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The IMILAST project: Intercomparison of mid-latitude storm diagnostics -background and aims of the project

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Storm-associated damages are amongst the highest losses due to natural disasters in the mid-latitudes. Therefore the knowledge of the future variability and change in extratropical cyclone frequency, intensity and track locations is crucial for the strategic planning and minimization of the disaster impacts. Future changes in the total number of storms might be small but major signals could occur in the cyclone characteristics such as intensity, life time, or especially track locations. The analysis of geographical track distribution and temporal evolution of storm characteristics strongly depends on the methodologies that are used for storm track detection. Thus, scientific studies may find seemingly contradictory results based on the same datasets, which makes the interpretation of storm track analyses and projection results very difficult for any users. The project IMILAST (Intercomparison of Mid-latitude Storm Diagnostics) aims at providing a systematic intercomparison of different methodologies and a comprehensive assessment of all types of uncertainties inherent in the mid-latitudinal storm tracking algorithms. The project aims at providing a "handbook" which presents a description of the available different identification and tracking schemes, their advantages and restrictions, and their suitability for specific purposes. It further provides on overview of the definitions, thresholds and parameters used for the quantification of cyclone activity and storm tracks. The intercomparison experiment involves the calculation of all storm tracks for a pre-defined 20 year period (1989 - 2009) in the Northern and Southern hemisphere, respectively, by all the about 15 individual tracking schemes. As input data all calculations use the same ERA-interim reanalysis data set (1.5^{o} resolution). In a second step, the simulations of a set of about 20 individual (extreme) storms will be compared. The evaluation of the numerous schemes showed a broad variety of differences between the methods: Some schemes perform data pre-processing (grid transformation, data filtering), there are different metrics used for identification (SLP minima, vorticity, pressure contours, 850 hPa minima), different thresholds (for vorticity, core pressure, pressure gradient, amplitude, terrain height, lifetime), different treatment of special cases (splitting of cyclones; inclusion/exclusion of open systems; cyclone distance; heat lows), different tracking algorithms, different intensity measures (vorticity, SLP minima, pressure gradient), and different post-processing. Even differences in presentation (e.g. choice of contour intervals) might lead to different pattern perception. Detailed analysis of the intercomparison results provides information on methodological differences and similarities in the various aspects of extratropical cyclone characteristics and the specific influence of the above mentioned methodological variations.