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Intercomparison of mid latitude storm diagnostics (IMILAST) – project update

Urs Neu and the IMILAST Team
ProClim-, Swiss Academy of Sciences, Bern, Switzerland (urs.neu@scnat.ch, 41 31 3282320)

The analysis of the occurrence of mid-latitude storms is of great socio-economical interest due to their vast and destructive impacts. However, a unique definition of cyclones is missing as they are complex systems which may have very diverse characteristics. Thus, the definition of what a cyclone is as well as quantifying its strength contains subjective choices. Existing automatic cyclone identification and tracking algorithms are based on different definitions and use diverse characteristics. These methods generally differ in the following aspects: data transformation (e.g., grid transformation, smoothing, etc.), metrics used for cyclone identification (e.g. sea level pressure or vorticity), cyclone identification procedures, different tracking methods (e.g. near neighborhood search), and elimination criteria (e.g., requiring a certain pressure minimum or minimum life time). The different choices made in these algorithms can lead to substantial differences in cyclone climatologies, temporal trends of the frequency, strength, or other characteristics of cyclones. These differences render the interpretation and comparison of cyclone studies rather difficult.
The project IMILAST systematically compares different cyclone detection and tracking methods (currently 15 different algorithms), with the aim to comprehensively assess systematic uncertainties in mid-latitudinal storm identification and tracking.
As a common data basis the ERA-interim reanalysis data set is used in all IMILAST studies. A first study presented a general overview of differences between the methods with respect to number, track density, life cycle characteristics, and trend patterns for a 20 year period of ERA-Interim. In a second study, potential differences of the long-term climate change signal of cyclonic activity between the methods were assessed. Currently, the intercomparison is extended to a 30 year period from 1979 to 2009 and focuses on more specific aspects, such as parameter sensitivities, the comparison of automated to manual tracking sets, regional analysis (regional trends, Arctic and Antarctic cyclones, cyclones in the Mediterranean) or specific phenomena like splitting and merging of cyclones.
While the main results of the project are presented in specific EGU contributions of this session (oral and poster presentations), this contribution presents an overview of its general aspects.