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Development of a Long-Term IBTrACS Database for Nearshore Tropical Cyclone Activity in the Eastern North Pacific

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Abstract: This proposal seeks funding to support further development, analysis, and dissemination of a long-term historical data set of tropical cyclone (TC) activity that covers the far Eastern North Pacific (EPAC) basin. The proposed work seeks to extend our earlier efforts in which we defined annual TC frequency/abundance occurring within an area we term the “Nearshore” region where historical shipping lane and land based data sets provide reliable tracking tools. The geographic dimensions of the data set and the proposed approaches to development and analysis are data driven – we believe that they reflect a realistic appraisal of the quality and quantity of historical surface observations available to define EPAC TC activity and its impact on extreme rainfall variability over western Mexico. The proposed work has three principal objectives. The first objective is to provide once-a-day estimates of TC positions for Nearshore storms for the period 1921 – 1955. The effort forms the basis for the creation of digital track records that will be integrated into the WMO endorsed International Best Track Archive for Climate Stewardship (IBTrACS). This represents a substantial addition to the IBTrACS catalog which currently contains EPAC tracks only from 1949-onward. The second objective is to investigate the feasibility of estimating storm intensities for the early Nearshore data set (i.e., 1921-1955). The final objective for the proposed work is more diagnostically-oriented. It seeks to evaluate the variability in TC activity on timescales ranging from interannual to multi-decadal, and to determine how and to what extent TC variability produces systematic behaviors in critical climate monitoring parameters – particularly rainfall. It will focus on rainfall extremes over western Mexico, short-period extremes associated with TC translation through the coastal environment.