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Water vapor effect on low frequency variability and storm-tracks

A. Laîné (1), G. Lapeyre (1), and G. Rivière (2)
(1) LMD-ENS, IPSL, Paris, France, (2) CNRM-GAME, Météo-France, Toulouse, France

Storm tracks are an important component of the climate system, particularly for winter at mid-latitudes when they determine the daily weather and supply most of the precipitation. Recently, the way synoptic waves break along the storm-tracks (cyclonically or anticyclonically) in the eastern part of the oceanic basins was shown to influence the latitudinal displacement of the jet and the low frequency variability like the North Atlantic Oscillation (NAO). The characteristics of the coupling between low frequency variability and the dynamics of weather systems still need to be better assessed.

We use a quasi-geostrophic model on the sphere to study the interaction between low frequency variability and synoptic systems for the northern mid-latitude climate. A dry and a moist version of the model are used to study the effect of humidity on synoptic activity and especially the type of wave breaking, cyclonic or anticyclonic. Different forcing climatologies are used to assess the sensitivity of the storm track and the influence of water vapor.