**Cover**

**A digital elevation model of the inter-tidal areas of the Wash, England, produced by the waterline method**

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Figure 1 (cover) shows a digital elevation model (DEM) of the inter-tidal areas within the Wash, England, produced by the waterline method using ERS-1 SAR images and hydrodynamic modelling.

The waterline method (Cracknell *et al.* 1987, Koopmans and Wang 1995, Mason *et al.* 1995, Ramsey 1995) involves finding the georegistered positions of the shoreline (the land–sea boundary) from a remotely sensed image using image processing techniques, then superimposing the heights of the shoreline relative to mean sea level on the corresponding positions. These heights are predicted using a hydrodynamic tide-surge model run for this area with the atmospheric conditions pertaining at the time of image acquisition. From multiple images obtained over a range of tide and surge elevations, it is possible to build up a set of heighted shorelines within the inter-tidal zone, and from this a gridded DEM may be interpolated. Such a DEM is useful for developing improved tide-surge models, and changes in the DEM over time allow measurement of sediment mass transfers in the inter-tidal zone due to storm or seasonal changes.

Figure 2 shows the shorelines used to produce the DEM. These were extracted from thirteen ERS-1 SAR images obtained mainly during the winter months of 1992–1994, using the semi-automatic shoreline delineator described in Mason and Davenport (1996). They were heighted using shoreline elevations generated by a hydrodynamic tide-surge model of the English east coast similar to that of Flather (1994). Model heights were corrected using local tide gauge information as described in Davenport *et al.* (1996). The lowest shoreline present had a mean elevation of $-2.8$ m ODN, whilst the highest shoreline had a mean elevation of $2.9$ m ODN.

A raster DEM was interpolated from the heighted shorelines using universal