# THE REAL CAUSE OF CLIMATE CHANGE

Southwest Weather, Inc. feels climate change begins and ends with solar changes and the secondary effects from these solar changes can cause positive feedbacks to develop in the climatic system. These positive feedbacks can vary in degree of intensity causing minor, moderate or major climatic changes. If the positive feedbacks should reach a certain intensity, they could bring the climate to a threshold, in which case an abrupt climatic change may take place. There have been many abrupt climate changes in the past, which could happen over a very short span of time. Possibly a decade or so.

**SOLAR CHANGES VERSUS THE CLIMATE**

1. **SOLAR IRRADIANCE CHANGES**. We think mainstream under estimates the amount by which solar irradiance can vary between active solar periods and prolong solar minimum periods. A study of other sun like stars has found a variance of up to .6%, much greater than the conventional .1% difference, often quoted for solar irradiance change over the course of the typical 11 year sunspot cycle. Each .1% change in solar irradiance equates to a .2c temperature change. This means during a period of prolonged minimum solar activity, the temperatures at a minimum due to solar irradiance changes, are going to be at least .2c colder and possibly much more.

2. **ULTRAVIOLET LIGHT CHANGES** - This has been shown to vary by as much as 35% for UV light with wave lengths of less than 1000A, to as much as 20% for UV light in the range of 1500A, to still as much as a 2% change for UV light in the 2700A range. This variance in UV light occurring between solar maximum periods vs solar minimum periods. At times of solar eruptions, UV light may increase by as much as 16%.

   We are more concerned with the variance in UV light between solar maximum periods vs prolonged solar minimum periods. The reason being, that when UV light reaching the atmosphere of the earth decreases, the amounts of OZONE decrease, along with ozone changes of concentrations in a vertical and horizontal sense. This causes the temperature difference in the atmosphere at the lower stratosphere / upper troposphere level to lessen between the poles and the mid latitudes. This in turn, causes the pressure difference to lessen between the poles and lower latitudes, leading to a more meridional atmospheric circulation. This then leads to more climate extremes.

   Southwest Weather, Inc. feels a strong negative arctic oscillation atmospheric circulation leads to an increase in cloud cover and snow cover for the Northern Hemisphere, which leads to an increase in earth's albedo, which results in colder temperatures.

   As we talk about this, the ACI, (atmospheric circulation index), is going to lower more meridional levels. This trend should continue until at least 2020.

3. **PART A - SOLAR WIND** - This carries the charged particles from the sun to the earth, which at times react with earth's magnetic field to produce the Northern and Southern lights. More importantly, as far as the climate is concerned, the solar wind determines the amounts of cosmic rays which may enter the atmosphere of the earth.

   Cosmic rays vs clouds - At times of high cosmic ray intensities entering our atmosphere, it has been shown, that the increase in the cosmic rays correlate to an increase in the amounts of low cloud coverage in a significant manner. This in turn, causes more incoming solar

radiation to be reflected back into space, which results in lower temperatures.

**PART B - SOLAR WIND** - It is thought by Southwest Weather, Inc. that when the solar wind is weak, but has a sudden jump in velocity (due to a spike in solar activity within a prolonged solar minimum period), that the jolt to the magnetic field (from the increase in charged particles from the sun) of the earth may be strong enough to trigger more geological activity. It is a fact that volcanic / earthquake activity always becomes more common / stronger, around sunspot minimum periods. In fact, 85% of all major volcanic eruptions since 1600 AD have been associated with sunspot minimum periods.

4. **VOLCANIC ACTIVITY VS THE CLIMATE** - When volcanic activity is high, the amounts of SO2 particles put into the atmosphere from the volcanic activity increases. This causes more incoming sunlight to be captured and absorbed in the stratosphere, thus not being able to reach the surface of the earth. The result is colder temperatures for the surface of the earth, and warmer temperatures in the stratosphere. If the volcanic eruptions occur in the higher latitudes, they could cause the stratosphere to warm in the higher latitudes relative to the lower latitudes, enhancing a more meridional atmospheric circulation.

5. **LOD (length of day) CHANGES** - During periods of very strong earthquake activity (with low solar activity) the rotation of the earth speeds up, causing the length of the day to decrease. Studies have shown when the LOD decreases, temperatures trend lower, and the ACI, becomes more meridional.

6. **EARTH'S WEAKENING / CHANGING MAGNETIC FIELD** - When earth's magnetic field weakens, it allows more cosmic rays to enter the atmosphere. This results in more low cloud formation. In addition, it causes any solar eruptions to have a greater impact on the earth, because of the weakened state of the magnetic field.

   At the same time when the magnetic field of the earth is weakening, this often causes the magnetic poles to shift and move to lower latitudes. This could greatly enhance the ability of cosmic rays to create clouds for the vertical magnetic field lines of force (the dip poles) will be found at lower latitudes where the air has more moisture, which would aid the cosmic rays being brought down into the earth's atmosphere in that area, to create more clouds. The result is colder temperatures.

   Carbon 14, and Beryllium increase when cosmic ray activity picks up. Cosmic ray activity increases during prolonged solar minimum periods and decreases during active solar periods. Temperature changes correlate closely to C14/Beryllium concentration changes in the atmosphere. This is more evidence of a solar / climate connection.

7. **QBO** - This changes from an Easterly to Westerly component and can be shown to be linked to solar changes, along with the PDO, 60 year cycle, which seems to be in a cold phase when solar minimums occur. When the PDO is in a cold phase, more La Ninas are the rule the result is colder temperatures.

8. **PDO** - The Pacific Decadel Oscillation seems to favor being in a cold phase when solar activity is in a prolonged minimum state. When the PDO is in a cold phase, this promotes more La Ninas, which in turn have a cooling effect for the globe.

9. **MILANKOVITCH CYCLES = EARTH ORBIT / TILT** - are more or less neutral. However, the PRECESSION favors cooling due to the fact that the earth is closest to the sun during the

Northern hemisphere winter. In addition, the position of the moon relative to the sun, can modulate the effects of the solar wind.

10. **IONOSPHERE** - Has less ionization and electrical activity when the sun is in a prolonged minimum state. Thunderstorm activity is less during prolonged solar quiet periods. The THERMOSPHERE, (the highest level of our atmosphere) is found to cool and contract during periods of low solar activity. This is further evidence that solar activity changes, do indeed effect the atmosphere. Since the atmosphere is interconnected, it follows that any change in the atmosphere must translate to a change in the climate.

11. **THERMOHALINE OCEANIC** CIRCULATION - The amount of fresh water vs salt water effects this circulation. This in turn is effected by atmospheric circulation patterns / precipitation, which again can be shown to be tied to solar activity. A weak oceanic circulation will favor cooling in the higher latitudes.

Those are many of the changes the sun exerts on the climate both directly and indirectly. If the positive feedbacks from these many factors reach a certain degree of magnitude / duration of time, they will be able to overcome the inherent negative feedbacks in our climate system. This will bring the climate to a threshold or a series of thresholds, each time resulting in a temperature drop to another range. This will happen when the sun is in a minimum state, as it is currently.

Further, last century's solar activity was not the kind of solar activity that is going to result in climate change. Last century's solar activity, simply maintained our climate in the same regime after the DALTON SOLAR MINIMUM ended, around 1850. The solar activity last century was a steady rhythmic 11 year active sunspot cycle which kept temperatures warm, compared to the colder DALTON SOLAR MINIMUM period.

All variations in the climate from 1850-present have been in the same climate regime, or same temperature range. Southwest Weather, Inc. believes this is going to change this decade, because during Oct. 2005, solar activity went from a very active state to a very quiet state. This has to do with the angular momentum, the four large gas planets exert on the sun, due to their relative positions to the sun, as they orbit about the sun. Based on this theory the sun should remain in a very quiet condition until at least 2035. Solar Cycle 24, a very weak cycle, is in the process of peaking. If this level of activity turns out to be the peak for this cycle, it will make it as weak as solar cycle 5, associated with the DALTON MINIMUM. The DALTON MINIMUM, being a time of colder temperatures, more extreme climate, and an increase in geological activity.

To make this even more significant it looks like the next solar cycle, cycle 25, will be weaker than the solar cycles that were associated with the DALTON MINIMUM.

***The sun is the source that drives the climatic and oceanic systems of the earth. Any change in the sun if large enough, will have an effect on those systems as it is the source that drives them.***

## *CLIMATE OUTLOOK FOR THE NORTHERN HEMISPHERE BEFORE THIS DECADE ENDS*

Given all of the above, Southwest Weather, Inc. is quite confident that the temperatures for the rest of this decade will be in a lower range. At the same time climatic extremes will be more common as will higher geological activity.

| *RANGE OF TEMPERATURE* | *PROBABILITY* |
|---|---|
| **0 to +.5c** | 0% |
| **0 to -1.0 c** | 15% |
| **-1.0 c to -2.0 c** | 65% |
| **-2.0 c to -3.0 c** | 15% |
| **-3.0 c or greater** | 5% |

The Southern hemisphere will not be affected as much due to the geography of the Southern hemisphere, and the large amount of water vs land. Note: Antarctica is land surrounded by water, where as the ARCTIC, is water surrounded by land.

Water has high specific heat capacity, land does not, which means it is much harder to change the temperature of a large mass of water, in contrast to a large mass of land. Most of the land mass is in the Northern hemisphere.

Southwest Weather, Inc. will also be researching where the likelihood of drought vs flooding may be, as this decade proceeds.

Southwest Weather, Inc. feels the transition to the climate we expect later this decade, is taking place currently. We believe the transition will be completed by year 2017, once the very weak solar cycle peak of activity associated with sunspot cycle 24 passes by.