

A Super Best Track Data Set for Tropical Cyclone Studies

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Deterministic track forecasts have become so accurate in the medium range (e.g., the mean 72-h position error of the global models is now *below* predictability ‘limits’) that long-term tropical cyclone (TC) studies and forecasting can move in new directions with different emphases. For forecasting two new directions are:

- 1) a more explicit (and better) prediction of the surface wind field (e.g., intensity and the wind radii); and
- 2) ‘completing the forecast’ with predictions of genesis (and dissipation).

For climate studies, the availability of high-resolution global reanalysis will allow a more in-depth examination of the relationship between TC activity and the tropical general circulation.

Current best track data sets have several deficiencies for both forecasting and climate research; specifically, they lack:

- 1) observational analyses of the surface wind field (e.g., the NOAA Multiplatform Satellite Surface Wind Analysis) and precipitation
- 2) position data in the pre/potential TC (pTC) genesis stage
- 3) a ‘diagnostic file,’ with environmental variables known to be related to intensity change, derived from high-quality and consistent global (re)analyses/forecasts (e.g., vertical wind shear)
- 4) track forecasts for both pTCs and TCs that include TC structure, e.g., pressure/radius of the outermost closed isobar

The foundation of the super best track (SBT) is the ‘final’ best tracks of the two US operational forecast centers –the Joint Typhoon Warning Center (JTWC) and the National Hurricane Center (NHC). The SBT is thus global and unique in three important ways by including:

- 1) pTC tracks taken from a curated archive of *all* (both ‘numbered’ and INVEST or 9X systems) working best track data from JTWC/NHC since 2007
- 2) dynamical environmental variables (analysis and forecasts) come the latest/greatest ECMWF reanalysis –ERA5 –that has the same resolution as the NWP global models circa 2015
- 3) satellite precipitation analyses

The initial version of the SBT covers a 13-year period 2007-2019 and after a short summary of SBT properties, the talk gives one application example for TC genesis. Version 2.0 will include the entire ERA5 period 1979-2020.

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