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Trends in Northern Hemispheric Cyclone Diagnostics

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Temporal variations in cyclone numbers and their preferred locations are likely to be influenced by (i) natural climate variability (observed to fluctuate on interannual to decadal time scales) and (ii) possibly by a climate-change forcing (operating on longer time scales). Existing cyclone tracking algorithms however differ in their means of both identifying and tracking cyclones, thus attempts to obtain objective trend estimates could be sensitive to method-specifics.

Here we present a preliminary intercomparison of seasonal trends in metrics produced by cyclone-tracking algorithms participating in the IMILAST (Intercomparison of Mid Latitude Storm Diagnostics) project. The various algorithms were run on the ERA-Interim 1.5 degree x 1.5 degree dataset over the 20 year period 1989-2009. We investigate the spatial coherence of fitted linear trends over the 20 year period in locally-averaged Northern Hemispheric cyclone diagnostics (cyclone count, track density, genesis and lysis densities, lifetime and displacement speed).

Whilst large differences exist in absolute trends, a comparison of standardised trends reveals considerable regional agreement between algorithms for certain diagnostics (cyclone and track density, lifetime, and displacement speed). A robust and likely physically-based signal of decadal variability is thus present in these diagnostics. In contrast, trends in genesis and lysis densities show reduced agreement amongst the methods and coherence over much smaller spatial scales. Trends in these diagnostics show increased sensitivity to cyclone definition.