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Evaluation and climatology of explosive developments in ERA Interim under consideration of multiple tracking approaches

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Extratropical cyclones are one of the most important features in the mid-latitudes. Cyclones which undergo strong intensification within a short time range are of special interest due to their low predictability and hence difficulties in issuing timely early warning. Cyclones with deepening rates of at least (24*sinφ/sin60°) hPa in 24 hours are referenced in the literature as explosive cyclogenesis / developments or simply as bombs. This corresponds to 24 hPa in 24 hours at a reference latitude 60°N. For the North Atlantic/Europe region, the vast majority of these bombs achieve their maximum deepening rates over the North Atlantic ocean. Nevertheless these fast moving systems can reach western Europe with outstanding wind strength, provoking widespread damage and often human fatalities, such as the recent cases of storms Klaus (2009) and Xynthia (2010).
Within the IMILAST intercomparison project, Northern Hemisphere cyclones were identified using multiple identification and tracking methods. This enables an evaluation and comparison of "bomb" climatologies for recent climate conditions based on a comprehensive dataset, which is the special focus here. All tracking approaches were applied to the ERA Interim dataset with 1.5° resolution for the period from January 1989 to March 2009. First, the climatologies of cyclogenesis and track densities of bombs are analysed and compared. Second, the obtained deepening rates of selected bombs are compared between the different approaches. Finally, the relation between the number of bombs vs. total number of cyclones identified by the different methods is analysed.