THE HOCKEY SCHTICK

If you can't explain the 'pause', you can't explain the cause...

Thursday, September 6, 2012

New paper finds another mechanism by which the Sun controls climate

A paper published today in the *Journal of Geophysical Research* describes an additional mechanism by which small changes in solar activity are amplified to cause climate change. According to the authors, the "mechanism describes how solar UV changes can lead to a significant enhancement of the small initial signal and corresponding changes in stratospheric dynamics", which in combination with a natural atmospheric circulation, the Quasi-Biennial Oscillation, causes a "significant ocean response," alterations of the Southern Annular Mode, wind anomalies, and deviations in ocean currents. The IPCC dismisses the Sun as a cause of recent climate change by assuming solar activity is a constant [the "solar constant" or TSI], and by ignoring amplifying factors on solar activity such as clouds, sunshine hours, ozone, large changes in solar UV within and between solar cycles, and the mechanism described by this new paper.

The paper also points out yet another shortcoming of current climate models, stating "it is concluded that comprehensive climate model studies require a middle atmosphere as well as a coupled ocean to investigate and understand natural climate variability."

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JOURNAL OF GEOPHYSICAL RESEARCH, doi:10.1029/2011JD017390

Impact of the solar cycle and the QBO on the atmosphere and the ocean

Key Points

- Modeled oceanic solar cycle response depends on **realistically** modeled stratosphere
- A realistically modeled stratospheric solar cycle response requires a QBO

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The Solar Cycle and the Quasi-Biennial Oscillation are two major components of **natural** climate variability. Their direct and indirect influences in the stratosphere and troposphere are subject of a number of studies. **The so-called ``top-down' mechanism describes how solar UV changes can lead to a significant enhancement of the small initial signal and corresponding changes in stratospheric dynamics. How the signal then propagates to the surface is still under investigation.** We continue the ``top-down' analysis further down to the ocean and show the dynamical ocean response with respect to the solar cycle and the QBO. For this we use two 110-year chemistry climate model experiments from NCAR's Whole Atmosphere Community Climate Model (WACCM), one with a time varying solar cycle only and one with an additionally nudged QBO, to force an ocean general circulation model, GFZ's Ocean Model for Circulation and Tides (OMCT). **We find a significant ocean response to the solar cycle only in combination with a prescribed QBO. Especially in the Southern Hemisphere we find the tendency to positive Southern Annular Mode (SAM) like pattern in the surface pressure and associated wind anomalies during solar maximum conditions. These atmospheric anomalies propagate into the ocean and induce deviations in ocean currents down into deeper layers, inducing an integrated sea surface height signal.** Finally, limitations of this study are discussed and **it is concluded that comprehensive climate model studies require a middle atmosphere as well as a coupled ocean to investigate and understand natural climate variability.**

Posted by MS at 5:14 PM

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Anonymous September 7, 2012 at 7:48 AM

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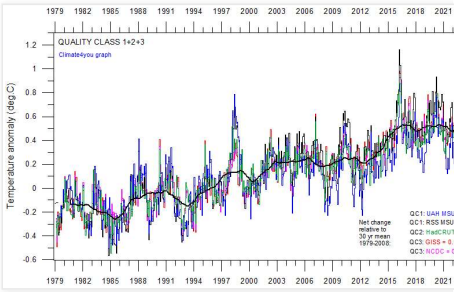

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