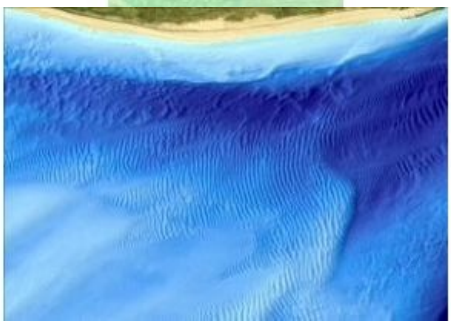
STRATEGIC REGIONAL COASTAL MONITORING NOW IMPLEMENTED ALONG ENGLANDÂ€™S COASTLINE.

National Oceanography Centre



With effect from 1 April 2011, a coastal monitoring programme is in place for the entire English coastline via a national network of coastal monitoring programmes. In addition to the well-established programmes (Southeast 2002 and Southwest 2006), new regional programmes have started in the Northwest (led by Sefton Council), the Northeast (Scarborough District Council), East Riding of Yorkshire (ERY Council) and Anglia (Environment Agency). All programmes have been designed on a similar risk-basis, tailored to local requirements and collect similar types of data using the same specifications. All programmes are fully committed to the principle of making their data freely available (and free) to all. Data will be loaded to the existing website archive (1); data formats, etc. will be the same as for the SE and SW programmes and the only difference for external users will, in effect, be data coverage around the entire coast of England.

The coastal wave and tide network has expanded to encompass 28 Directional Waveriders and 9 tide gauges, one of the newest gauges at Port Isaac filling a notable gap in measured tide data along the north Cornwall coastline (Figure 1). All data are available in real-time on the website and users can receive emails to alert them of particular wave conditions - this facility appears to be widely used by surfers!

Real-time wave spectra are also now available and are proving of real benefit both for coastal engineering and for operations at sea. The spatial spread of the network has shown that bi-modal seas (e.g. wind waves plus an underlying swell wave component) occur along the English Channel far more often than was realised. Nearly all coastal engineering beach schemes are designed using wind wave parameters (Tz), but experience is demonstrating that a relatively small proportion of swell wave energy (Tp) may result in unexpected beach erosion or coastal flooding. For example, in February 2011, un-forecast coastal flooding occurred on Chesil Beach with only moderate wave heights, negligible tidal surge and not on spring tides, yet with swell wave periods of up to 22 seconds. Coastal engineers are now using alerts for long period waves occurring at the Porthleven Waverider in Cornwall, as ~6 hours warning for their potential arrival at Chesil and further east along the Channel.

Such occurrences have been instrumental in the move to view real-time integrated wave parameters in terms of their energy spectrum (rather than just in terms of significant wave height and period) and wave spectral graphs are displayed on the website. These developments have been moved forward in conjunction with the programmes' oceanographic contractors, EMU Limited, and are proving of real significance for maritime operations. Typically, limiting conditions for crew transfers to fixed structures are defined in terms of significant wave height (Hs), but with no consideration for wave period. The importance will vary with vessel length, e.g. a 5s wave in 10m water depth will have a length of ~36m; for an 18m vessel, this is about half the vessel's length and as a result the vessel can pitch around its axis, instead of riding the whole wave (which it could do with a longer wave) - this is crucially important when a vessel is moored in some way to a fixed structure and means that operating conditions should include an assessment of wave period in addition to wave height. The real-time parameters and spectra are proving of considerable use for this purpose and are an example of the benefits of making such data freely available and in real-time.

Nearshore Swath Bathymetry

The other major change since 2005 has been the move from single-beam to swath bathymetry thanks to collaboration with the Maritime & Coastguard Agency's Civil Hydrography Programme. The coastal surveys are expensive due to the requirement to reach MLWS and are, therefore, highly tide- and weather-restricted and it makes sense to ensure that such surveys fulfil the requirement of both organisations. Accordingly, in areas of common interest, the SE and SW Coastal Monitoring Programmes have adopted IHO Order 1a specifications and the MCA & UKHO have overseen the coastal swath surveys and the data shared. As a result, a coastal swath survey from north Kent to Selsey Bill, Isle of Wight and Christchurch Bay has been either completed or is in progress, in addition to Mount's Bay, the 'DORIS' survey

and much of Lyme Bay. Furthermore, East Riding of Yorkshire Council has contributed its recent 140km2 coastal swath survey data to the website. The intention of the national network of programmes over the next 5 years is to undertake a coastal swath survey where none has been done before.

The surveys have highlighted numerous unknown features in the nearshore as well as identifying significant areas of mobile bedforms, possible sources of recharge material and anthropogenic features all of which have coastal engineering and management implications (Figures 2 and 3). Unusually for bathymetric data, the survey results for the coastal monitoring programmes are in OSGB and to Ordnance Datum (translated from WGS84/CD for us by the UKHO), but it means that the data can be combined with terrestrial topographic and Lidar data to provide a complete digital ground model of the coastal zone at 1m resolution.

Coastal Data
Over 200,000 individual data files, fully populated with metadata, are available for users to browse, view and download directly, with a recently-added facility for users to be alerted if new data of their chosen type and/or area are added, along with reports, photos, habitat mapping and useful regional-scale shape files such as MLWS contour.