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Tropical cyclone count predictability on seasonal time-scale using dynamical climate forecasts

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This study investigates the predictability of Tropical Cyclone (TC) seasonal count anomalies using the first version of the CMCC-INGV Seasonal Prediction System (CSPS-v1). The skill in reproducing the observed (National Hurricane Center and U.S Joint Typhoon Warning Center) TC counts has been evaluated after the application of a TC location and tracking detection method to the CSPS-v1 retrospective forecasts.
The CSPS-v1 displays a good skill in predicting the observed TC count anomalies, particularly over the tropical Pacific and Atlantic Oceans. The simulated TC activity exhibits realistic seasonal modulation, geographical distribution and interannual variability, thus indicating that the model is able to reproduce the major basic mechanisms that link the TCs occurrence with the large scale circulation.
Further, TC count anomalies prediction has been found to be sensitive to the inclusion of the assimilation of in situ temperature and salinity data in the estimation of the ocean Initial Conditions (ICs). Using the ocean ICs thus improved, we performed an additional set of ensemble hindcasts taking the same initial conditions for all the coupled model components but the ocean. Our results indicate that the assimilation significantly improves the prediction of the TC count anomalies over Eastern Pacific and Indian Ocean during Boreal summer. During the Austral counterpart, we evidenced a significant progress in the prediction over the area surrounding Australia. The improved prediction skill of the anomalous TC activity appears to be linked to both the improved interannual anomalies and the reduced mean bias of the predicted Sea Surface Temperatures.