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Freddy: breaking record for Tropical Cyclone precipitation?

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Depending on the location on the Earth planet, the amount of precipitation associated with Tropical Cyclones (TCs) can reach 20% of the total yearly precipitation over land and up to 40% over some ocean regions. TC induced freshwater flooding has been suggested as the largest threat to human lives due to TCs. Therefore, a reliable quantification of the precipitation amount associated with each past TC is important for a better definition of the TC fingerprint on the climate. The temporal and horizontal resolution of state-of-the-art observational datasets and atmospheric reanalysis give the possibility to quantify the TC-associated precipitation over the Earth planet following the observed TC tracks. In this work we compare results from different observational and reanalysis datasets in terms of TC-associated precipitation, to verify the consistency between them. A particular focus is given to the record-breaking TC Freddy (Southern Indian Ocean, 2023). Here we show that the time-varying bias in TC associated precipitation, due to the positive trend in assimilated observations, makes it difficult to assess long-term trend investigation based on reanalysis: to this aim we need to build on state-of-the-art General Circulation Models, free to evolve under historical radiative forcing. This work is part of CLINT EU project activity (grant agreement ID: 101003876; DOI: 10.3030/101003876).