



**Royal
HaskoningDHV**
Enhancing Society Together

Cell 1 Regional Coastal Monitoring AGM 2014

Cell 1 Sediment Transport Study Dr Nick Cooper

11th April 2014

York

Aim: improve understanding of governing sediment transport mechanisms and pathways

Sept 2013

Scoping Phase

- Literature review
- Consultation
- Conceptual understanding
- Recommendations

Dec 2013

Jan 2014

Main Phase

- Historical trends analysis
- Numerical modelling
- Sand tracer experiment
- Synthesis of findings

Aug 2014

A Macro-review of the coastline of England and Wales

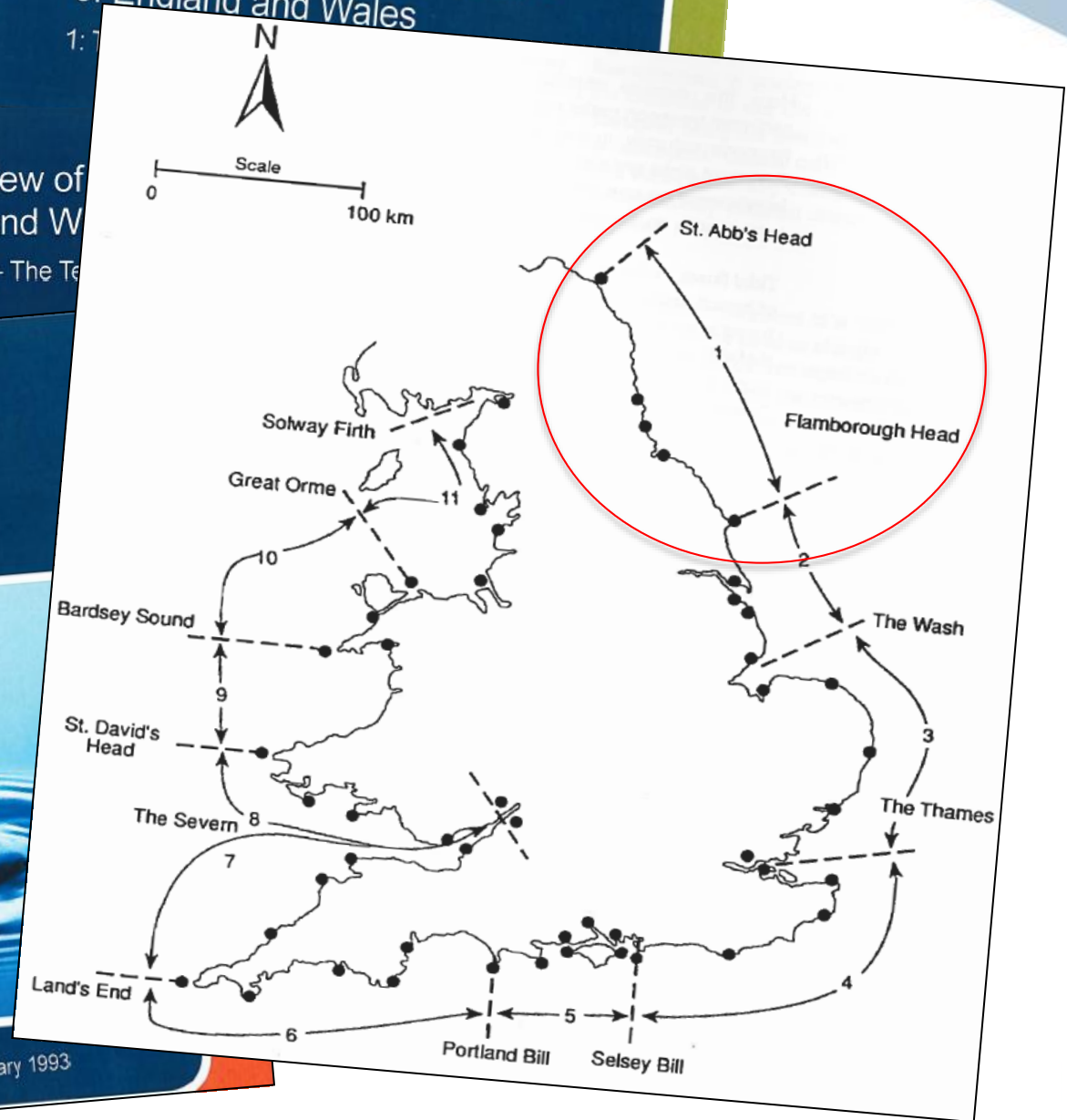
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A Macro-review of
of England and W
2: The East coast - The Te

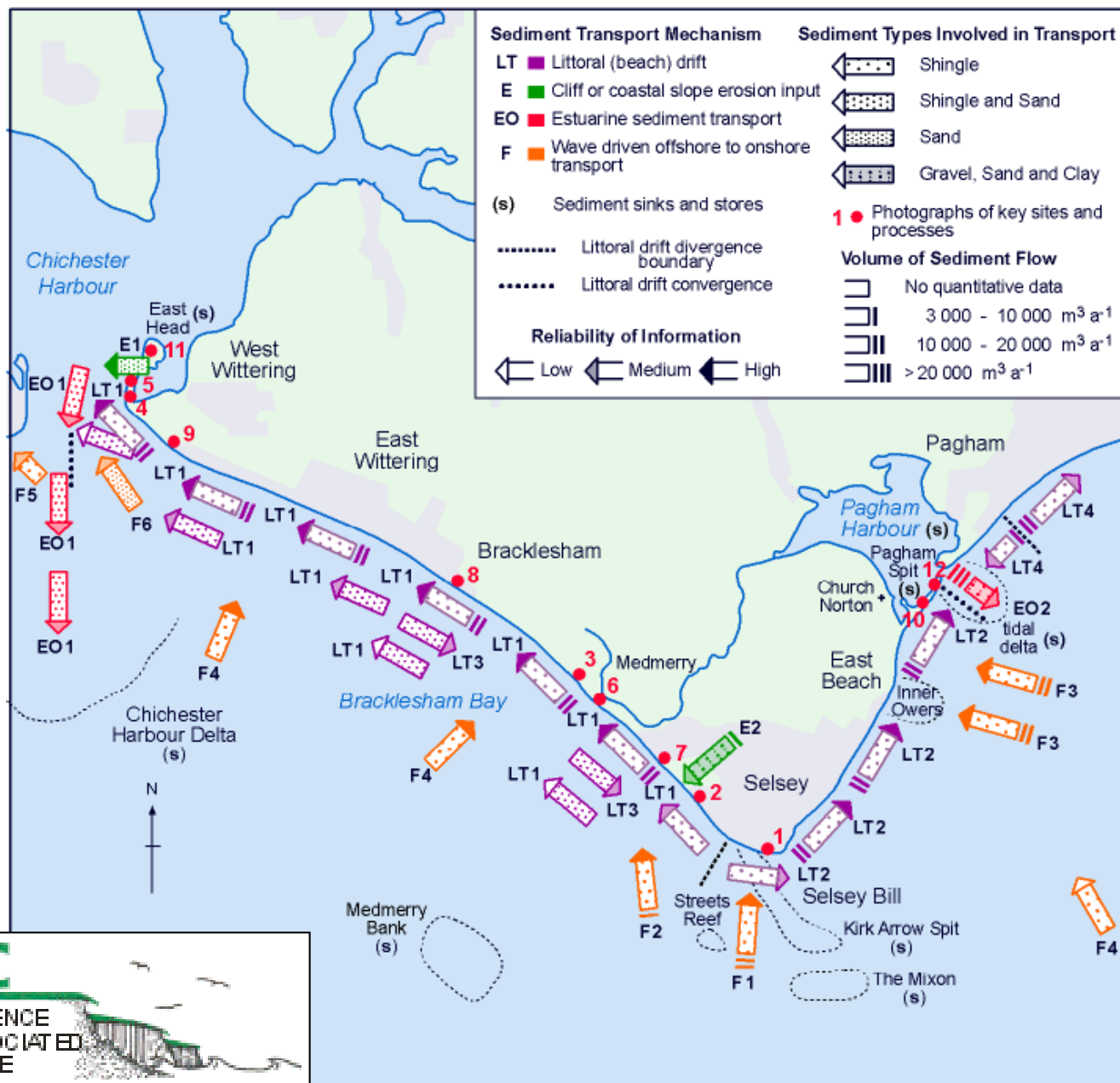
Coastal Management Mapping of littoral cells

SR 328

January 1993



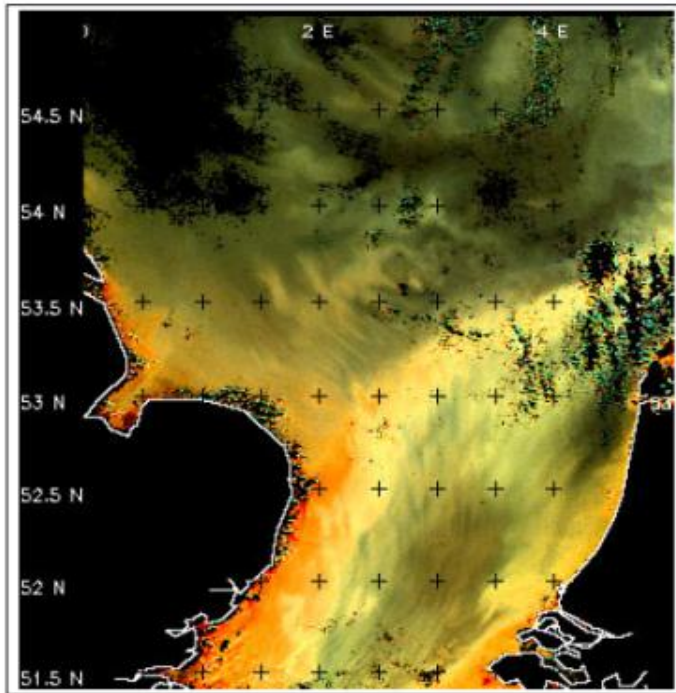
East Head to Pagham, West Sussex: Sediment Transport



SCOPAC

STANDING CONFERENCE
ON PROBLEMS ASSOCIATED
WITH THE COAST LINE

Southern North Sea Sediment Transport Study, Phase 2



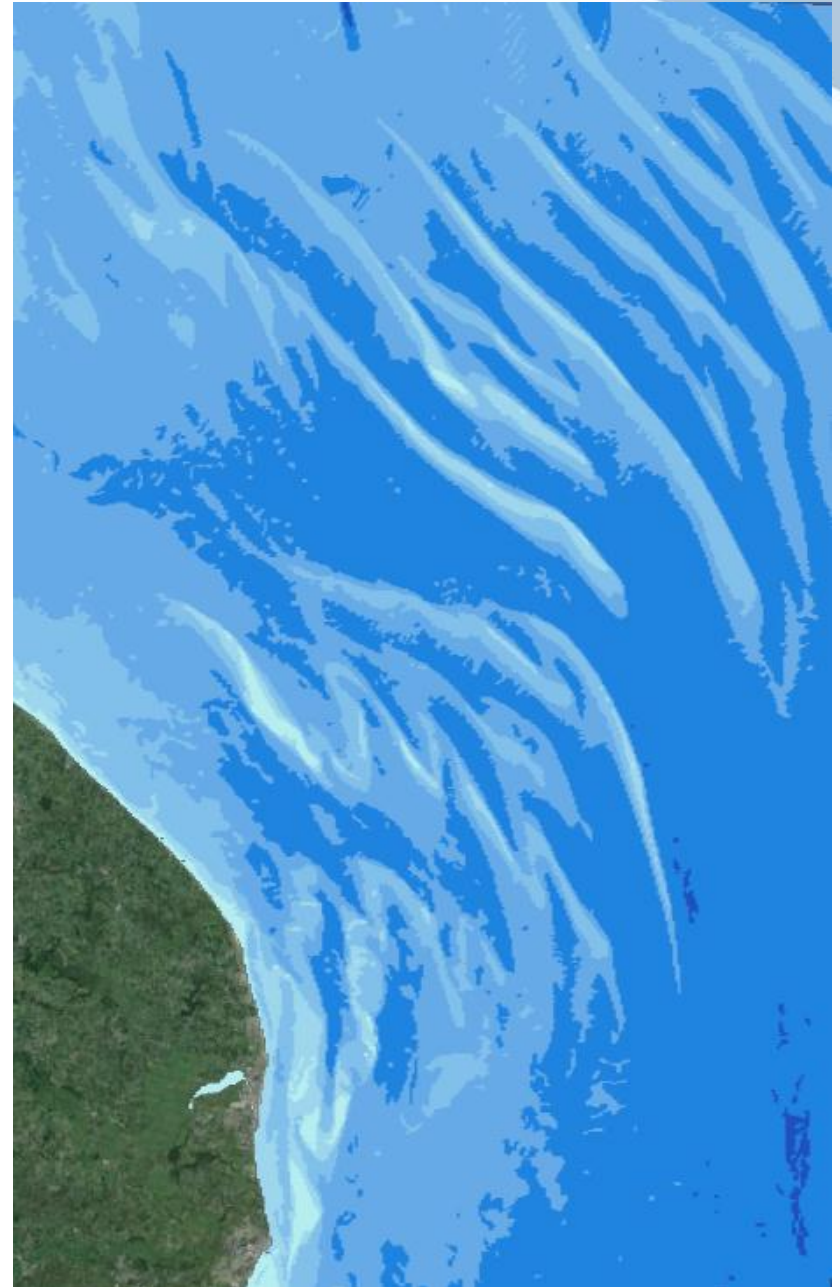
Sediment Transport Report
Report EX 4526
August 2002



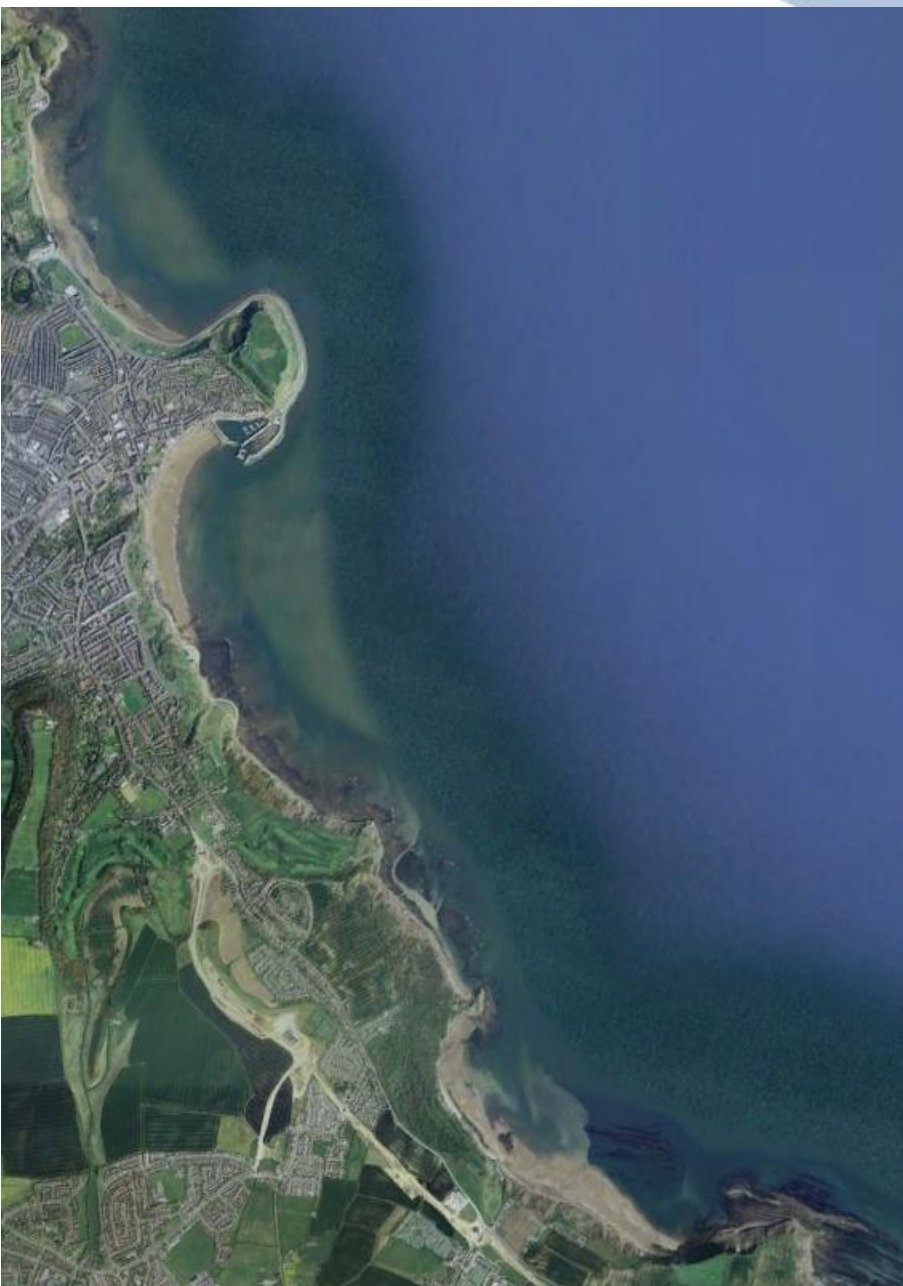
HR Wallingford



ROYAL HASKONING



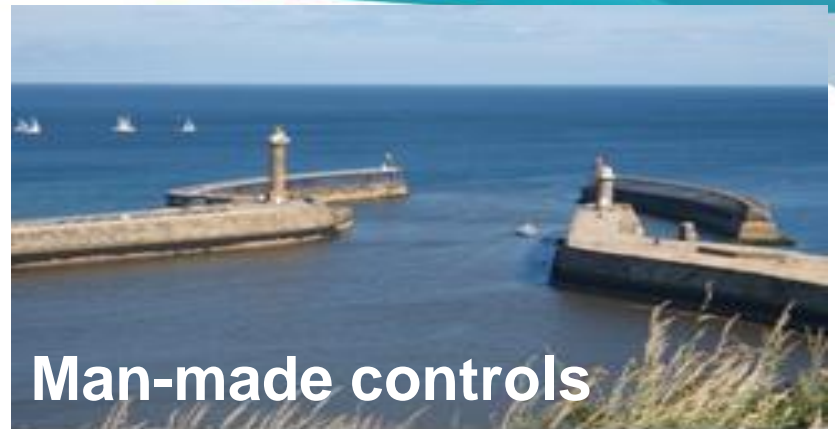




Scoping Phase



Holocene evolution



Man-made controls



Geology



Management activities



Geomorphology



Headland controls

Historic changes in the shoreline



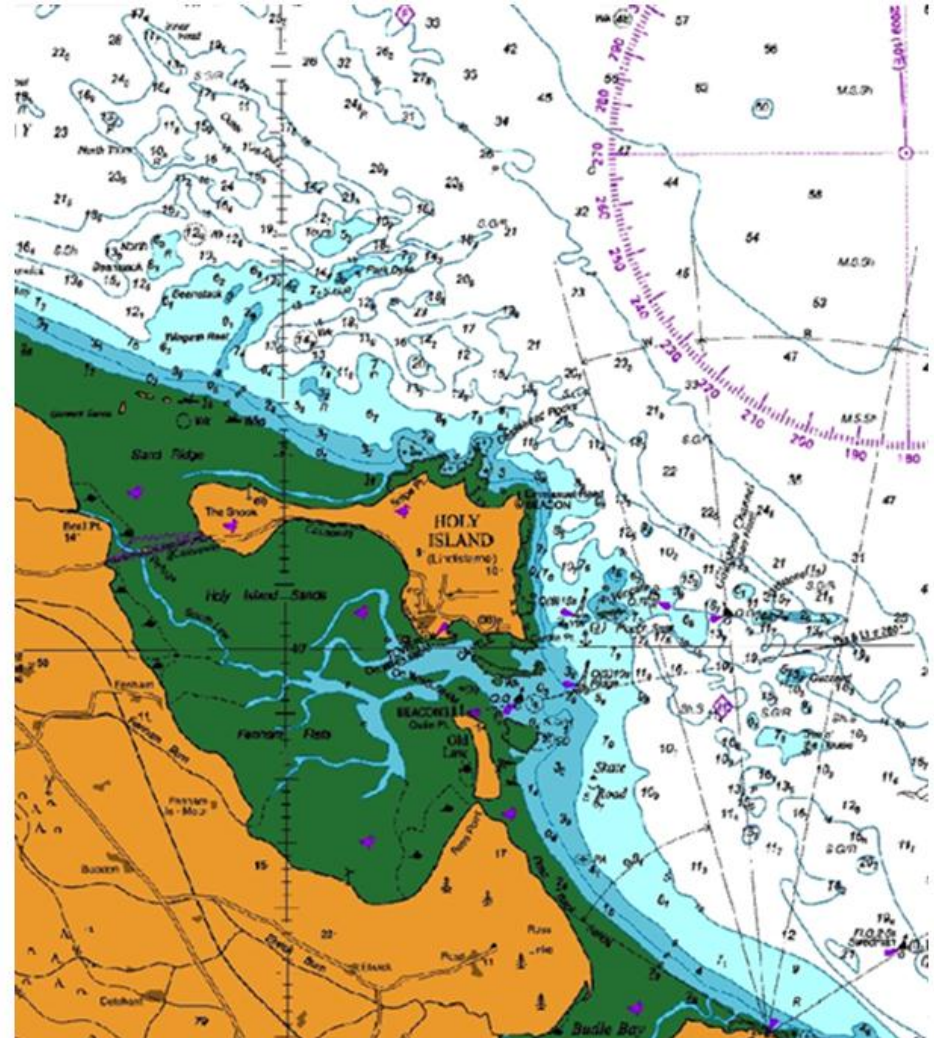
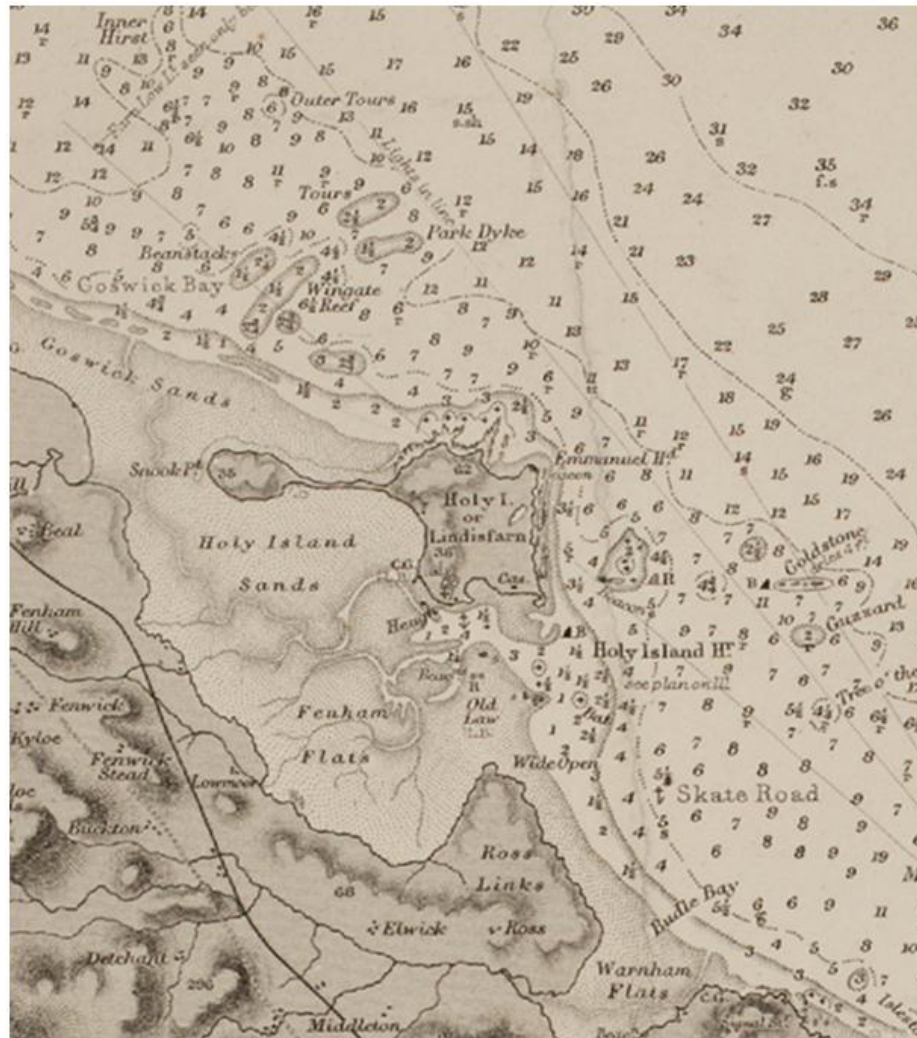
1800s



2013

Visual inspection using GIS

Historic changes in the sea bed



Visual inspection using GIS

Beach and sea bed sediments



Silts

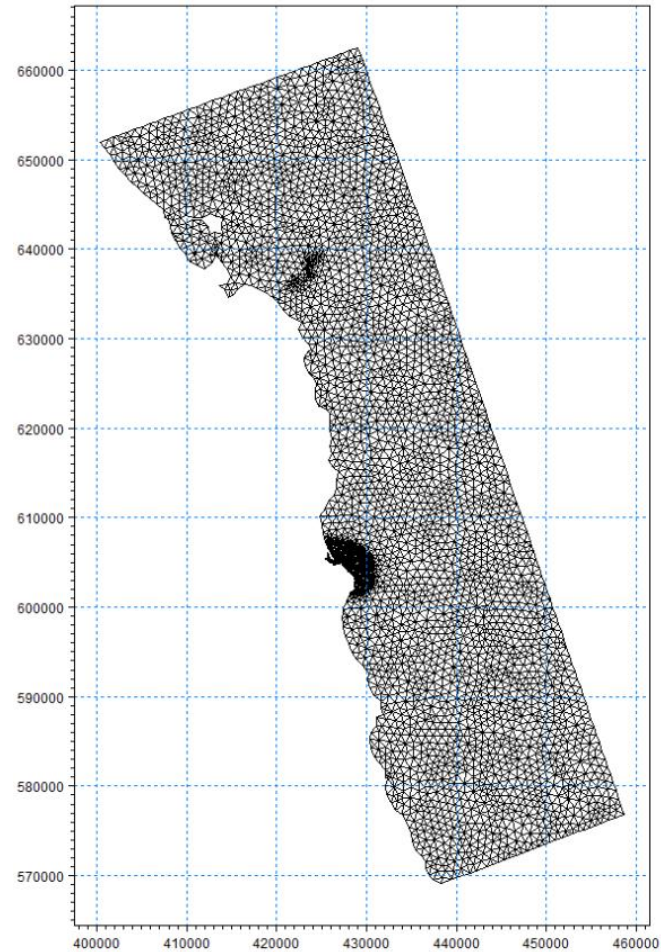
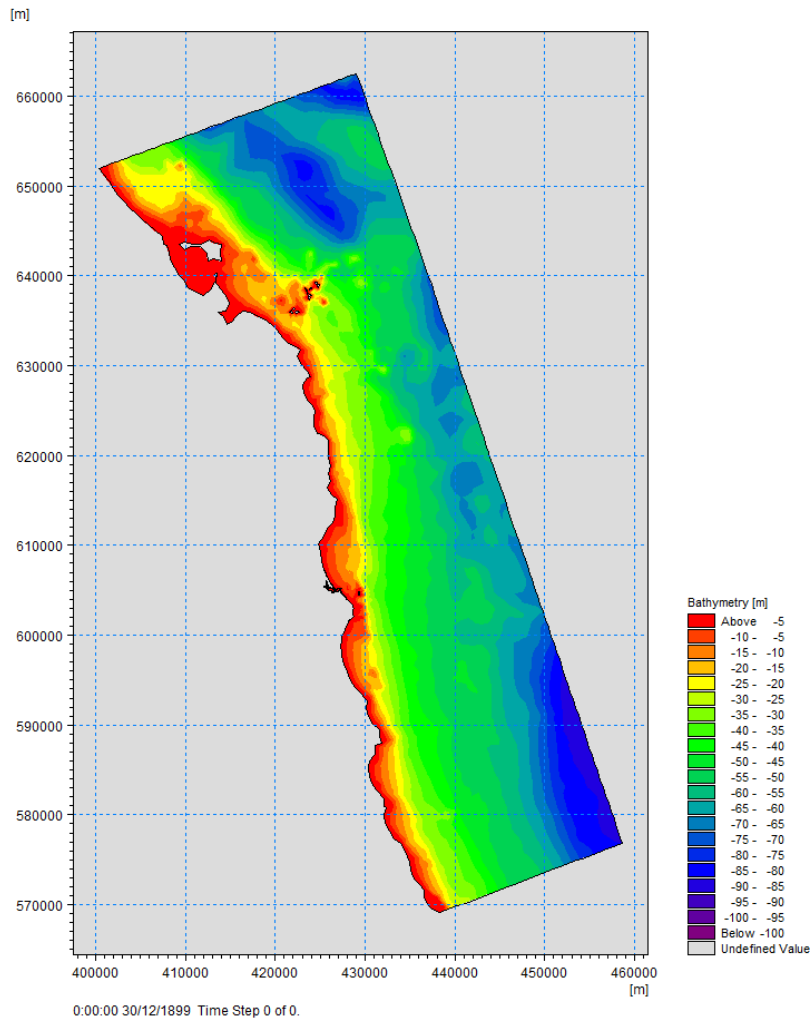


Sands



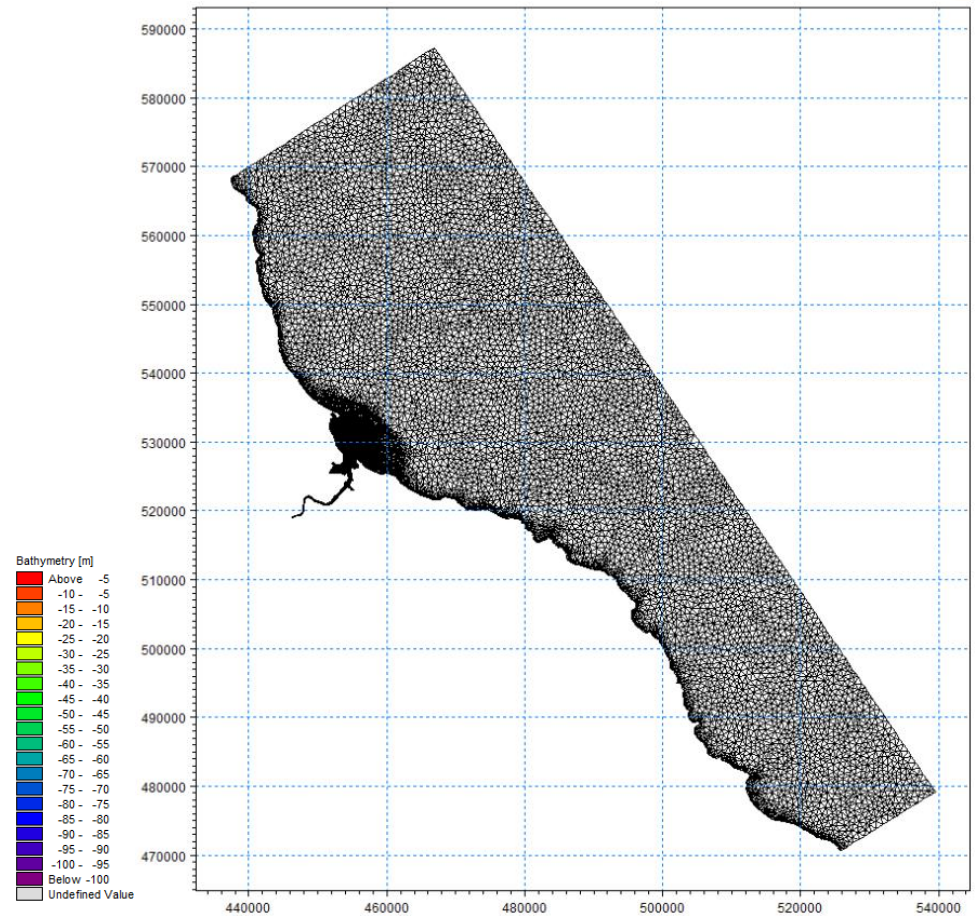
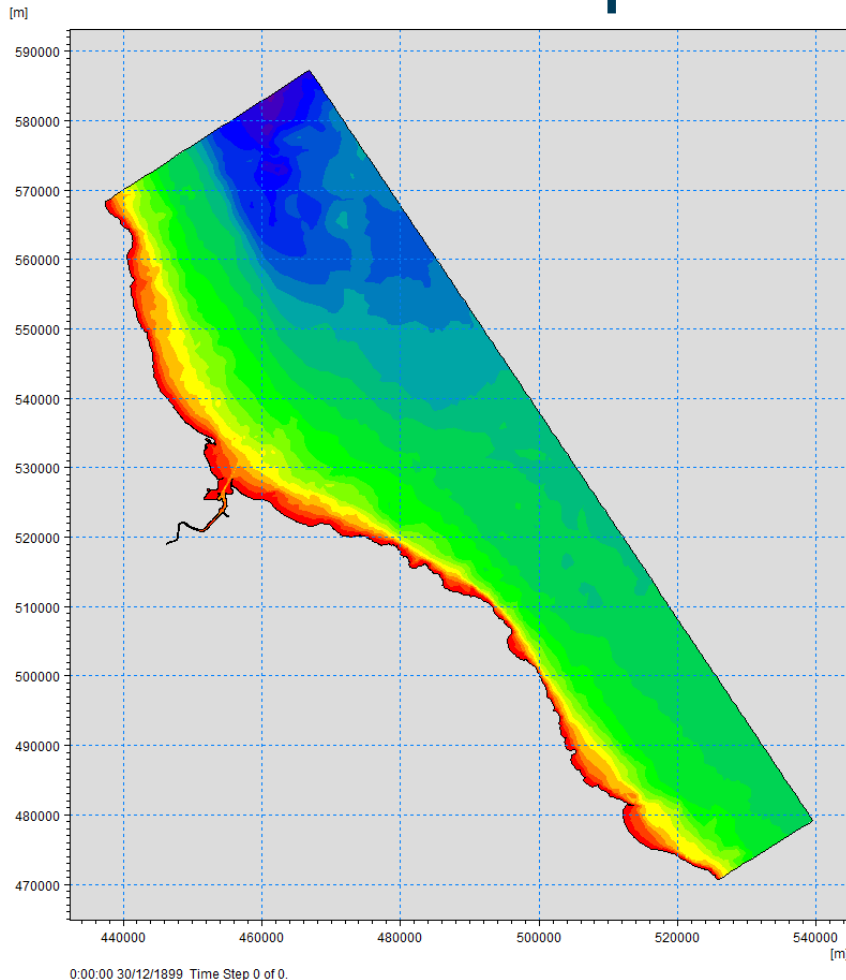
Gravels

Coastal processes: tidal currents



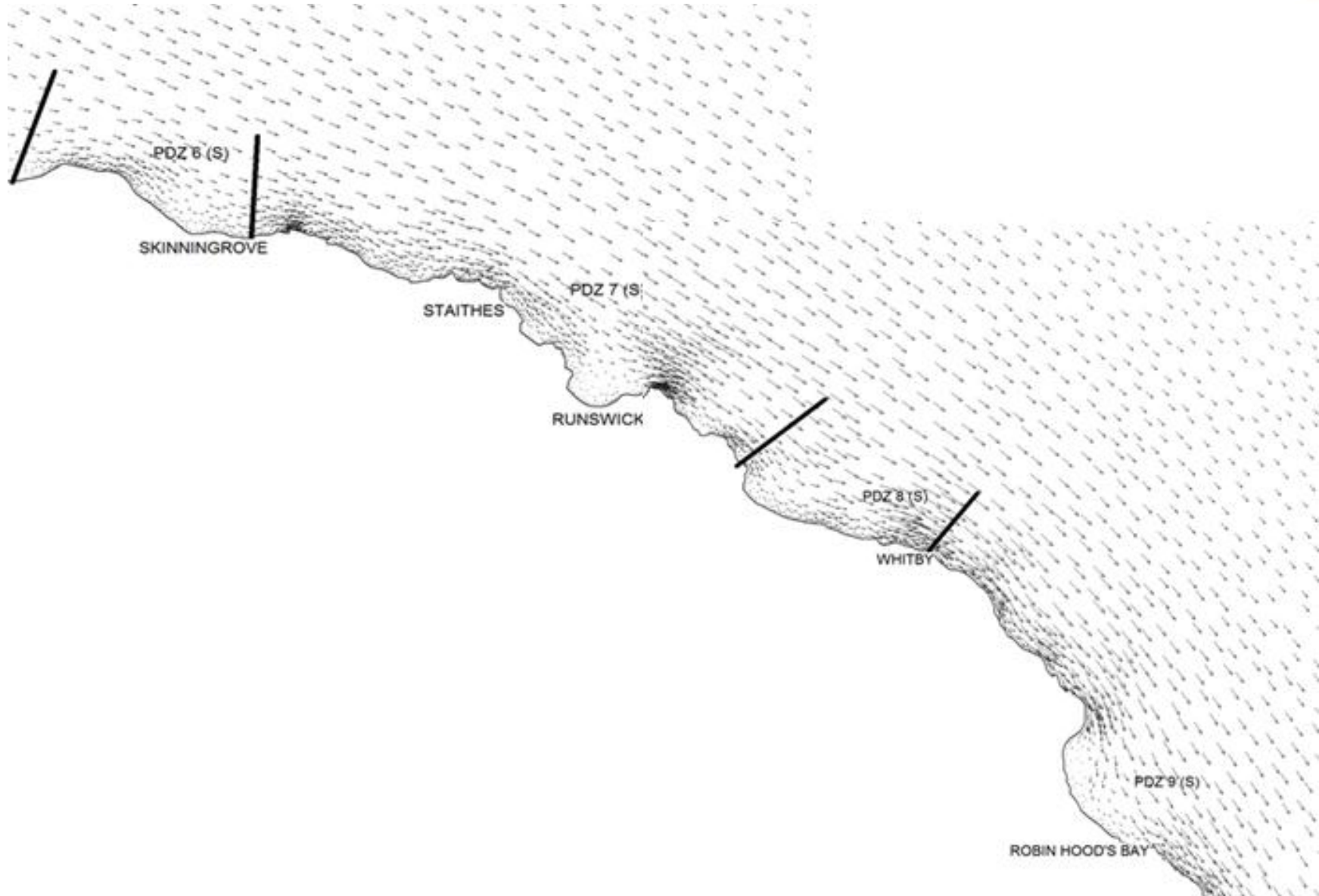
Existing models

Coastal processes: tidal currents

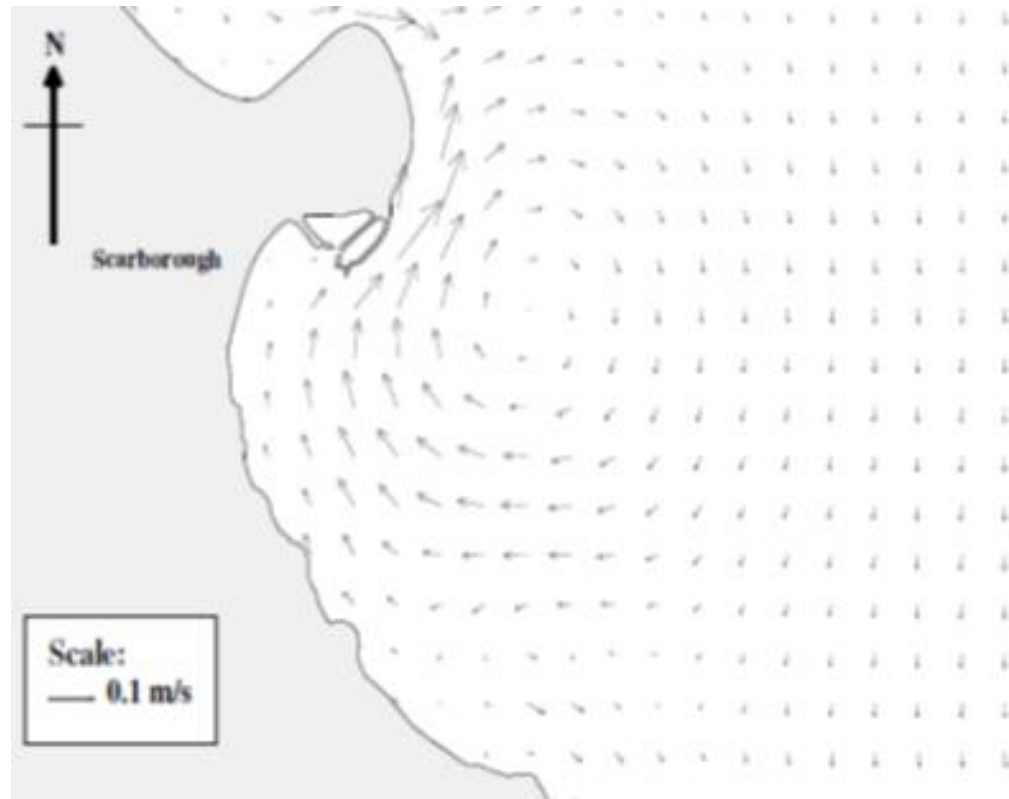
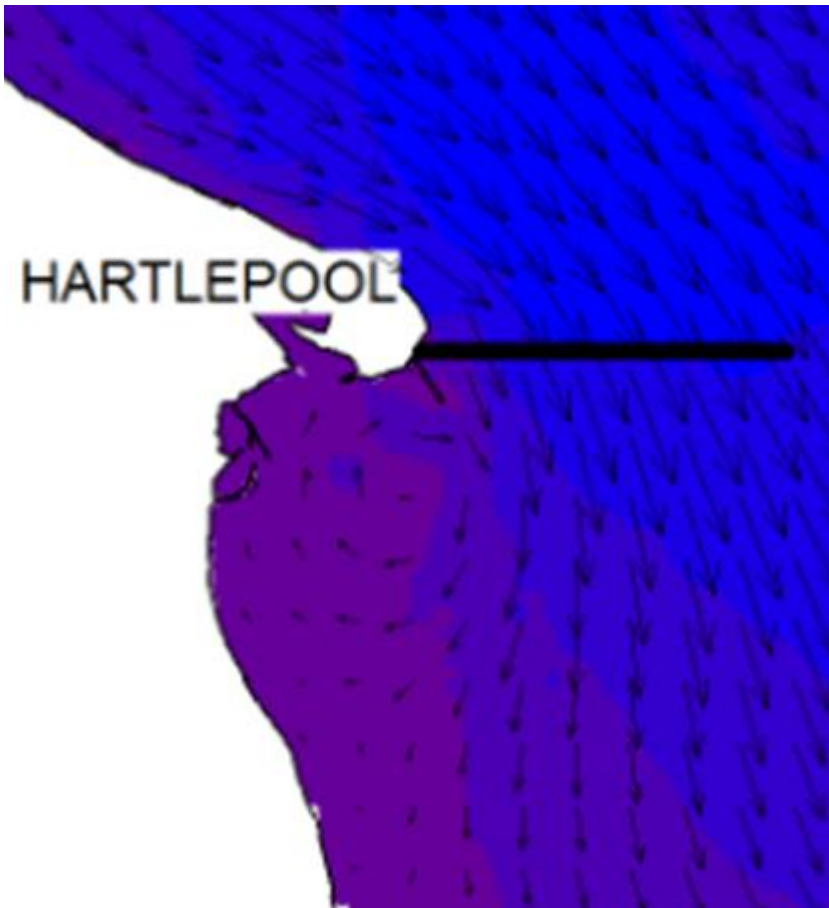


Existing models

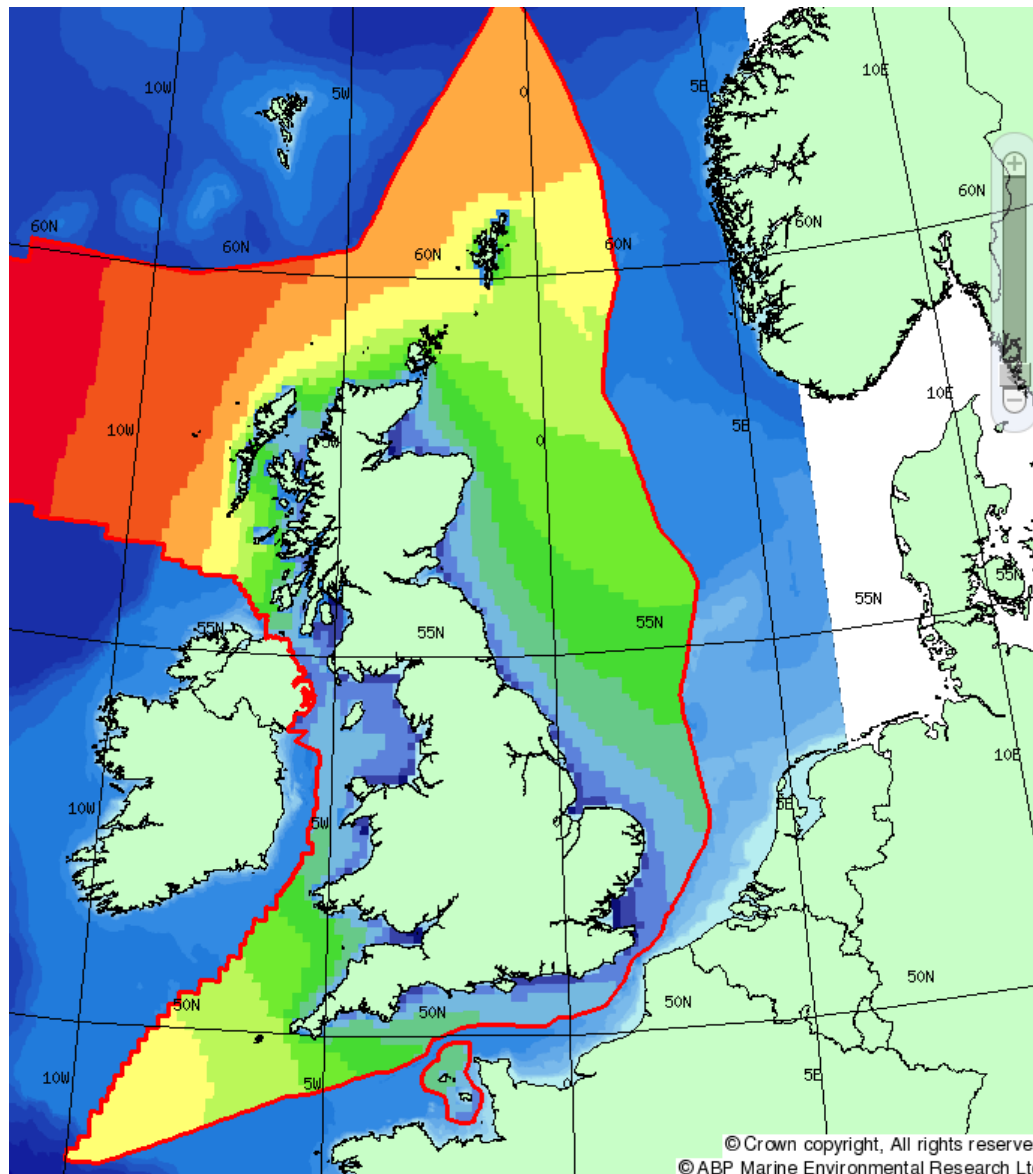
Coastal processes: tidal currents



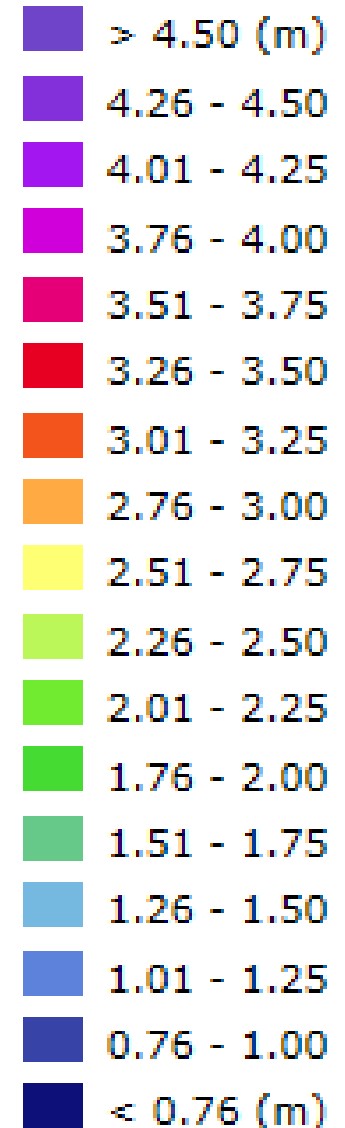
Coastal processes: tidal currents



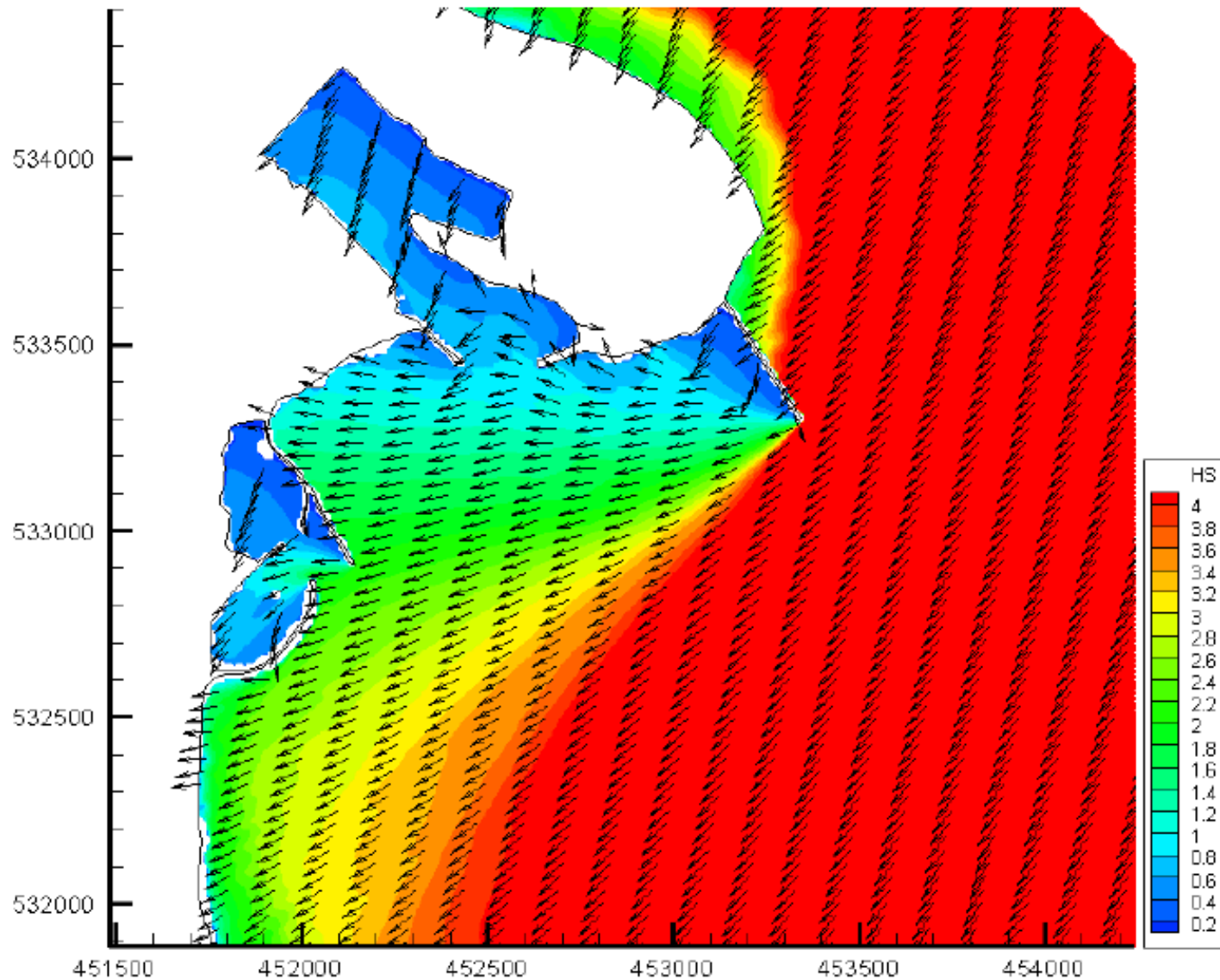
Coastal processes: waves



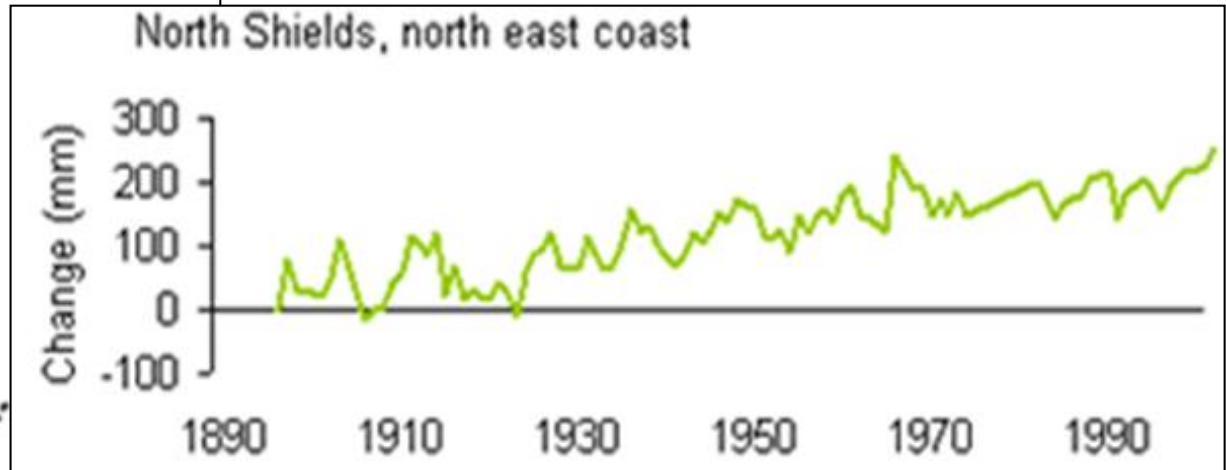
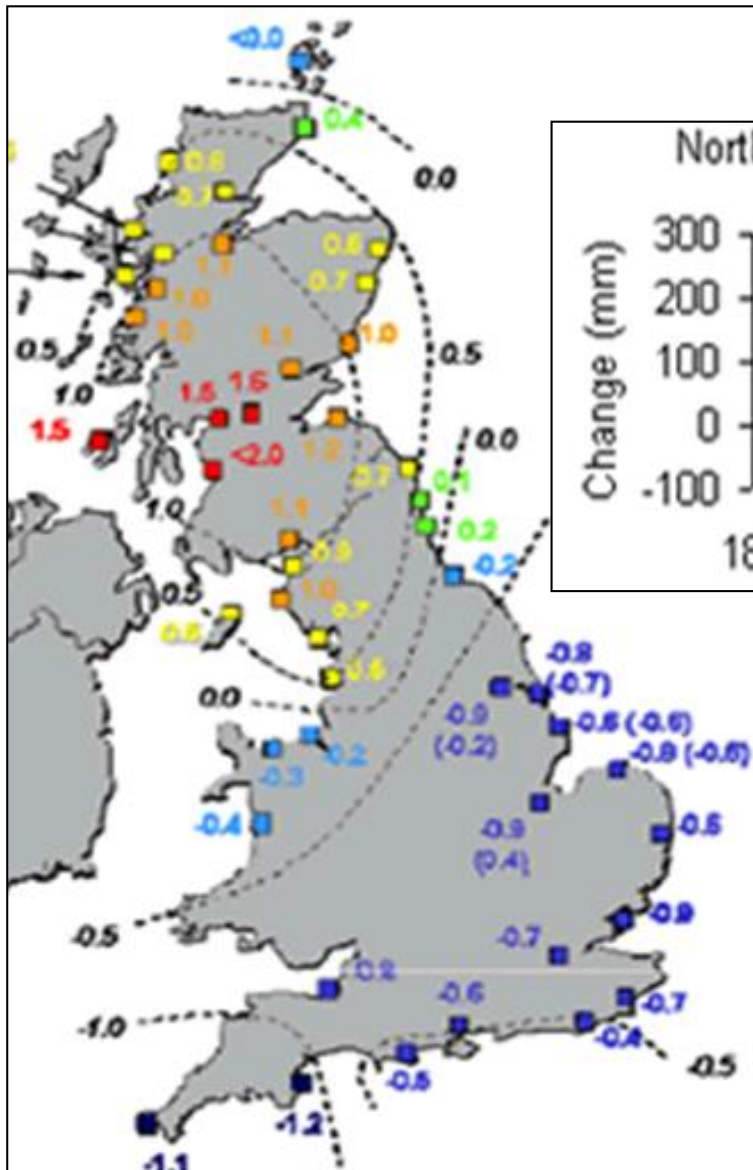
Annual Wave Height



Coastal processes: waves



Coastal processes: relative sea level rise



Coastal processes: estuaries

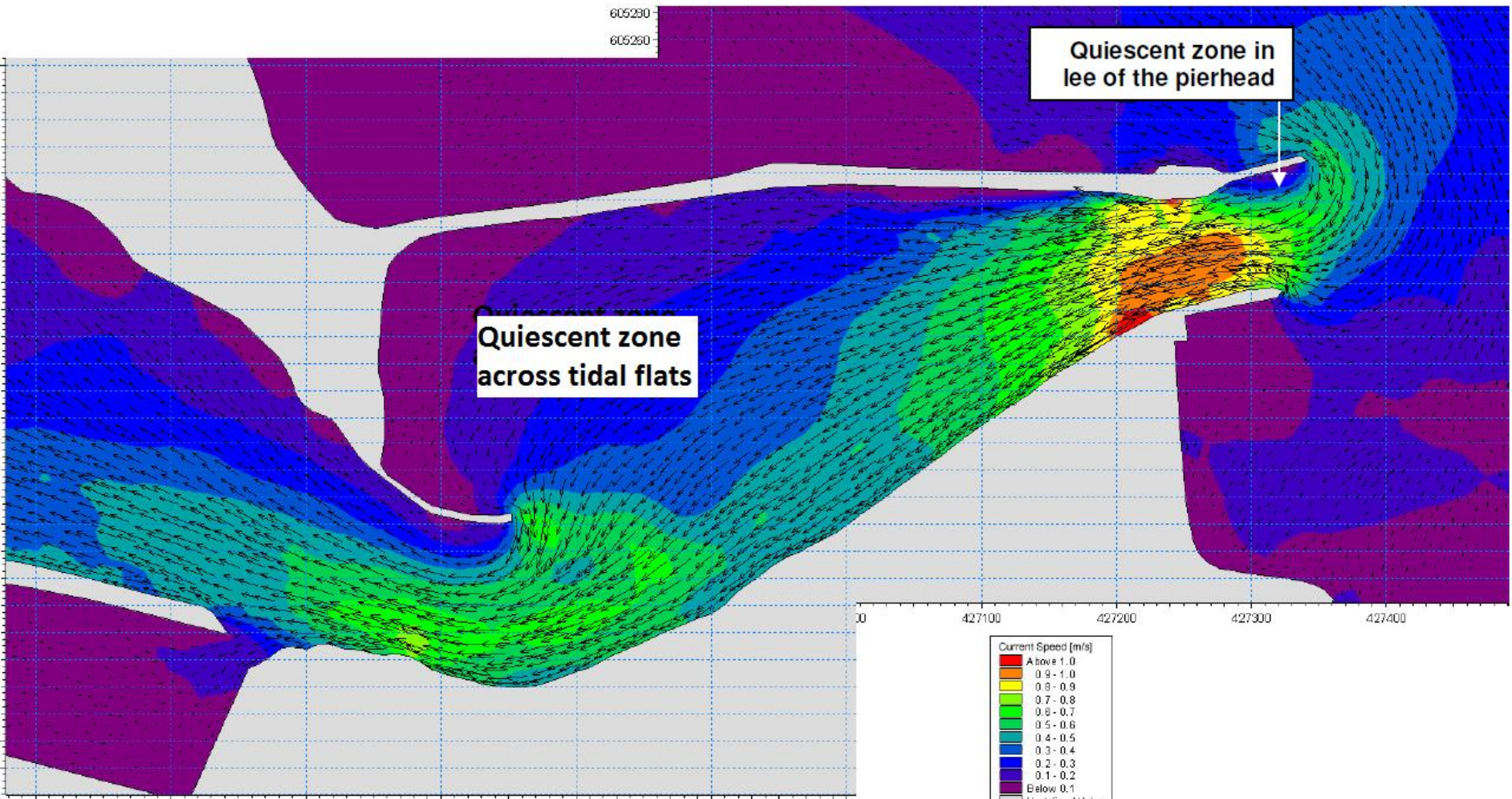


River Aln
(unconstrained)

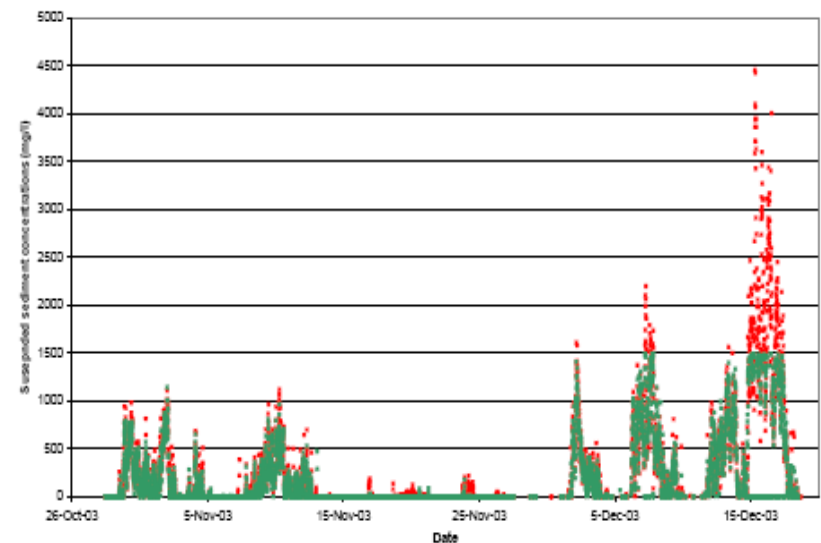
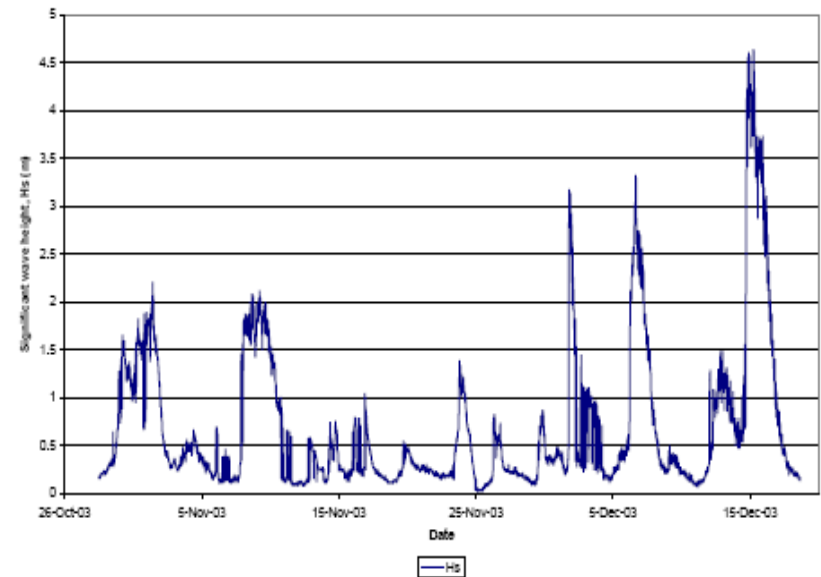


River Coquet
(controlled)

Coastal processes: estuaries



Coastal processes: sediment mobilisation



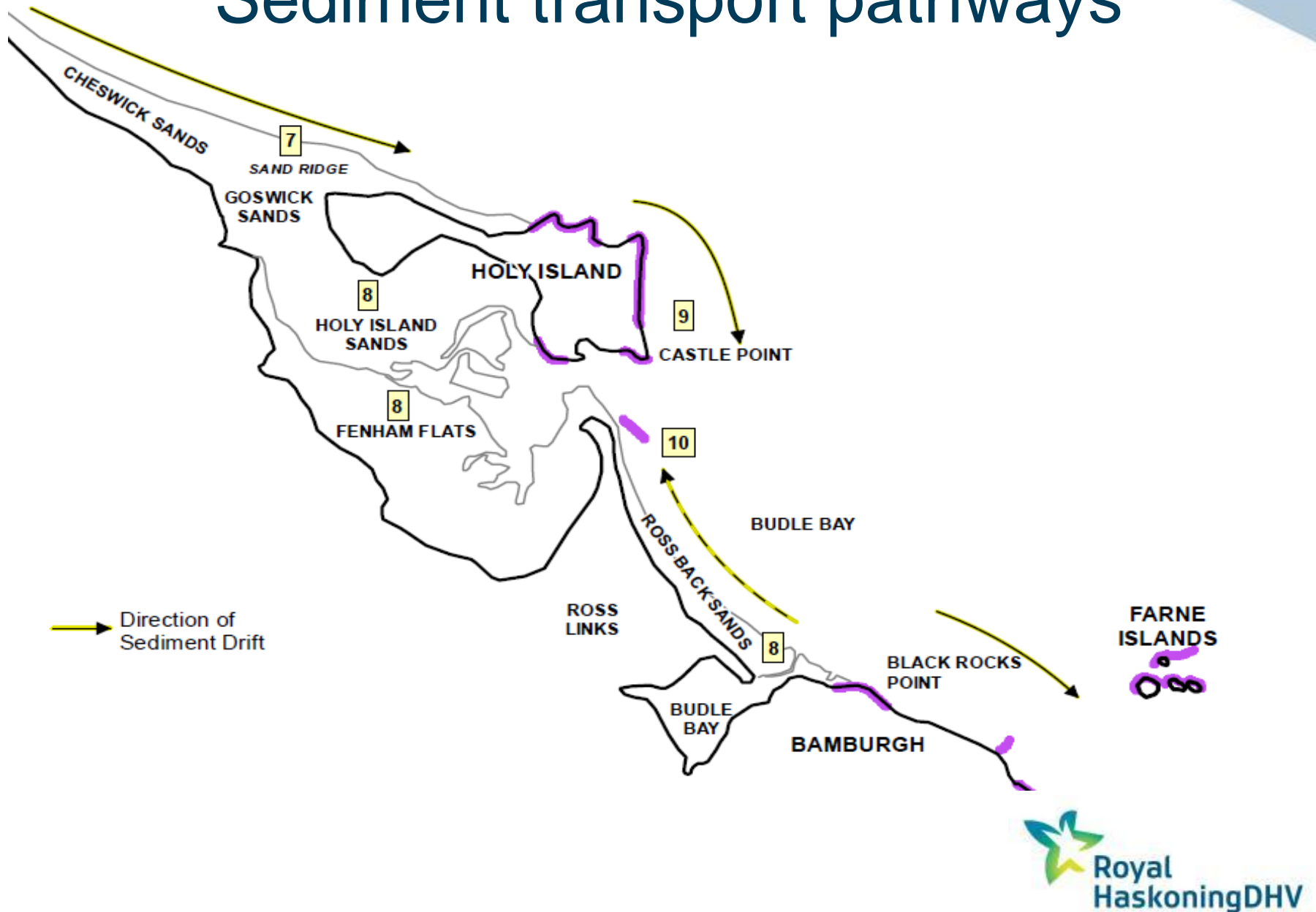
Beach management: beach recharge



Beach management: colliery spoil



Sediment transport pathways



Key findings

Geological controls

- Relatively resistant solid geology
- Deposits of boulder clay (cliffs) and sand (dunes)
- 'Headlands and bays' coastline

Littoral sediment transport

- Weak rates of littoral drift, generally to S *
- Generally confined within bays
- Headlands and control structures
- Local reversals (gyres) *

Cross-shore sediment transport

- Driven by storm events *
- Tidal currents transport sediment (nearshore)
- Progressive returns to beaches

Coastal management

- Colliery spoil tipping (and cessation) *
- Beach recharge and recycling
- Sand extraction and navigation dredging

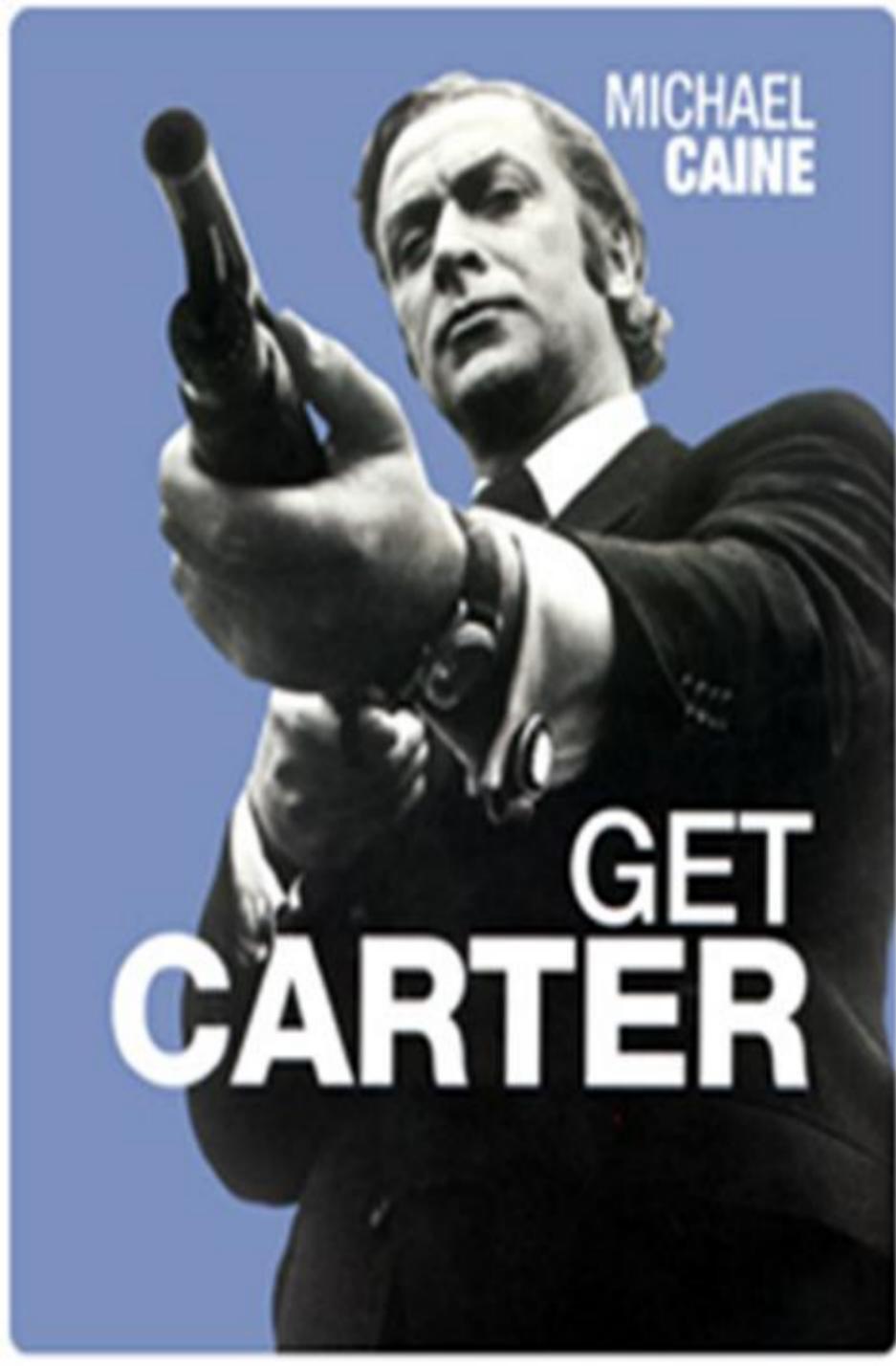
Main Phase

Historical Trends Analysis

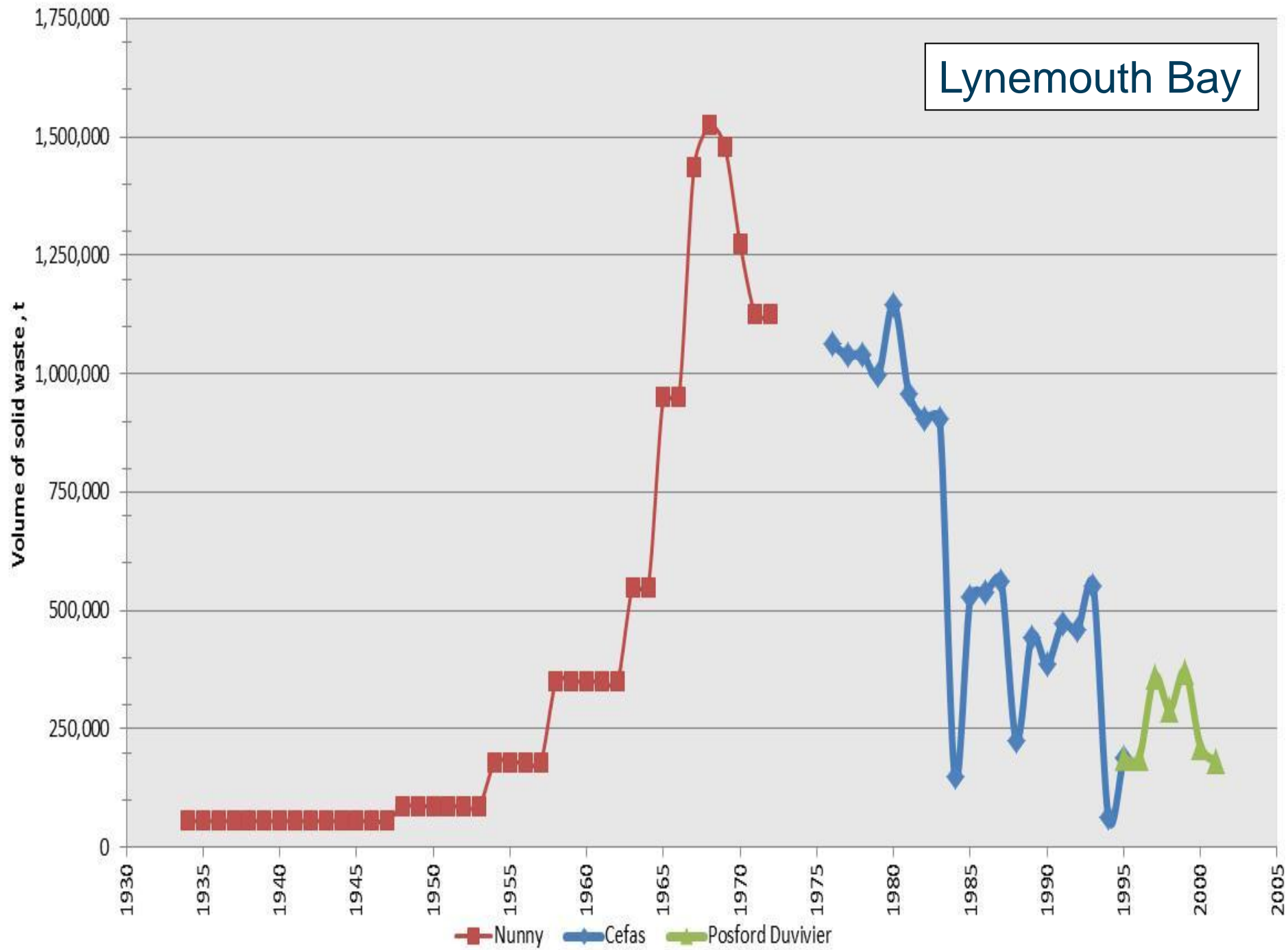
- Lynemouth Bay
- Cambois Bay
- County Durham coastline

MICHAEL
CAINE

GET
CARTER

A movie poster for the film 'Get Carter'. It features a black and white photograph of Michael Caine as the character John Mackenzie. He is wearing a dark suit, a white shirt, and a dark tie. He is holding a handgun in his right hand, pointing it directly at the viewer. The background is a solid blue color. The text 'MICHAEL CAINE' is in the top right corner, and 'GET CARTER' is in large, bold, white letters at the bottom.

Lynemouth Bay





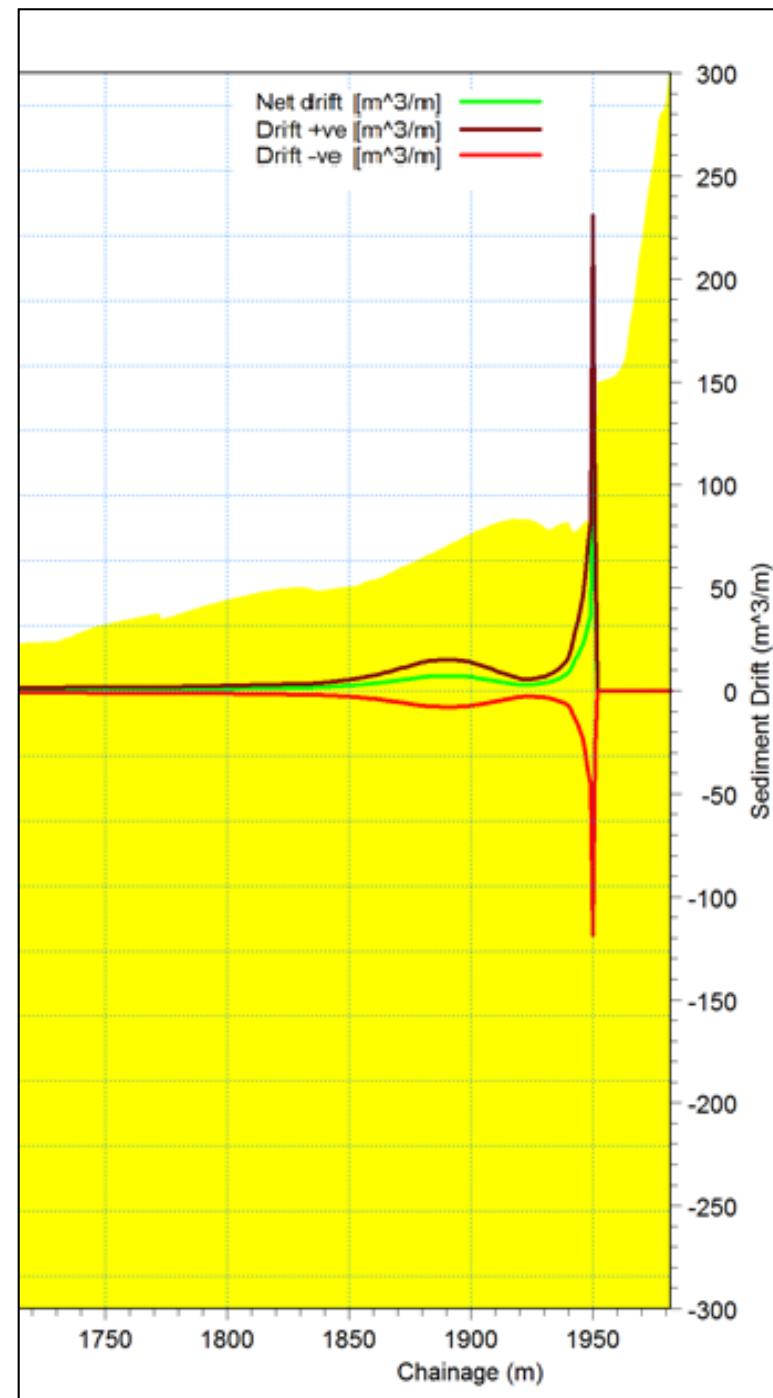
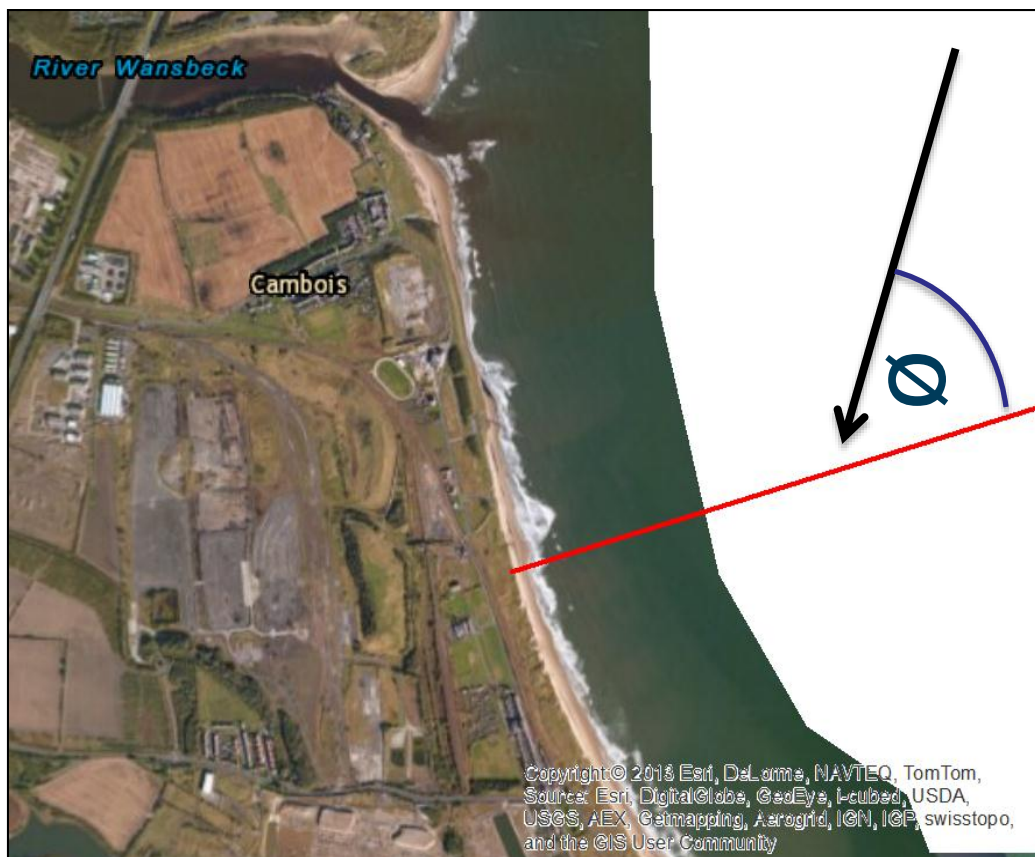


Main Phase

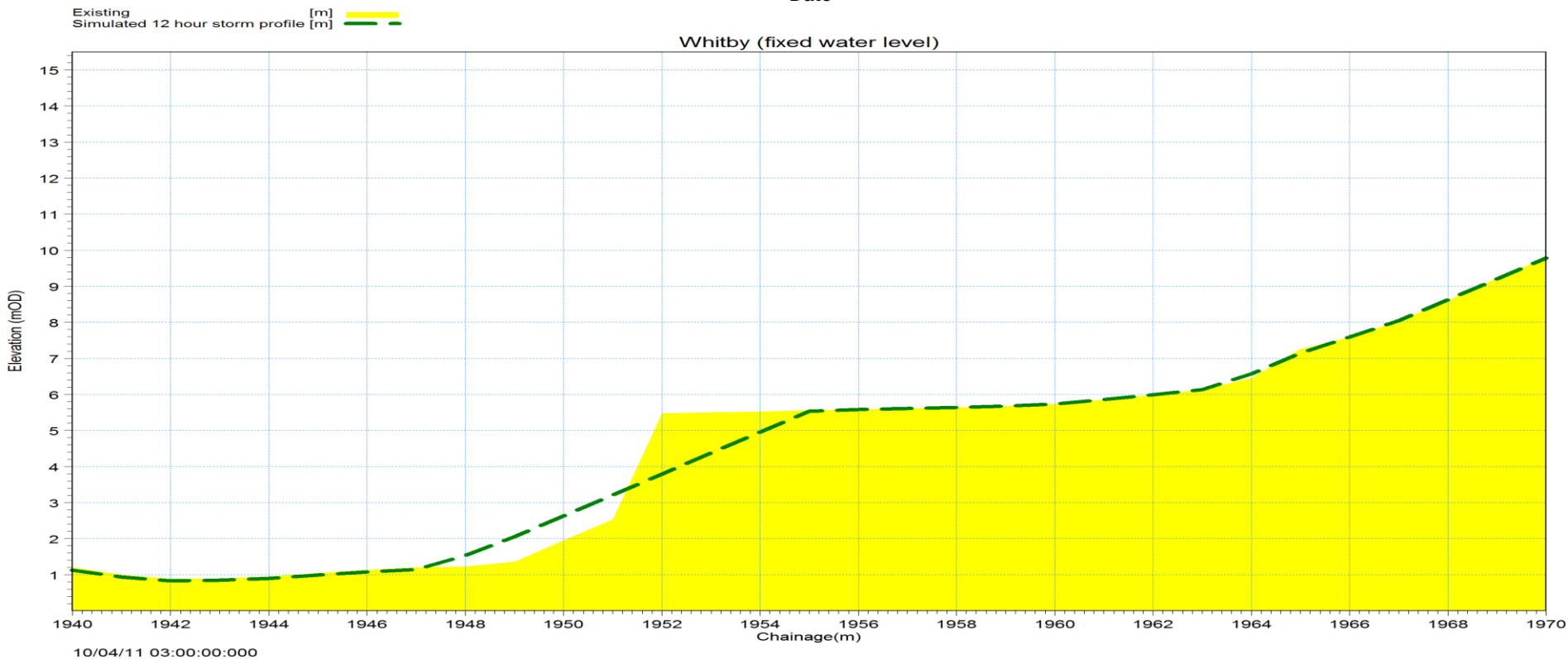
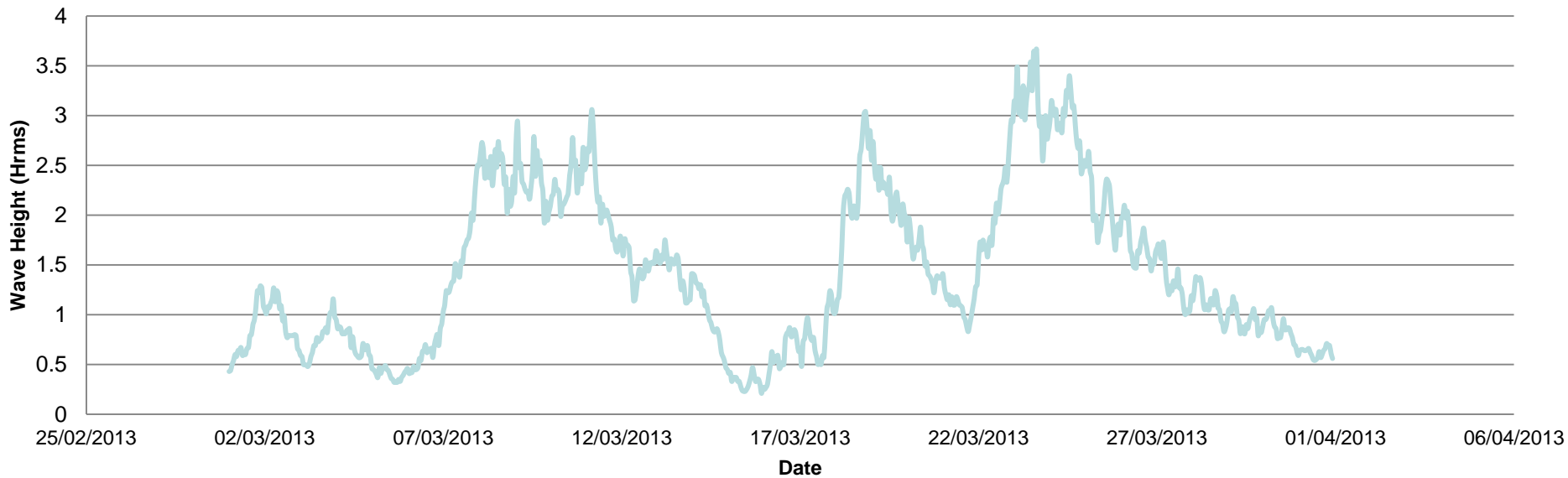
Numerical Modelling



LITDRIFT (longshore)
LITPROF (cross-shore)



Whitby Real-time Storm Events



Main Phase

Sand Tracing Experiment



