



Intercomparison of mid latitude storm diagnostics: The IMILAST-Project

U. Neu and the IMILAST Team

ProClim-, Swiss Academy of Sciences, Bern, Switzerland (urs.neu@scnat.ch, 41 31 3282326)

The detection and tracking of mid-latitude storms, which are of high socio-economic interest due to their impacts, is due to the nature of mid-latitude cyclone systems a demanding effort. Since cyclones are complex systems with very diverse characteristics, the definition of what is a cyclone 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 methodologies. The different choices made in different cyclone identification and tracking algorithms can lead to different results for individual tracks or statistics of cyclone characteristics.

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-latitude storm tracking. In a first intercomparison experiment, cyclone tracks for a 20-year test period (1989-2009) for both the northern and southern hemispheres have been calculated with 15 different methodologies. As input data in all calculations the same ERA-interim reanalysis data set has been used. The methods generally differ in data transformation (e.g. grid transformation, smoothing), metrics used for cyclone identification (e.g. sea level pressure and/or vorticity), cyclone identification procedures and parameter setting, tracking algorithm, and elimination criteria (e.g. requiring a certain pressure minimum or minimum life-time). The results show that in some aspects the tracks of various methods differ widely (e.g. in total cyclone numbers, life-time, propagation velocity, tracks in genesis and lysis phase of cyclones), while in other aspects results are remarkably consistent (e.g. track and intensity statistics of deep cyclones, interannual variability of cyclone numbers, deepening rates of cyclones, intense phase of individual extreme cyclone tracks in two case studies). Until now, no relations between differences in results and methodological differences have been identified.