**I would like to start by introducing our brilliant all-star team. We got Guy back just in time after the knee surgery, Madhu, Steve and me-Albert.**

**To begin, I have to point out that our ambitious project turned out to be scientific in nature and for that I would like to apologies to my group partners. We picked a heavy topic and only a week and a half to complete. I think we made progress. I also think we had fun working long hours. I am kidding.**

**Instead of picking a simpler idea such as regulating credit card/insurance fraud or evaluating the housing market or determining the trends in cryptocurrency, all are good project ideas and are based on one concept that they all have in common: making or saving money (money related).**

**After some basic core objection from the teammates, we picked an idea of a global warming study and called it Thermal Warming Project.**

**With just having basic knowledge of the Global Warming from the news, we wanted to dig deeper and get a better understanding of whether such effect exists and possible correlating factors contributing to that effect. So that is the topic of our discussion.**

**Our Google internet data research began with the formation of the relationships between the Sun and Earth, with concentration on a possible warming effect planet earth is currently experiencing.**

**Further, defining some of the possible cause factors contributing to the warming effect and by forming the relationships between the factors.**

**After some heavy discussions and many objections from the teammates, we picked warming planet idea and called it Thermal Warming Project.**

**All Simply due to many issues we experienced obtaining and forming the proper data sets. Today we stand before you with some results.**

**The data research consisting of pre-determined assumptions which are built on orbital and proximal relationships between the Sun and Earth, with a primary emphasis on a type of temperature effect the energy radiating star is having on the planet.**

**Coinciding the possibilities of man-made pollution as an addition to global temperature effect.**

**I am going to begin with the Earth Energy Budget Slide**

**(Energy Budget Slide)**

**Earth's energy budget refers to the tracking of how much**[**energy**](https://energyeducation.ca/encyclopedia/Energy)**is flowing into and out of the Earth's**[**climate**](https://energyeducation.ca/encyclopedia/Climate)**, and if the energy coming in balances with the energy going out. Understanding the Earth's energy budget can help to predict future effects of**[**global warming**](https://energyeducation.ca/encyclopedia/Global_warming)**, and to understand the various**[**flows of energy on the Earth**](https://energyeducation.ca/encyclopedia/Earth%27s_energy_flows)**.**

**The two major components that must be investigated to determine if the Earth's energy budget balances are in from the incoming solar energy and out with radiation from planet Earth.**

**Looking at the activities constantly occurring in the atmosphere as well as on the surface of Earth, offers a better understanding of *how* Earth's energy budget balances, by investigating the energy flows.**

**Figure slide presents the current understanding of how energy flows Earth.**

**Earth's energy budget is vital in establishing the Earth's climate. When the energy budget balances,**

**the temperature on Earth stays relatively constant, with no overall increase or decrease in average temperature.**

**However, not all of this energy reaches the Earth's atmosphere or surface is reflected by**[**clouds**](https://energyeducation.ca/encyclopedia/Cloud)**or the atmosphere.**

**The energy that does pass through is absorbed by the atmosphere or the surface, and then moves around through**[**convection**](https://energyeducation.ca/encyclopedia/Convection)**,**[**evaporation**](https://energyeducation.ca/encyclopedia/Evaporation)**, or in the form of**[**latent heat**](https://energyeducation.ca/encyclopedia/Latent_heat)**.**

**Finally, when the energy exits the Earth, it can do so by emission from the surface of the Earth, by clouds, or by the atmosphere.**

**Some of the energy that is radiated by the surface of the Earth is absorbed by the clouds and greenhouse gases in the atmosphere and then re-emitted downwards, which is how the surface of the Earth is heated and kept at a habitable temperature.**

**This process of heating is known as the greenhouse effect. Overall, the energy that exits the Earth in different forms, when added together is equal to the energy that is absorbed by different parts of the Earth.**

**After some research and experiencing certain constraints in obtaining accurate, official scientific data measurements that are related to understanding how earths energy budget comes to balance and further forming the relationship between these measurements have on each other and on the possible global warming as a result.**

**(Slide)**

**Steps taken to achieve positive resolution:**

**(Slide) skip don’t read!!!!!**

1. **Pre-Determining the basic assumptions in the Global Warming case:**

**Assumption 1: surface temperature is rising, and the global warming effect is present.**

**Assumption 2: distance decrease from Earth to the Sun produce a global warming.**

**Assumption 3: atmospheric Co2 trapping irradiating heat produce a global warming.**

**Assumption 4: atmospheric aerosol-mixed vapor particles produce a global warming.**

Slide expaination:>>>>converse and Add Assumption 2 Q to slide

1. **Assumption, the surface temperature is rising, and the global warming effect is present.**
2. **Assumption, the decrease in the distance from Earth to the Sun produces a global warming. The sun is in a moving rotating orbiting motion around the galaxy. Similar way Earth rotates in a variable orbital direction and velocity and elliptical distance and path, all while performing gravitational orbiting motion around the sun. The shift or even a slight alteration in the revolution distance of earth-round-sun orbit causes the distance from the sun to earth shortened and triggers the increased warming effect on a year to year comparison basis. Are there increases in the amount of radiation come out of our planet in case of the global warming?**
3. **Assumption, the warming effect is caused by lower atmosphere trapped carbon dioxide gasses confining the heat radiation gases to the planets greenhouse, resulting in an increased warming effect.**
4. **Assumption, the Aerosol-mixed particles, gasses and droplets formed in vapors contribute to potential global warming effect.**

Next Slide!!!! explanation of step B (below)>>>>>converse

**Step B Performing online research in obtaining and forming the required data into data sets. In case of a Global Warming, the objective is to determine the leading contributing cause.**

**Researching and selecting the required related measurements to track the Global Thermal scene within a predetermined time period.**

**>>>>>> don’t read below!**

**(Slide)**

**Step B. Performing online research, setting measurement data parameters and ranges:**

**>>>>read below**

**>>>>>>>>Read!**

**The Data Sets Primary data is set on 4 planetary measurements in units:**

* **Surface Temperatures Levels in Degrees Celsius**
* **Total Solar Irradiances (TSI) in Watts/m2**
* **Atmospheric Co2 Gas Levels in parts-per-million(ppm)**
* **Atmospheric Aerosols Particle Levels particulate matter—(pm/cm3)**

**NEXT (Slide)!!>>>>>Read CHANGE to 2017 in pp**

**Data Ranges:**

* **Dates ranging from 01-01-1970 to 01-01-2017**

**We chose 1970 as the starting points due to modern methods of data collection. Then on to**

* **Monthly Global Average Surface Temperature, Thenon to**
* **Monthly Global Average Carbon (Co2) concentration in atmosphere, Then**
* **Monthly Global Average Total Solar Irradiance in atmosphere, then**
* **Monthly Global Average Aerosols concentration in atmosphere**

**NEXT (Slide)!!!!>>>>read**

**The project experienced issues obtaining pre-determined fully filled data set parameters, including:**

* **Encountering unknown Data Range Variables**
* **Locating Official Scientific Data Sources**
* **Relating Available Scientific Measurements**
* **Accepting Primary Scientific Data Collection Methods and Inconsistencies**

**NEXT Slide!!!>>>>>>>>Read**

**Step C. Recognizing various patterns while forming the relational data sets based on pre-determined assumptions and visualizing the output onto plots. Searching for relationship patterns between the key measurement parameters.**

**>>>>>READ and modify pp!**

**Locating the cause and effect relationship between:**

* **Surface Temperature vs Time-**
* **Total Solar Irradiance vs Time-**
* **Atmospheric Aerosol vs Time-**
* **Atmospheric Co2 vs Time-**
* **Surface Temperature vs Atmospheric Co2 Gas Levels-**
* **Surface Temperature vs Total Solar Irradiance Levels-**
* **Surface Temperature vs Atmospheric Aerosols Particle Levels-**

**The Steps B and C will be covered in detail by my partners….**

**NEXT (Slide) !!!!**

**Step D. Final Analysis based on the collected data:**

1. **Assumption - Surface Air Temperature**
2. **Assumption - Atmospheric Total Solar Irradiance (distance to the Sun)**
3. **Assumption - Atmospheric Carbon Dioxide Gasses**
4. **Assumption – Atmospheric Aerosols**

**READ>>>>>**

**Concluding with a Final Analysis based on the collected data for each presumed assumption:**

1. **Assumption - Surface Air Temperature**

**Primary Scientific Data Collection Method:**

**The global surface air temperature reading is reported from the global weather stations. The temperature readings are managed by the Global Historical Climatology Network (GHCN).**

**The temperature of the air near the surface of the Earth, determined by a thermometer in an instrument shelter about 2 m above the ground. The true daily mean, obtained from a thermograph, is approximated by the mean of 24-hourly readings and may differ by 1.0 degrees C from the average based on minimum and maximum readings.**

**By applying the measurement data to the formula sets, research project can attempt to build a relationship between Earths:**

* **Time and Surface Air Temperature Levels**

**Based on the collected data and relationships comparisons in Assumption 1, the following statements can be accepted:**

Global Surface Average Air Temperatures statistical data shows there has been a slight change in the past 42-year period, moving Approx. +1.15 Degree Celsius higher to a current global average reading 17.736 Degrees C. Statistical Assumption of a global temperature increase is accepted.

1. **Assumption - Atmospheric Total Solar Irradiance (distance to the Sun)**

**Primary Scientific Data Collection Method and Inconsistencies:**

**The distance from earth to sun is approximated by various methods.**

**All of the methods are only estimations. The Sun absorbs any frequency of the incoming wave signal with a null rate of reflection. Simply, a wave signal from the Sun will not beacon back to the radar stations on Earth. A measurement is performed by assuming the planet Venus is making a symmetric circle around the sun, by echoing back a signal from Venus, then measuring the relational distance to the sun. This method is indirect. True alternating distances from Sun to Earth are unknown. We used TSI instead, where the distance is a constant mean depending on the solar positions and cycles. It also calculates Irradiation and becomes our main focus.**

**Total Solar Irradiance (TSI) calculates total solar power radiating from planet Earth in any frequency above the atmospheric levels of earth. Data ranging from 2003-present is calculated by a radiometer onboard the SORCE Satellite. Equipment calibrations is an ongoing effort. Prior to 2003 the TSI data is a historical reconstruction based on various proxy-model data sources.**

Based on the collected data and relationships comparisons in Assumption 2, the following statements can be accepted:

1975 Started with 1360.715watts/m2 and ended with 2017 1360.66watts/m2. At the peak of solar cycles, the temp is at 1361 watts/m2 and trough is 1360.6 watts/m. Adjusted R=value with respect to the temp correlation value is .021. The solar irradiance and does not affect the rising temp. Not much change with the time. Solar irradiance is not statistically directly correlated to a global warming and assumption is rejected. There may be a possible correlation between solar cycles and TSI.

1. **Assumption - Atmospheric Carbon Dioxide Gasses**

**Primary Scientific Data Collection Method:**

**Carbon dioxide (CO2) is an important heat-trapping (greenhouse) gas, which is released through human activities such as deforestation and burning fossil fuels, as well as natural processes such as respiration and volcanic eruptions.**

**CO2 data is measured by a scientific institution at the Mauna Loa Observatory (MLO) on the Big Island in Hawaii USA by the National Oceanic and Atmospheric Administration (NOAA).**

**Flask collection method for global atmospheric measurement of CO2:**

**Air sample on the surface level is collected into tightly sealed bottle and is used to gather the detailed information on carbon cycling by measuring the CO2 concentration. Collected samples are examined by the laboratory. The CO2 is separated from other gasses and the concentration levels are thoroughly measured by a mass spectrometer.**

**Space-based collection method for global atmospheric measurement of CO2:**

**A satellite network equipped with various optical measuring equipment that scan and direct infrared energy from the Earth into the data collecting instrument.**

**Data Collection Method Inconsistencies:**

**Both the flask and space-based collection are indirect methods of systematic data gathering on the tropospheric and stratospheric levels. After all, the lower part of the Earth’s atmosphere is where the greenhouse carbons are apparently being trapped.**

**In addendum with the satellite and surface level collection methods, directly obtaining daily measurement of CO2 readings from the lower atmospheric levels around the globe will provide for more precise and concurrent data. Deploying stratospheric lighter-than-air aerostats or airships maybe a viable option.**

**By applying the measurement data to the formula sets, research project and attempt to build a relationship between Earths:**

* **Time and Atmospheric Co2 Gas Presence.**
* **Surface Air Temperatures and Atmospheric Co2 Gas Presence.**
* **Atmospheric Aerosols Particle Levels and Atmospheric Co2 Gas Presence.**

**Based on the collected data and relationships comparisons in Assumption 3, the following statements can be accepted:**

Based on the collected data and relationships comparisons in Assumption 3, the following statements can be accepted:

In 1975 the reading was -331.18 parts per million and 2017 406.27 parts per million max, the statistical relationship between time and Co2 is linear and present with a strong positive correlation with temperature and adjusted R-value is .9217 positive. Assumption Co2 Gas levels are on the obvious increase cycle. The statistical assumption of the Co2 is having effect on global warming is accepted.

A further analysis of man-made versus nature made Co2 has to be conducted. Mixed reports. No subtle data is available.

There is a 1-point fluctuation throughout the past 40-year history.

1. Assumption – Atmospheric Aerosols

Primary Scientific Data Collection Method:

Atmospheric Aerosols are solid particles and liquid droplets specks of matter in the Earth atmosphere. Key aerosol groups include sulfates, organic carbon, black carbon, nitrates, mineral dust, and sea salt. The bulk of aerosols—about 90 percent by mass—have natural origins. Volcanoes eject huge columns of ash into the air, as well as sulfur dioxide and other gases, yielding sulfates. Sea salt and dust are two of the most abundant aerosols. The remaining 10 percent of aerosols are considered anthropogenic, or human-made. Aerosols and clouds seeded by them reflect about a quarter of the Sun’s energy back to space.

Scientists use an array of satellite, aircraft, and ground-based instruments to monitor aerosols. Radiometers, infrared and sun-photometer instruments quantify the amount of electromagnetic radiation and optical depth.

Data Collection Method Inconsistencies:

Aircraft and other ground stations deploy instruments that measure certain aerosol properties with greater accuracy but less frequently. Measuring particles within clouds remains challenging. Different types of particles can clump together to form hybrids that are difficult to distinguish. And changes in humidity or temperature can cause drastic changes in how certain aerosols behave and interact with cloud droplets.

By applying the measurement data to the formula sets, research project can attempt to build a relationship between Earths:

* Time and Atmospheric Aerosols Particle Levels
* Surface Air Temperature and Atmospheric Aerosols Particle Levels

Based on the collected data and relationships comparisons in Assumption 4, the following statements can be accepted:

Statistically, in 1975 Aerosols Annual Average was 795.03 pm/cm3 and in 2017 767.58 pm/cm3-time vs aerosol no pattern. Temperature vs Aerosol there is positive a weak correlation of 0.55, which does not present a strong pattern. Assumption is excepted but requires additional studies.

Analysis conclusion:

Out of the four assumption the 1 and 3 Assumptions Statistics proves right. Assumption 2 statistics do not support our assumption. Assumption 4, there is a weak statistical correlation which requires addition data studies.

**Data Research Study Final Thoughts:**

**We are only hitting the tip of the iceberg in our understanding of what kind of shape our planet is really in. The suns energy and exact distance measurement can certainly be further explored. As well as the Global Warming factors and relationships.**

**As we recently reached the a 24-million-mile mark with a Parker Solar Probe on Oct 29, 2018. According to NASA, a 4-million-mile mark is the final destination in year 2024.**

**Another fun fact, according to Nasa report out late last year, the ozone layer began shrinking and by the year 2060, at the current regression rates should completely disappear.**

**I want to say my first group IT project turned out all right and I would like to give special shout out to all that contributed to this assignment.**

**Thank you for your time and for all of your ladies and gents.**