



## **Dynamical downscaling of Tropical Cyclone activity from NCEP/NCAR and ERA 40 reanalysis data sets.**

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In order to derive climate statistics, long and homogeneous time series are needed. Observational data sets (best track data) of tropical cyclone activity in the western North Pacific basin show strong discrepancies in the long-term trends derived for the last decades. We derive alternative datasets of tropical cyclone (TC) activity, by applying dynamical downscaling approach.

Two reanalysis data sets: NCEP/NCAR 1 and ERA 40 are downscaled, using an atmospheric regional model (CCLM). The reconstructed TC variability (yearly and climate-scale) yields good agreement with the observed one, mainly for the last three decades. Reconstructed and observed long-term trends (1948-2011) of TC frequency differ. Both reanalyses reveal a strong increase of TC activity, while observation-based data sets show rather decadal variability.

Additional analysis indicates that the reconstructed long-term (1948-2011) TC activity may suffer from temporal inhomogeneities included in both sets of reanalyses, which were used to drive the regional climate model. For both simulations TC intensity reveals abrupt upward shift in 1978, which coincides with the introduction of satellite-based observations to reanalyses. Moreover, differences between the regional climate model simulations forced by either NCEP/NCAR 1 or ERA 40 point also to uncertainties associated with intrinsic features and quality changes of the reanalyses (e.g. observational data and methods of data assimilation). Therefore the interpretation of dynamically downscaled reanalyses should be treated with caution, especially for the pre-satellite period. Study discuss the reliability of the results, derived from downscaling the inhomogeneous data set.