Geophysical Research Abstracts
Vol. 16, EGU2014-15358, 2014
EGU General Assembly 2014

Decomposition of the observed surface temperature with the Multi-channel Singular-Spectrum Analysis.

Monika Barcikowska (1) and Tom Knutson (2)

(1) Princeton Environmental Institute, Princeton University, Princeton, NJ, USA (monikab@princeton.edu), (2) Geophysical Fluid Dynamics Laboratory, Princeton, NJ,USA (tom.knutson@noaa.gov)

Climate of the twentieth century is shaped by its natural variability and response to the anthropogenic activity. Therefore to predict the future climate, response of the climate to greenhouse-gas concentrations has to be well understood. As such response may be masked by natural climate oscillations, it is important to separate those components.
In this study, Multi-channel Singular-Spectrum Analysis (M-SSA) is applied to the available observational data sets. Those data sets are global fields of surface/sea surface temperature: Met Office HadCRUT4, HadISST and Reynolds OI. With an application of M-SSA, four oscillatory components were found to explain large part of temperature variability. Time scale of derived components varies from an annual to interdecadal. Significant components resemble features of some already identified climate signals, like Atlantic Multidecadal Oscillation, which influences both the Atlantic and North Pacific.
Additional analysis is made to assess the physical relevancy of the Pacific Decadal Oscillation (PDO). We test the hypothesis, whether PDO index can be reconstructed with derived oscillatory components.
Further analysis aims to discuss statistical significance, physical relevancy of all derived modes and capability of the method to separate natural signal from anthropogenic one in the short and noisy time series.