Geophysical Research Abstracts
Vol. 17, EGU2015-3105, 2015
EGU General Assembly 2015

The role of Pacific Trade Wind trends in driving ocean heat uptake and global hiatuses

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Previous work has noted the importance of the tropical Pacific in modulating global temperatures and in offsetting anthropogenic surface warming over decadal periods. This project investigates the role of Pacific Trade Wind changes in modulating the exchange of heat into and out of the sub-surface tropical Pacific Ocean. In particular, the trade wind acceleration observed since the early 1990's is examined, with a focus on ocean heat uptake dynamics associated with phase changes of the Interdecadal Pacific Oscillation (IPO). A number of simulations are performed in an eddy-permitting global ocean model (MOM5) coupled to a sea ice model (SIS). To examine the recent period, the ocean model is forced with atmospheric CORE normal year forcing, with the observed Pacific wind trend from 1992-2013 superimposed linearly over the tropical Pacific region. The role of seasonally varying wind trends is further investigated by running a second experiment with seasonally varying wind anomalies added in the Pacific. To investigate how and when the subducted heat might re-surfaces from the ocean interior in the future, additional experiments are performed that include a ramp down of the trade winds under a variety of scenarios to mimic a future phase change in the IPO. This work has implications for decadal predictions of future global climate change.