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Follows two abstracts: Preference for the first subject. Dietmar Dommenget

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Title: Generation of Global Hyper Climate Modes

Authors: D. Dommenget and M. Latif

Abstract:
The talk will discuss global modes of multi-decadal climate variability. It is shown that the leading mode of global multi-decadal sea surface temperature (SST) and the variance increase of SST variability to multi-decadal time scales can be explained by local air-sea interactions. A concept for "Global Hyper Climate Modes" is formulated: surface heat flux variability associated with regional atmospheric variability patterns is integrated by the large heat capacity of the extra-tropical oceans, leading to a continuous increase of SST variance towards longer timescales. Atmospheric teleconnections spread the extra-tropical signal to the tropical regions. Once SST anomalies have developed in the Tropics, global atmospheric teleconnections spread the signal around the world creating a global hyper climate mode. A simple model suggests that hyper climate modes can vary on timescales longer than 1,000 years. Ocean dynamics may amplify theses modes and influence the regional expression of the variability, but are not at the heart of the mechanism which produces the hyper modes. The global SST trend of the past decades projects onto this mode and it is likely that future anthropogenic climate change will exist this mode.

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Title: A Null Hypothesis for Teleconnection Modes in Climate.

Authors: D. Dommenget

Abstract:
In this note it is suggested that isotropic diffusion driven by spatially unstructured forcing, representing a spatial auto regressive process (AR(1)-process), can be used as a null hypothesis for the spatial structure of climate variability. By projecting the leading empirical orthogonal functions (EOFs) of the null hypothesis onto an EOF mode of an observed data set inferences about the nature of the observed mode can be made. The formulation of a stochastic null hypothesis allows to define teleconnection modes as the modes that are most distinguished from the stochastic null hypothesis, which can be found by rotation of the EOF modes. The analysis introduced in this note is applied to several artificial and real data examples including the sea surface temperature (SST) variability of the tropical Pacific and Indian Ocean and the Northern Hemisphere wintertime sea level pressure (SLP) variability.