Max Pike (Rutgers University, Atmospheric Science), Benjamin Lintner (Rutgers University, Atmospheric Science), Matthew Niznik (Rutgers University, Atmospheric Science)

**Application of self-organizing maps to observed and simulated daily precipitation over the tropical and southern Pacific Ocean**

Self-organizing maps (SOMs) comprise a class of artificial neural networks that aim to organize complex input data through computation of a set of M x N representative maps. Here we use an SOM routine to isolate the spatial patterns inherent in daily austral summer (December-January-February or DJF) rainfall over the tropical and southern Pacific Ocean basins from Tropical Rainfall Measuring Mission (TRMM) satellite observations as well from an ensemble of models from Phase 5 of the Coupled Model Intercomparison Project (CMIP5). Applying a 2x2 SOM to all available DJFs from TRMM yields two maps that may be regarded as Intertropical Convergence Zone (ITCZ)-active, in which precipitation is more intense over the ITCZ region compared to the South Pacific Convergence Zone (SPCZ) region, while the remaining maps are SPCZ-dominant. The latter reflect a spatial translation of the SPCZ consistent with the previously described impact of the El Niño/Southern Oscillation (ENSO) or analogous low-frequency modes of variability on the SPCZ. Comparing the CMIP5-based SOMs to TRMM reveals some broad similarities in the orientation and extent of large-scale features, as well as spurious features, which point to errors or biases in the models. Because of the pronounced impact of ENSO, we further consider SOMs computed separately for each of the El Niño and La Niña phases. This analysis suggests that while the overall position of the SPCZ is sensitive to the phase of ENSO, within each phase, similar high-frequency changes in SPCZ slope occur. Thus, while the mean position of the SPCZ may be dominantly controlled by ENSO phase, the distinct orientations within the same ENSO phase point to additional controls on SPCZ slope.