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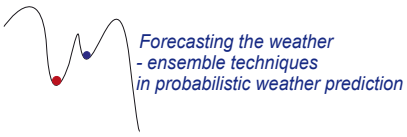


# Significance and climatology of diabatic Rossby-waves

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Diabatic Rossby waves (DRWs) are low-tropospheric positive potential vorticity (PV) anomalies that are continuously regenerated through diabatic processes, leading to a rapid propagation often along an intense baroclinic zone. It has been hypothesized that DRWs can be important precursors for rapid cyclone development. Previously, the mechanism of DRWs has been studied mainly in idealized channel flows.

In the first part of the talk simulations with a regional model of a DRW case that occurred in December 2005 over the North Atlantic involving an explosive pressure deepening are presented. An atrifical experiment concerning the latent heat release is shown that leads to a decay of the DRW. Eventually, a new cyclone in a favourable position develops by dry dynamics that overexceed the pressure drop of the cyclone that was supported by the DRW as precursor. It indicates that the intensification of the pre-existing vortex of the DRW is a sensitive process and a challenge for numerical prediction models.

In the second part a climatology of DRWs over the years 2004-2010 is presented using ECMWF analyses. For this purpose a tracking algorithm is created that selects positive PV anomalies in the lower troposphere and identify them as a DRW whether they are located over a baroclinic zone, propagate fastly and are not forced by upper-level waves for certain time steps. It is shown that DRW events occur more frequently over the Pacific than over the Atlantic basin, and of them the percentage of explosively deepening DRWs is also higher in the Pacific basin. The number of DRWs that intensify explosively is evaluated against the number of all explosively intensifying extratropical cyclones.