Geophysical Research Abstracts, Vol. 7, 06972, 2005
SRef-ID: 1607-7962/gra/EGU05-A-06972


# Principal Component (EOF) Analysis of the Elbe River flow across Germany: Development of a regional Model at ungauged Stations.

D Markovic and M. Koch

Department of Geotechnology and Geohydraulics

University of Kassel

Germany

(kochm@uni-kassel.de)

Spatial and temporal patterns of the long range Elbe River flows across Germany are investigated using the Principal Component Analysis. The Empirical Orthogonal Functions are used to develop a regional model for estimating flows at ungauged locations while the corresponding Principal Components are subjected to a wavelet analysis to detect the main oscillatory components and their temporal behaviour. Results of the analysis show altitude dependent EOF's . Using the modelled EOF's we simulate monthly time series at test gauges and find an agreement with the corresponding time series distributional properties as well for the whole time series length as for the winter (Nov-Mar) and summer (Apr-Okt) season. Apart from a preservation of the short memory effects quantified through the calculation of the autocorrelations with different lag, the simulated time series also preserve the long range memory i.e. the Hurst exponent. A wavelet analysis of the dominant Principal Component indicates low frequency oscillations at interannual (6.9 years) and interdecadal (13.9 years) scales. The Elbe River variability on these scales has been especially pronounced during the 1980's. It is conjectured that these long-term fluctuations are due to a teleconnective influence of the North Atlantic Oscillation.