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Hydrological and water management related applications of long term meteorological prediction

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Seasonal forecast activities at the Hungarian Meteorological Service have a long history. Published forecasts used to be the results of different statistical procedures based on clustering of different typical sequences. Long term meteorological forecasts of recent years are based on ECMWF long term projections. Those are interpreted and downscaled for the territory of Hungary and Danube catchments. 1 – 6-month forecasts of 2-m temperatures and precipitation are used for hydrological projections. Seasonal forecasts of Lake Balaton water budget, monthly mean streamflow and low water estimates for central Danube are targeted. The catchments comprising the river system are situated in various climatological and geo-morphological settings across the region. Skill score of the projections are investigated for average and extreme conditions. The five year period in between 2000-2004 resulted dry conditions over the Balaton drainage area. The continuous extreme low values in water budget of the Lake led to significant drop of water levels. Starting with the summer of 2000 water level of the Lake remained most time below the lower regulation level. Typical patterns of water level fluctuation remained in this dry period (rises during cold half year, decreases during warm half year). However the series of annual deficits are expressed in lower and lower annual minimum of water levels. The accumulated deficit of natural water budget relative to multi-annual average reached a maximum for lake surface without any precedent for the period of water budget accounting. Danube monthly flow, minimum flow and water level predictions for the period 1984-2009 are also analysed.