

Forecasting Extreme Water Levels in Estuaries for Flood Warning Purposes

There is a need for rigorous but practical methods for the real time forecasting of extreme water levels in estuaries, which are suitable for incorporation into flood forecasting systems. As the first stage in developing appropriate methods, this report contains the findings of a detailed review of current practice for flood forecasting for estuaries in England and Wales.

Detailed descriptions of methods and data availability for all estuaries are presented, based on information gathered through interviews with Agency Flood Warning staff, questionnaires and previous reports. A database has been set up containing currently available data and it is intended to update this with further information, as more data on the accuracy of forecasts becomes available.

The current forecasting methods for predicting water levels in estuaries are classified into the following categories:

- Forecast levels derived from correlation with a reference port level;
- Astronomic tide plus Storm Tide Forecasting Service (STFS) surge;
- Tide table plus STFS surge residuals;
- Astronomic tide time series and STFS surge residuals.

The accurate and reliable prediction of tide and surge residuals is key to the generation of extreme level forecasting and warning for estuaries. The report identifies the need to improve existing or develop new methods to overcome a range of deficiencies in current methods, including:

- Insufficient lead times;
- Lack of real-time correction of forecast errors;
- Available tidal, wind and wave information not being fully utilised;
- Lack of reliable means of translating STFS surge related peak values and timings from the site where calculated to the site used for level forecasting.

Site specific recommendations are made for additional or improved real-time monitored or forecast data (astronomic tidal levels, surge residuals, wave data, wind speed, wind direction and fluvial flow) in order to improve forecast water levels. A caveat on the results of this report is that little objective information was readily available on the accuracy of current forecasting methods. As part of the next stage of the project a more detailed assessment of accuracy will be made at a limited set of representative locations. Following this review the research will focus on developing improved methodologies.

This R&D Technical Summary relates to information from project W5-010 contained in the following output:-

R&D Project Record W5/010/1 – Forecasting extreme water levels in estuaries for flood warning: stage 1 – review of current practice and recommendations for stage 2.

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External status: Restricted

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