eyes.
- Excess blinking or watering of the eyes.
- Loss of vision.
- Difficulty hearing.
- Ear ache.
- Running ear.
- Buzzing or other noises in the ears.
- Motion sickness.
- Teeth or gum problems.
- Sore or sensitive tongue.
- Change in sense of taste.
- Nose stuffed up.

- Runny nose.
- Sneezing spells.
- Frequent head colds.
- Bleeding from the nose.
- Sore throat even without a cold.
- Enlarged tonsils.
- Hoarse voice even without a cold.
- Difficulty or pain in swallowing.
- Wheezing or difficulty breathing.
- Coughing spells.
- Coughing up a lot of phlegm.
- Coughing up blood.
- Chest colds more than once a month.
- High blood pressure.
- Low blood pressure.
- Heart trouble.
- Thumping or racing heart.
- Pain or tightness in the chest.
- Shortness of breath.
- Heartburn.
- Feeling bloated.
- Excess belching.
- Discomfort in the pit of your stomach.
- Nausea.
- Vomiting blood.
- Peptic ulcer.
- Change in appetite.
- Digestive problems.
- Easy burning skin.
- Dizziness or light headedness.
- Feeling faint or fainting.
- Numbness in any part of your body.
- Cold hands or feet even in hot weather.
- Paralysis.
- Blacking out.
- Fits, convulsions, or epilepsy.
- Change in your handwriting.
- Tendency to shake or tremble.
- Tendency to be too hot or too cold.
- Sweating more than usual.
- Hot flashes.
- Being short of breath with minimal effort.
- Failure to get adequate exercise.
- Being overweight.
- Being underweight.
- Having lost more than half your teeth.

- Bleeding gums.
- Badly coated tongue.
- A lot of small accidents or injuries.
- Varicose veins.
- Headaches.
- Other aches or pains.
- Feeling pessimistic or hopeless.
- Have had any kind of surgery within the past year.
- Being upset easily by criticism.
- Having little annoyances get on your nerves and make you angry.
- Getting angry easily.
- Getting nervous around strangers.
- Feeling lonely.
- Having difficulty relaxing.
- Being troubled by frightening dreams or thoughts.
- Being disturbed by work or family problems.
- Excess hunger.
- Getting up frequently at night to urinate.
- Urinating more than 5-6 times a day.
- Unable to control your urine.
- Burning or pains when you urinate.
- Black, brown, or bloody urine.
- Difficulty starting your urine.
- Constant urge to urinate.
- Constipation.
- Diarrhea.
- Black or bloody bowel movement.
- Grey bowel movement.
- Pain when you move your bowels.
- Bleeding from your rectum.
- Stomach pains which double you up.
- Frequent stomach trouble.
- Intestinal worms.
- Hemorrhoids.
- Yellow jaundice.
- Biting your nails.
- Stuttering or stammering.
- Any kind of problem with your genital or sexual organs.
- Sexual problems.
- Hernia or rupture.
- Kidney or bladder disease.
- Stiff or painful muscles or joints.
- Swelling joints.
- Pain in your back or shoulders.
- Painful feet,
- Swelling in your armpits or groin.

- Trouble with swollen feet or ankles.
- Cramps in your legs at night or with walking.
- Itching or burning skin.
- Excess bleeding from a small cut.
- Wishing that you could get psychological or psychiatric help.
- Being tense or jittery.
- Being easily upset.
- Being in low spirits.
- Being in very low spirits.
- Believing that your life is out of your hands and controlled by external forces.
- Feeling that life is empty, filled with despair.
- Having no goals or aims at all.
- Having failed to make progress towards your life goals.
- Feeling that you are completely bound by factors outside yourself.
- Feeling sad, blue, or down in the dumps.
- Feeling slowed down or restless and unable to sit still.
- Being confined to bed by illness.

For men only:

- Having urine stream that is very weak or very slow.
- Having prostate trouble.
- Having unusual burning or discharge from your penis.
- Having swelling or lumps in your testicles.
- Having your testicles painful.
- Having trouble getting erections (getting hard).

For women only:

- Having trouble with your menstrual period.
- Bleeding between your periods.
- Having heavy bleeding with your periods.
- Getting bloated or irritable before your periods.
- Taking birth control pills (in the last year).
- Having lumps in your breasts.
- Having excess discharge from your vagina.
- Feeling weak or sick with your periods.
- Having to lie down when your periods start.
- Feeling tense and jumpy with your periods.
- Having constant hot flashes and sweats.
- Have had a hysterectomy or on hormonal replacement.

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## **APPENDIX E**

### **JS INTEGER/STANDARD DEVIATION DATA**

The following charts show the data results as collected on the GDV program. The data compiled in an Excel program are in the following order:

Ring of Fire

Ring of Water

Ring of Earth

Ring of Air

Ring of Crystal

Control

Within each chart are the left and right hands, before and after, with and without a filter. Also listed is the standard deviation of each. All of this data is reflected in the statistical analysis in Chapter 4.

# Ring of Fire Data

Subject	102	0.33	0.41	0.40	0.54	0.27	0.26	0.25	0.28	0.34	0.44	0.37	0.41	0.22	0.22	0.36	0.25	0.31	0.07	0.13	0.03	-0.03	0.93	1.08	1.14	0.86	-0.11
JS IntegerDleft pre w/o	103	-0.72	-1.08	0.27	0.11	0.68	0.77	0.30	0.23	-0.55	-0.45	0.33	0.20	0.20	0.54	0.46	0.22	0.19	1.00	1.19	0.88	0.65	0.44	0.30	0.41	0.40	0.97
JS IntegerDleft pre Dwo	104	0.32	0.64	0.06	0.56	0.27	0.41	0.33	0.30	0.25	0.52	0.13	0.42	0.29	0.24	0.31	0.33	-0.26	-0.08	-0.12	-0.10	1.22	0.73	1.07	1.38	-0.27	
JS IntegerDright pre Dwo	105	0.43	0.33	0.63	0.44	0.23	0.16	0.22	0.29	0.19	0.21	0.28	0.28	0.19	0.21	0.23	0.32	-0.03	0.11	0.09	0.07	0.96	1.81	1.21	1.52	-0.64	
JS Integer Dleft post w/o	106	0.47	0.65	0.48	0.70	0.36	0.25	0.30	0.31	1.35	0.51	0.33	0.45	1.36	0.24	0.34	0.24	0.01	0.05	-1.02	-0.06	0.83	1.24	0.25	1.00	0.34	
JS Integer Dright post Dwo	107	-0.11	-0.11	-0.11	0.51	0.39	0.36	0.49	0.40	0.05	0.04	-0.24	-0.58	0.43	0.34	0.49	0.49	0.00	0.62	-0.29	-0.61	1.26	1.11	1.14	1.44	-0.92	
Pre IntDStandardDDeviation	108	0.25	0.43	0.27	0.39	0.33	0.25	0.24	0.26	0.34	0.34	0.34	0.34	0.21	0.19	0.24	0.27	0.02	-0.04	0.00	0.00	0.73	1.04	1.14	1.42	0.04	
Pre rightDStandardDDeviation	109	0.30	0.24	0.40	0.53	0.36	0.35	0.24	0.31	0.52	0.58	0.27	0.28	0.31	0.33	0.31	0.31	0.10	0.29	-0.26	-0.30	0.67	0.80	1.00	0.94	0.17	
Post IntDStandardDDeviation	110	0.26	0.06	0.48	0.51	0.31	0.28	0.43	0.36	0.35	0.27	0.55	0.43	0.25	0.27	0.29	0.21	0.22	0.45	0.21	0.16	1.39	1.29	1.16	0.78	0.29	
Post rightDStandardDDeviation	111	0.07	0.16	0.54	0.51	0.46	0.56	0.34	0.24	0.71	0.66	0.76	0.75	0.24	0.29	0.24	0.18	0.47	0.36	0.05	0.09	0.74	0.43	1.00	0.62	1.60	
	112	0.05	0.09	-0.07	0.13	0.24	0.22	0.31	0.20	0.09	0.12	0.05	0.03	0.19	0.19	0.22	0.23	-0.12	0.03	-0.04	-0.09	1.29	0.91	1.16	1.21	0.08	
	113	0.28	0.43	0.17	0.33	0.32	0.28	0.40	0.24	0.61	0.42	0.65	0.42	0.34	0.21	0.36	0.20	-0.11	-0.10	-0.08	0.01	1.25	0.86	1.06	0.95	0.79	
	115	0.39	0.29	0.49	0.57	0.33	0.27	0.53	0.26	0.27	0.27	0.30	0.37	0.20	0.22	0.21	0.31	0.10	0.20	0.11	0.11	1.01	0.96	0.75	1.41	-0.45	
	116	0.39	0.29	0.49	0.46	0.33	0.27	0.53	0.26	0.27	0.27	0.38	0.37	0.28	0.22	0.21	0.31	0.10	0.16	0.11	0.11	1.61	0.96	0.75	1.41	-0.33	
	117	-0.03	-0.06	0.12	0.25	0.18	0.30	0.28	0.32	0.05	0.11	0.07	0.17	0.23	0.30	0.23	0.29	0.14	0.31	0.02	0.06	1.56	1.07	1.00	0.97	0.10	
	118	0.03	0.01	-0.16	0.06	0.32	0.28	0.38	0.24	0.32	0.18	0.21	0.12	0.18	0.18	0.27	0.24	-0.19	0.05	-0.11	-0.06	1.19	0.86	1.50	1.33	0.90	
	119	0.43	0.33	0.26	0.38	1.07	0.23	0.18	0.21	0.27	0.36	0.36	0.53	0.21	0.28	0.24	0.20	-0.17	0.05	0.09	0.17	0.17	0.91	1.14	0.71	0.11	
	121	0.21	0.12	-0.07	-0.09	0.33	0.45	0.26	0.30	0.08	0.13	0.10	-0.07	0.29	0.18	0.17	0.20	-0.28	-0.21	0.01	-0.20	0.85	0.67	0.59	1.11	0.06	
	122	-0.31	-0.06	0.12	0.08	0.42	0.31	0.24	0.24	0.17	0.11	0.26	0.21	0.31	0.28	0.21	0.29	0.43	0.14	0.09	0.10	0.57	0.77	0.88	1.04	0.06	
	125	0.74	0.52	0.62	0.46	0.46	0.29	0.31	0.30	0.68	0.50	0.74	0.44	0.31	0.23	0.27	0.25	-0.12	-0.06	0.06	-0.06	0.67	1.03	0.87	1.09	0.01	
	126	0.30	0.22	0.07	0.14	0.20	0.27	0.38	0.36	0.13	0.24	0.10	0.16	0.29	0.24	0.23	0.24	-0.24	-0.08	-0.03	-0.08	1.90	1.33	0.79	1.00	-0.10	
	128	0.34	0.29	0.40	0.50	0.34	0.28	0.22	0.29	0.45	0.50	0.43	0.41	0.25	0.26	0.32	0.23	0.06	0.21	-0.02	-0.09	0.65	1.04	1.28	0.89	0.26	
	135	0.40	0.45	0.41	0.44	0.24	0.28	0.31	0.27	0.43	0.42	0.53	0.33	0.18	0.20	0.22	0.18	0.01	-0.01	0.10	-0.08	1.29	0.96	1.22	0.90	0.01	
	138	0.22	0.37	0.38	0.35	0.24	0.37	0.30	0.35	0.35	0.25	0.30	0.27	0.43	0.23	0.35	0.22	0.17	-0.02	-0.05	0.02	1.25	0.95	0.81	0.98	-0.13	
	140	-0.37	-0.55	0.01	0.04	0.45	0.39	0.36	0.28	0.35	0.24	0.26	0.23	0.28	0.28	0.24	0.24	0.38	0.59	-0.09	-0.02	0.80	0.67	0.92	0.88	1.95	
	141	-0.01	-0.17	0.20	0.29	0.42	0.37	0.38	0.27	0.27	0.20	0.30	0.23	0.32	0.31	0.33	0.33	0.21	0.46	0.03	0.02	0.90	0.73	1.03	1.06	0.68	
	160	0.37	0.24	0.28	0.25	0.23	0.30	0.29	0.32	0.36	0.29	0.22	0.36	0.23	0.27	0.26	0.23	-0.09	0.01	-0.14	0.07	1.26	1.07	1.13	0.85	0.09	
	161	0.30	0.30	0.10	0.10	0.35	0.21	0.27	0.25	0.13	0.14	0.16	0.12	0.21	0.23	0.26	0.31	-0.20	-0.20	0.03	-0.02	0.77	1.19	1.24	1.35	-0.24	
	163	-0.03	-0.57	0.14	-0.32	0.43	0.62	0.32	0.55	0.31	0.04	0.17	-0.01	0.28	0.24	0.29	0.26	0.17	0.26	-0.15	-0.05	0.74	0.89	1.04	1.08	1.29	
	169	0.12	0.10	0.34	0.23	0.30	0.42	0.29	0.41	0.39	0.40	0.41	0.40	0.25	0.17	0.19	0.11	0.22	0.08	0.02	0.00	0.81	0.98	0.76	0.65	0.76	
	172	-0.17	-0.26	0.17	-0.01	0.35	0.26	0.39	0.33	0.27	-0.08	0.19	-0.04	0.26	0.17	0.21	0.16	0.34	0.25	-0.08	0.04	1.11	1.27	0.81	0.94	0.61	
	200	0.46	0.46	0.04	-0.08	0.21	0.25	0.30	0.47	0.40	0.41	0.41	0.42	0.22	0.24	0.24	0.22	-0.41	-0.53	0.01	0.01	1.43	1.88	1.09	0.92	0.76	
	201	-0.10	-0.04	-0.15	-0.14	0.26	0.31	0.36	0.28	-0.01	0.02	0.03	0.02	0.31	0.35	0.30	0.32	-0.05	-0.10	0.04	0.00	1.38	0.90	0.97	0.91	0.48	
	202	-0.19	-0.14	-0.09	0.17	0.26	0.22	0.24	0.40	-0.02	-0.02	0.01	0.13	0.21	0.22	0.27	0.32	0.10	0.31	0.03	0.15	0.92	1.82	1.29	1.45	0.34	
	203	-0.19	-0.14	-0.09	0.17	0.26	0.22	0.24	0.40	0.41	0.28	0.27	0.27	0.25	0.19	0.16	0.24	0.10	0.31	-0.15	-0.01	0.92	1.09	0.64	1.26	1.47	
	204	0.52	0.54	0.33	0.22	0.36	0.33	0.42	0.32	0.59	0.17	0.63	-0.05	0.79	0.24	1.80	0.32	-0.18	-0.32	0.03	-0.22	1.17	0.97	2.28	1.33	-0.27	
	205	0.07	0.27	-0.04	0.16	0.30	0.26	0.32	0.27	0.08	-0.01	0.06	0.03	0.34	0.29	0.26	0.25	-0.10	-0.11	-0.02	0.04	1.07	1.04	0.76	0.86	-0.30	
	206	0.14	0.23	0.13	0.10	0.22	0.24	0.28	0.25	0.06	0.08	0.06	-0.05	0.20	0.19	0.20	0.24	0.00	-0.13	0.00	-0.13	1.27	1.04	1.00	1.26	-0.45	
	207	-0.30	-0.05	0.09	0.00	0.27	0.35	0.35	0.25	-0.56	-0.27	-0.15	-0.00	0.98	0.44	0.29	0.29	0.39	0.05	0.42	0.27	1.30	0.71	0.30	0.64	-0.72	
	208	-0.12	0.00	-0.38	-0.18	0.26	0.17	0.31	0.21	-0.09	-0.01	-0.12	-0.08	0.23	0.22	0.26	0.26	-0.26	-0.18	-0.03	-0.08	1.19	1.24	1.13	1.18	0.39	
	209	0.02	-0.61	0.31	0.27	0.32	0.83	0.26	0.30	0.34	0.12	0.28	0.31	0.21	0.23	0.27	0.25	0.33	0.88	-0.06	0.19	0.81	0.36	1.29	1.09	1.12	
	210	0.03	0.03	0.14	0.00	0.24	0.26	0.27	0.34	-0.07	-0.10	-0.08	-0.02	0.27	0.19	0.21	0.23	0.11	-0.03	-0.01	0.08	1.13	1.31	0.78	1.21	-0.47	
	211	-0.38	-0.26	-0.66	-0.63	0.54	0.54	0.39	0.27	-0.26	-0.19	-0.23	-0.25	0.21	0.25	0.21	0.25	-0.28	-0.36	0.03	-0.09	0.72	0.50	1.00	1.00	1.00	
	212	1.62	1.04	-0.34	-0.07	1.11	0.60	0.39	0.34	-0.47	-0.15	-0.05	-0.03	0.57	0.33	0.22	0.30	-1.95	-1.10	0.41	0.12	0.35	0.52	0.39	1.15	-2.90	
	213	-0.21	-0.22	-0.25	-0.12	0.36	0.41	0.38	0.32	-0.10	-0.11	-0.01	-0.07	0.20	0.30	0.25	0.26	-0.03	0.10	0.09	0.05	1.06	0.78	1.25	0.87	0.52	
	214	0.06	0.00	0.16	-0.01	0.27	0.30	0.32	0.16	0.12	0.26	-0.04	-0.05	0.31	0.38	0.26	0.37	0.09	0.00	-0.15	-0.31	1.19	0.53	0.84	0.97	0.08	
	215	0.12	0.26	-0.21	-0.29	0.31	0.38	0.23	0.29	0.00	0.00	-0.04	-0.05	0.27	0.30	0.20	0.37	-0.32	-0.55	-0.10	-0.05	0.74	0.76	0.96	1.23	0.08	
	216	-0.03	0.09	0.18	0.05	0.26	0.22	0.29	0.30	-0.01	-0.18	-0.02	-0.10	0.24	0.22	0.29	0.18	0.21	-0.04	-0.01	0.08	1.12	1.36	1.21	0.82	-0.60	
	217	-0.22	-0.18	-0.32	-0.32	0.35	0.41	0.29	0.35	-0.26	-0.17	-0.27	-0.28	0.35	0.27	0.36	0.26	-0.09	-0.13	-0.01	-0.11	0.83	0.85	1.03	0.96	0.05	
	218	0.11	0.06	-0.54	-0.59</																						



# Ring of Earth Data

Subject	US Integer:left pre wo	US Integer:right pre wo	US Integer:left post wo	US Integer:right post wo	Pre left:Standard:Deviation	Pre right:Standard:Deviation	Post left:Standard:Deviation	Post right:Standard:Deviation	US Integer:left pre with filter	US Integer:right pre with filter	US Integer:left post with filter	US Integer:right post with filter	Pre left:Standard:Deviation	Pre right:Standard:Deviation	Post left:Standard:Deviation	Post right:Standard:Deviation	Change Left [post - pre] wo	Change Right [post - pre] wo	Change Left [post - pre] with	Change Right [post - pre] with	Ratio of Left Std Post/Pre wo	Ratio of Right Std Post/Pre wo	Ratio of Left Std Post/Pre with	Ratio of Right Std Post/Pre with	Diff [with - wo]
102	0.07	0.20	0.21	0.22	0.44	0.30	0.42	0.40	0.17	0.11	0.27	0.28	0.38	0.27	0.31	0.22	0.14	0.02	0.10	0.17	0.95	1.33	0.82	0.81	0.14
103	0.17	0.14	0.10	0.18	0.32	0.22	0.27	0.30	0.19	0.08	-0.06	-0.11	0.32	0.30	0.32	0.28	0.02	0.01	-0.26	-0.10	0.84	1.38	1.00	0.83	-0.66
104	0.36	0.37	0.21	0.24	0.22	0.28	0.25	0.23	0.21	0.28	0.19	0.16	0.27	0.28	0.25	0.26	-0.16	-0.13	-0.02	-0.12	1.14	0.82	0.93	0.93	-0.34
105	0.33	0.34	0.31	0.28	0.23	0.28	0.23	0.25	0.32	0.17	0.25	0.23	0.23	0.25	0.21	0.21	-0.03	-0.07	-0.07	0.06	1.00	0.89	0.91	0.84	-0.29
106	-0.02	0.09	0.00	0.25	0.46	0.31	0.31	0.28	0.19	0.12	0.12	0.44	0.32	0.29	0.26	0.31	0.02	0.15	-0.07	0.32	0.67	0.90	0.81	1.07	0.55
108	0.50	0.21	0.43	0.34	0.30	0.35	0.38	0.29	0.53	0.29	0.41	0.36	0.31	0.22	0.25	0.26	-0.06	0.13	-0.12	0.07	1.27	0.93	0.91	1.19	0.10
109	0.37	0.37	0.18	0.15	0.28	0.30	0.44	0.37	0.48	0.42	0.37	0.37	0.22	0.27	0.27	0.33	-0.20	-0.23	-0.12	-0.05	1.57	1.23	1.23	1.22	0.57
110	0.31	0.45	0.42	0.50	0.32	0.18	0.33	0.26	0.36	0.41	0.30	0.38	0.31	0.31	0.22	0.32	0.10	0.04	-0.07	-0.04	1.03	1.44	0.71	1.03	-0.23
111	0.38	0.20	0.62	0.66	0.63	0.38	0.44	0.33	0.77	0.40	1.05	0.60	0.47	0.34	0.29	0.21	0.24	0.47	0.28	0.31	0.70	0.61	0.62	0.68	1.27
112	-0.44	-0.38	-0.07	0.09	0.69	0.50	0.37	0.28	0.21	0.28	0.25	0.15	0.20	0.26	0.26	0.25	0.37	0.47	0.04	-0.13	0.54	0.52	1.30	0.96	1.70
113	0.00	0.19	0.41	0.48	0.33	0.26	0.24	0.24	0.24	0.28	0.51	0.53	0.20	0.21	0.22	0.27	0.40	0.29	0.27	0.25	0.73	0.92	1.10	1.29	0.47
114	0.14	0.31	0.57	0.52	0.30	0.21	0.20	0.19	0.26	0.20	0.51	0.48	0.23	0.26	0.22	0.26	0.43	0.21	0.26	0.28	0.67	0.90	0.96	1.00	-0.10
115	0.12	0.18	0.21	0.28	0.30	0.21	0.23	0.19	0.14	0.30	0.29	0.32	0.18	0.14	0.13	0.15	0.09	0.10	0.15	0.02	0.77	0.90	0.72	1.07	0.28
116	0.50	0.64	0.37	0.47	0.25	0.32	0.23	0.27	0.35	0.34	0.26	0.30	0.36	0.32	0.30	0.26	-0.14	-0.17	-0.09	-0.04	0.92	0.84	0.93	0.81	-0.73
117	-0.16	-0.11	0.02	0.21	0.38	0.45	0.31	0.44	0.07	0.04	-0.12	0.08	0.26	0.28	0.27	0.22	0.18	0.32	-0.19	0.04	0.82	0.98	1.04	0.79	0.10
118	-0.43	-0.05	0.14	0.10	0.38	0.37	0.27	0.33	0.12	0.04	0.15	0.24	0.23	0.19	0.32	0.24	0.57	0.15	0.04	0.19	0.71	0.89	1.39	1.26	0.79
119	0.10	0.04	0.30	0.63	0.34	0.40	0.20	0.30	0.20	0.17	0.40	0.42	0.30	0.31	0.26	0.22	0.20	0.59	0.12	0.25	0.59	0.75	0.87	0.71	0.20
121	-0.50	-0.62	-0.32	-0.34	0.35	0.37	0.41	0.41	-0.22	-0.22	-0.15	0.01	0.28	0.25	0.28	0.20	0.18	0.28	0.07	0.22	1.17	1.11	1.00	0.80	1.20
122	0.29	0.22	0.43	0.30	0.21	0.25	0.34	0.29	0.30	0.20	0.40	0.49	0.30	0.20	0.25	0.22	0.14	0.09	0.04	0.23	1.14	1.10	0.83	1.10	0.25
123	0.66	0.57	0.52	0.44	0.18	0.24	0.20	0.20	0.52	0.64	0.67	0.40	0.21	0.26	0.28	0.21	-0.14	-0.12	0.15	-0.24	1.11	0.83	1.33	0.81	0.03
124	-0.04	-0.19	0.01	-0.20	0.27	0.29	0.26	-0.32	0.07	0.01	0.15	0.15	0.19	0.18	0.20	0.25	0.04	-0.01	0.09	0.14	0.96	-1.10	1.05	1.39	0.79
125	0.64	0.33	0.77	0.48	0.34	0.22	0.23	0.23	0.76	0.46	1.03	0.65	0.29	0.19	0.31	0.31	0.13	0.15	0.27	0.19	0.68	1.05	1.07	1.03	0.68
126	0.25	0.32	0.39	0.43	0.27	0.18	0.15	0.22	0.31	0.39	0.39	0.52	0.25	0.25	0.22	0.21	0.14	0.11	0.09	0.13	0.56	1.22	0.88	0.94	0.22
129	0.29	0.15	0.48	0.38	0.30	0.24	0.37	0.37	0.34	0.25	0.46	0.25	0.42	0.40	0.40	0.40	0.19	0.23	0.12	0.01	1.23	1.09	0.96	1.15	0.01
130	0.06	0.44	0.34	0.94	0.31	0.20	0.24	0.26	0.60	0.61	0.48	0.71	0.21	0.32	0.27	0.26	0.29	0.50	-0.18	0.10	0.77	1.30	1.29	0.81	0.68
160	0.33	0.28	0.54	0.38	0.21	0.22	0.21	0.31	0.57	0.43	0.40	0.37	0.19	0.29	0.27	0.27	0.21	0.10	-0.17	-0.06	1.00	1.41	1.42	0.93	0.23
161	0.17	0.42	0.15	0.18	0.26	0.26	0.30	0.16	0.17	0.11	0.14	0.11	0.19	0.16	0.24	0.21	-0.02	-0.24	-0.04	0.00	1.15	0.62	1.29	1.31	-0.38
163	0.05	0.06	0.19	0.03	0.37	0.22	0.29	0.27	0.25	0.12	-0.04	0.17	0.22	0.23	0.30	0.30	0.14	-0.03	-0.11	-0.15	0.78	1.23	1.35	1.36	0.44
164	0.45	0.69	0.57	0.44	0.21	0.27	0.47	0.19	0.71	0.67	0.64	0.48	0.40	0.15	0.26	0.33	0.12	-0.26	-0.08	-0.19	2.24	0.70	0.65	2.20	0.35
171	0.55	0.44	0.63	0.71	0.26	0.27	0.32	0.25	0.78	0.59	0.89	0.44	0.38	0.30	0.21	0.26	0.09	0.27	-0.07	-0.16	1.23	0.93	0.58	0.87	0.16
179	0.20	0.26	0.33	0.21	0.31	0.27	0.30	0.28	0.35	0.30	0.30	0.25	0.34	0.24	0.26	0.26	0.13	-0.04	-0.05	0.00	0.97	1.04	0.96	0.76	0.32
180	0.25	0.16	-0.02	0.16	0.26	0.21	0.32	0.22	0.58	0.30	0.26	0.23	0.30	0.18	0.35	0.28	-0.27	0.00	-0.31	-0.08	1.23	1.05	1.17	1.56	0.83
181	0.27	0.38	0.49	0.39	0.34	0.29	0.33	0.22	0.33	0.23	0.28	0.32	0.30	0.20	0.31	0.21	0.21	0.03	-0.07	0.09	0.97	0.85	0.90	1.05	-0.38
200	0.13	0.08	-0.22	-0.03	0.27	0.38	0.67	0.38	0.44	0.21	0.18	0.17	0.20	0.18	0.21	0.21	-0.35	-0.10	-0.28	-0.04	2.48	1.08	1.05	1.17	1.02
201	0.19	0.40	0.48	0.45	0.23	0.35	0.25	0.36	0.14	0.28	0.24	0.20	0.31	0.30	0.27	0.34	0.29	0.05	0.10	0.01	1.09	1.03	0.87	0.87	0.56
202	-0.19	-0.20	0.22	0.23	0.75	0.52	0.24	0.29	0.53	0.22	0.37	0.31	0.35	0.23	0.29	0.26	0.40	0.43	-0.16	0.09	0.32	0.56	0.83	1.13	1.36
203	0.59	0.66	0.60	0.65	0.28	0.24	0.27	0.29	0.62	0.62	1.35	0.94	0.34	0.26	1.00	0.40	0.09	0.20	0.54	0.12	0.96	1.21	2.94	1.43	1.15
204	0.88	1.58	0.80	1.13	0.30	1.18	0.20	1.01	1.45	0.67	0.86	0.74	1.22	0.27	0.27	0.76	0.11	-0.45	-0.79	0.17	0.67	0.86	0.22	2.81	-0.67
205	0.31	0.30	0.44	0.34	0.23	0.25	0.23	0.28	0.29	0.10	0.16	0.12	0.19	0.26	0.22	0.23	0.13	0.05	-0.13	0.01	1.00	1.12	1.16	0.88	-0.73
206	0.56	0.43	0.47	0.51	0.32	0.31	0.23	0.36	0.32	0.12	0.35	0.35	0.22	0.25	0.41	0.39	-0.09	0.08	0.03	0.22	0.72	1.16	1.86	1.56	-0.84
207	0.37	0.41	0.30	0.39	0.28	0.20	0.20	0.27	0.15	0.13	0.33	0.31	0.28	0.26	0.25	0.30	-0.07	-0.03	0.19	0.19	0.71	1.35	0.96	1.15	-0.96
208	0.05	-0.06	0.14	0.22	0.38	0.32	0.20	0.20	0.47	0.33	0.18	0.19	0.32	0.24	0.29	0.29	0.09	0.27	-0.29	-0.15	0.53	0.63	0.88	1.21	0.91
209	0.39	0.39	0.35	0.46	0.27	0.28	0.34	0.28	0.41	0.50	0.55	0.48	0.23	0.29	0.31	0.23	-0.05	0.07	0.14	-0.01	0.80	1.00	1.35	0.79	0.37
210	0.39	0.24	0.36	0.31	0.26	0.26	0.25	0.28	0.18	0.67	0.10	0.33	0.25	0.30	0.23	0.37	-0.03	0.08	-0.07	-0.34	0.96	1.08	0.82	1.23	-0.02
211	0.01	-0.09	-0.10	0.01	0.17	0.17	0.20	0.24	-0.16	-0.26	-0.02	0.09	0.25	0.19	0.24	0.21	-0.12	0.10	0.15	0.35	1.18	1.41	0.96	1.11	-0.19
212	0.36	0.62	0.30	0.20	0.39	0.55	0.26	0.25	0.29	0.34	0.36	0.34	0.38	0.26	0.33	0.33	-0.06	-0.43	0.07	0.00	0.72	0.45	0.87	1.27	-0.15
213	0.11	-0.03	0.16	0.08	0.36	0.29	0.27	0.17	0.23	-0.07	0.21	0.09	0.26	0.24	0.25	0.23	0.06	0.11	-0.02	0.15	0.75	0.59	0.96	0.96	0.14
214	0.28	0.17	0.83	0.38	0.29	0.28	0.78	0.40	0.18	-0.02	0.85	0.33	0.34	0.28	0.37	0.43	0.88	0.18	0.37	0.34	2.89	1.80	1.09	1.54	-0.67
215	-0.52	-0.20	-0.21	-0.13	0.38	0.34	0.20	0.29	-0.09	0.04	-0.01	-0.06	0.29	0.32	0.28	0.24	0.31	0.08	0.07	-0.10	0.53	0.85	0.97	0.75	0.94
216	0.19	0.25	0.21	0.27	0.26	0.20	0.24	0.27	-0.03	0.02	0.11	0.12	0.26	0.26	0.25	0.25	0.03	0.03	0.15	0.11	0.92	1.35	0.96	0.96	-0.71
218	0.01	0.02	0.04	0.02	0.27																				

# Ring of Air Data

Subject	JS IntegerLeft pre wo	JS IntegerLeft pre Cw	JS IntegerRight pre wo	JS IntegerRight pre Cw	JS IntegerLeft post wo	JS IntegerLeft post Cw	JS IntegerRight post wo	JS IntegerRight post Cw	Pre Left Standard Deviation	Pre Right Standard Deviation	Post Left Standard Deviation	Post Right Standard Deviation	JS IntegerLeft pre Cw with filter	JS IntegerRight pre Cw with filter	JS IntegerLeft post Cw with filter	JS IntegerRight post Cw with filter	Pre It w/o Standard Deviation	Pre It w/ Standard Deviation	Post It w/o Standard Deviation	Post It w/ Standard Deviation	Change Left (post - pre) wo	Change Right (post - pre) wo	Change Left (post - pre) with	Change Right (post - pre) with	Ratio of Left Std Post/Pre wo	Ratio of Right Std Post/Pre wo	Ratio of Left Std Post/Pre with	Ratio of Right Std Post/Pre with	Diff (with - wo)							
102	0.05	0.05	0.45	0.31	0.35	0.31	0.32	0.29	0.56	0.52	0.39	0.41	0.27	0.27	0.38	0.26	0.40	0.25	-0.20	-0.11	0.91	0.94	1.41	1.04	1.01	1.04	1.01									
103	0.22	0.08	0.20	-0.03	0.31	0.30	0.22	0.32	0.34	0.10	0.33	0.10	0.33	0.23	0.27	0.22	-0.02	-0.10	-0.02	0.00	0.71	1.07	0.92	0.96	0.40	0.88	1.08	0.16								
104	0.31	0.45	0.38	0.81	0.29	0.34	0.28	0.28	0.48	0.59	0.54	0.59	0.34	0.20	-0.23	0.27	0.22	0.35	0.08	-0.01	1.03	1.45	-0.88	1.25	0.72	0.24	0.26	0.00	-0.03	0.79	0.81	0.96	0.96	1.00		
107	-0.67	-0.61	-0.43	-0.35	0.29	0.31	0.33	0.25	-0.24	-0.27	-0.24	-0.30	0.28	0.28	0.27	0.27	0.35	1.10	0.53	0.37	0.32	1.37	0.30	0.21	0.28	0.17	0.18	-0.73	1.13	0.02	0.94	0.15	0.73			
108	0.19	0.40	0.47	0.57	0.24	0.26	0.27	0.24	0.57	0.52	0.57	0.48	0.21	0.29	0.23	0.30	0.10	0.10	0.01	-0.05	0.82	1.13	1.10	1.03	0.27	1.03	1.03	0.72	0.48	1.03	1.03	0.72	0.48			
109	0.41	0.42	0.51	0.53	0.33	0.23	0.27	0.26	0.31	0.51	0.16	0.22	0.30	0.39	0.31	0.28	-0.03	0.12	-0.15	-0.29	1.19	1.04	1.03	1.72	0.46	0.79	1.23	0.08	0.26	0.32	0.55	0.54	1.16	2.03		
110	0.38	0.40	0.35	0.52	0.26	0.25	0.31	0.26	0.18	0.13	0.22	0.06	0.27	0.23	0.27	0.18	0.00	-0.15	0.04	-0.06	0.78	1.00	1.00	0.78	0.13	0.15	-0.02	0.12	0.02	1.00	1.53	0.77	1.18	1.09		
111	0.15	-0.21	0.94	1.02	0.68	0.51	0.22	0.28	0.25	0.40	0.47	0.43	0.33	0.26	0.23	0.25	0.23	0.16	0.22	0.04	1.00	0.75	0.70	0.69	0.31	0.35	0.35	0.03	-0.02	0.56	0.55	0.91	0.91	0.04		
112	0.10	0.20	0.10	0.06	0.37	0.26	0.29	0.26	0.07	0.14	0.08	0.07	0.25	0.29	0.21	0.24	-0.13	-0.27	0.01	-0.08	1.27	1.83	0.84	0.83	1.43	0.28	0.28	0.44	0.08	0.12	0.80	1.25	1.00	1.00	0.20	
113	0.01	0.18	0.16	0.18	0.38	0.19	0.38	0.29	0.30	0.35	0.57	0.44	0.32	0.28	0.24	0.24	-0.01	0.26	0.27	0.10	0.81	1.65	0.75	0.86	0.32	0.28	0.15	0.09	0.00	1.00	1.04	0.64	0.91	0.29		
116	0.19	0.22	0.42	0.40	0.28	0.32	0.26	0.24	-0.02	-0.02	0.07	0.07	0.28	0.22	0.18	0.20	0.49	0.23	0.56	0.53	0.29	0.24	0.22	0.26	0.17	0.19	0.09	0.09	0.12	0.16	1.00	1.00	0.78	1.08	0.17	
117	-0.12	-0.09	0.23	0.20	0.39	0.47	0.22	0.26	-0.06	0.09	0.12	0.25	0.33	0.31	0.26	0.22	-0.03	-0.01	0.06	0.11	1.06	1.11	0.45	1.00	-0.04	0.14	0.17	-0.07	0.05	0.80	0.70	0.84	0.86	-0.29		
118	-0.15	-0.18	-0.28	-0.45	0.28	0.29	0.33	0.53	0.49	0.38	0.71	0.54	0.20	0.28	0.22	0.14	0.24	0.19	0.22	0.16	1.11	0.79	1.10	0.50	0.96	0.29	0.32	0.18	0.26	0.25	0.32	0.38	0.41	0.35	-0.50	
119	0.08	0.10	0.38	0.54	0.25	0.20	0.20	0.25	0.44	0.51	0.55	0.54	0.25	0.17	0.41	0.23	-0.16	-0.21	0.11	0.03	1.45	0.39	1.64	1.35	-1.31	0.19	0.20	0.26	0.34	0.27	0.25	0.42	0.23	0.33	0.19	
120	0.29	0.26	0.28	0.52	0.37	0.36	0.24	0.19	0.60	0.29	0.66	0.40	0.40	0.19	0.18	0.18	0.82	0.47	0.55	0.52	0.37	0.27	0.31	0.26	0.29	0.27	0.77	0.31	0.90	0.48	0.70	0.27	0.56	0.19	0.19	
121	-0.16	-0.15	0.12	0.00	0.27	0.24	0.27	0.25	0.49	0.38	0.71	0.54	0.20	0.28	0.22	0.14	0.49	0.38	0.71	0.54	0.20	0.28	0.22	0.14	0.19	0.15	0.12	0.05	0.36	0.33	0.46	0.31	0.46	0.31	0.26	0.22
122	0.39	0.40	0.47	0.38	0.26	0.34	0.24	0.19	0.82	0.47	0.55	0.52	0.37	0.27	0.31	0.26	-0.06	0.07	-0.07	-0.08	1.28	0.92	1.28	0.94	-0.50	0.19	0.25	0.19	0.16	1.00	1.00	0.58	0.70	1.01	0.47	0.47
123	0.01	0.42	0.58	0.40	0.32	0.28	0.34	0.31	0.60	0.29	0.66	0.40	0.40	0.19	0.18	0.18	-0.03	-0.01	0.06	0.11	1.06	1.11	0.45	1.00	-0.04	0.14	0.17	-0.07	0.05	0.80	0.70	0.84	0.86	-0.29		
124	0.77	0.31	0.90	0.48	0.70	0.27	0.56	0.19	0.82	0.47	0.55	0.52	0.37	0.27	0.31	0.26	0.14	0.19	0.22	0.16	1.11	0.79	1.10	0.50	0.96	0.29	0.32	0.18	0.26	0.25	0.32	0.38	0.41	0.35	-0.50	
125	0.01	0.42	0.58	0.40	0.32	0.28	0.34	0.31	0.60	0.29	0.66	0.40	0.40	0.19	0.18	0.18	-0.03	-0.01	0.06	0.11	1.06	1.11	0.45	1.00	-0.04	0.14	0.17	-0.07	0.05	0.80	0.70	0.84	0.86	-0.29		
127	0.77	0.31	0.90	0.48	0.70	0.27	0.56	0.19	0.82	0.47	0.55	0.52	0.37	0.27	0.31	0.26	0.14	0.19	0.22	0.16	1.11	0.79	1.10	0.50	0.96	0.29	0.32	0.18	0.26	0.25	0.32	0.38	0.41	0.35	-0.50	
128	0.25	0.31	0.49	0.49	0.28	0.24	0.31	0.19	0.49	0.38	0.71	0.54	0.20	0.28	0.22	0.14	0.19	0.15	0.12	0.05	0.36	0.33	0.46	0.31	0.46	0.31	0.46	0.31	0.46	0.31	0.46	0.31	0.46	0.31	0.46	0.31
129	0.32	0.18	0.26	0.25	0.32	0.38	0.41	0.35	0.44	0.51	0.55	0.54	0.25	0.17	0.41	0.23	-0.16	-0.21	0.11	0.03	1.45	0.39	1.64	1.35	-1.31	0.19	0.20	0.26	0.34	0.27	0.25	0.42	0.23	0.33	0.19	
130	0.77	1.09	0.61	0.88	0.20	0.82	0.29	0.32	0.56	0.28	0.55	0.46	0.20	0.18	0.18	0.23	0.42	0.24	0.27	0.07	0.26	0.31	0.23	0.24	-0.17	-0.07	-0.16	-0.15	-0.11	1.03	1.94	0.78	1.00	1.17	0.19	
140	0.50	0.58	0.65	0.37	0.22	0.19	0.23	0.21	0.52	0.36	0.57	0.55	0.26	0.20	0.22	0.21	0.21	0.30	0.20	0.18	0.33	0.26	0.32	0.33	0.19	0.20	0.26	0.34	0.27	0.25	0.42	0.23	0.33	0.19		
163	-0.23	-0.38	-0.01	-0.26	0.62	0.51	0.29	0.46	0.29	0.35	0.31	0.30	0.22	0.30	0.24	0.20	0.29	0.35	0.31	0.30	0.22	0.30	0.24	0.20	0.49	0.39	0.20	0.08	0.58	1.00	1.10	1.16	0.60	0.60	0.60	0.60
172	-0.37	-0.28	-0.44	-0.44	0.31	0.18	0.32	0.35	0.34	0.15	0.15	0.12	0.05	0.36	0.33	0.46	0.31	0.46	0.31	0.46	0.31	0.46	0.31	0.46	0.31	0.46	0.31	0.46	0.31	0.46	0.31	0.46	0.31	0.46	0.31	
179	0.20	0.26	0.34	0.27	0.25	0.42	0.23	0.33	0.26	0.21	0.20	0.18	0.33	0.26	0.32	0.33	0.14	0.01	0.00	-0.12	0.92	0.79	0.97	1.27	-0.19	0.19	-0.03	0.05	0.20	0.53	1.63	0.79	1.05	0.29	0.29	
200	0.38	0.40	0.56	0.37	0.36	0.24	0.19	0.39	0.29	0.35	0.31	0.30	0.22	0.30	0.24	0.20	0.49	0.23	0.56	0.53	0.29	0.24	0.22	0.26	0.17	0.19	0.09	0.09	0.12	0.16	1.00	1.00	0.78	1.08	0.17	
201	0.07	0.49	0.37	0.20	0.39	0.24	0.24	0.22	0.34	0.15	0.55	0.23	0.20	0.25	0.22	0.29	0.49	0.39	0.20	0.08	0.58	1.00	1.10	1.16	0.60	0.15	0.25	-0.13	0.08	0.74	0.83	0.71	1.31	0.26	0.26	
202	-0.04	-0.02	0.45	0.37	0.34	0.24	0.19	0.24	0.57	0.41	0.60	0.57	0.27	0.26	0.25	0.40	0.01	0.18	0.12	0.16	1.10	0.96	0.93	1.43	-0.04	0.08	0.25	0.07	0.09	1.13	1.35	1.35	0.91	0.06	0.06	
203	0.25	0.41	0.40	0.66	0.39	0.28	0.29	0.26	0.54	0.34	0.55	0.23	0.27	0.33	0.22	0.29	0.06	-0.25	0.01	-0.12	1.64	0.49	0.81	0.88	0.33	0.06	-0.25	0.01	-0.12	1.64	0.49	0.81	0.88	0.33	0.33	
204	0.64	0.41	0.65	0.50	0.26	0.26	0.31	0.25	0.26	0.21	0.25	0.16	0.26	0.35	0.34	0.23	-0.17	0.01	-0.01	-0.05	0.80	1.00	1.31	0.66	0.07	0.08	0.18	0.33	0.14	0.23	0.30	0.38	0.25	0.38	0.25	0.38
205	0.41	0.18	0.49	0.44	0.24	0.20	0.27	0.27	0.47	0.38	0.34	0.38	0.26	0.23	0.20	0.19	-0.02	0.32	-0.13	0.00	0.89	0.84	0.77	0.83	-0.10	0.47	0.38	0.34	0.38	0.26	0.23	0.20	0.19	0.19		
206	0.42	0.33	0.49	0.08	0.14	0.35	0.23	0.17	0.47	0.23	0.07	0.27	0.43	0.25	0.34	0.36	0.16	0.02	-0.40	0.04	1.35	1.27	0.79	1.44	0.22	0.16	0.23	0.15	-0.04	1.00	0.84	0.88	0.74	0.94	0.94	
207	0.30	0.18	0.14	0.19	0.30	0.26	0.24	0.26	-0.11	0.11	0.04	0.07	0.16	0.34	0.14	0.25	-0.07	-0.01	0.01	0.12	0.19	0.71	4.92	1.25	0.51	0.19	-0.01	0.01	0.12	0.19	0.71	4.92	1.25	0.51	0.51	
208	0.00	0.03	-0.04	0.01	0.30	0.22	0.20	0.21	0.18	0.08	0.22	0.10	0.27	0.20	0.24	0.16	-0.05	0.03	0.05	0.02	0.56	1.08	0.99	0.80	-0.14	0.12	-0.08	0.01	-0.01	0.88	0.84	0.73	1.08	0.02</		

# Ring of Crystal Data

Subject	JS Integer	Standard	Standard	Standard	Standard	Standard	JS Integer	Standard	Standard	Standard	Standard	Standard	Change Left	Change Right	Change Left	Change Right	Ratio of Left	Ratio of Right	Ratio of Left	Ratio of Right	CMR								
	Left	Right	Pre	Post	With	Dev	Dev	Dev	Dev	Dev	Pre	Post	Pre	Post	Left	Left	Left	Left	Left	Left	(post - pre)	(post - pre)	(post - pre)	(post - pre)	Std	Std	Std	Std	(with .wo)
102	0.30	0.35	0.31	0.38	0.44	0.38	0.30	0.31	0.31	0.31	0.39	0.45	0.44	0.41	0.31	0.36	0.32	0.29	0.29	0.01	0.03	0.05	-0.04	0.68	0.82	1.03	0.81	0.35	
103	0.40	0.26	0.21	-0.02	0.23	0.30	0.31	0.26	0.26	0.26	0.20	0.13	0.09	0.02	0.24	0.25	0.26	0.23	0.23	-0.19	-0.29	-0.14	-0.11	1.35	0.87	1.08	0.92	-0.45	
104	-0.05	-0.26	0.07	-0.05	0.31	0.09	0.29	0.33	0.33	0.33	0.32	0.21	0.43	0.32	0.31	0.20	0.19	0.33	0.33	0.11	0.21	0.11	0.11	0.94	0.40	0.61	1.10	1.50	
105	0.33	0.28	0.37	0.37	0.20	0.27	0.23	0.27	0.27	0.27	0.43	0.28	0.32	0.20	0.19	0.30	0.27	0.22	0.22	0.04	0.09	-0.11	-0.08	1.15	1.00	1.42	0.73	-0.11	
106	0.54	0.75	0.38	0.37	0.35	0.24	0.43	0.37	0.37	0.37	0.58	0.70	0.63	0.63	0.33	0.28	0.28	0.22	0.22	-0.18	-0.38	0.05	-0.07	1.23	1.54	0.85	0.79	0.53	
107	-0.49	-0.54	-0.71	-0.63	0.37	0.28	0.28	0.25	0.25	0.25	-0.14	-0.29	-0.16	-0.22	0.32	0.29	0.36	0.35	0.35	-0.22	-0.09	-0.02	0.07	0.76	0.89	1.13	1.21	1.56	
108	0.31	0.32	0.36	0.48	0.28	0.28	0.29	0.37	0.37	0.37	0.32	0.39	0.30	0.28	0.26	0.24	0.23	0.27	0.27	0.05	0.16	-0.02	-0.11	1.04	1.42	0.88	1.13	-0.17	
109	0.28	0.24	0.64	0.78	0.37	0.28	0.28	0.28	0.28	0.28	0.41	0.41	0.43	0.46	0.26	0.29	0.33	0.35	0.35	0.40	0.54	0.02	0.06	0.68	1.00	1.27	1.21	-0.20	
110	0.17	0.33	0.60	0.58	0.37	0.38	0.38	0.30	0.30	0.30	0.31	0.29	0.47	0.60	0.38	0.32	0.29	0.28	0.28	0.34	0.26	0.16	0.21	1.03	0.88	0.81	0.88	-0.01	
111	0.38	0.18	0.33	0.58	0.83	0.67	0.36	0.33	0.33	0.33	0.83	0.73	0.74	0.82	0.18	0.29	0.27	0.22	0.22	-0.05	0.40	-0.19	-0.11	0.43	0.49	1.50	0.76	1.54	
112	0.04	0.15	0.30	0.26	0.42	0.25	0.22	0.25	0.25	0.25	0.37	0.22	0.27	0.33	0.29	0.31	0.23	0.24	0.24	0.26	0.11	-0.10	0.11	0.52	1.00	0.79	0.77	0.44	
114	0.22	0.04	0.34	0.31	0.22	0.23	0.29	0.37	0.37	0.37	0.27	0.43	0.53	0.40	0.20	0.23	0.26	0.22	0.22	0.12	0.27	0.26	-0.03	1.32	1.61	1.30	0.96	0.72	
115	0.31	0.30	0.30	0.30	0.25	0.24	0.30	0.16	0.16	0.16	0.45	0.36	0.41	0.37	0.22	0.24	0.20	0.22	0.22	0.00	0.00	-0.05	0.01	1.20	0.87	0.91	0.92	0.39	
116	0.49	0.52	0.46	0.46	0.27	0.28	0.28	0.32	0.32	0.32	0.35	0.33	0.37	0.42	0.29	0.23	0.36	0.31	0.31	-0.03	-0.06	0.02	0.09	1.04	1.14	1.24	1.35	-0.48	
117	-0.03	-0.02	0.03	0.35	0.51	0.25	0.28	0.28	0.28	0.28	0.13	0.08	0.15	0.04	0.27	0.21	0.21	0.35	0.35	0.02	0.05	0.02	-0.04	0.71	0.55	0.78	1.67	0.45	
118	-0.43	-0.96	0.01	-0.18	0.67	0.53	0.19	0.45	0.45	0.45	0.17	0.27	0.25	0.43	0.24	0.16	0.18	0.30	0.30	0.45	0.78	0.08	0.17	0.28	0.85	0.75	1.88	2.08	0.28
119	0.11	0.39	0.38	0.43	0.29	0.26	0.21	0.26	0.26	0.26	0.19	0.31	0.29	0.32	0.27	0.25	0.29	0.25	0.25	0.27	0.04	0.09	0.02	0.72	1.00	1.07	1.00	-0.20	
121	0.25	-0.01	-0.02	0.13	0.32	0.20	0.34	0.27	0.27	0.27	0.03	0.08	0.10	-0.09	0.21	0.19	0.25	0.21	0.21	-0.20	0.14	0.06	-0.17	1.06	0.96	1.19	1.11	-0.24	
123	0.48	0.52	0.72	0.60	0.24	0.23	0.23	0.23	0.23	0.23	0.84	0.56	0.60	0.64	0.24	0.22	0.21	0.23	0.23	0.24	0.08	-0.03	0.08	0.96	1.00	0.88	1.05	0.12	
125	0.62	0.45	0.56	0.48	0.25	0.32	0.36	0.32	0.32	0.32	0.61	0.44	0.66	0.52	0.28	0.19	0.36	0.17	0.17	-0.06	0.03	0.04	0.08	1.44	1.00	1.29	0.89	0.12	
127	0.70	0.44	0.32	0.38	0.30	0.30	0.26	0.22	0.22	0.22	0.61	0.31	0.65	0.31	0.42	0.21	0.64	0.23	0.23	-0.47	-0.06	0.03	-0.01	0.87	0.73	1.52	1.10	-0.05	
128	0.16	0.12	0.54	0.52	0.34	0.31	0.32	0.24	0.24	0.24	0.38	0.41	0.49	0.45	0.54	0.26	0.23	0.17	0.17	0.38	0.40	0.10	0.04	0.94	0.77	0.43	0.65	0.38	
129	0.43	0.32	0.76	0.25	0.31	0.37	0.97	0.34	0.34	0.34	0.59	0.25	0.47	0.38	0.87	0.39	0.43	0.40	0.40	0.33	-0.07	-0.52	0.13	1.13	0.92	0.49	1.03	0.33	
130	0.66	0.86	0.42	0.60	0.48	0.27	0.34	0.22	0.22	0.22	0.43	0.45	0.76	0.55	0.22	0.28	0.28	0.28	0.28	-0.14	-0.38	0.32	0.10	0.74	0.81	1.00	1.00	-0.16	
136	0.05	-0.10	0.27	0.28	0.38	0.38	0.28	0.30	0.30	0.30	0.58	0.45	0.49	0.54	0.22	0.21	0.29	0.23	0.23	0.22	0.38	-0.13	0.09	0.79	0.79	1.32	1.10	1.53	
137	0.18	0.51	0.27	0.42	0.33	0.31	0.36	0.36	0.36	0.36	0.11	0.54	0.34	0.41	0.32	0.39	0.36	0.39	0.39	0.09	-0.10	0.23	-0.13	1.09	1.16	1.13	1.00	0.01	
138	0.61	0.62	0.64	0.60	0.27	0.37	0.28	0.30	0.30	0.30	0.35	0.38	0.47	0.56	0.19	0.30	0.23	0.31	0.31	0.03	-0.02	0.12	0.16	1.04	0.81	1.21	1.03	-0.71	
139	0.23	0.24	0.44	0.63	0.29	0.28	0.21	0.23	0.23	0.23	0.34	0.47	0.43	0.64	0.28	0.22	0.28	0.23	0.23	0.21	0.39	0.09	0.16	0.72	0.82	1.00	1.05	0.35	
161	-0.16	-0.20	-0.29	-0.33	0.48	0.36	0.58	0.32	0.32	0.32	-0.16	-0.06	-0.19	-0.12	0.34	0.23	0.21	0.20	0.20	-0.13	-0.13	-0.01	-0.04	1.21	0.89	0.62	0.87	0.42	
164	0.31	0.32	0.76	0.55	0.27	0.26	0.27	0.22	0.22	0.22	0.48	0.40	0.79	0.56	0.28	0.27	0.28	0.21	0.21	0.46	0.23	0.32	0.16	1.00	0.85	1.00	0.78	0.30	
185	0.84	0.51	0.42	0.30	0.28	0.28	0.22	0.33	0.33	0.33	0.37	0.48	0.40	0.40	0.28	0.29	0.10	0.38	0.38	-0.12	-0.12	0.12	-0.08	0.85	1.18	0.83	1.21	-0.12	
175	0.23	0.29	-0.08	0.08	0.43	0.24	0.46	0.49	0.49	0.49	0.36	0.40	0.21	0.41	0.26	0.27	0.30	0.23	0.23	-0.31	-0.21	-0.15	0.01	1.07	2.04	1.15	0.85	0.86	
200	0.49	0.54	0.55	0.64	0.24	0.23	0.23	0.19	0.19	0.19	0.59	0.71	0.69	0.51	0.20	0.18	0.18	0.20	0.20	0.06	0.10	0.10	-0.20	0.96	0.83	0.90	1.11	0.26	
201	0.24	0.28	0.18	0.20	0.27	0.36	0.22	0.24	0.24	0.24	0.05	0.25	0.20	0.19	0.24	0.30	0.29	0.23	0.23	-0.06	-0.09	0.15	-0.07	0.81	0.67	1.21	0.77	-0.22	
202	0.19	-0.06	0.34	0.28	0.39	0.42	0.20	0.24	0.24	0.24	0.47	0.20	0.35	0.22	0.23	0.19	0.23	0.19	0.19	0.15	0.34	-0.12	0.02	0.51	0.57	1.00	1.00	0.49	
203	0.49	0.78	0.70	0.69	0.25	0.40	0.32	0.24	0.24	0.24	0.49	0.78	0.55	0.60	0.25	0.40	0.22	0.25	0.25	0.21	-0.11	0.06	-0.19	1.28	0.60	0.88	0.63	-0.22	
204	0.79	0.68	0.69	0.54	0.34	0.37	0.19	0.38	0.38	0.38	0.52	0.41	0.58	0.42	0.28	0.27	0.26	0.26	0.26	-0.12	-0.14	0.07	0.01	0.56	1.03	0.93	0.96	-0.76	
205	0.42	0.34	0.58	0.37	0.20	0.24	0.16	0.22	0.22	0.22	0.28	0.22	0.28	0.22	0.21	0.31	0.27	0.19	0.19	0.16	0.03	0.00	0.01	0.80	0.92	1.29	0.61	-0.70	
206	0.54	0.42	0.45	0.32	0.25	0.25	0.30	0.21	0.21	0.21	0.29	0.24	0.41	0.38	0.28	0.24	0.22	0.44	0.44	-0.10	-0.10	0.12	0.14	1.20	0.84	0.79	1.83	-0.42	
207	0.36	0.23	0.31	0.22	0.22	0.28	0.24	0.23	0.23	0.23	0.24	0.19	0.22	0.15	0.20	0.28	0.17	0.31	0.31	-0.05	-0.02	-0.02	-0.04	1.09	0.82	0.85	1.11	-0.31	
208	0.17	0.09	0.20	0.24	0.21	0.24	0.28	0.23	0.23	0.23	0.04	0.11	0.30	0.28	0.23	0.16	0.20	0.27	0.27	0.11	0.15	0.26	0.10	1.33	0.96	0.87	1.69	-0.05	
209	0.17	0.26	0.59	0.68	0.37	0.37	0.27	0.25	0.25	0.25	0.28	0.32	0.49	0.41	0.28	0.20	0.25	0.24	0.24	0.42	0.42	0.21	0.09	0.73	0.68	0.89	1.20	-0.20	
210	0.10	0.40	0.36	0.30	0.24	0.33	0.35	0.24	0.24	0.24	0.19	0.28	0.26	0.19	0.24	0.33	0.19	0.25	0.25	0.26	-0.09	0.07	-0.09	1.46	0.73	0.79	0.76	-0.24	
211	-0.19	-0.24	-0.03	-0.04	0.25	0.21	0.20	0.27	0.27	0.27	-0.06	0.05	0.25	0.09	0.21	0.25	0.28	0.18	0.18	0.16	0.20	0.31	0.04	0.80	1.29	1.33	0.72	0.83	
212	0.36	0.32	0.30	0.40	0.39	0.35	0.35	0.31	0.31	0.31	0.28	0.25	0.37	0.33	0.38	0.36													



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