



An object-oriented methodology for the verification of cyclone trajectories in an ensemble forecasting system

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The results of an ensemble can be assessed through a large variety of techniques and observations. One can use from point station observations to continuous satellite information using deterministic or statistical methodologies. One of the most used fields for an ensemble validation has been the precipitation, since it is the main source of intense negative impacts of atmospheric phenomena on the human societies. In the cases where a cyclone is present (or any other well defined atmospheric circulation evolving in time), the verification of an ensemble through the precipitation could not be adequate. The proposed technique provides an objective way to compare the trajectories of the circulation system as simulated by the ensemble against a reference one. This methodology allows the verification of the ensemble forecasting system with regard to the most influencing dynamical feature on the high impact weather. In this work the new objective object-oriented method is applied to assess the trajectories of a set of simulated cyclones obtained from a MM5 multi-physical ensemble forecast system. With the obtained results a probabilistic map of the cyclone trajectory is also provided. Object-oriented study of the trajectories is done taking as reference the trajectory of the cyclone in the satellite imagery. The objective computation of each trajectory is based on the correlation between the velocities and accelerations of pieces of the total simulated trajectory with the satellite-based one. The object-oriented methodology provides information about the morphology, zone of evolution, propagation speed and temporal shifts of ensemble trajectories.