Stephen Wilde's New Climate Model

(First Review) October 2010.

Abstract:

This is a refinement of a proposed climate description first published on a tentative basis in April 2010. Various changes have been made as a result of valid criticisms but the essential components remain intact.

http://climaterealists.com/index.php?id=5497

" A New and Effective Climate Model"

The most important new proposition (amongst several) was that the solar effect on atmospheric temperatures must be the reverse of that normally expected. In reality a more active sun must be accompanied by a natural decline in ozone in the upper atmosphere and a natural cooling of the stratosphere and mesosphere. As appears below there is now supportive evidence for that very proposition.

The advantage of recognising a reversed sign for the solar effect high up in the atmosphere is that it enables a scenario whereby the bottom up effects of ocean cycles and the top down effects of solar variability can be seen to be engaged in a complex ever changing dance with the primary climate response being changes in the tropospheric air circulation systems to give us the observed natural climate variability via cyclical latitudinal shifts in all the air circulation systems and notably the jet streams.

As a side effect all our earlier assumptions about a significant climate effect from human CO2 emissions and about ozone destruction from human generated CFCs appear to be in question.

It seems that at a time of more active sun the troposphere warmed, the stratosphere and mesosphere both cooled and the thermosphere warmed.

What is the most up to date data now that the sun is less active?

Jo Haigh has answered that question exactly as I would have expected. There is now a less active sun and the process is now in reverse.

http://www.nature.com/nature/journal/v467/n7316/full/nature09426.html

Solar proton impacts (rather than UV) on high level ozone especially at the poles due to direction by the magnetic field (they are charged particles) when the sun is more active appear cause ozone depletion from 45Km upwards with the effect of reversing the solar sign from just below the stratopause upwards so as to increase the vertical decline in temperatures and accelerate energy out of the lower stratosphere so as to cool that as well and draw the tropopause higher with the jets moving poleward.

http://earthobservatory.nasa.gov/Newsroom/view.php?old=200108015015

Although the above article refers to solar storms the fact is that solar proton quantities ebb and flow in line with the waxing and waning of solar activity with solar storms just being short term spikes.

The opposite process when the sun is less active as currently so the Haigh paper has found increasing ozone above 45Km presumably accompanied by a mesosphere that is no longer cooling and may be warming.

The thermosphere is so thin that the heating of it from direct solar impacts has no significant damping effect on the cooling process that goes on below when the sun is more active.

CFCs and CO2 are therefore not required to account for observations or are far less important than previously proposed.

Foreword:

My first attempt at a new climate model comprised a general explanation and a list of changes in various climate related phenomena that appeared to me to accord with real world observations over time.

That list (comprising 26 sequential steps) was as follows later in this article and in this review I add evidence or further explanation in relation to each step so that any reader can develop a more informed opinion regarding the extent to which my ‘Model’ is accurate, needs revision or is untenable.

Note that throughout this work whenever I refer to a shift in the jet streams it is in fact the entire body of the air circulation systems that shifts latitudinally with the jet stream shift just being the most obvious feature of the change.

Furthermore the term ‘Model’ may be premature at this stage. I accept the comment of one critic that it might be more accurately described as a suggested set of parameters for use in construction of a new model. However that is a rather unwieldy description so I’ll stick with the existing term subject to that proviso.

A Major New Development:

A substantial concern for me when preparing my initial Model description was that for the sequence of events to be true the cooling of the stratosphere during the late 20th century warming period had to be natural without needing to invoke human CO2 or CFCs. It had to be natural because only then could one extend the narrative back through history to the Mediaeval Warm Period and beyond.

The conventional wisdom is that higher solar activity warms the stratosphere via the impact of increased solar UV radiation on ozone molecules. That is the complete opposite of what I needed for my Model to work. The establishment ‘consensus’ view was that human influences had uniquely during the late 20th century reversed the process in two ways.

Firstly it was proposed that human CO2 was retaining more energy in the troposphere thus reducing the energy available to the stratosphere .

Secondly, human CFCs were destroying ozone thus reducing its warming power in the stratosphere when the sun became more active.

However that consensus view increasingly became implausible in my mind as I watched what the planet was actually doing from around 2000.

In the event I risked all and set it out as I saw it with the following comment in my original Article:

"Thus when the sun is more active far from warming the planet the sun is facilitating an increased rate of cooling of the planet. That is why the stratosphere cooled during the late 20th Century period of a highly active sun. The stratosphere cooled because energy was going up faster than it was being received from the troposphere below.

The opposite occurs for a period of inactive sun."

There are some specific climate features that should have long ago alerted climate professionals to the possibility that there was a problem namely:

i) The fact that ozone quantities decline when the polar oscillations are positive (but one year later) thus suggesting that if the CFC proposition were correct then one would have to also propose that the human CFCs were first altering the polar oscillation or at the very least exclude the effect of the prolonged 20th century positive polar oscillations from the calculations but no one ever did that so far as I know.

http://www.appinsys.com/GlobalWarming/Ozone.htm

"The positive AO seems to correspond to lower ozone, lagged by one year."

and:

" the AO started a strong positive phase in 1989 and the ozone decreased starting in 1990 as shown above."

In the light of the new evidence in the Haigh paper that a more active sun depletes ozone above 45Km (assumed on the basis that ozone above that level now seems to be increasing while the sun is less active) it may be that the ozone depletion above that level when the sun is active cools the mesosphere provoking faster upward energy transfer from the stratosphere thus cooling the stratosphere as well. That then causes the more positive AO by reducing the strength of the inversion at the tropopause (usually represented by height – higher means weaker and lower means stronger). Then the ozone at the lower levels below 45Km starts to fall a year later.

ii) That the poleward and equatorward shifts of the jets represented a change in the speed of the hydrological cycle so that poleward jets meant faster energy transfer to the stratosphere and not slower so therefore a poleward shift is inconsistent with AGW theory which requires a slower transfer of energy to the stratosphere and a 'backing up' of energy near the top of the troposphere that has never been found.

iii) That having proclaimed the jets as having shifted poleward as a result of AGW the equatorward drift from around 2000 occurred despite still increasing CO2 levels so attributing causation to CO2 quantities has not been tenable for about 10 years.

To my mind those inconsistent factors meant that the only way to reconcile observations with physics was to assume that causation was natural and probably solar and then reverse the sign of the solar effect on stratospheric temperatures.

My surprise at no one else even considering the possibility over the past 10 years is matched by surprise at having it appearing to be confirmed so soon after my initial proposition in a recent paper from Joanna D. Haigh and colleagues here:

http://www.nature.com/nature/journal/v467/n7316/full/nature09426.html

"An Influence Of Solar Spectral Variations On Radiative Forcing Of Climate."

"Our findings raise the possibility that the effects of solar variability on temperature throughout the atmosphere may be contrary to current expectations."

So to my relief it may indeed be that the wrong sign for the solar effect on the stratosphere has been adopted by all other current Models and Theories.

Initially I considered a likely cause to be the expansion of the atmosphere at a time of active sun and increased turbulence at the boundaries between layers of the atmosphere combining to encourage a faster upward energy flux.

Subsequently, as a result of comments from critics, I thought it might more likely be something to do with ozone reactions because the earlier proposal seemed unlikely to be powerful enough on its own. I see from Joanna Haigh's work that ozone reactions do seem to be at the heart of it and in particular the region at 45Km near the top of the stratosphere where there appears to be an unexpected disjunction between the ozone reactions above and below that level.

http://www.eoearth.org/article/Atmosphere_layers

I would suggest that that region near the top of the stratosphere will be found to be the point of balance between the oceanic effects from below and the solar effects from above. I anticipate that it will be found to rise and fall in tune with varying amounts of incoming solar protons altering ozone quantities so as to regulate the energy flux from stratosphere to mesosphere.

Here is how the more active sun would deplete ozone in the higher layers so as to cool them and thereby accelerate the upward energy flux from the stratosphere below which then cools instead of warming when the sun is more active:

http://earthobservatory.nasa.gov/Newsroom/view.php?old=200108015015

The temperature of the stratosphere will thus be found to vary in part due to top down solar forcing from variations in incoming quantities of solar protons (the other part being bottom up oceanic forces involving a variable speed for the hydrological cycle) and of course that combination then impacts on the strength of the temperature inversion at the tropopause for an inevitable effect on the air pressure distribution in the troposphere. Thus 'squaring the circle'.

However the detail of the process does not affect the basic setup of my Model as long as the stratosphere does cool naturally when the sun is more active.

Some have asserted that according to Joanna's work the planet as a whole cools when the sun is more active and they expressed disbelief as a result. I do not think that to be an accurate interpretation of the findings. I think her data implies that a more active sun producing more solar protons, in causing more depletion of ozone above 45Km, cools the mesosphere thereby enhancing the upward energy flux from stratosphere to mesosphere thus cooling the stratosphere too. It can still warm the system overall because the jets shift poleward, albedo falls and more energy enters the oceans.

At the same time the sky becomes a little less bright when the sun is more active because less energy is coming in at visible wavelengths (but more at higher energies such as invisible UV). Similarly when the sun is less active the sky becomes a little brighter because more energy is coming in at visible wavelengths (but less at higher energies such as invisible UV).

I have seen some anecdotal reports that some sensitive individuals see the light at times of an active sun to be 'harsher' or more 'contrasty' with a more deeply blue sky and the light at times of a less active sun to be more diffuse with a less deeply blue sky.

Anyway, Dr. Haigh says this:

“ over this declining phase of the solar cycle there was a four to six times larger decline in ultraviolet than would have been predicted on the basis of our previous understanding. **This reduction was partially compensated in the total solar output by an increase in radiation at visible wavelengths**.”

Note, however, that for global energy budget purposes it is the change in UV quantities that matters more than the change in visible wavelengths. UV penetrates the ocean surface more than visible wavelengths and so adds proportionately more to ocean heat content. Furthermore the change in UV is only partially compensated for by the change in visible wavelengths.

The effect on the troposphere then depends on whether the oceans are in the mood to release that energy or squirrel it away hence the need for oceanic cycles to provide the other half of the equation.

If the observations are verified then all current models need the assumed anthropogenic components stripped out. The newly found solar effect then needs to be quantified and the models calibrated and re run accordingly. Even then they would only have the top down part of the equation. Additionally they need better data concerning variable rates of energy release by the oceans to provide the bottom up component.

My most trenchant critic was a distinguished solar scientist who felt that the sun could not possibly have such an effect on the climate system below. He decided that my entire Model failed on that point. It appears that he was wrong.

In light of all that I will now proceed to go through the relevant steps updating and providing evidence as necessary.

The New Climate Model (NCM):

Note that I have changed some terminology in response to criticisms but the reasoning is unaffected.

1) Solar activity increases causing an expansion of the Earth’s atmosphere.

As explained above I now prefer the ozone based explanation for an increase in the upward energy flux supported by Joanna Haigh’s recent work.

In my next review depending on whether those findings are verified I may have to simplify and re order steps 1 to 3. The outcome however remains the same.

The variations in solar activity have differential effects on the various layers of the atmosphere and so alter the upward energy flux from layer to layer.

Something of that nature is required to explain why the stratosphere cooled when the sun was more active and is now warming slightly with a less active sun (see No.2 below). That is contrary to established climatology and despite pointing the issue out several times I have never had a satisfactory (or indeed any) response.

As it happens the **cause of** a cooling stratosphere when the sun is more active is of no great concern to me because it does not affect the rest of my Model. The **fact** of a cooling stratosphere at such a time is however critical because only a cooling stratosphere can allow the jets to move poleward by weakening the inversion at the tropopause.

2) Resistance to outgoing longwave radiation reduces due to a weaker inversion at the tropopause, energy is lost to space faster whilst the stratosphere cools.

We see from this link that there was a cooling trend in the stratosphere whilst the sun was more active:

http://www.jstage.jst.go.jp/article/sola/5/0/53/_pdf

but note that they also say this:

“The evidence for the cooling trend in the stratosphere may need to be revisited. This study presents evidence that the stratosphere has been slightly warming since 1996.”

Now it is possible to argue, as AGW proponents did, that the stratosphere cooled because more CO2 in the troposphere reduced the upward energy flow. That is no longer tenable because CO2 has continued to rise but the stratospheric temperature trend has changed.

The change in trend coincided with the declining levels of solar activity after the peak of solar cycle 23.

3) Possibly also the number of chemical reactions in the upper atmosphere increases due to the increased solar effects with faster destruction of ozone.

That is again contrary to established climatology because it is generally assumed that a more active sun creates more ozone to warm the stratosphere. However observations clearly show a cooling stratosphere when the sun is more active.

http://www.atmos-chem-phys-discuss.net/10/17491/2010/acpd-10-17491-2010.pdf

“Stratospheric ozone has shown large decreases during past decades”

The above paper refers to the late 20th century warming period when the stratosphere was cooling and ozone was falling. They attribute the decline in ozone quantities to human generated CFCs and the recovery to the Montreal Protocol. A much better match as regards timing and scale was the reduction in solar activity when the recovery began.

There are now serious doubts about the mechanics of CFC involvement as described here:

http://www.nature.com/news/2007/070924/full/449382a.html

“The result was a shock: at least 60% of ozone destruction at the poles seems to be due to an unknown mechanism.”

Joanna Haigh’s work is especially pertinent here. Effectively she appears to at least confirm the possibility of my proposition that what is going on is an entirely natural solar induced process (destruction of ozone in the upper atmosphere by more incoming solar protons) which casts doubt on all previous assumptions concerning human CO2 **AND** CFCs.

Furthermore the cooling effect during a period of active sun appears to extend to the mesosphere as discussed here:

http://www.voanews.com/english/news/science-technology/Australian-Scientists-Probe-Distant-Clouds-With-Giant-Antarctic-Laser-103849314.html

"Our atmospheric dynamics are such that as we've got a warming troposphere - which is where we live - as that warms that in fact is interlinked with a phenomenon called global cooling up in the mesosphere above 50 kilometers”

And ozone changes are again implicated because that level of 50Km is so close to that level of 45Km (mentioned by Joanna Haigh) where the ozone reaction seems to change.

My earlier link relating to the effect of solar protons provides a plausible mechanism for the ozone changes above 45Km and in the mesosphere.

4) The tropopause rises.

https://www.llnl.gov/str/March04/Santer.html

The tropopause normally rises when the troposphere is warming and the jets are moving poleward. It usually falls when the troposphere is cooling and the jets moving equatorward.

5) Because there is less resistance to energy flowing up from the troposphere the polar high pressure systems shrink and weaken accompanied by increasingly Positive (high pressure cells closer to the poles) Arctic and Antarctic Oscillations.

http://iopscience.iop.org/1748-9326/5/3/034008/fulltext

Also see this from a paper to which Michael Mann contributed :

December 2001, nearly 9 years ago, Shindell, Schmidt, Mann co-authored a paper which looked at Solar Forcing of Regional Climate Change During the Maunder Minimum. The Abstract reads

We examine the climate response to solar irradiance changes between the late 17th-century Maunder Minimum and the late 18th century. ***Global average temperature changes are small (about 0.3° to 0.4°C)*** *in both a climate model and empirical reconstructions.* ***However, regional temperature changes are quite large*** *. In the model, these occur primarily through a forced shift toward* **the low index state of the Arctic Oscillation/North Atlantic Oscillation as solar irradiance decreases.** ***This leads to colder temperatures over the Northern Hemisphere continents, especially in winter (1° to 2°C)*** *, in agreement with historical records and proxy data for surface temperatures.*

At that time Mr. Mann and his colleagues clearly accepted that a less active sun resulted in a more negative polar oscillation but he never seems to have followed through with the logical implications, not least that a more active sun

might have caused the observed late 20th century positive polar oscillations and the observed poleward drift of the jets and that therefore the cause was not changes in anthropogenic CO2 and /or CFC quantities.

6) The air circulation systems in both hemispheres move poleward and the ITCZ moves further north of the equator as the speed of the hydrological cycle increases due to the cooler stratosphere increasing the temperature differential between stratosphere and surface.

http://geography.about.com/od/climate/a/jetstream.htm

and see here for a discussion of ITCZ movements:

http://www.springerlink.com/content/h3p1736qm55vm080/

7) The main cloud bands move more poleward to regions where solar insolation is less intense so total global albedo decreases.

http://www.bbso.njit.edu/
The above link doesn't go straight to the paper so once on the BBSO site:

Go to Projects, click on Earthshine, scroll down to bibliography and click on 'here'
then click on PDF for

Inter-annual trends in earth's reflectance1999-2007, E. Palle, P. Montanes-Rodriguez, P.R. Goode, Journal of Geophysical Research, 2008, in press. PDF

"Variations in terrestrial reflectance derive primarily from changes in cloud amount,thickness **and location**, all of which seem to have changed over decadal and longerscales (Pall¶e and Butler, 2002). Global compilations from ground-based radiometer data(Liepert, 2002), **covering the period 1960-1990, suggest a substantial decrease in solar irradiance reaching the ground."**

then:

"These data, together with newly available surface observations from the Baseline Surface Radiation Network(BSRN) from 1990 to present, show that the

decline in solar radiation reaching land surfaces seen in earlier data disappears in the 1990's."

then:

"Earthshine and FD analyses show contemporaneous and **climatologically significant increases in the Earth's reflectance from the outset of our earthshine measurements beginning in late 1998** roughly until mid- 2000. After that and to date, all three show a roughly constant terrestrial albedo, except for the FD data in the most recent years."

So the Earthshine project first reveals the global high albedo of the more equatorward jets from the 1960s when the sun was less active during cycle 20 (although cycle 20 was still high in historical terms) and there was some tropospheric cooling. That setup continued until the late 80s. The lag between solar recovery and the subsequent poleward jet shifting would have been due to the residual effects from the earlier negative oceanic phase around the 1960s which operated to offset the solar influence on jet stream positioning.

Then for the next ten years until the late 90s albedo gradually declined as the jets moved poleward and the troposphere warmed.

Then in the late 90s a sudden recovery of albedo as the jets moved equatorward again and I have often said that I noticed that around 2000. That is when the tropospheric warming trend seems to have stopped.

Then a few years of stable albedo as the jets hovered around about the same position but I would guess that just recently the jets moved even more equatorward due to the recent long solar minimum and albedo has probably now gone up a bit more but we don't have the up to date figures yet. The outlying FD data is probably a precursor. If we now start to see true cooling in the oceans first and then the air I would not be surprised.

It is proposed that the jets didn't move much from 2000 to 2008 because the residual oceanic effects from the strong late 20th century run of El Ninos were still opposing the tendency of the less active sun to push the jets equatorward. That effect is now fading.

Conclusions:

i) Global albedo is closely linked to the latitudinal position of the Earth's clouds and they are mostly found near and along the jets and the ITCZ. The ITCZ also seems to move latitudinally along with the jets.

ii) A less active sun pushes the jets equatorward thereby increasing albedo resulting in less energy entering the oceans and net overall cooling whilst the stratosphere warms.

My proposition is NOT that the jets are the SOLE determinant of albedo.

However what I do say is that if other factors alter albedo (or any other component of the global energy budget) then the jets will move in response to that other forcing in order to try to move back towards equilibrium between the temperature of the ocean surface and the temperature at the tropopause.

The jets achieve their effect by altering the flow of energy through the troposphere but in doing so they alter albedo so, depending on the overall net situation ,if another forcing increases or decreases albedo then the jets may not have to shift so far or the jets may need to move a bit further depending on the net balance at the time.

However all other effects on global albedo are trivial as compared to the effects of solar and oceanic forcing. Even ice ages with their vastly increased albedo from extra snow and ice cover are eventually overcome and if ice ages don't reach a perrmanent tipping point then nothing humans can do will ever do so.

iii) A more active sun allows the jets to move poleward thereby decreasing albedo resulting in more energy entering the oceans and net overall warming despite the cooling upper atmosphere **unless at the same time the oceans are in warm mode and thereby offsetting the solar effect.**

iv) The oceans then vary independently as regards the release of energy to the air and thereby substantially modulate the solar effects sometimes offsetting and sometimes supplementing those solar effects.

And all the time the jets are bounced between the solar and oceanic forcings to cause regional climate changes.

The more equatorward jets of the LIA and more poleward jets of the MWP display a more extreme longer term cycling of the very same type of changes as those observed over the past 60 years and of course the variations in solar activity levels from MWP to LIA would equally have been much greater than anything seen so far during our lifetimes.

For more discussion of the recent albedo changes see here:

http://wattsupwiththat.com/2007/10/17/earths-albedo-tells-a-interesting-story/

8) More solar energy reaches the surface and in particular the oceans as more ocean surfaces either side of the equator are exposed to the sun by the movement of the clouds to cover more continental regions.

I would hope that this is apparent to readers without further explanation from me here by virtue of obviously greater land mass areas as one moves northwards and to a lesser extent southwards from the equator.

9) Less rain falls on ocean surfaces allowing them to warm more.

As for 8 above.

10)Ocean energy input increases but not all is returned to the air. A portion enters the thermohaline circulation to embark on a journey of 1000 to 1500 years. A pulse of slightly warmer water has entered the deep ocean circulation.

http://wattsupwiththat.com/2010/09/26/maybe-theyve-found-trenberths-missing-heat/#comments

No mechanism is given as to how energy gets in so deeply but the observation is helpful to my Model.

As for evidence that the oceans do indeed vary the rate at which they release energy to the air with a consequent effect on climate variability see here:

http://esciencenews.com/articles/2009/08/14/changes.net.flow.ocean.heat.correlate.with.past.climate.anomalies

11) Solar surface turbulence passes its peak and the Earth's atmosphere starts to contract.

Or, in light of Joanna Haigh's findings the stratosphere starts to warm (as opposed to cooling in accordance with standard climate theories).

From here to item 20 is simply the reverse (cooling) phase of the same global climate cycle described in items 1 to 10.

It all accords with such relevant observations as are currently available for the period after 2000 AD

12) Resistance to outgoing longwave radiation increases, energy is lost to space more slowly.

13) The stratosphere warms. Ozone levels start to recover.

14) The tropopause falls

15) There is increased resistance to energy flowing up from the troposphere so the polar high pressure systems expand and intensify producing increasingly negative (high pressure cells further away from the poles) Arctic and Antarctic Oscillations.

16) The air circulation systems in both hemispheres move back equatorward and the ITCZ moves nearer the equator as the speed of the hydrological cycle decreases due to the warming stratosphere reducing the temperature differential between stratosphere and surface.

17) The main cloud bands move more equatorward to regions where solar insolation is more intense so total global albedo increases once more.

18) Less solar energy reaches the surface and in particular the oceans as less ocean surfaces north of the equator are exposed to the sun by the movement of the clouds to cover more oceanic regions.

19)More rain falls on ocean surfaces further cooling them.

20)Ocean energy input decreases and the amount of energy entering the thermohaline circulation declines sending a pulse of slightly cooler water on that 1000 to 1500 year journey.

The following points constitute supposition based on what has gone before but they help to provide a neat topping and tailing to the entire scenario. Nonetheless, supposition or not, they are consistent with observations. To firm up on these issues we need more data about internal ocean movements and in particular data concerning possible temperature discontinuities along the thermohaline circulation.

21)After 1000 to 1500 years those variations in energy flowing through the thermohaline circulation return to the surface by influencing the size and intensity of the ocean surface temperature oscillations that have now been noted around the world in all the main ocean basins and in particular the Pacific and the Atlantic. It is likely that the current (I'm not yet sure that it has ended) powerful run of positive Pacific El Nino events is the pulse of warmth from the Mediaeval Warm Period returning to the surface with the consequent inevitable increase in atmospheric CO2 as that warmer water fails to take up as much CO2 by absorption.

Cooler water absorbs more CO2, warmer water absorbs less CO2.
We have the arrival of the cool pulse from the Little Ice Age to look forward to and the scale of its effect will depend upon the level of solar surface activity at the time. A quiet sun would be helpful otherwise the rate of tropospheric cooling as an active sun throws energy into space at the same time as the oceans deny energy to the air will be fearful indeed. Fortunately the level of solar activity does seem to have begun a decline from recent peaks.

22) The length of the thermohaline circulation is not synchronous with the length of the variations in solar surface activity so it is very much a lottery as to whether a returning warm or cool pulse will encounter an active or inactive sun.

23)A returning warm pulse will try to expand the tropical air masses as more energy is released and will try to push the air circulation systems poleward against whatever resistance is being supplied at the time by the then level of solar surface activity. A returning cool pulse will present less opposition to solar effects from a quiet sun. Each warm or cool pulse will be spread over several hundred years and will ebb and flow many times in the progression towards a trough or a peak.

There are four potential scenarios and an infinity of variations between extremes. Each scenario has a different climate response.

A warm pulse can surface when the sun is weak or when it is active.

Similarly for a cool pulse.

Warm oceanic pulse plus active sun and cool oceanic pulse plus quiet sun are both offsetting scenarios.

Cool oceanic pulse plus active sun and warm oceanic pulse plus quiet sun are compounding scenarios.

Joanna Haigh's finding about the proper sign for the solar effect on stratospheric temperatures is also necessary for this part of my Model. It has to be the reverse of standard climatology for these scenarios to work as described and thereby fit actual observations over the past 2000 years.

24) Climate in any given location is simply a product of the current balance in the troposphere between the solar and oceanic effects on the positions and intensities of all the global air circulation systems

25) The timing of the solar cycles and ocean cycles will drift relative to one another due to their lack of synchronicity so there will be periods when solar and ocean cycles supplement one another in transferring energy out to space and other periods when they will offset one another.

26)During the current interglacial the solar and oceanic cycles are broadly offsetting one another to reduce overall climate variability but during glacial epochs they broadly supplement one another to produce much larger climate swings. The active sun during the Mediaeval Warm Period and the Modern Warm Period and the quiet sun during the Little Ice Age reduced the size of the climate swings that would otherwise have occurred. During the former two periods the extra energy from a warm ocean pulse was ejected quickly to space by an active sun to reduce tropospheric heating. During the latter period the effect on tropospheric temperatures of reduced energy from a cool ocean pulse was mitigated by slower ejection of energy to space from a less active sun.

Summary:

There now appears to be evidence that all our existing climate models and theories are based on a false premise.

As a result of assuming that a more active sun should warm the stratosphere it was necessary to invoke an effect from anthropogenic CO2 and CFCs to explain the actual observation of a cooling stratosphere when the sun was more active.

Once the sign of the solar effect on the stratosphere is reversed it becomes possible to propose a system of climate change arising simply from the latitudinal shifting of the air circulation systems in response to competing forces from variable oceanic and solar cycles.