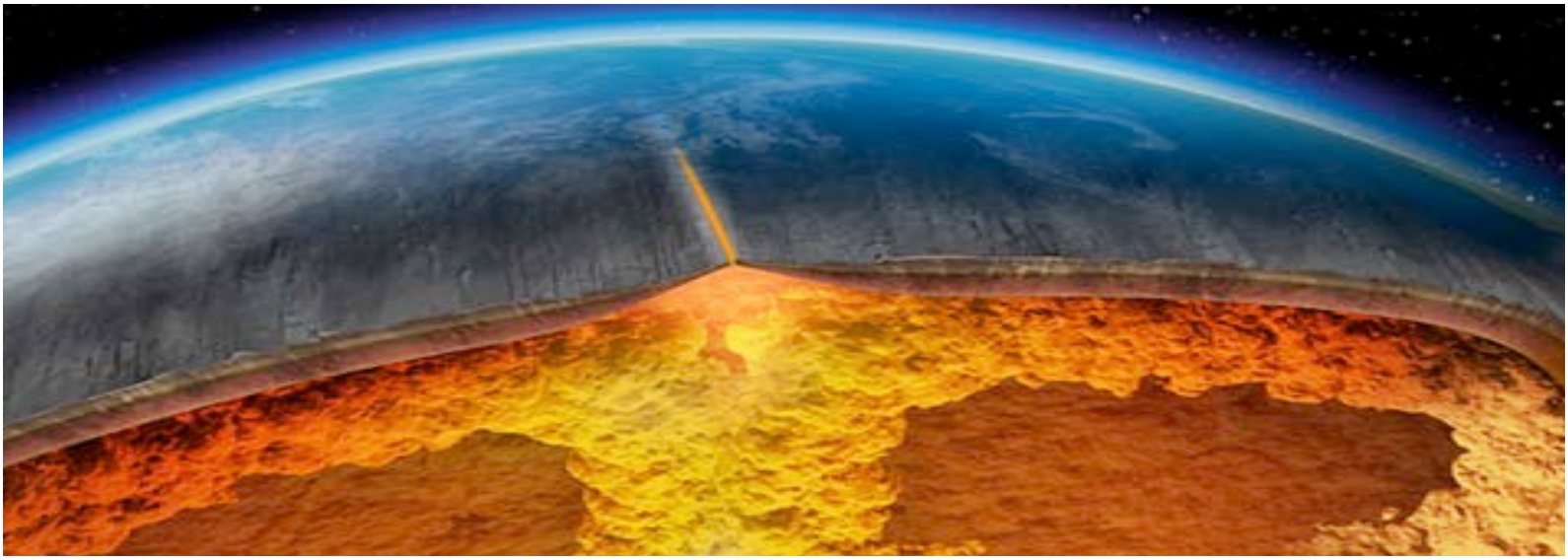


PLATE CLIMATOLOGY THEORY

by
James Edward Kamis
10-7-2014

OVERVIEW

The Sun, quite obviously, is the first order driver of earth's climate, but a much neglected second order driver can contribute significantly to natural variations. The overall theory contends that periods of active earth tectonics and volcanism can be correlated to periods of active climate change and climate related events. To describe this new theory, the term **Plate Climatology** is designated. The theory was first formally introduced on October 7, 2014, after 10 years of research.

In general, increased tectonic activity, either locally or globally, equates to more faulting and volcanic activity, which leads to more heat and fluid release from these active geological features into both the oceans and atmosphere. Altered heat and fluid input equates to climate change.

This effect has been largely hidden from scientific investigation because the heat and fluid release is primarily from two under explored / under monitored regions. First, earth's Deep Oceans, which contain major geological features such as Divergent Plate Boundaries (tectonic plate pull-apart boundaries), Transform Plate Boundaries (tectonic plate side sliding boundaries), Convergent Plate Boundaries (Subduction and Obduction Zones), and High Heat Flow Volcanic regions. The associated heat and fluid release from these geological features acts to alter ocean temperatures, densities, and chemical compositions. The "Altered Oceans" then influence or drive climate changes and climate related events.

Secondly, earth's Polar Ice Caps which contain major geological features such as: Divergent (tectonic plate pull-apart boundaries), Transform Plate Boundaries (tectonic plate side sliding boundaries), and High Heat Flow Volcanic regions. The associated heat and fluid release from these geological features acts to alter sub-ice sheet temperatures. The altered Sub-Glacial Ice Sheets then influence or drive climate changes and climate related events.

Many connections between Geology and Climate are explored and explained in this theory.

The technical portion of the website has been divided into three basic categories:

1. How Geological Forces Affect **Oceans**
2. How Geological Forces Affect **Polar Regions**
3. How Geological Forces Affect **Atmosphere**

Individual articles within these categories provide more detail of geological forces affect on climate and climate-related events related to that category. Such as How Geological Forces:

- Generate El Nino's/La Nina's
- Melt the Base of Selected Antarctic Glaciers
- Melt the Base of the Arctic Sea Ice
- Slowed Down the Gulf Stream Ocean Current
- Emit Significant Amounts of Methane and CO2 into the Atmosphere
- Act Like Deep Ocean "Forest Fires" to Diversify and Spread Coral Reefs
- Significantly Influence Plankton Blooms with Control Earth's Atmospheric Oxygen Content
- Significantly Influence the Temperature and Chemistry of the Oceans
- Act in Concert with Normal Atmospheric Processes to Control Earth's Climate

It makes common sense that if major geological plate boundary geological phenomenon have the power to move continents 2-3 centimeters per year, frequently create large tsunamis that mix thousands of feet of ocean column, support vast chemosynthetic communities, and contain 90% of the planets known active volcanoes that they can certainly/easily influence our climate in a dramatic fashion. Our planet is best described as "water covered" because 71% of the surface area is ocean. Astoundingly, we have only explored 3% of Earth's ocean sea floors. Conversely, we have studied nearly every aspect of the atmosphere. As a result, climate scientists incorrectly assumed that climate was exclusively driven by atmosphere, here termed **Atmospheric Bias**. The introduction of the Plate Climatology Theory opened a new era of how we interpret our climate, a more balanced approach with includes the impact of geological forces.

It is hoped that this new and comprehensive theory would be a catalyst for future research and provide a platform to join what are now several independently researched branches of science: Geology, Climatology, Meteorology, Oceanography, and Biology. The science of Climate is extremely complex and necessitates a multi-discipline approach.

EFFECT OF SUB-OCEAN TECTONISM AND VOLCANISM ON CLIMATE

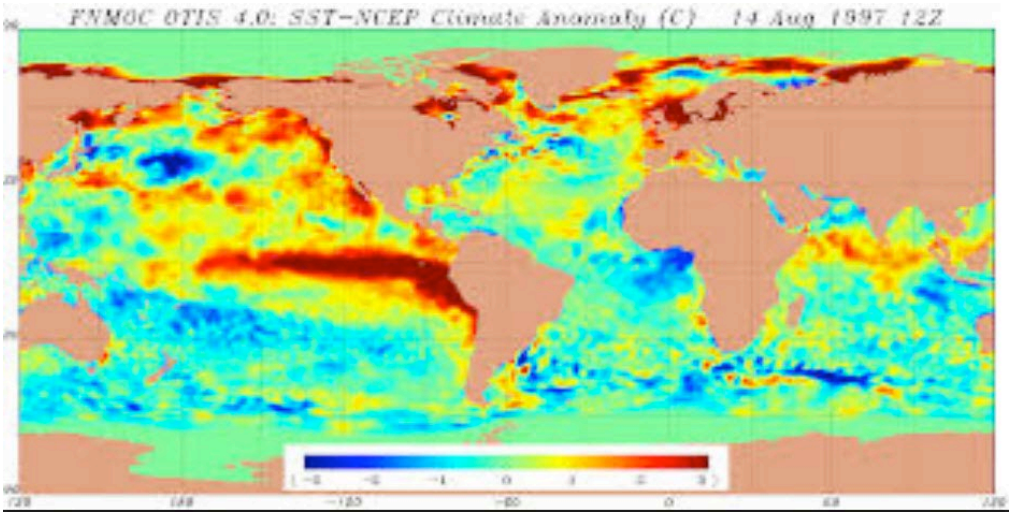
Introduction

This theory proposes that sub-oceanic tectonism, volcanism, heat flow, and fluid expulsion have a strong influence on worldwide climates. Several prominent examples are; El Niño's, La Niña's, the recent California drought, ice mass reduction in southern Greenland, ice mass reduction in the Arctic, and selective ice mass reduction in Antarctica.

This effect has been largely hidden from scientific investigation because the primary heat release is within underexplored/monitored deep ocean regions; Rift Systems (tectonic plate pull-apart boundaries), Traverse Fault Systems (tectonic plate side sliding boundaries), Subduction Zones (tectonic plate converging boundaries), and High Heat Flow Volcanic Regions. Ocean temperatures, densities, and chemical compositions are altered by this varying tectonic activity. The "Altered Oceans" then influence or drive climate changes and climate related events.

Several specific examples of this aspect the Plate Climatology Theory are listed below.

El Nino



El Nino's originate as deep ocean high temperature anomalies at a "Point" * source in the western Pacific, then migrate east, become progressively shallower, and fan out. This can be interpreted as strong evidence that the control/origin of El Nino's is heat from a specific deep sea floor geologically controlled location, almost certainly a deep sea floor volcano, vent, or major plate boundary fault intersection. In essence, a sudden increase in sub-oceanic crustal plate movement, or increase in sub-oceanic volcanism in a small or reasonably small area within the western Pacific leads to release of large amounts of heat and fluids, generating an El Nino. Historically other geologists have also argued that El Nino's are likely geologically driven.

New research done by Kessler et al as referenced below can be interpreted to show that a deep ocean geological heat **"Point Source"** for El Niño's has been located east of Papua New Guinea. The notion of a fixed "point" source fits perfectly with the Plate Climatology Theory because fixed point sources have proven to be related to sea floor geological phenomenon. As an example, "Hot Spots" are fixed sea floor heat sources. The specific point source identified by Kessler et al is an area of known active ocean volcanism, and at the juncture of several major plate boundaries, which also fits well with the Plate Climatology Theory.

Another method to demonstrate that the primary source of El Nino heat is a deep ocean fixed point source is to use published ocean temperature maps of all previous El Nino's. It is possible to discern the western most starting point of these El Niño's by drawing lines on the maps that frame the boundary of heated El Nino and normal surface ocean water. Each map has a resulting northern and southern bounding line. On every map these bounding lines converge on one point, an area east of Papua New Guinea. This coincides / matches perfectly with the newly defined Kessler heated ocean area.

Other geologists have previously proposed this same area as the generating point of El Nino occurrences (see Mandeville reference below).

In fairness to Kessler et al, it is important to note that they do not interpret the results of their research as we do. Their work is comprehensive and documents the distribution of heated ocean water by a system of complex ocean currents. It is best that readers take a moment to study both of the references to their work listed below. It is obviously excellent work. However, we have a basic disagreement with their conclusion, which implies that it is ultimately all about the atmosphere. We believe it is all about the geological heating influence at deep ocean plate boundaries and associated volcanism.

Climate Scientists currently maintain that El Nino's are fueled / initiated by solar energy that is somehow focused into the deep ocean, and then modified and concentrated by complex ocean currents. There are many problems with this theory. First, why do all El Nino's originate at the same point? It's very difficult to believe that they would not occur in other areas of the western Pacific where the solar energy is just as strong.

Secondly, it is very difficult to believe that there are not other areas of the Pacific where complex ocean currents wouldn't form temperature patterns that resemble El Nino's. El Nino sea surface temperature map patterns are typically unique. This is readily apparent by combining the daily or even monthly sea surface temperature maps for an individual El Nino. The resulting map has a distinct funnel shape with prominent north and south temperature bounding lines limits that converge west to a single point east of Papua New Guinea.

Lastly, La Nina's also form at a point source, the same point source as El Nino's. We conclude that the point source origin of El Nino's is clear evidence that they are not formed by current modified solar energy but rather it strongly indicates that they are formed by a deep ocean geological phenomenon.

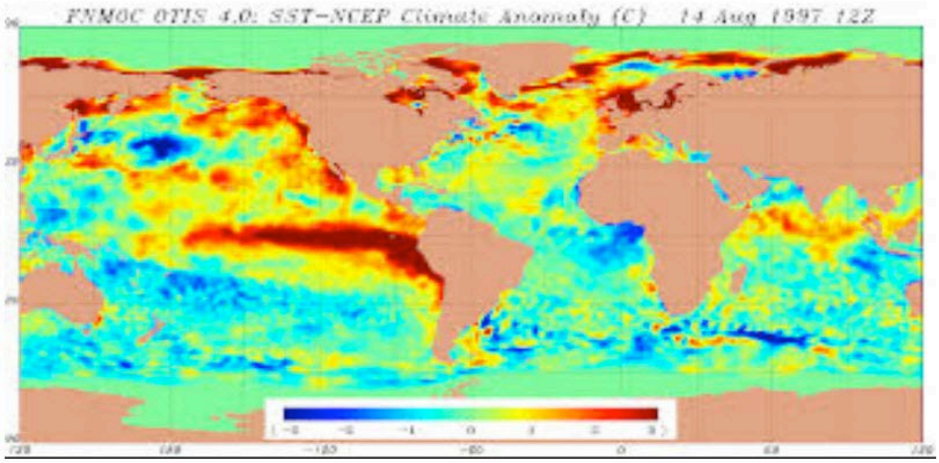
Once formed El Nino's migrate east, become progressively shallower, and fan out. During this progression they maintain a strong, clear and definable temperature pattern. This pattern/progression is unique and unlike any other temperature pattern in the Pacific. This can also be interpreted as strong evidence that the control/origin of El Nino's are a unique event, specifically heat from a deep sea floor geologically controlled phenomenon.

El Nino's often occur in "bundles". Multiple El Nino's occur in a short time span, grouped together. Typically the first El Nino in a bundle is of lower intensity, subsequent El Nino's are progressively more intense, often ending with a final maximum/high intensity El Nino. This El Nino bundle pattern is very similar to the progression of well monitored and well-understood land based volcanic and tectonic events. Which typically build through time to a final large volcanic eruption or tectonic event. Climate Scientists have struggled to predict when El Nino's will occur. Why? I believe it is due to a basic flaw in their models. They are modeling the effects, not the cause of El Nino's. In their models they load atmospheric data; wind directions, air temperatures, and storm cycles. They are not modeling the change in the geological events. As a result their atmospheric models are limited in scope and therefore struggle to predict El Nino occurrences. In fairness to the Climate Scientists, predicting volcanic/tectonic heat flow is no simple task either. It is not possible to simply model seismicity and relate it to heat and fluid flow. Nonetheless, modeling the geological heat flow is the correct way to head with future El Nino prediction modeling.

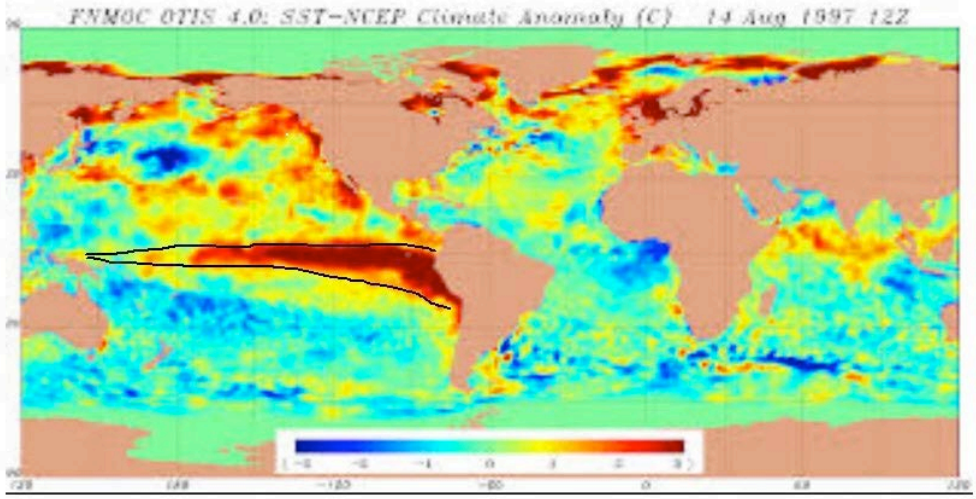
The temperature boundaries of El Nino's with normal seawater are relatively sharp. This implies that the energy source that generates the El Nino is very strong/intense. I believe the best candidate to create such sharp boundaries is an extremely high temperature seawater pulse from a geological point source. Conversely, the sharp boundary contrast does not match up well with a solar/atmospheric origin.

Information on selected geologically monitored deep-sea vents/fumaroles show that they are perfect analogies to the much larger El Nino's. These geologically driven vents/fumaroles typically occur at major deep continental rift boundaries or at major fault segments associated with the plate movements. These point source vents/fumaroles emit extremely hot chemically charged water forming plumes of hot water that migrate east, become progressively shallower, and fan out. This progression, there sharp temperature boundary, and propensity to turn on and off is a very good match to the larger El Nino events.

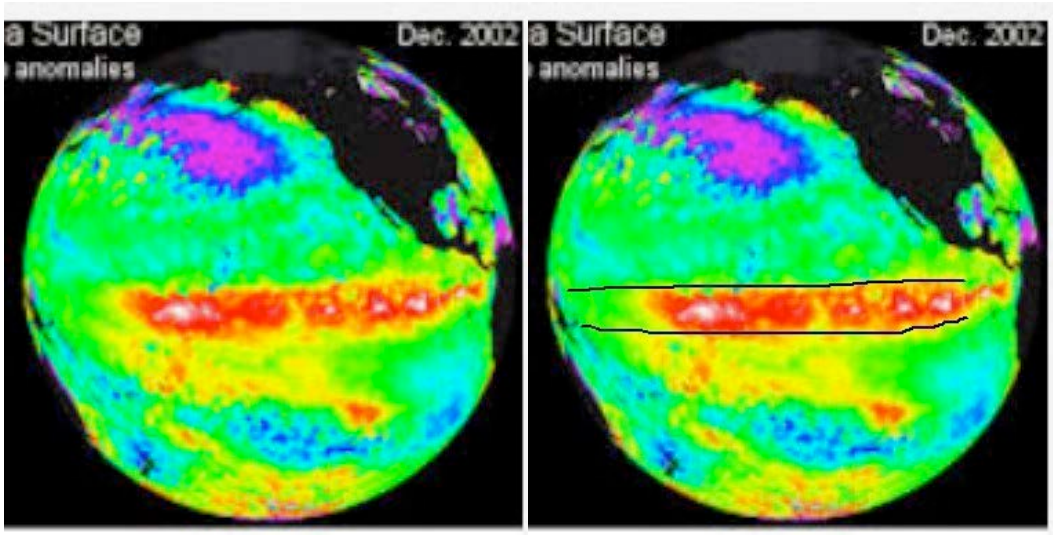
1997 El Nino



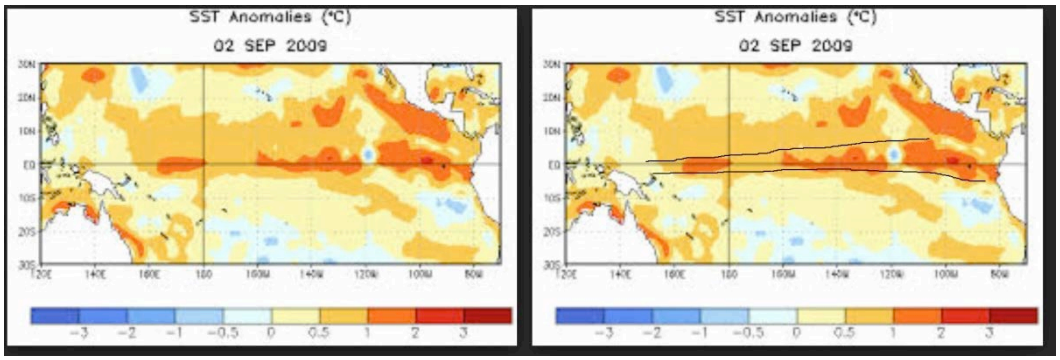
1997 El Nino with Defining Lines



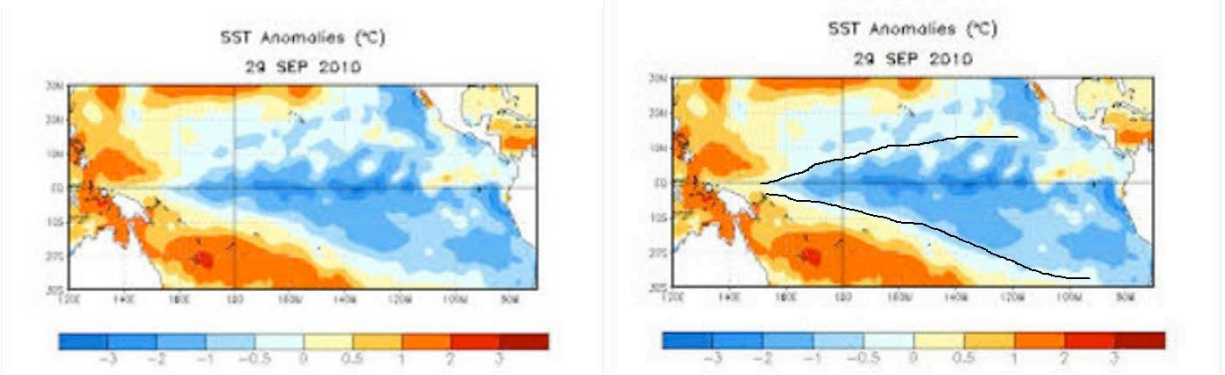
2002 El Nino ***2002 El Nino with defining lines***



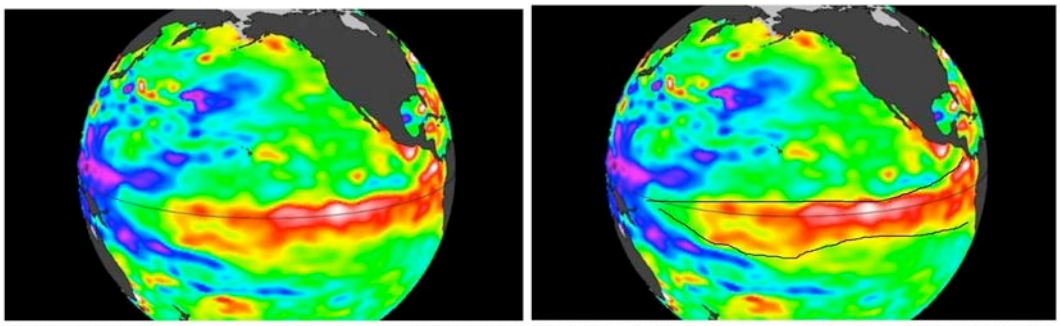
2009 El Nino ***2009 El Nino with defining lines***



2010 La Nina ***2010 La Nina with defining lines***



2012 El Nino ***2012 El Nino with defining lines***

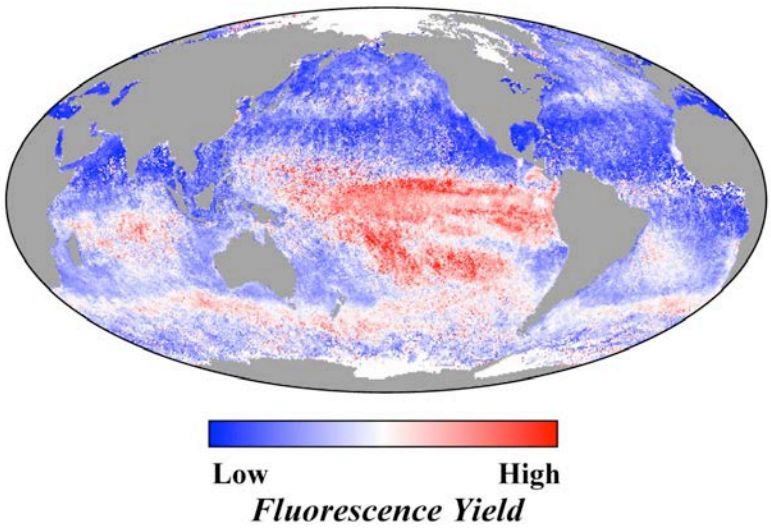


A satellite thermal map show El Niño conditions developing in the equatorial Pacific Ocean. Shades of red and orange indicate where the water is warmer and above normal sea level. Credits: JPL/Nasa

A satellite thermal map show El Niño conditions developing in the equatorial Pacific Ocean. Shades of red and orange indicate where the water is warmer and above normal sea level. Credits: JPL/Nasa

Another geological pattern that looks similar to the origin and progression of El Nino's is large land based volcanic eruptions. Here the analogy is not as strong as the vent / fumaroles analogy for obvious reasons; different fluids air vs. water, non-heat vs. ash, more direct influence of the sun. Having noted these differences, I believe both events have similarities worth noting. The land-based eruptions emit ash from a point source, which spreads east, fans out, and progressively becomes higher in the atmosphere as it breaks through density layers. These large volcanic eruptions have immediate and lasting changes on climate. The extent of the climate change from these volcanic eruptions is related to; eruption intensity, eruption duration, atmospheric density layers and atmospheric trade winds.

Ocean plant life such as phytoplankton can now be globally mapped by satellite. One such map is shown below. This map is here interpreted to show that the phytoplankton spreads out from a point source east of Papua New Guinea; the likely geologically induced heat point source of all El Nino's.



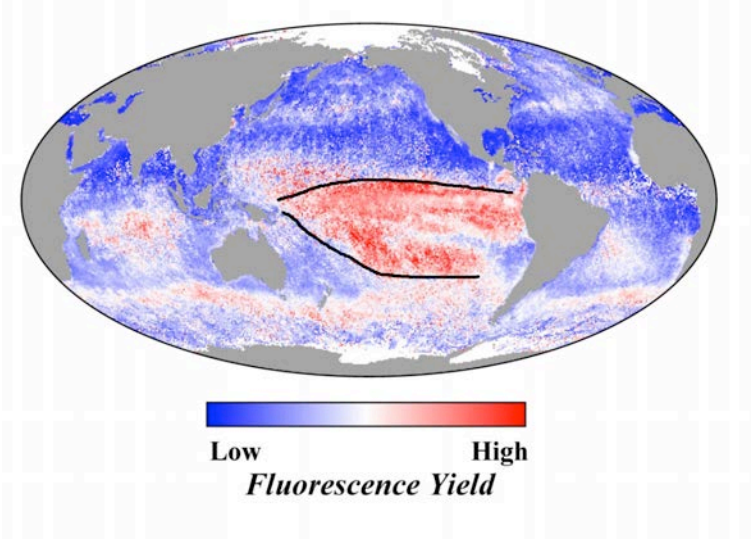


Figure 1: The MODIS instrument on NASA's Aqua satellite compiled this global view of the amount of fluorescent light emitted by phytoplankton in the ocean. The amount of fluorescent light is not constant; it changes with the health of the plant life. **Credit:** Mike Behrenfeld, Oregon State University

The MODIS instrument on NASA's Aqua satellite compiled this global view of the amount of fluorescent light emitted by phytoplankton in the ocean. The amount of fluorescent light is not constant; it changes with the health of the plant life. Credit: Mike Behrenfeld, Oregon State University

This phytoplankton bloom may be responding to geologically induced increased ocean temperatures, associated ocean water chemistry changes, or both.

Can deep ocean geological events generate enough energy / heat to create an El Nino? We believe the answer is yes. We offer several known / measured geological events as proof that it is well within the realm of possibility.

The first example is the Mount Pinatubo eruption. It released approximately 5.9 times 10 to the 12^{th} BTUs during its short eruptive period. This is enough energy to heat a 50 mile by 50 mile by 2.5 mile portion of the ocean 1 degree Celsius in just

a short time period. Another example is the Yellowstone Volcanic Plateau (50 mile by 50 mile area), which releases 27 times 10 to the 10^{th} BTUs per day.

These two "known" geological heat release examples seem even more compelling when they are compared to deep ocean rifts and subduction zones. Rifts and subduction zones are almost certainly the largest energy release points on the planet. Add to this that they have been virtually unmonitored, and we contend that it is very possible, in fact likely that deep geological events are driving many climate changes.

El Nino's have a strong and direct effect on climate, and it is therefore important that we understand them. We theorize that their origin has been incorrectly attributed to atmospheric conditions. I believe there is strong evidence to show they are geologically driven. If correct, it stands to reason that many other heated areas within the ocean are also affecting modern climate.

La Nina

La Nina's originate as deep ocean low temperature anomalies at a "point" source in the western Pacific, then migrate east, become progressively shallower, and often fan out. We believe that the source point for El Nino's and La Nina's is the same. Though not as well understood as El Nino's, we theorize that La Nina's are the result of much cooler water being emitted from the same geologically controlled location. The heat is turned off, but water still continues to flow from the deep-sea location. This phenomenon has been observed and has been termed "Cold Seeps". These Cold Seeps have a cooling effect on the previous El Nino ocean waters. La Nina water is not extremely cold, just less heated than the El Nino water, so the effect is not as dramatic as the El Nino effect. Still there is an overall cooling effect of the El Nino water.

California Drought

Another specific example of geological phenomenon influencing climate is the most recent California drought. Early on in the California Drought Cycle Meteorologists published information that an unusually persistent wintertime atmospheric high-pressure ridge in the Gulf of Alaska was affecting North American storm tracks. This persistent high-pressure ridge diverted much needed rain bearing storms away from California. Follow-up published reports indicated that the water in the far western Gulf of Alaska was much warmer than normal, and that unusual fish species had been noted in the Gulf. Additionally published maps indicated that through time the geographic position of this unusually warm water didn't change. This was interpreted to imply that the source of the heat was from a one location, a "Point Source". Fixed heat point sources imply that the origin of the heat is likely a fixed deep geological area such as a plate juncture or active volcanic area.

Given the information at this time it was theorized that this unusually persistent high pressure ridge and associated warm surface ocean water were both in fact related to a geological phenomenon, specifically increased volcanic or geothermal activity associated with the Pacific Plate Subduction Zone in the area of the Gulf of Alaska. Deep heated ocean water from a point source made its way to shallow portions of the ocean and thereby affected the surface weather patterns; pressure ridges, wind directions, air temperatures, etc.

Meteorologists had an entirely different interpretation. They theorized that the high-pressure ridge was the result of atmospheric conditions, and therefore it was implied that unusual atmospheric conditions caused the California Drought.

New information strongly indicates that unusual atmospheric conditions were not the cause of the California drought.

The results of a just released NOAA sponsored Assessment Report "Causes and Predictability of the 2014-14 California Drought" by lead author Richard Seager of Columbia University's Lamont Doherty Earth Observatory was summarized in a USA Today article (December 8, 2014) as follows:

> "N*atural weather patterns, not man-made global warming, are causing the historic drought that's parching California, says a study out Monday from federal scientists."*

The NOAA report goes on to say that an unusually persistent (three year) winter time atmospheric high pressure ridge has diverted / blocked rain bearing storms from reaching California, and that unusually elevated ocean surface temperatures in the far western Gulf of Alaska are aiding this process. This is a very significant conclusion, because the study implies that atmospheric conditions are being driven by warm ocean water, **NOT** the other way around.

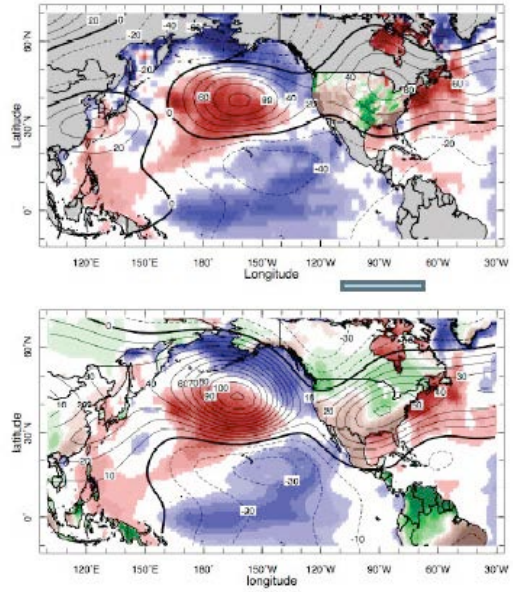


FIGURE 3

The 200mb height (contours), sea surface temperature (color, ocean), and U.S. precipitation (color, land) anomalies for November 2011-April 2012 observed (top) and average of 150 climate simulations (bottom). Red (blue) denotes warm (cold), and brown (green) denotes dry (wet).

Climate scientists have for many years contended that the atmosphere is the sole driver of climate, and that it also warms the oceans. Their atmospherically based Climate Models supposedly support this contention. So increased CO2 leads to increased world temperatures, and importantly warmed oceans.

The Plate Climatology Theory contends that many, not all, but many unusual natural climate variations are related to geologically induced increased heat flow often from deep ocean faults and tectonic plate junctures.

The California drought certainly qualifies as an unusual climate variation, and recent reports / publications support the notion that something other than the atmosphere is driving this weather pattern. It seems logical to at least consider that deep geologically induced ocean heating has made its way to shallower depths in the far portions of the Gulf of Alaska thereby directly contributing to the California Drought.

I here theorize that the California drought was the result of geologically induced geothermal heat flow from a deep ocean plate juncture. Two possible sources for this heated water are;

1.) The sub-duction zone on the east side of the Gulf of Alaska.
2.) The Same heat source as el Nino, deep ocean east of Papua New Guinea

In order for the Gulf of Alaska sub-duction zone case to be the heat source, it necessary to invoke strong surface water downwelling along the west coast of Alaska.

It could work as follows. Geothermally warmed surface water in the far western Gulf of Alaska is wind driven to the northeast. As the warm water is driven progressively farther northeast it cools, becomes denser and “downwells” / sinks into the deep ocean. Here it comes in contact with the heating source subduction zone. The water is heated and stays near bottom as it begins to flow southwest and progressively become shallower. This whole system is envisioned to be a very large circulation pattern.

One result of this type of large circulation pattern would be shallow ocean water temperature maps that show cool temperatures near the coast of the Gulf of Alaska and warm temperatures in the far western Gulf of Alaska. This is what the NOAA shallow ocean temperature maps indicate.

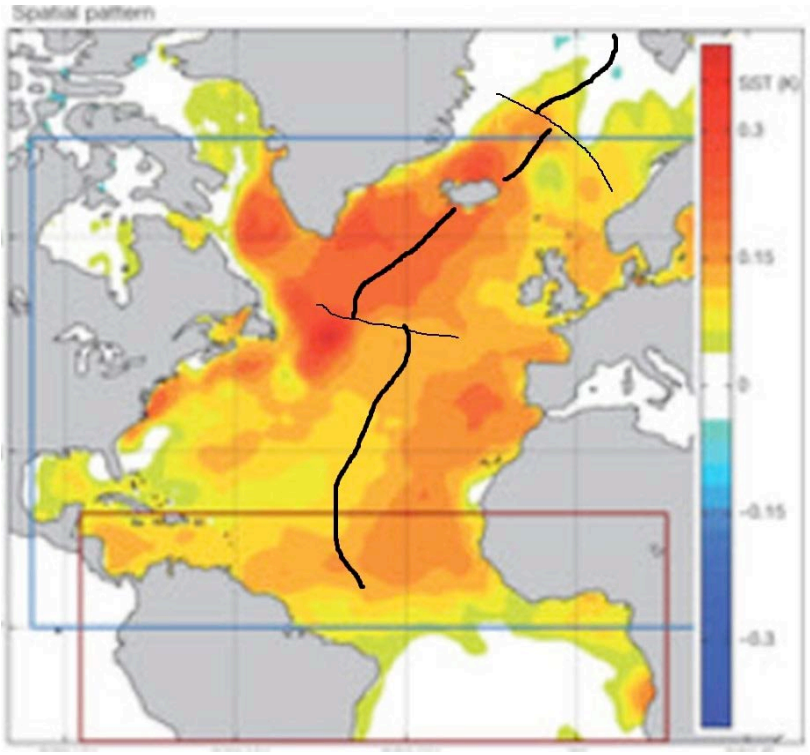
This is a highly theoretical and non-unique solution, however I believe it is at least a plausible explanation of how to generate a fixed and persistent shallow ocean water high temperature anomaly in the far western Gulf of Alaska.

The alternative heat source, east of Papua New Guinea, is an equally likely. This would entail a long distance northeast, and progressive swallowing of deep heated water. This is a more favored explanation by climate scientists.

Mid-Atlantic Rift System

Another example of geologically controlled deep ocean climate change can be gleaned from a publication in Nature by Li et al (see reference below). This publication contends that recent unusually high North Atlantic Ocean near surface temperatures are the cause of increased ice mass in Antarctica. Li's theory essentially invokes a Domino like effect from these anomalous North Atlantic sea temperatures to induce changes in; atmospheric wind directions, wind temperatures, and weather patterns. These changed weather patterns are then theorized to be responsible for increased ice mass in Antarctica

Upon reviewing Li's North Atlantic temperature anomaly map, and then overlaying the trace of the Mid Atlantic Ridge / Rift, we discovered that there is a very close match between the two maps. We believe this match strongly indicates a cause and effect relationship, between the Mid – Atlantic Rift and elevated temperatures in the overlying ocean. The Mid – Atlantic Rift crest and major offsetting faults are marked as black lines on the accompanying map.



In fairness to LI et al currents, such as the Gulf Stream, have altered the SST temperature map, but not enough to erase the telltale influence of the Mid-Atlantic Rift.

There is a more direct, and I believe more logical interpretation of Li's published North Atlantic temperature maps. I here theorize that the high near surface temperatures in the North Atlantic are caused by heat release from the Mid-Atlantic Rift. These heated waters, and associated elevated local air temperatures are then responsible for melting of the southern

Greenland Ice Sheet and melting of at least part of the Arctic Polar Ice Sheet. Furthermore we believe that these warmed North Atlantic waters have little if anything to do with increased Ice Mass in the Antarctica.

CO2 "Lag"

Worldwide deep ocean tectonic activity and associated heat and fluid release have a much greater effect on CO2 concentrations than previously thought.

Many scientists have noted that historically, atmospheric CO2 concentrations are actually low at the beginning of extended warming periods and that atmospheric CO2 concentrations rise after atmospheric warming starts. This is called the CO2 "Lag". It has been well documented in the literature. Climate scientists have had a very difficult time explaining the reason for this lag. Skeptics have offered it as proof that CO2 cannot be the cause of the atmospheric warming. We agree with the skeptics contention.

We theorize that during geologically induced worldwide ocean warming periods, the heated oceans lose their ability to retain / absorb CO2. Instead, they begin to progressively emit more CO2 into the atmosphere because warmer seawater holds less CO2. Another contributing factor to increased CO2 during these geologically induced ocean heated periods is the release of liquid CO2 from vents. Vents are more active and release more CO2. Relatively recent research shows that vents emit liquid CO2.

The net effect of all this is that during periods when active geological events are progressively heating the oceans, the oceans progressively emit increasing amounts of CO2 into the atmosphere. This progression creates a "lagged" CO2 atmospheric response.

It is important to note that in this scenario increased atmospheric CO2 is an effect of the warming oceans, not a cause.

Concerning the effect of this whole scenario on plankton blooms, We theorize that the magnitude and frequency of near surface Plankton Blooms is increased, however these blooms are not likely to be large enough to consume a significant portion of CO2 released from the heated oceans. Therefore most of the released CO2 makes its way into the atmosphere.

Lastly, we predict that present atmospheric CO2 concentrations will not continue to rise as they have during the last decade. Rather, we believe they will level off / remain at present day concentrations for several years, and then begin to fall.

Why? The current global ocean warming period appears to be ending as demonstrated by both the 18-year atmospheric temperature "Pause", and other global ocean temperature data. The consequence of a lower overall ocean temperature is that the ocean will have a greater ability to retain CO2. It will therefore emit less CO2. The result will be lower atmospheric CO2 levels. This response will "Lag" the temperature "pause" of the atmosphere.

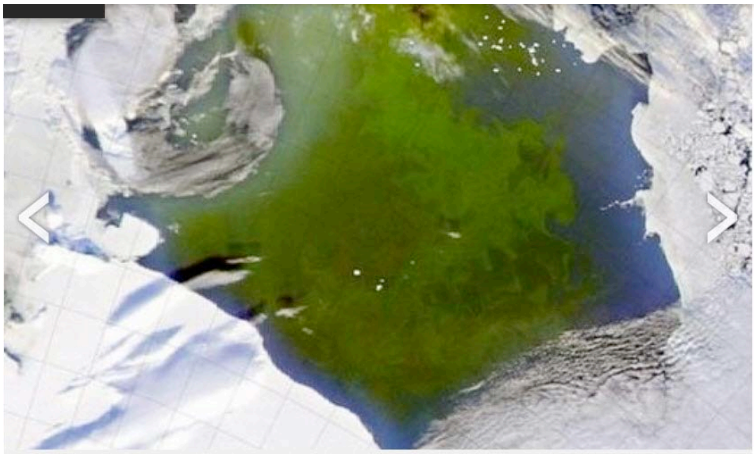
Plankton Blooms

Worldwide deep ocean tectonic activity and associated heat and fluid release have a much greater effect on plankton levels than previously thought.

Chemosynthesis is a fascinating new branch of biology. It is now well known that deep ocean vents have biologic communities associated with them. These vents release significant amounts of heat and chemicals, which supply food for numerous biological communities. The number of vents and their overall effect on the ocean is largely unknown, save a few isolated areas. Ongoing research shows that there is likely significantly more heat and chemical release than previously thought. The implications of Chemosynthesis have not been fully appreciated. However, it is in essence a confirmation that geologically driven deep ocean geological events are likely to be significant.

Given that deep ocean chemosynthesis exists, it is a logical next step to theorize that geologically controlled deep ocean heat and associated fluid release may also have an effect on shallow plankton blooms; alteration of upwelling currents, alteration of temperature boundaries, alteration of ocean nutrient content, and alteration of ocean chemical content (specifically CO2, Nitrogen, and Phosphorous).

Below find an image from NASA of a Plankton bloom in the Ross Ice sheet area of Antarctica. The Ross Ice sheet is an isolated area where the Antarctic Ice sheet is actually retreating, not advancing / growing. It's very interesting to note that recently it has been discovered that ocean temperatures beneath and near the Ross Ice sheet are unusually warm relative to other areas of the Antarctic. We theorize that this local ice retreat and the unusual plankton bloom are caused by geologically induced heat and fluid release from a relatively nearby deep ocean vent or fault zone, almost certainly the West Antarctic Rift System.



#6: Pea Soup On Ice COLLAPSE CAPTION

Even in natural colors, blooms can be striking -- and in surprising places. This pea-soup-green bloom was captured in the act in Antarctica's Ross Sea on Dec. 6. 2004. The phytoplankton-thick waters were found just north of the Ross Ice Shelf. Credit: NASA/GeoEye

The reader is referred to the Antarctic Continent portion of this write-up for a more complete description of the overwhelming amount of evidence that shows that selective Antarctic ice sheet melting is caused by geologically induced geothermal heating.

Other recently released space images and data also show unusual plankton blooms in the North Atlantic. Again it is possible that these unusual blooms may be affected or even indirectly created by heating and fluid release from deep ocean vents, small volcanoes, or faulted areas.

A fascinating new development is the discovery of Phytoplankton blooms under the ice in the Chukchi Sea area of the Arctic Ocean by Stanford University scientists. Their research showed that these blooms have likely existed in this area for decades. The discovery of well-developed and aerially extensive blooms beneath ice areas that have not been melted has forced a dramatic change in considering how and where Arctic blooms occur. This fascinating new discovery has not yet led to proof that there is a direct relationship of these types of blooms with geologically induced deep ocean heat, however I would suggest that this should be considered.

The climate prediction / modeling implications of establishing a better understanding of how and when Plankton Blooms will form are obvious; large blooms can lead to more oxygen expulsion and reduced CO2 concentrations, especially since it has now been determined that massive plankton blooms exist beneath large portions of the arctic, beneath portions of Antarctic ice sheet, and in never before locations above deep ocean rift systems.

Although the science of Plankton Blooms is extremely complex and therefore not easily understood / explained, we believe it is time to consider the possibility that geologic phenomenon may have a very strong influence on their frequency, location and magnitude.

Major Deep Ocean Currents

Major worldwide deep ocean currents, such as the Gulf Stream, are affected by variations in sub-sea tectonism, volcanism, heat flow, and fluid release.

Major shifts in deep ocean currents have long been thought to be associated exclusively with changes in either continental fresh surface water discharge or changes atmospheric conditions. Although these factors obviously have had influence, we believe that they are not the only reason for changes in major ocean currents.

We believe that significant time periods of heat and fluid release from major deep ocean geological controlled areas such as plate junctures, plate spreading rifts, volcanic areas, or vents areas can significantly alter the temperature, density and chemistry of the overlying ocean. This in turn leads to changes in deep-sea currents.

One recent example of a major geologically influenced current change is the Gulf Stream "Shutdown". Below find a published map of the normal Gulf Stream Current in December 2009, followed by two temperature maps from Feb 2010 and May 2010 that illustrate the Gulf Stream "Shutdown".

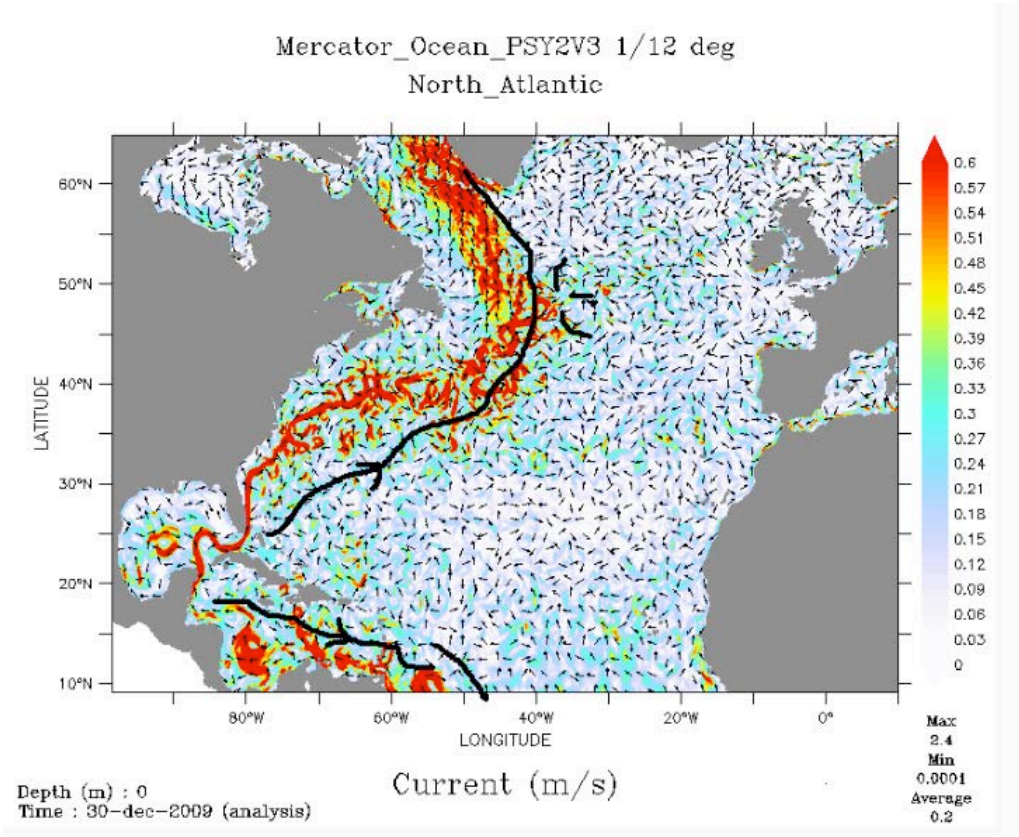
Upon review of these maps and many other published maps it is clear to us that;

1.) The Gulf Stream current was "normal"/unaffected from its origin point (northeast of the Yucatan Peninsula) to an area east of Newfoundland in the North Atlantic Ocean during any time/mapped period.
2.) Beginning at an area east of Newfoundland the Gulf Steam Current was degraded/changed beginning in February 2010.
3.) Degradation/alteration of the Gulf Steam continued through the May 2010 time period. Again from a point east of Newfoundland.

Based on this information we conclude that the Gulf Stream Shutdown began at a specific point, and that that point of disruption did not significantly move. This has strong implications on what caused the disruption. It is also germane to mention that two other phenomenon occur at approximately at the same location and at approximately the same time as the Gulf Stream Shutdown; unusually high North Atlantic SST temperatures (Li et al) and large plankton blooms (NASA satellite images).

We theorize that the same force causes all three of these events: Gulf Steam "Shutdown", High North Atlantic SST temperatures, and North Atlantic plankton blooms. That force was the release of heat and fluid from a portion of the Mid Atlantic Ridge spreading center.

As the Gulf Stream Current came in contact with this elevated heat and fluid it degraded and changed.
We here theorize that a geologically controlled phenomenon is responsible for the Gulf Steam Shutdown.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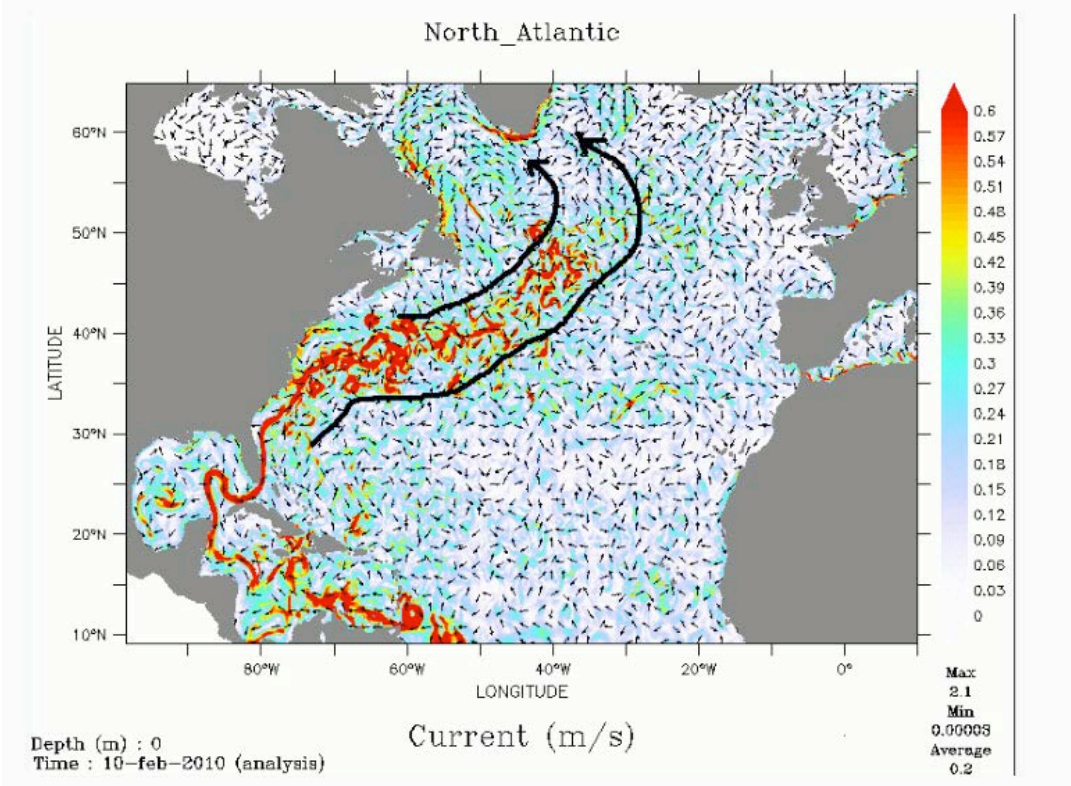
Current (m/s)
Depth (m) : 0
Time : 30-dec-2009 (analysis)


North_Atlantic
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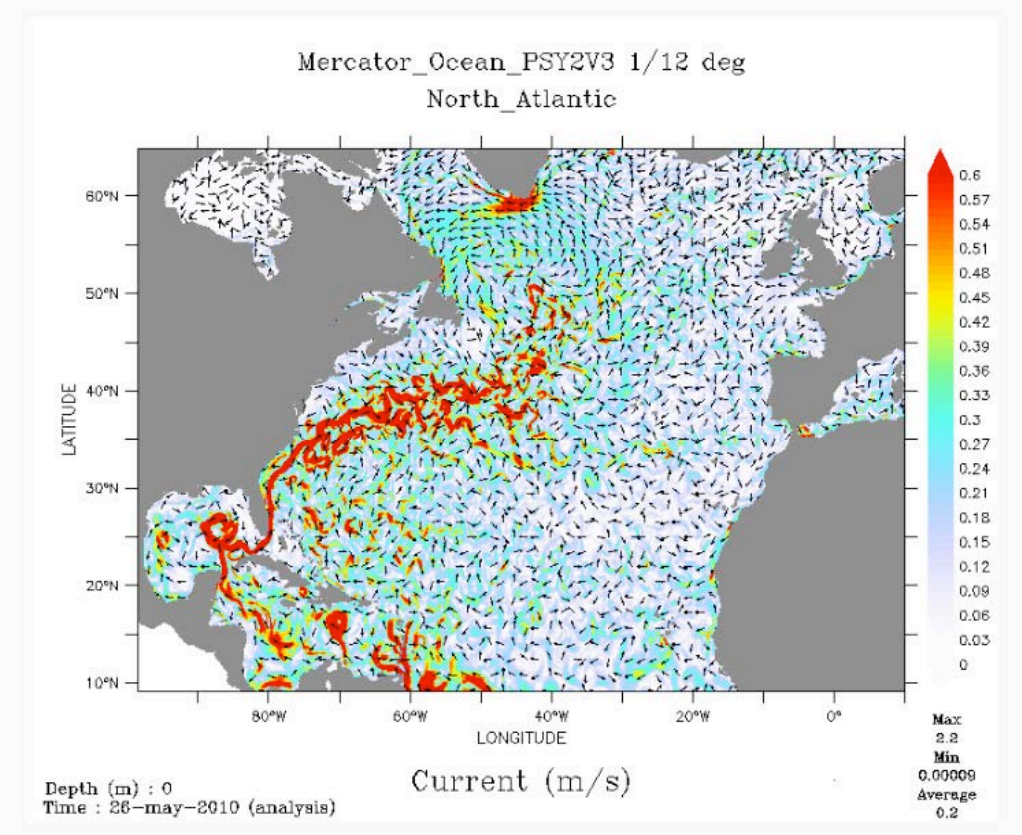
Current (m/s)
Depth (m) : 0
Time : 10-feb-2010 (analysis)



For many decades Climate scientists have asserted that unusual changes in both the Gulf Steam Current and Western European climate can be attributed solely to unusual changes in atmospheric conditions. We disagree and here theorize that these unusual changes are driven by heating and fluid release from deep sea floor geological areas, primarily the Mid Atlantic Rift complex.

The changes in atmospheric conditions are an “effect” not the “cause”. It is easy to understand why climate models have historically been based almost solely on atmospheric observations. Atmospheric data is much easier to acquire, abundant, available to all scientists, recorded for thousands of years and is globally complete. Lastly we live in, and breathe the atmosphere. It’s what we know. There has always been a kind of, well prejudice. It must be about our atmosphere and us.

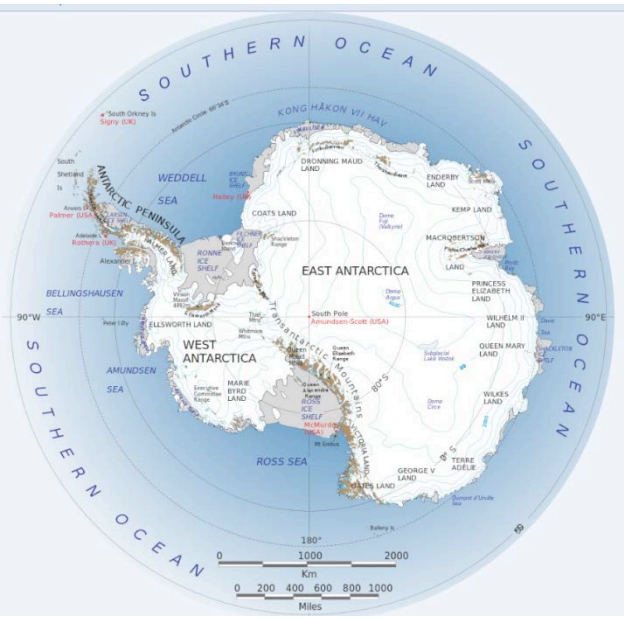
The influence on climate of deep ocean geological phenomenon is easily dismissed because we know very little about them. Deep ocean data is not easy to obtained, not abundant, incomplete, not measured across the entire planet and does not accurately measure the heat source, just water above the heat source. It is therefore more challenging to assess / interpret the influence of the deep geological heat sources. Even given these restrictions the telltale sign of their strong influence on climate can be recognized. Lastly it just makes common sense that if deep ocean geological phenomenon have the power to move continents 2-3 centimeters per year, frequently create large tsunamis that mix thousands of feet of ocean, support vast chemosynthetic communities, and contain 70% of the planets known active volcanoes that they can certainly / easily influence our climate in a dramatic fashion.

Until recently vertical segregation of the deep oceans by density and temperature layering was argued as a reason for not including the deep oceans in climate models. This notion has changed in the last few years as observed natural climate variations were difficult to explain based solely on atmospheric models. This essentially opened up Pandora’s Box. It is now fair game to include all deep ocean phenomenons in climate models. We completely agree with this change, and believe it strengthens our long-standing contention that deep ocean sea floor geological influences should be considered in climate modeling.

We have contended for many years that complete vertical segregation of the oceans was unlikely because periods active tectonism can lead to many factors that promote vertical mixing of the oceans; increased numbers of Tsunami’s, major heat and fluid releases, and chemical changes in the ocean water.

In summary the influence on major ocean currents by deep ocean geological phenomenon seems obvious to us, and should at the very least be considered by climate scientists. Current research and modeling is all centered on atmospheric solutions to observed natural variation in major ocean currents. It's time to change that paradigm.

Antarctic Continent



Ice sheet and climate variations on the Antarctic Continent during the last thirty years cannot be easily explained utilizing current atmospheric based climate models. A list of these ice sheet and climate variations is as follows;

- The overall extent of the ice sheet has steadily expanded for the last thirty years including those portions that extend out onto the ocean.
- Atmospheric CO2 content has steadily increased for the last thirty years.
- Selective portions of the ice sheet are retreating/melting, some at very high rates.
- Melting of the ice sheet is from beneath, not from above.
- There are subtle but measurable differences in atmospheric temperatures between eastern and western Antarctica.
- There are unusual plankton blooms in the Ross Ice Sheet area.
- There is thinning and sagging of the continental portion of the Ice Sheet along the West Antarctic Rift
- *The presence of two "modern" sub-glacial volcanic eruptions (updated 12-18-2014)*

The Plate Climatology Theory can explain a significant number of these variations.

The Ross Ice Sheet is melting/retreating at a greater rate than other ice sheets that do not extend onto the ocean. Why? The author has theorized for nearly ten years that heat flow from a geological feature was the likely reason for this local ice sheet melting. Recent publications strongly support, if not prove that this is in fact the case. These publications show that heat release from the active West Antarctic Rift system is indeed happening present day. Refer to the map below that illustrates the position of the Western Antarctic Rift/Trans Antarctic Mountains. This notion is also supported by the knowledge from recent publications that the Ross Ice sheet is melting from beneath, not from above. This is due to heat circulation from the West Antarctic Rift System, which extends beneath the ice sheet.

Sub-Glacial Freshwater lakes have long been known to exist beneath areas of the continental ice sheets in Antarctica. Prior to their actual discovery, Russian Glaciologists had theorized they could exist based on pressure loading of the overlying ice sheet and resulting temperature increases at the base of the glaciers. Once the presence of these sub-glacial lakes was confirmed scientists lacked a credible explanation for their existence. At the dawn of the Manmade Global Warming Theory many climate scientists contended that these lakes were proof that atmospherically heated ocean water somehow seeped up under the glaciers thereby melting the base of the glaciers. Even today many climate scientists, including those at NASA, still cling to this theory even in the face of huge amounts of research that do not support this theory.

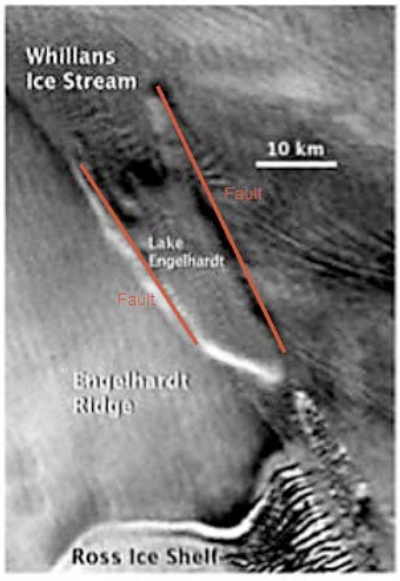
Significant amounts of research from numerous universities and organizations such as the University of Texas, Aberdeen University, and others clearly shows that the West Antarctic Rift System a very active. This activity is expressed geologically as high rift spreading rates, presence of an active volcano (Mount Erebus), and most importantly very high geothermal flux.

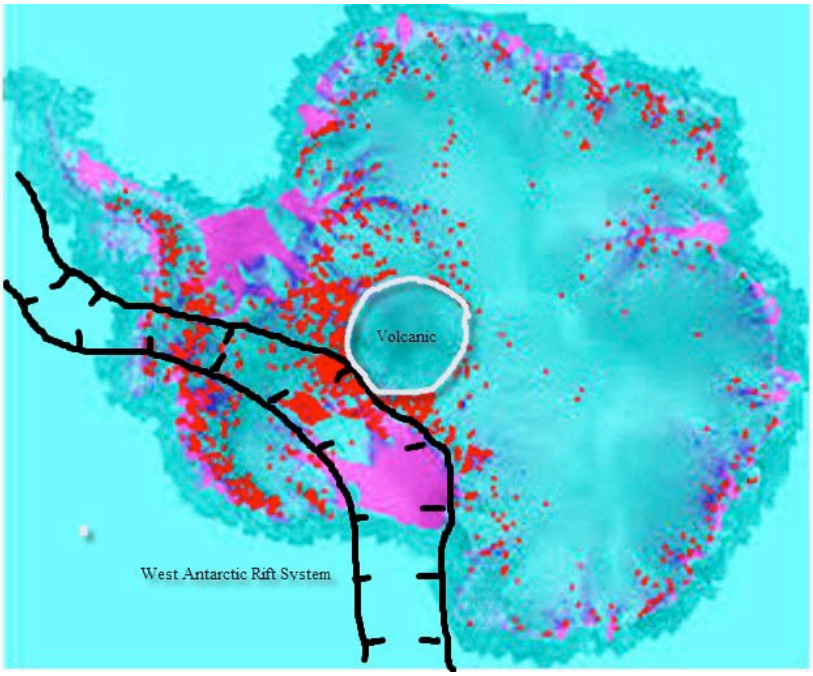
These lakes and associated streams are clearly related to melting from geologically generated geothermal heat sources; either heat transmitted by faults related to the West Antarctic Rift, or from Volcanic-like features that are also associated with the West Antarctic Rift. This has been definitively proven by significant amounts of new research cited in our list of references. This new research has measured / documented elevated heat flow, unusual mineral content, and unusual biota in the sub-glacier lakes and streams. All strong indicators of geothermal heat flow. It is important to note that the confirmation of this geothermal heat flow was not completely confirmed until scientists drilled into the lakes and took temperature readings.

I here theorize, and agree with many others who have theorized, that a more plausible explanation for the presence of sub-glacial Antarctic freshwater lakes is geologically induced geothermal heat flow. It is now likely that the entire Antarctic Continent has at least some low level of heat flow that is causing minor melting across the entire continent. It is likely that a vast network of very minor sub-glacier melting is present across the entire continent, but it is not recognizable with current technology. Current technology is only able to detect freshwater lakes and streams at the coastlines and other areas within the interior of the continent where they are substantial enough to detect. Even with these limitations a very large number of lakes and connecting streams have been identified.

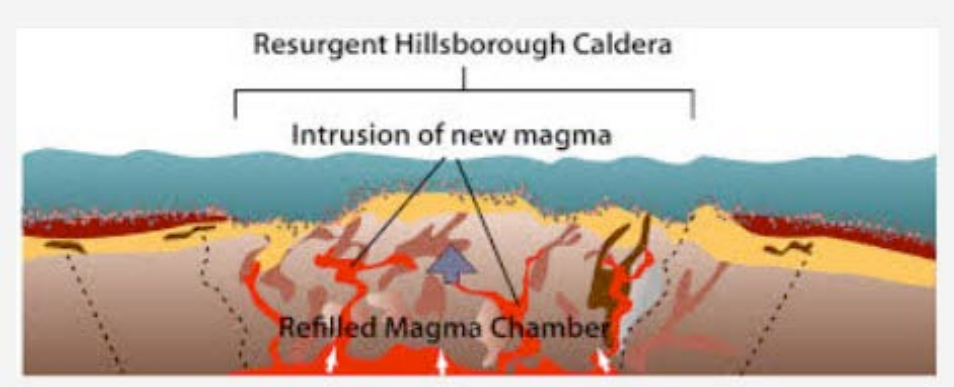
I believe as more information is collected, and as detecting techniques improve it will be found that the a very large interconnected freshwater drainage system exists across the entire continent with lakes, streams, and a unique hydrologic system related to the geology of the continent. This geology includes faulting, geothermal heat flow, fracturing, differential sedimentation, etc. So it will prove to be a unique new type of hydrologic system.

A map of one such lake and stream system is shown in the map below. I have added fault lines to this map based on the very linear nature of the topography shown on the map and the known occurrence of faulting in this general area.

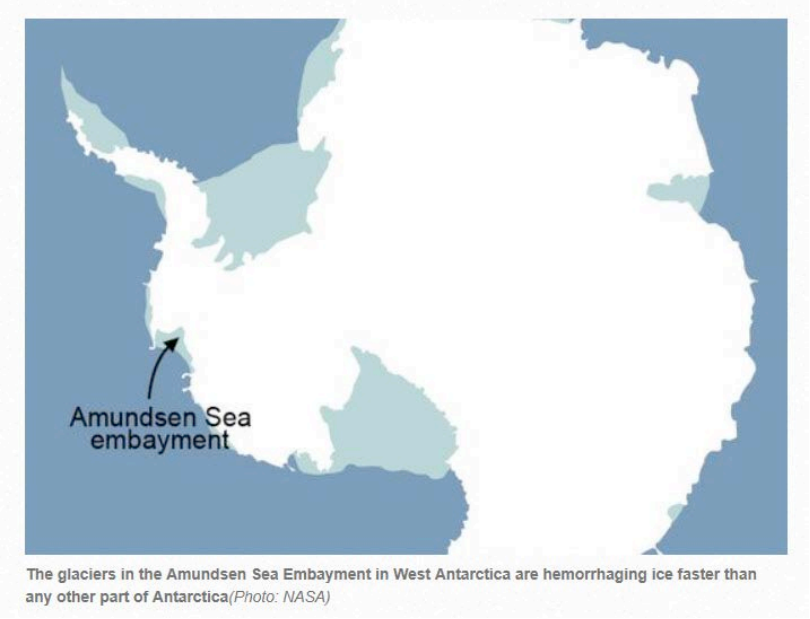




I have observed one very interesting large volcanic like feature that to our knowledge has not been mentioned in any literature to date. It's very distinct circular shape is defined by the circular distribution of freshwater lakes shown on the map above. I here speculate that this large circular feature may be a large relatively inactive volcanic feature, perhaps a collapsed caldera that is resurgent on its outer edges as illustrated below.

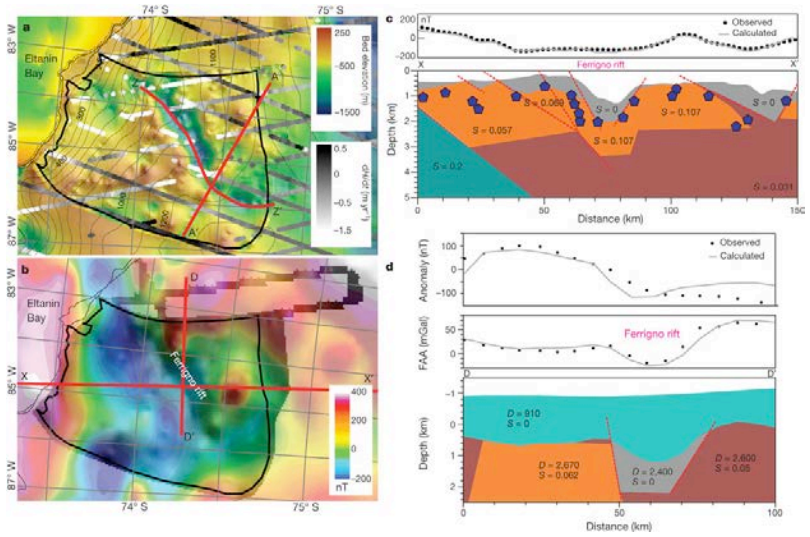


According to recently released statements by NASA Antarctic Glaciers are receding at alarming rates do to atmospheric Global Warming. One of their primary examples is the Amundsen Embayment Area. (see map below)



The glaciers in the Amundsen Sea Embayment in West Antarctica are hemorrhaging ice faster than any other part of Antarctica*(Photo: NASA)*

NASA theorizes that slightly warm seawater is being "Channelized" from the ocean laterally underneath the glaciers along a recently documented long topographically low valley that exists beneath the ice. They contend that this large linear deep valley extends onto the continent and is somehow acting to conduct warm seawater great distances onto the continent. It has been named the Ferrigno Valley based on research by Robert Bingham of Aberdeen University. Part of the research is shown in the diagram below.



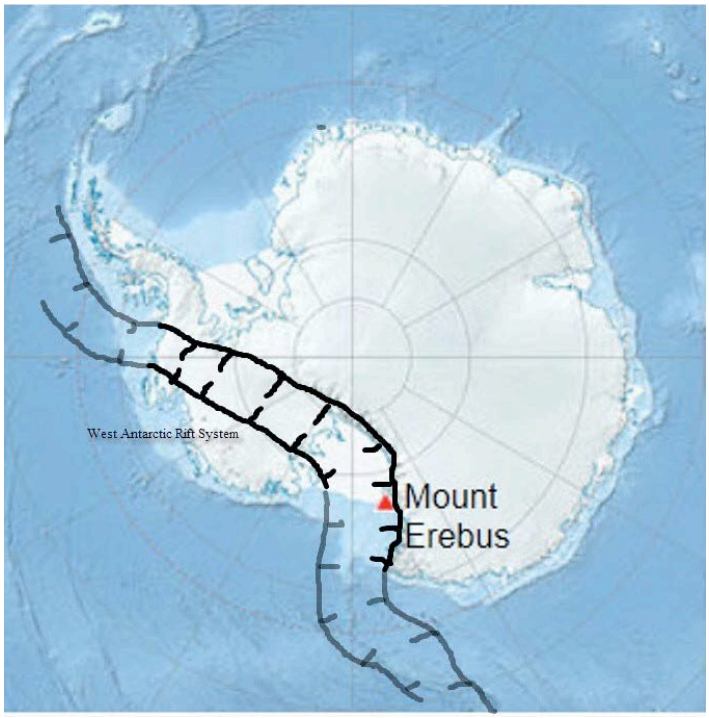
Robert Bingham's research states that the Ferrigno Rift valley was formed in response to faulting along a significant geological rift system. This active geological rift is part of the larger and very well known West Antarctic Rift System. As is shown in his research, the Ferrigno Rift is highly faulted, 1.5 km deep, 10 km wide, extending at least 100 km into the Antarctic Continent. This is a very important geological discovery because it further documents the regional extent of the greater West Antarctic Rift System. Like all active rift systems, the Ferrigno Rift System should have significant heat flow, as it is also part of the West Antarctic Rift system.

As stated above, many recent publications have shown that geothermal heat flow from portions of the West Antarctic Rift are the cause of bottom side and overall ice melting of the Ross Ice sheet. It is important to note that the discovery of heat emission from other portions of West Antarctic Rift System was only confirmed by actual drilling into the rift. To my

knowledge Bingham's group did not drill into the Ferrigno Rift, they just imaged it from magnetic surveys. So naturally they might not consider geothermal heat flow as a melting option. Seems a bit shortsighted that they would not at least mention a geothermal heat option for melting.

Why is there a very large embayment (a coastal recess forming a bay) in the Amundsen area? The obvious answer is that the rift valley extends out into the ocean and forms this alcove as heated water generated from the rift faults empties into ocean. It is important to emphasize that this warmer water would not be due to atmospheric warming, but instead geologically induced warming from rift faults.
Another very important research project by the University of Texas, lead author Dustin Schroeder, also concluded that glaciers in the Amundsen Embayment Area were melting in response to geothermal heat flow. (http://www.utexas.edu/news/2014/06/10/antarctic-glacier-melting/) Schroeder's work states that geothermal heat flow in the Amundsen Embayment area is the likely cause of accelerated glacier melting. It is important to note that this work was done in cooperation with NASA.

NASA also states that warm ocean water extends miles out into the ocean from Antarctica. This is not at all surprising, and in fact fits well with the Plate Climatology Theory. The giant West Antarctic Rift System extends well out into the ocean and is likely emitting heat into the ocean above it, so of course the ocean is warmer. This is one of the basic premises of my theory; deep ocean rifts release heat and effect earth's climate and climate related events. The map below shows the approximate location of the West Antarctic Rift System and the currently active volcano Mount Erebus that is part of the rift system.



Unusual plankton blooms such as in the Ross ice sheet area are also the result of circulation of deep geologically altered ocean water which likely changes the nearby deep ocean upwelling currents. If true they would act to supply needed CO2, Phosphorous, and Nitrogen to start a bloom.

Other recent publications indicate that Ross Ice Sheet is anchored to the sea bottom along its entire length, save a few recently defined points where continental water appears to be flowing under the ice sheet into the Ross Sea. We believe it will be found that the source of this water will be from the rift, likely an actively heated and fluid emitting part of the Rift.

Subtle but measurable differences in atmospheric temperatures between eastern and western Antarctica are likely the result of, and in response to local temperature variations in proximal ocean water, and possibly subtle increased heat flow from continental portions of the rift. Warmer proximal ocean water leads to warmer local atmospheric temperatures.

The majority of the Antarctic Ice sheet is growing. In fact overall ice extent in Antarctica has been increasing for more than 30 years, primarily in areas that are not in proximity to the West Antarctic Rift System. This fact in itself is strong evidence that atmospheric global warming is not having a measurable effect on the Antarctic Ice Sheets.

Yahoo news has just released news of research that indicates that two modern sub-glacial eruptions occurred in modern times, 23,000 and 45,000 years ago. This is immensely significant in many ways. It shows that geologically induced volcanic/geothermal activity has been occurring continuously on the Antarctic Continent and associated offshore regions for many years. Most importantly it strongly indicates that this geological system has enough power to melt huge amounts of glacial ice. This fit well with observed present day geologically driven sub-glacial geothermal heat and fluid flow as described in the text above.

I here postulate that if this powerful Antarctic Rift System can melt significant amounts of the Antarctic Glacial Ice Sheet in a relatively short time period, it certainly have a very strong effect on the Antarctic Climate. Even more interesting is the possibility that this system could have a direct effect on several major aspects of the Earth's Climate;

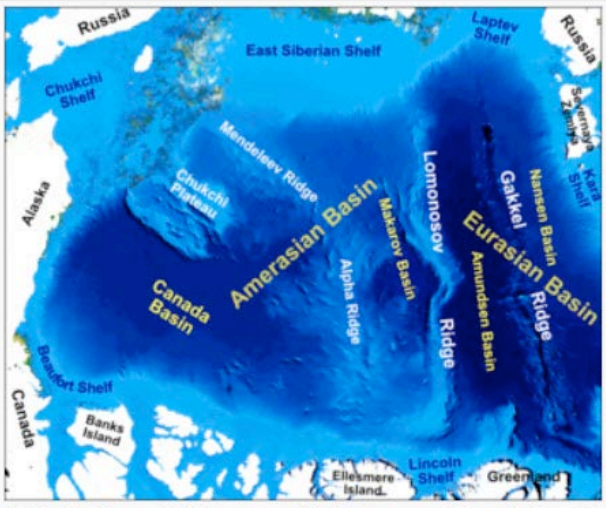
1. Worldwide Sea Level rise
2. Alteration of selected deep ocean currents
3. Alteration of significant portions of worldwide climate patterns

http://news.yahoo.com/violent-volcanic-blasts-ripped-antarctic-ice-sheet-twice-115608903.html

Mid-Arctic Ocean Rift System

The floor of the Arctic Ocean is comprised of several significant geological features, most notably the giant Mid-Arctic Rift and associated Rift System. The system is 1100 miles long / 120 miles wide and topographically expressed as high mountains and Grand Canyon scale trenches. In geological terms this is a major rift system, forming the boundary between two tectonic plates. Given its magnitude one would expect that it has been completely researched and is thoroughly understood. Quite the contrary scientists know very little about its geology due to its remote location, thick ice cover, and perceived geological inactivity. It is understandable that to date only limited amounts of data have been gathered concerning its heat flow and fluid expulsion.

However, relatively new research has indicated that this giant rift system may not be so inactive after all. Given that overwhelming amounts of data now virtually prove selective melting of the Antarctic Ice Sheet is caused by geologically induced geothermal heat flow from the **West Antarctic Rift System**, it only seems reasonable to reevaluate the limited amount of data available on the **Mid-Arctic Rift System**.

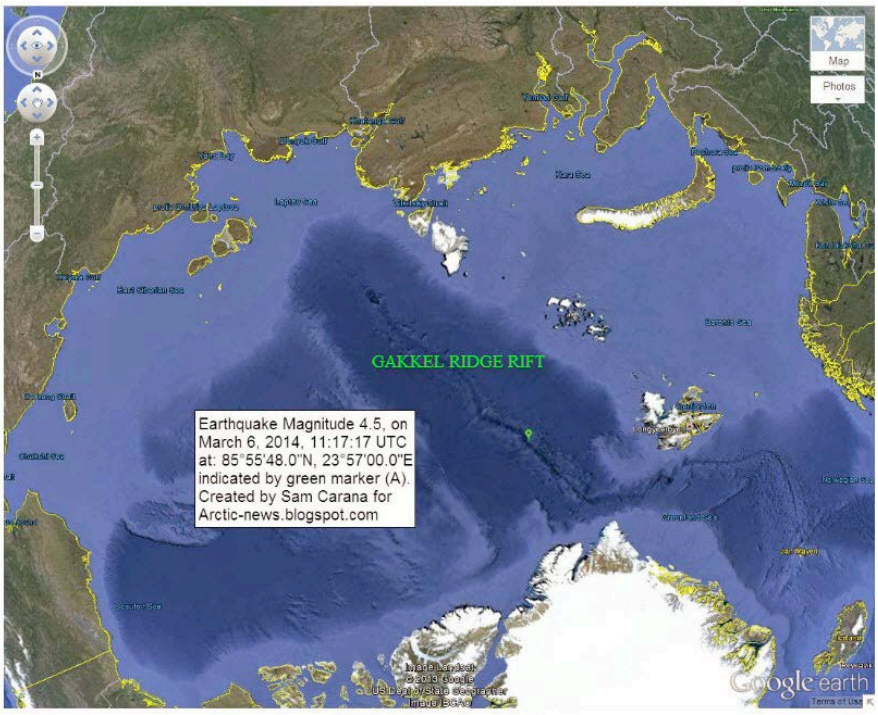


Main bathymetric/topographic features of the Arctic Ocean

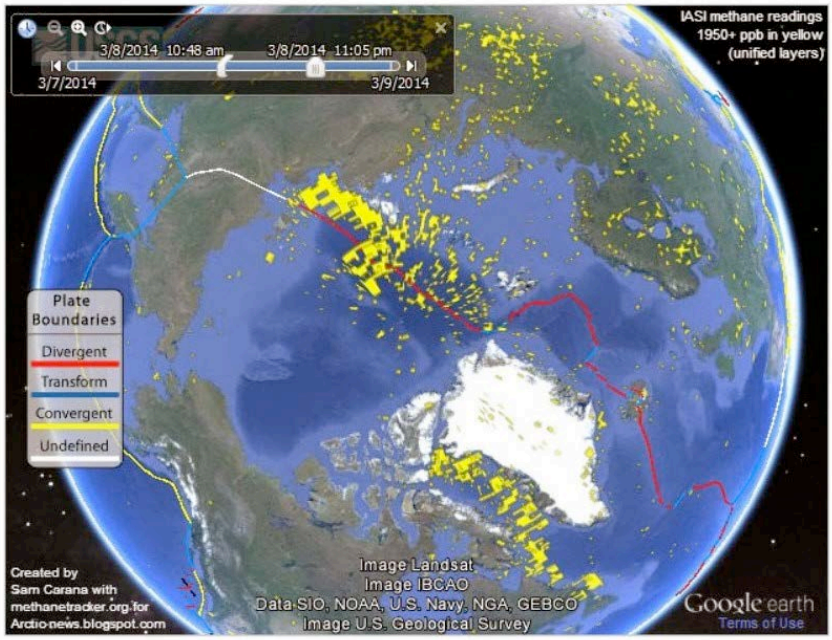
The Mid-Arctic Rift System has long been considered geologically “inactive”, and presumed to be of little consequence relative to geothermal heat and fluid expulsion into the overlying Arctic Ocean. This assumption was primarily based on the Rift’s very slow “spreading rate”, 0.05 centimeters per year and its typically low seismicity.

Documentation and reinterpretation of this relatively recent research is as follows. First and most telling a recent 4.5 earthquake along the Gakkel Ridge Rift clearly shows that this large fault system is active. Although this was only a moderate size earthquake it was associated with an extremely extensive release of methane into the atmosphere as illustrated on the maps below from the Arctic News Blog (March 2014).

An earthquake with a magnitude of 4.5 hit the Gakkel Ridge at a depth of 2 km on March 6, 2014, at 11:17.17.0 UTC. The location is shown on the map below.



The image below shows more recent methane readings, around March 8, 2014.



Given that the fault induced methane release was this extensive, it is very reasonable to conclude that the effect of the fault movement was not limited to just the epicenter, rather it affected the entire Gakkel Ridge Rift. The presence of currently active deep Gakkel Ridge hydrothermal vents has been well documented, however what was not well known was the number and distribution of these vents. The methane release map is likely an excellent proxy of the active vent systems areal distribution. Clearly active vents exist along an absolutely huge portion of the Ridge and that this is a large and powerful source of heat and fluid release, one that could easily influence Arctic climate and ice sheet melting.

Scientists have for years assumed that so-called "Cold Seep" vents which emit methane and cooler sea water where limited to moderate ocean depths along continental shelf regions. Research funded by the National Science Foundation published in March of 2012 showed that this was an incorrect assumption. Their research proved that in deep offshore regions of Costa Rica both Cold Seeps and Hydrothermal Vents exist in close proximity. This observation is important relative to the observed methane release from the Arctic Gakkel Rift.

First it shows that scientists have much to learn about vent systems in general. So their heat flow, chemical emission, gas emission, and heat emission are not well understood. Secondly this observation helps support the notion that faults and associated vents along the Gakkel Ridge are the likely cause of methane release.

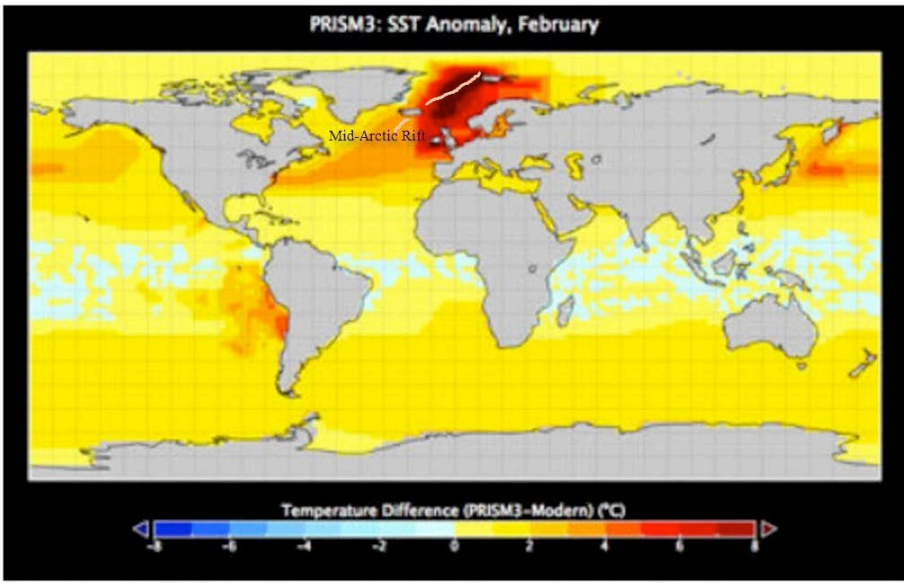
Not documented in any known published research is the composition of the other gases released by this latest fault induced Gakkel Rift "methane" pulse. Vents typically release other associated gases, most notably CO2. Another very important question is what amount of heat was released from this latest mild tectonic activity?

Other research that shows the Arctic Rift System is active is as follows. In 1999 researchers in a nuclear submarine documented the presence of active volcanoes along the rift system spreading center ridge. In 2001 researchers utilized icebreaker vessels to collect deep ocean rock samples along the Gakkel Ridge portion of the rift system. They observed numerous active hydrothermal vents. The Woods Hole Oceanographic Institute's 2007 AGAVE expedition discovered unconsolidated pyroclastic volcanic deposits. These deposits indicate that a very recent and strong sub-ocean volcanic eruption occurred along a significant portion of the Gakkel Ridge. Additionally the chemical make-up of these deposits indicates high volatility, upwards of ten times more volatile than volcanic beds researched to date along other major deep ocean rift systems. The Woods Hole expedition also found evidence of chemosynthetic microbial mats. This type of chemosynthetic life is known to be associated with hydrothermal vents.

Secondly and more importantly, a reinterpretation of this relatively new information shows that spreading rates and seismic activity do not necessarily correlate to heat flow frequency or intensity. The Mid-Arctic Rift System obviously has some seismicity associated with it and low amounts of plate spreading, however the amount of hydrothermic vent activity and volcanic activity appear to be much greater than would be projected based solely on seismicity or rift spreading rate.

This has significant implications concerning all other large deep ocean rift systems. Previously assumed inactive portions of other major worldwide rift systems that are not seismically very active can no longer be presumed to be emitting small amounts of heat and chemically charged fluids. They may in fact be emitting significant amounts of heat and fluid. Low amounts of seismic activity and rift spread rate can no longer be confidently used as direct measures of geologically induced heat flow and fluid release.

Other information shows that the crest / spreading center of the Mid-Arctic Rift System has in past actively emitted heat into the overlying Arctic Ocean. The map below is from a study by H. Dowsett et al of the USGS 2-2009, "Getting Warmer? Prehistoric Climate Can Help Forecast Future Changes". The authors used fossils of plants, animals, and pollen to reconstruct a map of elevated sea surface temperatures during the Mid-Pliocene geological time period. This time period was 3 million years ago. The trace of the Mid-Arctic Ocean Rift System has been marked in orange on the map. Darker shaded areas on the map show where the surface ocean temperatures were much warmer during this ancient time period. The exact match of the Rift with warm ocean temperatures strongly implies a cause and effect relationship.



A fascinating new development is the discovery of Phytoplankton blooms under the ice in the Chukchi Sea area of the Arctic Ocean by Stanford University scientists. Their research showed that these blooms have likely existed in this area for decades. The discovery of well developed and aerially extensive blooms beneath large ice areas that have not been melted in known human times has forced a dramatic change in considering how and where Arctic blooms occur. This fascinating new discovery has not yet led to proof that there is a direct relationship of these types of blooms with geologically induced deep ocean heat flow, however I would suggest that this should be considered.

The implications of this new information are powerful. First and most obviously, what if any effect has this hydrothermal vent heat flow and fluid expulsion had on the overlying ice sheet. Is this geothermal heat flow the cause of Arctic Ice sheet melting? Has the heat and associated fluid release altered deep Arctic Ocean currents? Both cases are certainly worth considering.

In summary, the Mid-Arctic Rift has emitted significant amounts of heat in ancient times, currently has active deep ocean geothermal vents, has very recently emplaced volcanic rocks at its crest, and has been shown to have a regionally extensive vent system. All of this evidence strongly suggests that at the very least climate scientists should consider geologically induced heat and associated fluid flow from the Mid-Arctic rift as a possible explanation for Arctic Ocean Sea ice melting and associated climate change. This notion fits well with the Plate Climatology Theory.

Greenland Ice Sheet

Previous Climate Change Dispatch posts have documented the affect of geologically induced geothermal heat flow on the Antarctic Continent and Arctic Ocean Ice Sheets. In both cases relatively recent research was used to reinterpret observed natural variations in climate, climate related events, and warmed oceans in a “Plate Climatology Theory” context.

Especially compelling is the amount and quality of research confirming the presence of significant Antarctic Geothermal Heat Flow. This fault focused heat flow and bottom melting of glaciers overlying the faults is clear evidence that strong geothermal forces are at work in Antarctica. Many scientists are now convinced that Manmade Atmospheric Global Warming can no longer be evoked as the cause of this limited Antarctic glacial melting.

In the Arctic Ocean region a reinterpretation of research and information, including very recent faulting along the Mid Arctic Rift System, has shown that ice sheet melting may also be related to geologically induced geothermal heat flow. Admittedly this reinterpretation is less proven; however it is still well within the realm of possibility and deserves strong consideration by Climate Scientists.

Newly released research, primarily from NASA and the GFZ German Research Center for Geosciences, can be interpreted to indicate that melting of selective Greenland Glaciers is also related to geologically induced heat flow, and not Manmade

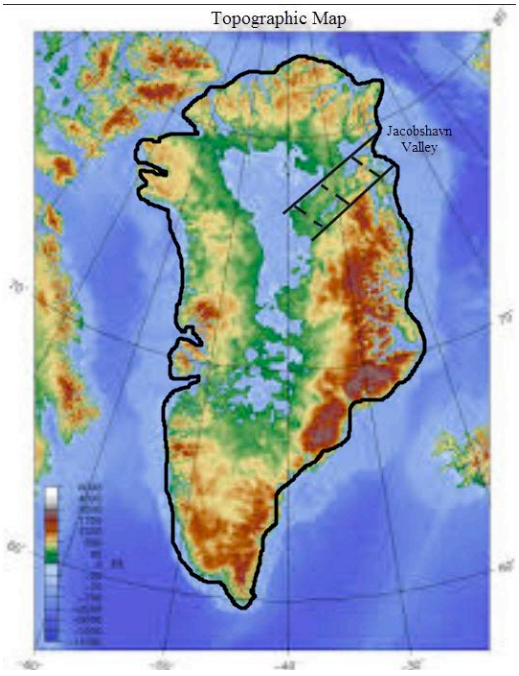
Atmospheric Global Warming. (http://www.nasa.gov/content/goddard/hidden-movements-of-greenland-ice-sheet-runoff-revealed/)
http://www.nature.com/ngeo/journal/v6/n9/full/ngeo1898.html

A summary of the very extensive NASA Greenland Ice Sheet Study is as follows. Greenland Glacier dynamics is very complex. Certain glaciers are retreating, others are unchanged, and still others are expanding. Additionally, individual glacier dynamics change with time, for instance advancing for years then suddenly changing to a retreating mode. In some cases the retreating rates are astounding.

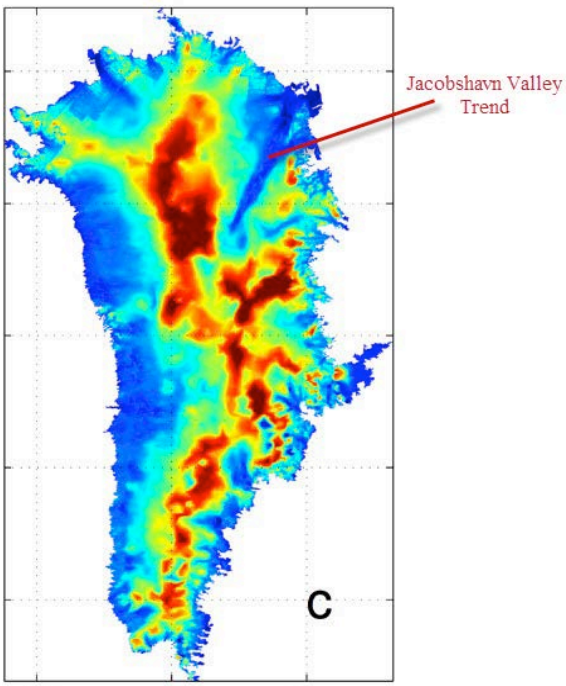
NASA also noted that glaciers melt from both beneath (bottom melting) and on top (surface melting). Extensive bottom melting is thought to be lubricating several glaciers and thereby greatly increasing surface velocity rate. In other words they flow much faster, in several cases extremely fast.

The area of greatest and most recent glacier retreat is located in the northeastern portion of Greenland and is associated with a very linear NNE trending bedrock valley termed the Jacobshavn Glacial Valley (see locator map above). A newly published bedrock topography map of Greenland (see map below) shows the prominent Jacobshavn valley topographic low. This valley extends miles into the Greenland continent and is here interpreted as a fault controlled valley due in large part to its very narrow and linear geometry. Additionally the NNE trend of this valley mimics the NNE trend of known Greenland fault tends such as those shown in the Nuuk Region.

The northeastern quadrant of Greenland, and most importantly the Jacobshavn Valley are in close proximity to the southern terminus of the Mid Arctic Rift System (see Locator Map). Other scientists have taken this as strong evidence that this part of Greenland is faulted and more tectonically active than most other portions of Greenland. Recent seismic activity in this region supports this notion.



The movement of the Glacier within the Jacobshavn Valley, Jacobshavn Glacier, is of great interest. NASA's Study shows that this glacier was flowing very slowly down the valley and at the same time slowly gaining ice mass until 1998. At that point in time it very suddenly started to rapidly flow down the valley and at the same time lose large amounts of ice mass.



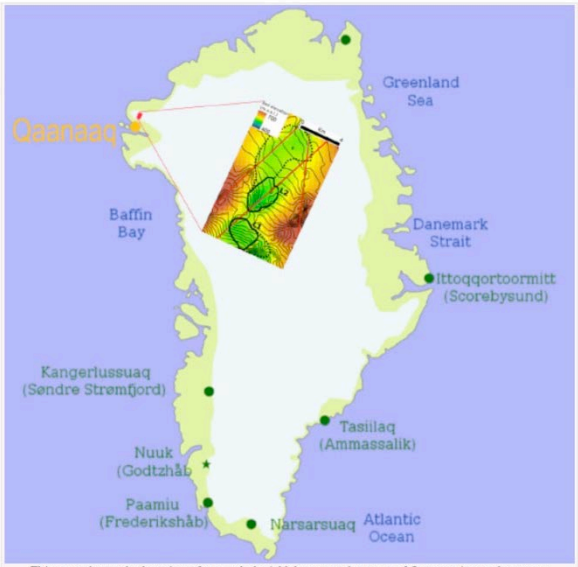
This rapid change in Jacobshavn Glacier flow rate is illustrated on the NASA map above as a unique and very linear trend that fits the topographic expression of the Jacobshavn Valley.

It is here theorized that the Jacobshavn Valley is geologically fault bounded, and has recently become geothermally active. All the data and observations fit this contention, so a sudden increase in fault related heat flow caused bottom melting of the glacier. In addition to bottom shrinking the glacier and thereby down faulting it into the valley, this bottom melting also generated a basal layer of liquid water that acted as a lubricant to speed up the glacial flow.

Also of significance relative to the geologically induced geothermal heat flow of Greenland is a recently published research project by the GFZ German Research Center for Geosciences.

> "At the Earth's surface, heat fluxes from the interior[1] are generally insignificant compared with those from the Sun and atmosphere[2], except in areas permanently blanketed by ice. Modelling studies show that geothermal heat flux influences the internal thermal structure of ice sheets and the distribution of basal melt water[3], and it should be taken into account in planning deep ice drilling campaigns and climate reconstructions[4]. Here we use a coupled ice–lithosphere model driven by climate and show that the oldest and thickest part of the Greenland Ice Sheet is strongly influenced by heat flow from the deep Earth. We find that the geothermal heat flux in central Greenland increases from west to east due to thinning of the lithosphere, which is only about 25–66% as thick as is typical for terrains of early Proterozoic age[5]. Complex interactions between geothermal heat flow and glaciation-induced thermal perturbations in the upper crust over glacial cycles lead to strong regional variations in basal ice conditions, with areas of rapid basal melting adjoining areas of extremely cold basal ice. Our findings demonstrate the role that the structure of the solid Earth plays in the dynamics of surface processes."

The recent discovery of two Sub-Glacial Freshwater Lakes beneath the Greenland Continental Ice Sheet is significant.



This map shows the location of two subglacial lakes near the town of Qaanaaq in northwestern Greenland.

Although not interpreted as being related to geothermal heat by the authors, it is here contended that geothermal heat is the more likely cause. The two lakes are located in the north central portion of Greenland beneath 1500 feet of ice and 30 miles from the ice-free edge. They each cover an area of five square miles, and most importantly are oriented in the NNE linear trend. Fault Related?

In summary the evidence for geologically induced geothermal heat flow on the Greenland Continent is sufficient to warrant consideration by Climate Scientists.

Glaciers do not melt uniformly as would be expected from atmospheric global warming, rather the melting and advancing of the glacial is complex and therefore more likely associated with geological forces.

The most significant and most recent glacial melting occurs in what is likely a geologically faulted linear valley that is theorized to have increased heat flow.

Sub-glacial freshwater lakes have been identified.

Newly released research by other scientists agree that geothermal forces are active in Greenland

Typhoons and Hurricanes

I here propose that more research be dedicated to examining the possibility that geology may a have direct or strong indirect influence on Typhoon and Hurricane location, frequency and intensity. This is clearly the most speculative and under-researched aspect of the overall Plate Climatology Theory. However it seems at least possible that if certain ocean regions are consistently warmer due to heat from large deep ocean plate boundaries or areas of increased volcanic activity they may an effect on Typhoons and Hurricanes. This warmed ocean water may act to enhance storms or in some not yet defied way capture them.

In summary of this portion of the write-up, I contend that the basic premises of the Plate Climatology Theory provide an excellent basis for explaining long term climate patterns, climate related events, and at least some of the atmospheric variations on the Antarctic Continent.

EFFECT OF CONTINENTAL TECTONISM AND VOLCANISM ON CLIMATE

Introduction

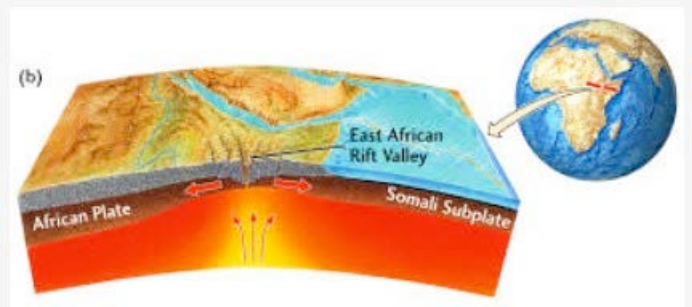
Continental tectonism, volcanism, and heat flow are thought to have a moderate influence on worldwide climate, however locally the effect can be strong. The connection/influence of tectonically generated heat/chemical/gas/fluid release beneath Continental Glacial Ice Masses, or the influence of heat/chemical/gas/fluid release from major continental rift systems has not been adequately studied or considered in terms of its possible influence on climate.

Alpine Glaciers

Consider the alpine glaciers of atop Mount Kilimanjaro. Recent research indicates that the glaciers are melting / retreating at an unusually high rate. Climate Scientists have used this as evidence that atmospheric global warming is the cause. It seems logical to me that part of the climate research should include analysis of the heat flow from the East African Rift, or at the least the Mount Kilimanjaro volcano itself. To our knowledge no such analysis has been completed. Why? Mount Kilimanjaro is exists because it is part of the giant East African Rift System. This is a very active rift system, with numerous very well documented geothermal and volcanic phenomenons along its entire length.

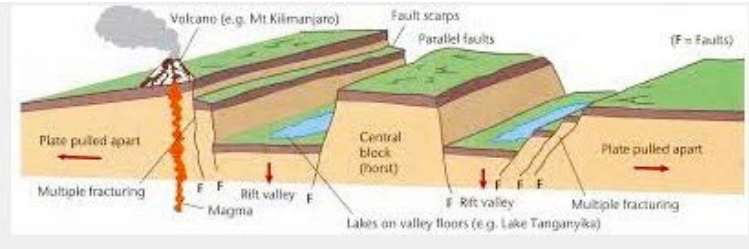
Location East African Rift System/Mount Kilimanjaro

General Heat Flow Model East African Rift System



Detailed Geological of Mount Kilimanjaro

EAST ***WEST***



I here theorize that the increased rate melting of the Mount Kilimanjaro glacier will be found to relate almost entirely too increased heat flow along this portion of the East African Rift. This may or may not be directly related to increased seismicity. It may just be increased heat flow along this portion of the Rift.

High mountain regions and associated glaciers are there for a reason, significant geological faulting. Often these faults are conduits for fluid and heat migration. It seems very logical to at least consider that the geology of high mountain glaciers could play a role in ice melting.

Also if geothermal heat flow is high and melting alpine glaciers then it stands to reason that the hydrology and ecosystems will also be affected.

Deep Continental Heat Flow

For years the scientific establishment has been unable to explain why specific western Antarctic glaciers were retreating/melting at unusually high rates relative to the majority of other Antarctic glaciers. Nearly ten years ago the author started arguing that the unusual retreat of these local glaciers was related to local geological fault heat. Recently scientists have indeed measured increased ocean temperature regions proximal to these retreating glacial areas. These elevated ocean temperatures may be related to major continental fault zones or heat release from nearby deep ocean plate junctures. More consideration should be given to possible geological controls of ice changes in Antarctica.

Volcanic Eruptions

We also believe that continental land based heat and fluid release along fault zones can have a limited effect on local weather patterns. Such as the active volcanoes along the Cascade Range, which emit varying amounts of; heat, particulate matter, and chemicals into the local atmosphere. We are all very aware of the weather and climatological effect large-scale eruptions have on local and worldwide weather. However to date no one has considered that lesser volcanic events can have an influence on local weather patterns. This is very likely happening.

Lightening Strikes

Another fascinating relationship between Geology and Climate is Lightening Strikes. Research by AAPG member H. Roice Nelson et al that was published in the AAPG Explorer sows that lightening does strike twice in the same place. Their work shows that “cloud-to-ground lightening strikes appear to be controlled more by variations in telluric currents than topography or infrastructure”. Telluric currents are primarily geo-magnetically induced currents, which are induced by changes in the outer part of the Earth's magnetic field. Another noteworthy part of this work is that it was a cooperative effort between a Geologist H. R. Nelson and a Meteorologist Jim Siebert.

SUMMARY

The overall theory contends that periods of active Earth tectonics and volcanism can be correlated to periods of active climate change and climate related events. To describe this new theory, the term **"Plate Climatology"** is proposed.

Recent publications can be interpreted to have strengthened many aspects the Plate Climatology Theory, still it remains just that a Theory. However it is now abundantly clear that Climate Scientists are struggling to explain observed "Natural Variations" in recent Climate Patterns.

To date the strong influence on climate of many geological phenomenon including but not limited to are, deep ocean plate boundaries, sub-polar ice cap major rift systems, active hydrothermal vent regions, mantle hot spots, active continental volcanic regions, and active continental rift systems have been underappreciated and under monitored by the climate science community. Important heat and chemical emission data from deep ocean and Sub-Polar Ice Cap data is not easily obtained, not abundant, not complete, not measured across the entire planet. As a result the importance and strength of these systems has not been accurately measured. To date only middle water column and shallow column data has been collected in abundance and on a tight spatial grid. It is therefore more challenging to assess / interpret the influence of the deep geological heat sources. Even given these restrictions the telltale sign of their strong influence on climate can be recognized.

It just makes common sense that if deep ocean or Sub-Polar Ice Cap major geological phenomenon have the power to move continents 2-3 centimeters per year, frequently create large tsunamis that mix thousands of feet of ocean column, support vast chemosynthetic communities, and contain 70% of the planets known active volcanoes that they can certainly / easily influence our climate in a dramatic fashion.

This short paper will hopefully spawn a new era of joint research between geologists, climatologists, and meteorologists. For decades many geologists have cited the connection between certain specific geological phenomenon and specific climate events. The time is long overdue for scientists to join forces in an effort to more accurately describe what drives climate over and above the Sun.

I continue to believe that Geological Phenomenon, especially those in the deep ocean floors, are strong candidates to explain natural variation in our climate.

ADDENDUM

James Edward Kamis is a working professional Geologist with an MS in Geology from Idaho State University, BS in Geology from Northern Illinois University, and AAPG member of 40 years. He has always been fascinated by the probable connection between Geology and Climate. Years of casual research / observation have convinced him that the Earth's Heat Flow Engine, which drives the outer crustal plates, is also an important second order driver of the Earth's climate. .

DEFINITIONS

The term "**Plate Climatology**" is here coined to describe the theorized strong connection between Geology and Climate. (The word Plate from Plate Tectonics).

The term "**Point**" source is here defined as a relatively small area, on the order of 50 miles by 50 miles by 2.5 miles deep. It is not meant to imply one single sub-ocean volcano or plate juncture; rather a relatively small area that may include multiple volcanic vents, volcano's or plate junctures. An area of this size is very small in comparison to the large extent of the Pacific Ocean. 50 miles by 50 miles is comparable in size to the Yellowstone Volcanic Plateau.

REFERENCES

http://www.michaelmandeville.com/vortectonics/vortex_correlations2.htm

http://www.washingtonpost.com/news/speaking-of-science/wp/2014/09/15/the-gulf-of-alaska-is-unusually-warm-and-weird-fish-are-showing-up/

http://cliserv.jql.usu.edu/paper/CA_drought_final.pdf

http://www.climatecentral.org/news/global-june-temperature-record-17796

http://wattsupwiththat.com/2010/10/10/hydrothermal-vents-may-contribute-more-to-the-thermal-budget-of-the-oceans-than-previously-assumed/

http://www.washingtonpost.com/news/speaking-of-science/wp/2014/09/15/the-gulf-of-alaska-is-unusually-warm-and-weird-fish-are-showing-up/

http://cliserv.jql.usu.edu/paper/CA_drought_final.pdf

http://www.climatecentral.org/news/global-june-temperature-record-17796

http://www.nature.com/nature/journal/v505/n7484/full/nature12945.html

http://www.michaelmandeville.com/vortectonics/vortex_correlations2.htm

http://www.ncbi.nlm.nih.gov/pubmed/20403838

http://www.abc.net.au/news/2014-05-12/climate-change-hot-spot-in-pacific-ocean/5446786

http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_LONGERREPORT.pdf

http://www.scientificamerican.com/article/ice-core-data-help-solve/

http://www.scientificamerican.com/article/oceans-may-absorb-more-carbon-dioxide/

http://news.discovery.com/earth/oceans/huge-north-sea-plankton-bloom-seen-from-space-140531.htm

http://www.reportingclimatescience.com/news-stories/article/heat-uptake-by-several-oceans-drives-pause-says-study.html

https://tallbloke.wordpress.com/2012/03/29/the-gulf-stream-today/

http://www.climatecentral.org/news/global-warming-antarctic-ice-shelf-collapse-18014

http://www.sale.scar.org/key-programs/on-the-tectonic-setting-of-antarctic-subglacial-lakes.html

http://www.livescience.com/46194-volcanoes-melt-antarctic-glaciers.html

http://www.pnas.org/content/111/25/9070.full.pdf+html

http://www.sciencedaily.com/releases/2012/07/120725132208.htm

http://www.bbc.com/news/science-environment-18959399

http://www.weatherwest.com/archives/tag/atmospheric-river

http://robertscribbler.wordpress.com/2014/04/28/ocean-heat-spikes-and-atmospheric-rivers-two-thousand-homes-destroyed-in-north-afghanistan-floods/

http://wattsupwiththat.com/2014/10/12/new-paper-finds-west-antarctic-glacier-likely-melting-from-geothermal-heat-below

http://www.sciencedirect.com/science/article/pii/S0012821X14005780
http://www.sciencemag.org/content/336/6087/1408

http://news.stanford.edu/news/2012/june/arctic-algal-blooms-060712.html