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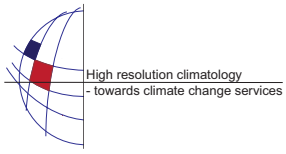


# Variability in the Summer Season Hydrological Cycle over the Atlantic-European Region

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Variability in aspects of the hydrological cycle over the Atlantic-European region during the summer season is analyzed for the period 1979-2007, using observational estimates, reanalyses and climate model simulations. Warming and moistening trends are evident in observations and models although decadal changes in water vapour are not well represented by reanalyses, including the new European Centre for Medium Range Weather Forecasts (ECMWF) Interim reanalysis. Over the North Atlantic and northern Europe, observed water vapour trends are close to that expected from the temperature trends and Clausius Clapeyron equation (7%/ºK), larger than the model simulations. Precipitation over Europe is dominated by large-scale dynamics with positive phases of the North Atlantic Oscillation coinciding with drier conditions over northern Europe and wetter conditions over the Mediterranean region. Evaporation trends over Europe are positive in reanalyses and models, especially for the Mediterranean region (1-3% per decade in reanalyses and climate models). Declining precipitation over the North Atlantic region, combined with increases in moisture, increase water vapour residence time over the period considered. Maximum P-E over the North Atlantic occurred during summer 1991, declining thereafter.