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Natural climate cycles of past centuries and millennia; are there implications for the next century and millennium?

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TS4 - 1.4 Earth's climate, past, present and future, Hall E1, October 17, 2018, 11:30 AM - 1:00 PM

Biography:
Michael Asten is a Professor (Retired) and ongoing Adjunct Senior Research Fellow in the School of Earth Atmosphere and Environment, Monash University, Melbourne. He is a past-President of the ASEG, and served a recent three-year term as the AGC representative on the Australian Academy of Sciences UNCOVER Committee. He has published 186 scientific papers. He has developed passive seismic (microtremor) methods for 15 years, developing applications for earthquake hazard, and regolith characterization. He has applied signal processing methods to paleoclimate data sets over the past 3 years with a view to quantifying past climate cycles and equilibrium climate sensitivity.

We review a range of recent studies of natural cycles in climate change on the scale centuries to millennia. The time span 0 to 2000 CE has been considered by multiple groups with results ranging from only a minor signature of natural cycles, to dominant natural cycles without an AGW signature.

The Luedecke-Weiss analysis finds three overwhelmingly dominant centennial cycles which represent the global warming from 1850 to 1990, thus casting doubt on human-caused global warming as the sole factor in global temperature change of the past century.

The Abbot-Marohasy analysis used records for the years 50-1830CE and machine learning methodology; projecting from 1830 they find a fit between predicted and observed proxy global temperatures was achieved by incorporating an AGW component with a value ECS=0.6 °C.
The Scafetta et al approach uses proxy data 0-2010 CE to fit 8 harmonic components together with a composite GCM, and find an optimal fit using ECS=1-2.3 °C.
Asten studied alkenone temperature proxies from four temperate-zone ocean cores identifying with periods of order 10k, 6k and 2.3k years especially well developed in a core from the Okinawa trough.
The documented natural cycles invite predictions of future temperature trends. Differing projections range from a sharp sunspot-related cooling this century; a cooling of 1 °C by 2200 CE; a warming of 1.5-2°C by 2100 CE, and an additional cooling component from millennial cycles acting over the next 1000 years. We discuss compatibility/incompatibility of these results inview of parameters and assumptions used in the different studies.