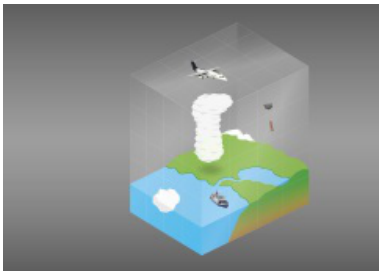

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Target observations for improving NAO event onset prediction

Based on the viewpoint that North Atlantic Oscillation (NAO) event has an intrinsic time scale about 2 weeks and can be treated as an initial-value problem, target observations for improving NAO event onset prediction are investigated by conditional nonlinear optimal perturbations method with a quasi-geostrophic model. The results show that the sensitive areas are flow-dependent, which are mainly located in the North Atlantic and its upstream regions. Target observations over main sensitive areas could improve NAO onset forecast in most cases (approximate 75%) due to reduced anomalous eddy vorticity forcing (EVF) projection errors on the typical NAO mode. Moreover, a fixed sensitive area is determined based on the winter climatological flow, and NAO onset forecast can also be improved by target observations over North American Continent and its adjacent Ocean, but somewhat lower than those in flow-dependent sensitive area. The above results indicate that target observations over sensitive area identified by CNOP method are helpful to improve the NAO onset forecast.

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