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

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The detection of the occurrence of mid-latitude storms, which are of high societal interest due to their impacts, is less straightforward than it might seem. Since cyclones are complex systems with very diverse characteristics, the definition of what a cyclone is and what should be considered as describing the strength of a cyclone contains subjective choices. Thus, existing analysis methods, especially automatic algorithms, are based on different definitions and use diverse identification and tracking (i.e. detecting the path of an individual cyclone over time) methodologies. The different choices made in different cyclone identification and tracking algorithms can lead to critical differences in temporal trends of the frequency, strength or life cycle of cyclones. These differences render the interpretation and comparison of cyclone trend studies difficult.
The project IMILAST performs a systematic intercomparison of different existing cyclone detection and tracking methods, with the aim of a comprehensive assessment of methodological uncertainties in mid-latitudinal storm tracking and an overview of advantages and restrictions of different schemes. The intensive discussions of first results have already pointed out a number of important issues that have to be carefully considered, and where some harmonization might make sense, like e.g. the arbitrary choice of thresholds like minimum life time or the elimination of cyclone tracks over high terrain.
Currently, cyclone tracks for a 20 year test period for both the northern and southern hemispheres have been calculated with 15 different methodologies. As input data all calculations used the same ERA-interim reanalysis data set. The methods generally differ in the following aspects: data transformation (e.g. grid transformation, smoothing), metrics used for cyclone identification (e.g. sea level pressure or vorticity), cyclone identification procedures, different tracking methods (how to combine the cyclone centers at different times to a track), and elimination criteria (e.g. requiring a certain pressure minimum or minimum life time). The results show that in some aspects the methods differ widely (e.g. in cyclone numbers), while in other aspects results are remarkably consistent (e.g. spatial trend patterns, relative temporal variations). While the main results of the project are presented in specific EGU contributions of this session (oral and poster presentations), an overview of its general aspects are presented in this contribution.