Geophysical Research Abstracts
Vol. 19, EGU2017-3686, 2017
EGU General Assembly 2017

On the evolution of El Niño events in observations and CMIP5 climate models

Michael Herzog (1), Andy Wang-Chun Lai (2), and Hans-F. Graf (1)

(1) University of Cambridge, Geography, Cambridge, United Kingdom (mh526@cam.ac.uk), (2) Hong Kong Observatory, Hong Kong, China

In observations, a significant fraction of variability in November to January Niño3.4 sea surface temperature anomalies (SSTA) can be explained by just two parameters: the Western Pacific subsurface oceanic potential temperature anomaly and the West to Central Pacific Cumulative zonal wind anomaly. From a linear combination of these two parameters a simple statistical model can be developed for ENSO forecast with an explained variance between observed and predicted November to January Niño3.4 SSTA of 57% and 86% at a lead time of eight and one months, respectively. In addition, the evolution not only of SSTA but also of zonal wind anomaly and ocean heat content follows characteristic patterns for different El Niño types: Eastern, Central and hybrid. We analysed the El Niño evolution for models in the CMIP5 archive that have been identified as the best models in terms of their ENSO statistics previously. The explained variance between Niño3.4 SSTA and zonal wind anomaly and ocean heat content is significantly lower in most climate models than in observations. Considering the evolution of El Niño allows for a very clear ranking and the identification of deficiencies in models.