



How to detect climate modes

D. Dommenges

IFM-GEOMAR

In this note it is suggested that a stochastic diffusive process 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.