

EGU22-5755

<https://doi.org/10.5194/egusphere-egu22-5755>

EGU General Assembly 2022

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



How Realistic are Tropical Cyclones in the ERA5 Reanalysis?

William Dulac¹, Julien Cattiaux¹, Fabrice Chauvin¹, Stella Bourdin², and Sébastien Fromang²

¹Centre National de Recherches Météorologiques, Toulouse, France (william.dulac@meteo.fr)

²Laboratoire des Sciences du Climat et de l'Environnement (LSCE/IPSL), Paris, France

The ERA5 dataset from the ECMWF is the first global reanalysis product to reach a horizontal resolution of 0.28125° (31 km), a resolution that is thought to allow for a realistic representation of small-scale atmospheric features such as tropical cyclones.

Using the CNRM Tropical Cyclone Tracking Scheme carefully calibrated for ERA5 and a track pairing algorithm that uses the International Best Track dataset (IBTrACS) as reference, we investigate how well tropical cyclones (TC) are represented in ERA5.

First we show that the majority of IBTrACS systems are found by the ERA5 tracking, but that performances in terms of probability of detection and false alarm rate varies from one geographical basin to the other. Moreover, by comparing the intensities between tracked TCs from ERA5 and their observational counterparts, we show that TCs in the reanalysis are rather weak considering the spatial resolution – both in terms of maximum wind speed and pressure minimum. By looking at mean wind speed life cycles in several geographic basins we also show that TCs de-escalate too quickly after reaching their peak intensity. Finally, using a compositing technique we look at the internal structure of TCs and find that despite the weak intensity, they present expected features regarding radial and tangential wind speed and upper-core temperature anomaly when sorted by Saffir-Simpson categories.