Geophysical Research Abstracts
Vol. 15, EGU2013-1388, 2013
EGU General Assembly 2013

An inter-hemispheric comparison of the Tropical Storm response to global warming

Stephanie Gleixner (1,2), Noel Keenlyside (1,3), Kevin Hodges (4), Wan-Ling Tseng (2), Lennart Bengtsson (4,5)

(1) Geophysical Institute, University of Bergen, Bergen, Norway, (2) GEOMAR Helmholtz Centre for Ocean Research , Kiel, Germany, (3) Bjerknes Centre for Climate Research, Bergen, Norway, (4) University of Reading, Whiteknights, Reading, UK, (5) International Space Science Institute (ISSI), Bern, Switzerland

Model studies do not agree on future changes in tropical cyclone (TC) activity on regional scales. We aim to shed further light on the distribution, frequency, intensity, and seasonality of TCs, that society can expect at the end of the 21st century in the Southern Hemisphere (SH). Therefore, we investigate TC changes simulated by the atmospheric model ECHAM5 with T213 (approx. 60km) horizontal resolution. We identify TCs in present-day (20C; 1969-1990) and a future (21C; 2069-2100) time slice simulations, using a tracking algorithm based on vorticity at 850 hPa. In contrast to the Northern Hemisphere (NH), where tropical storm numbers reduce by 6 %, there is a more dramatic 22% reduction in the SH, mainly in the South Indian Ocean. While an increase of static stability in 21C may partly explain the reduction in tropical storm number, stabilization cannot alone explain the larger SH drop. Large-scale circulation changes associated with a weakening of the Tropical Walker Circulation, cause the strong decrease of cyclones in the South Indian Ocean. Whereas the decrease found over the South Pacific appears to be related to increased vertical wind shear, associated with an enhanced meridional sea surface temperature (SST) gradient. We find the main difference between the hemispheres in changes of the tropical cyclones of intermediate strength. In both hemispheres the frequency of the strongest storms increases and the frequency of the weakest storms decreases, although the increase in SH intense storms is marginal.