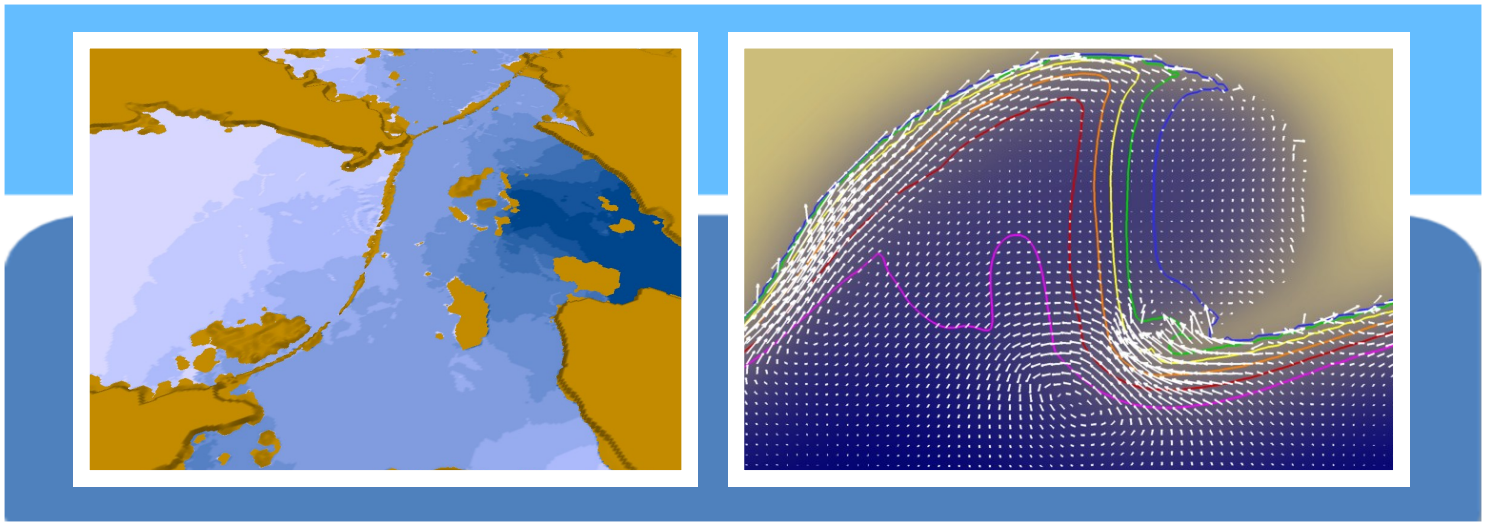
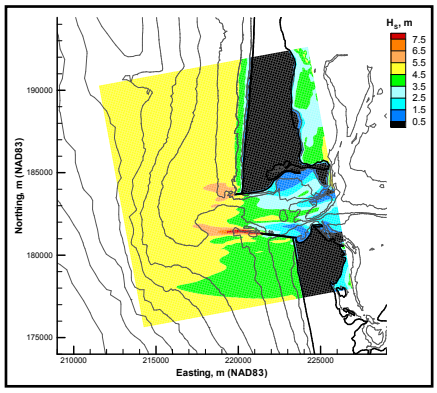
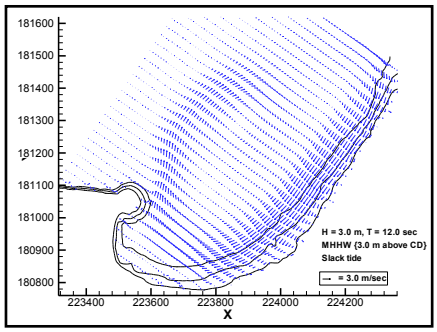
CAPABILITY Modelling Wave-Induced Nearshore Circulation





Large area simulation of combined refraction-diffraction



Modelling wave-induced circulation gyre behind a headland

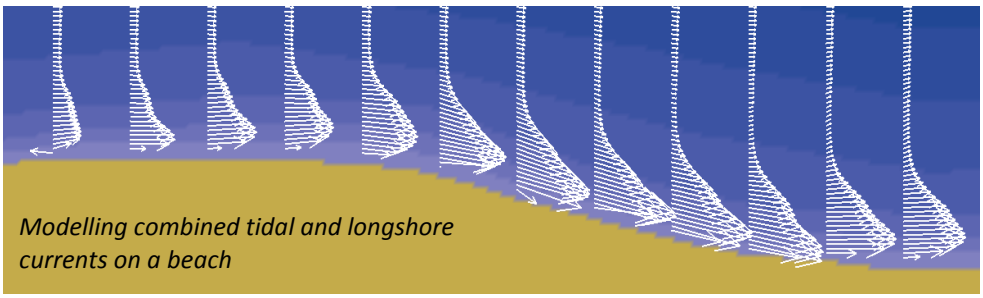
COASTL NEARSHORE CIRCULATION MODEL

CoastL is a state-of-the-art model for the simulation of nearshore circulation. Developed by Coldwater staff, the model is composed of two independent, but dynamically coupled modules: a combined refraction-diffraction wave model and a depth-averaged coastal flow model. Each module is solved at every time step based upon results of the other module from the previous time step. The model's explicit finite difference formulation allows complex geometries to be modelled in an efficient manner.

The wave model uses a wave-period averaged technique and so can be used over areas ranging from tens of meters to tens of kilometers. Approximate non-linear effects are included and both swell waves and random waves can be simulated in the surf zone. Full wave-current interaction between internally generated or externally imposed flow fields is also included.

The flow module computes the depth-averaged flows resulting from any combination of wind, wave and tidal forcing. Sophisticated combined wave-current friction and two-equation k-ε closures are included.

The CoastL model can be run in wave-only, current-only or wave-current modes. For highly non-linear situations, a fully non-linear version, CoastNL, can be used. CoastL output can also be used with Coldwater's PTM model to provide sediment transport and water quality simulations.



Modelling combined tidal and longshore currents on a beach

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