



North Atlantic post-tropical cyclones in reanalysis datasets

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Tropical cyclones may undergo extratropical transition and are an important natural hazard affecting Western Europe and the Northeast United States. Herein termed ‘post-tropical cyclones’, these high-impact weather events expose populous regions to hurricane-force wind speeds and extreme precipitation, where preparedness may be lower than areas more typically hit by tropical cyclones. Post-tropical cyclone frequency is projected to increase in response to anthropogenic climate change because warming-induced poleward and eastward expansion of tropical cyclone genesis areas will allow more systems to propagate into the mid-latitude baroclinic region. Therefore, a quantitative understanding of historical post-tropical cyclone variability – against which climate model performance and projections under climate change may be evaluated – is required. Here, we use an objective feature-tracking algorithm to identify post-tropical cyclones in reanalysis datasets, focussing on those systems which impact Western Europe and the Northeast United States. We then analyse post-tropical cyclone seasonality, interannual variability, structural characteristics, and life-cycles. We also use satellite-derived precipitation estimates (Tropical Rainfall Measuring Mission) to establish the importance of post-tropical cyclones for precipitation across the North Atlantic basin. We evaluate the performance of the reanalyses against International Best Track Archive for Climate Stewardship (IBTrACS) reference observations. We hope to stimulate further discussion of these systems, particularly their tracks, tropical-to-extratropical transition, societal impacts, and representation in climate models.