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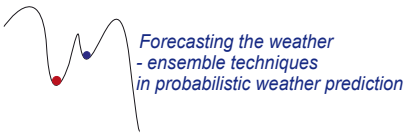

Variability of Spring Danube Discharge and its Prediction using Large-scale Atmospheric Indices

A. Polonsky (1), E. Voskresenskaya (), and V. Pososhkov ()

(1) Marine Hydrophysical Institute, Marine Climate Research, Sevastopol, Ukraine (apol@alpha.mhi.iuf.net, +380 692 55-42-53), (2) Marine Hydrophysical Institute, Atmosphere-Ocean Interaction, Ukraine , (3) Marine Hydrophysical Institute, Atmosphere-Ocean Interaction, Ukraine

The goal of the present work is to build the statistical forecast of spring Danube discharge using the characteristics of the leading Northern Hemisphere atmospheric modes and neuron network technique. Geophysical/statistical basis of the forecast is:
-the relationship between space-time large-scale atmospheric patterns (which can be considered as an integral characteristics of the atmospheric fields over the catchment) and river's discharge
-autocorrelation of Danube discharges.
Standardized monthly indices as characteristics of large-scale atmosphere circulation since 1950 from site [www.nws.noaa.gov] have been used. We use for the forecast the following first five modes ones: North Atlantic Oscillation (NAO), East Atlantic Oscillation (EAO), Scandinavian mode (S), Polar-Asian and Eurasian modes (PAM and EM). These modes have been chosen because they represent the crucial (for the Atlantic-European region) processes in the coupled system and account for more than 40% of total variance of the atmospheric pressure field over the Northern Hemisphere. Artificial three-layer perceptron has been used as the basic statistical model of neuron network.
Two-step forecast of the spring Danube discharge has been developed. The preliminary forecast (two months in advance) has been done using only large-scale atmospheric indices. Then it was corrected next month using the Danube discharge for previous two months. The best result is obtained for the May. Corrected forecast accounts for about 85% of total May Danube discharge variance.