



Climatology and interannual variability of storm-tracks in the Euro-Atlantic sector: a comparison between ERA-40 and NCEP/NCAR reanalyses

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An objective methodology (Trigo et al., 1999; Trigo et al., 2002) is applied to ERA-40 (European Centre for Medium-Range Weather Forecasts 40-year Reanalysis) and NCEP/NCAR (National Centers for Environmental Prediction / National Center for Atmospheric Research) reanalyses, to build two storm-track databases for the Euro-Atlantic sector (85°W-70°E; 20°N-75°N), spanning the period December 1958 to March 2000. The technique uses the full temporal (6-hourly) and spatial resolutions (1.125° and 2.5° regular grids, for ERA-40 and NCEP/NCAR, respectively) available. It is shown that the strong discrepancies in the number of storms in each dataset (higher for ERA-40) result from differences in the resolution of the fields subject to the storm detecting/tracking algorithm, and also from the characteristics of the integration models and assimilation schemes used for each reanalysis. An intercomparison of ERA-40 and NCEP/NCAR storm-tracks is performed for spatial distribution, and main characteristics, of the overall cyclone population and of a class of severe storms - explosive cyclones. Despite the discrepancies in storm numbers, both reanalyses agree on the main cyclone activity areas (formation, minimum central pressure, and lysis). The most pronounced differences occur where subsynoptic systems are frequent, as these are better resolved by ERA-40 data. The interannual variability of cyclone counts, analysed per intensity classes and for different regions of the domain, reveals reasonable agreement between the two datasets on the sign of trends (generally positive in northern latitudes, and negative in the Azores - Mediterranean band, in agreement with Trigo et al., 2000), but discrepancies regarding their strength in the most southern areas, where the mismatches between ERA-40 and NCEP/NCAR detected lows are greatest.