OFFICIAL ABSTRACT and CERTIFICATION

An Analysis of the Relationship Between Cyclogenesis Latitude and Sea Surface Temperature (SST) Anomalies

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Because cyclones can cause large scale destruction to human infrastructure, it is necessary to develop models that can effectively predict their occurrences. Though current research points at a poleward migration of yearly average cyclogenesis latitude in the Pacific region, developed trendlines of the shift cannot accurately predict seasonal cyclogenesis variability. In this investigation, I attempted to develop a new method that could predict yearly variability in cyclogenesis latitude during the cyclone off-season (months between consecutive cyclone seasons) using sea surface temperature (SST). The goal was to create a model that would achieve a balance between climatic prediction and immediate prediction. In such a scenario, both the level of accuracy and time span prior to storm occurrence are satisfactory enough to minimize physical damage. Additionally, the amount of weather data to analyze would be minimized by decreasing the time span to the off-season. To perform correlations between SSTs and cyclogenesis latitude, average latitudes of positive SST anomalies (regions of above average temperature) during the cyclone off-season (months between consecutive cyclone seasons) were calculated through the development of a Python algorithm. This algorithm could extract pixel coordinates from SST images by identifying color values that correspond to positive SST anomalies. This analysis was performed solely in the Northeast Pacific region. Moderate to strong non-linear relationships were found to exist, more apparent when averages were weighted in favor of larger positive anomalies.

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