Case Study: Application of an artificial neural network model for analysis of the extreme tide events in the Gulf of Trieste in the early December 2008

J. Jerman (1), M. Jeromel (1), M. Licer (2), and D. Zagar (2)

(1) The Environmental Agency of the Republic of Slovenia, (2) University of Ljubljana, Faculty of Civil Engineering and Geodesy

Tide tables may be useful for sea-level forecasting in many areas. Slovenian operational service for hydrological forecasts at the Environmental Agency of the Republic of Slovenia frequently deploys tide tables alongside least square harmonic analysis to predict the maximum sea levels in the Gulf of Trieste during tides. Meteorological influences like pressure gradient, wind stress and the induced seawater eigenoscillations (seiches) along the main axis of the Adriatic basin have been repeatedly proven as important factors for the sea level in the Gulf of Trieste. They are, however, only indirectly included in the harmonic analysis which in itself requires a large number of carefully tuned model parameters in order to make useful forecasts. A number of recent reports shows than an artificial neural network (ANN) can greatly improve sea level forecasts, providing we supply it with suitable input variables (ie. previous water levels, air pressure, wind speed, wind direction, tide charts etc.) We report on ANN based analysis of the recent extreme tide and flooding events at Slovenian coast in the beginning of the December 2008. The ANN model compares favourably with the currently used conventional forecasting methods.