Geophysical Research Abstracts
Vol. 18, EGU2016-8188, 2016
EGU General Assembly 2016

Trends in Southern Ocean Eddy Kinetic Energy

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A recent study by Hogg et al. (JGR, 2015) has demonstrated a 20-year trend in eddy kinetic energy (EKE) computed from satellite altimetry data. However, this estimate is based on an averaging over large spatial areas. In this study, we use the same methods to examine regional EKE trends throughout the Southern Ocean, from 1993-2015. We do find significant positive trends in several areas of the Southern Ocean, mainly in regions with high mean EKE associated with interactions between jets and bathymetry. At the same time, however, there are also regions with significant negative trends. Overall, EKE in the majority of the Southern Ocean has not changed.

These results suggest that the estimates of Hogg et al. may have been biased by these regional extremes, and that more work is needed to quantify climatic changes in EKE.