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Transport of Water Vapor over Europe and its Relation to Circulation Patterns

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In the continental Europe rainfall regime is strongly related to water vapor advection, because evaporation over land usually surpass precipitation. The aim of this paper is to describe the advection of water vapor and its divergence over Europe at different geopotential levels in the troposphere in relation to main circulation patterns in Euroatlantic sector of the Northern Hemisphere (NAO, EA, EA/WR, SCAND, NAM). Both the advection of water vapor and its divergence are crucial for rainfall development. Regions where the moisture convergence occur can be identified with areas of strong convection. Convergence of water vapor occurs when the influx of water vapor surpass the outflux and results in vertical transport of water vapor. When the convergence integrated over the whole column of air is positive it means that there is an excess in precipitation over evaporation (*Pexioto and Oort*, 1992; *Vigaud et al*., 2007).

The data used in this study consist of 6-hourly values of specific humidity and horizontal wind components at levels 1000, 850, 700, 500 and 300 hPa from NCEP/NCAR re-analysis covering the period 1979-2003 (*Kalnay et al*, 1996) and the indices of selected teleconnection patterns (*Wallace and Gutzler*, 1981) (http://www.cpc.noaa.gov/data/teledoc/telecontents.shtml). Moisture fluxes and divergence were computed at all levels over the area ranging from 30˚N to 70˚N in latitude and from 20˚W to 50˚E in longitude.

Climatological description comprises an analysis of fields of seasonal mean moisture fluxes and divergence at all levels with identification of key areas for convection.

The decomposition of the moisture fluxes into stationary and transient components was made. The relation of both components to main circulation patterns was analysed

on the basis Canonical Correlation Analysis.

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