



## **Indian Ocean zonal mode activity in 20th century observations and simulations**

Anja Sendelbeck and Thomas Mölg  
Friedrich-Alexander-University Erlangen-Nürnberg (FAU)

The Indian Ocean zonal mode (IOZM) is a coupled ocean-atmosphere system with anomalous cooling in the east, warming in the west and easterly wind anomalies, resulting in a complete reversal of the climatological zonal sea surface temperature (SST) gradient. The IOZM has a strong influence on East African climate by causing anomalously strong October – December (OND) precipitation. Using observational data and historical CMIP5 (Coupled Model Intercomparison Project phase 5) model output, the September – November (SON) dipole mode index (DMI), OND East African precipitation and SON zonal wind index (ZWI) are calculated. We pay particular attention to detrending SSTs for calculating the DMI, which seems to have been neglected in some published research. The ZWI is defined as the area-averaged zonal wind component at 850 hPa over the central Indian Ocean. Regression analysis is used to evaluate the models' capability to represent the IOZM and its impact on east African climate between 1948 and 2005. Simple correlations are calculated between SST, zonal wind and precipitation to show their interdependence. High correlation in models implies a good representation of the influence of IOZM on East African climate variability and our goal is to detect the models with the highest correlation coefficients. In future research, these model data might be used to investigate the impact of IOZM on the East African climate variability in the late 20's century with regard to anthropogenic causes and internal variability.