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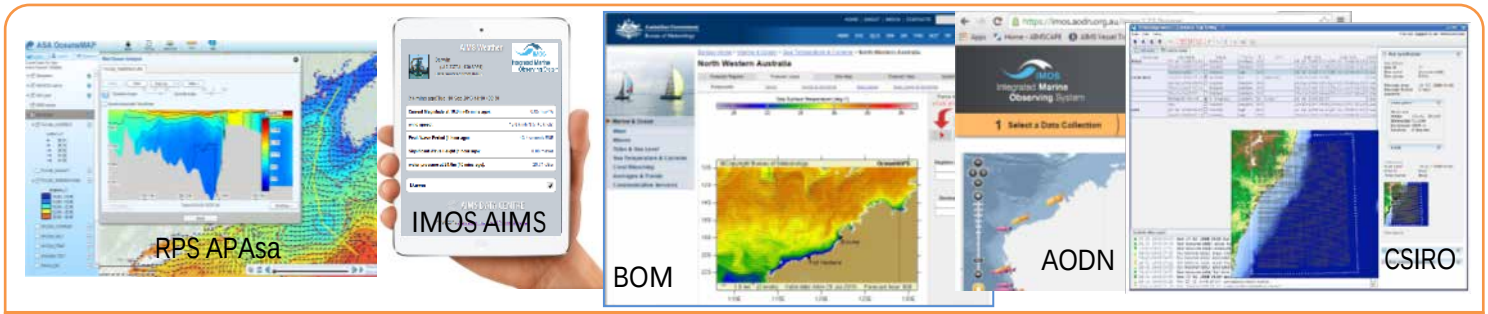
Scope of capabilities under consideration : ocean circulation, sea state and weather, climate, atmosphere and ecosystems

Richard Brinkman (AIMS) *on behalf of contributors*

What is operational oceanography?

Systematic delivery



Services and Product Delivery

Data Products

Operational Observing Systems

Ocean Modelling Systems

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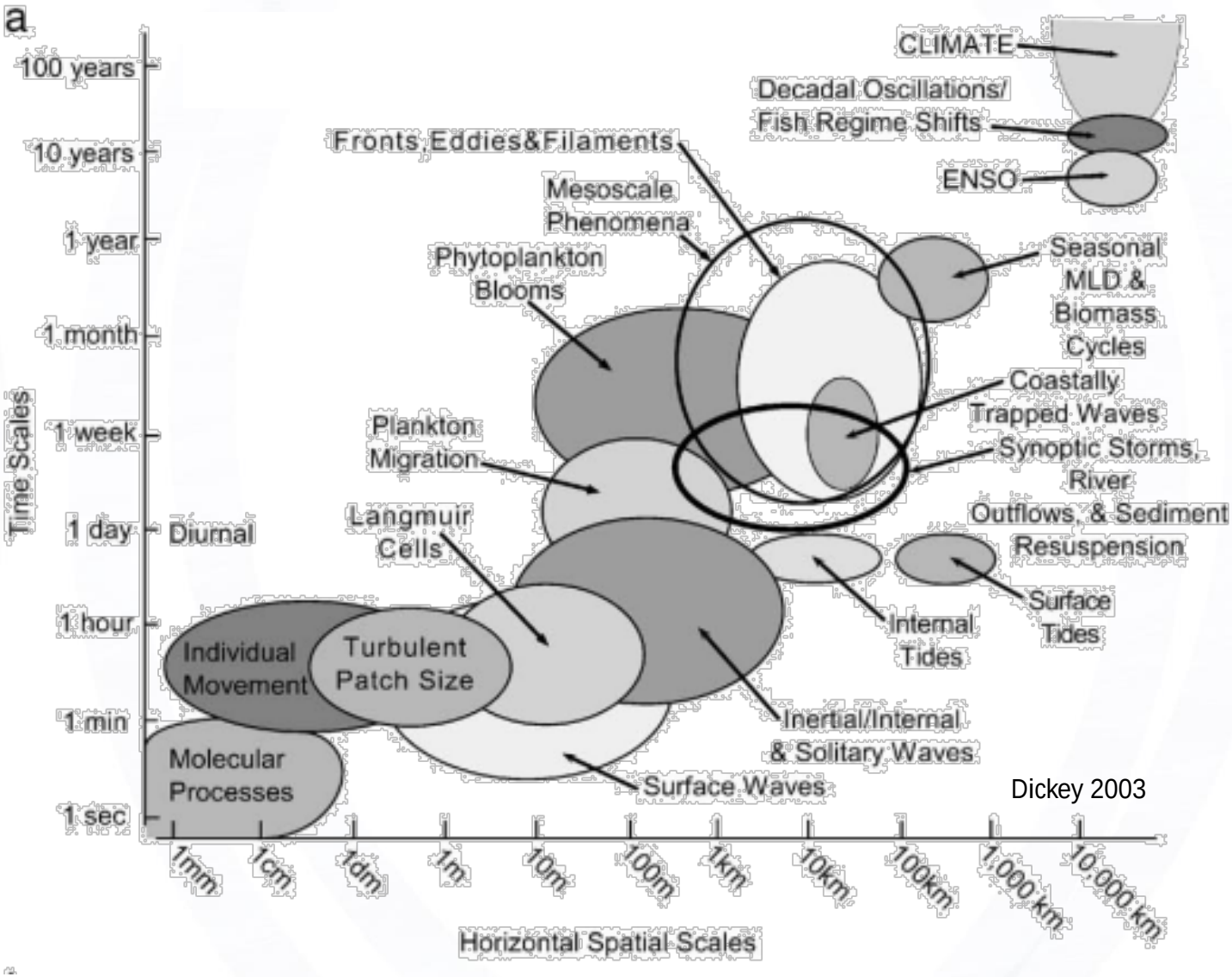
User	Uses, Applications
Environmental Policy	manage the marine environment for health and resilience of marine ecosystems & coastal management; Guidance on management actions to support sustainable marine industries e.g. fisheries, energy production, land-based influences.
Industry – Energy, Transport , Fisheries, Aquaculture	improve the safety, effectiveness and efficiency of oil and gas industries; includes exploration and production, planning and day-to-day operations; incident response; renewables. improve safety, effectiveness and efficiency of port and maritime operations including UKC systems; routeing forecasts and advice; development planning
Safety	avoid loss of life, search and rescue, coastal flooding and inundation, shipping forecasts, forecasts of severe weather,
Defence	Tactical decision making for surface, sub-surface and littoral operations
Public	Information provided as a public service; inform marine recreational activity planning (boating, diving, fishing etc)

Adapted from Bell et al 2013

Space and time scales - processes



Dickey 2003

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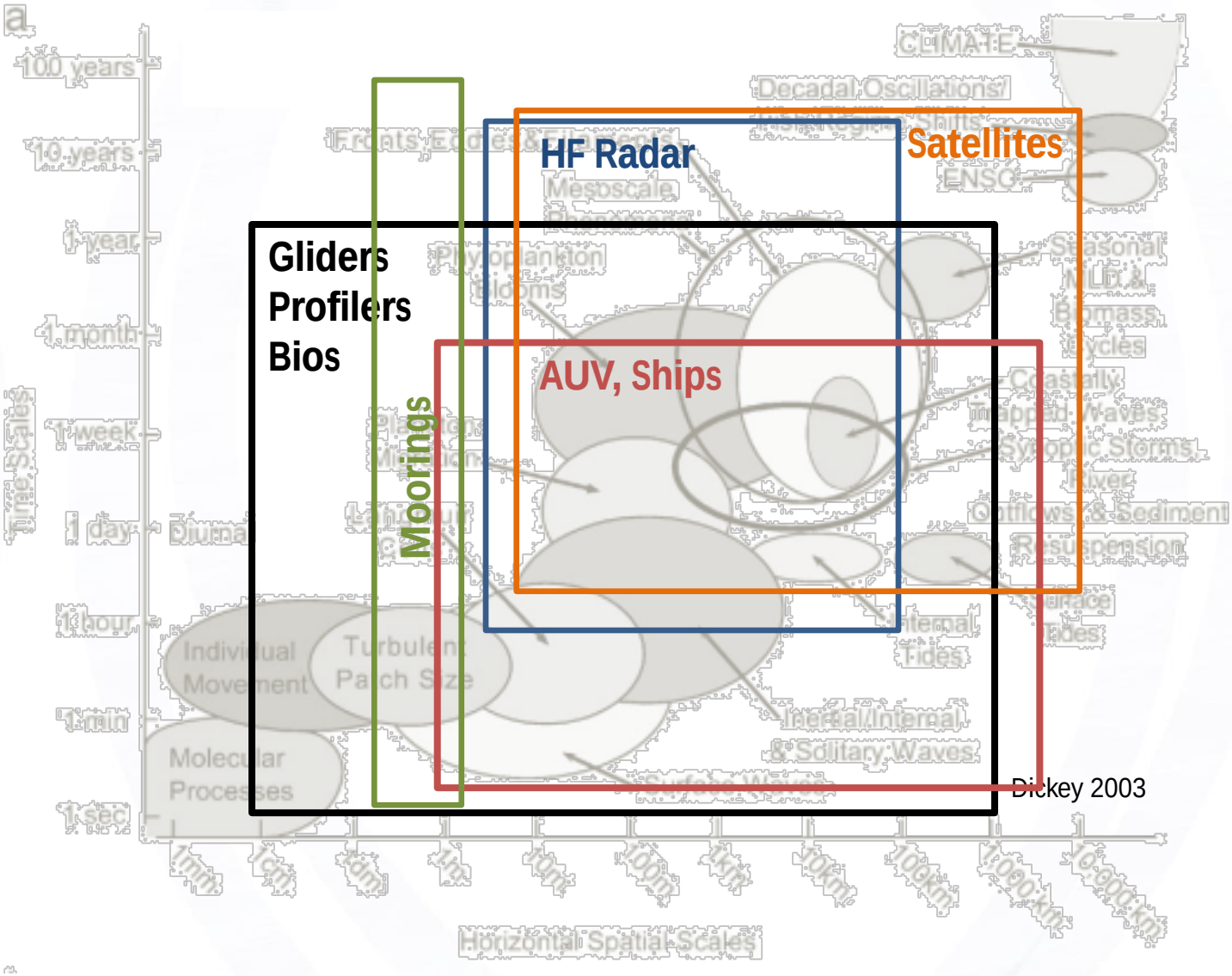
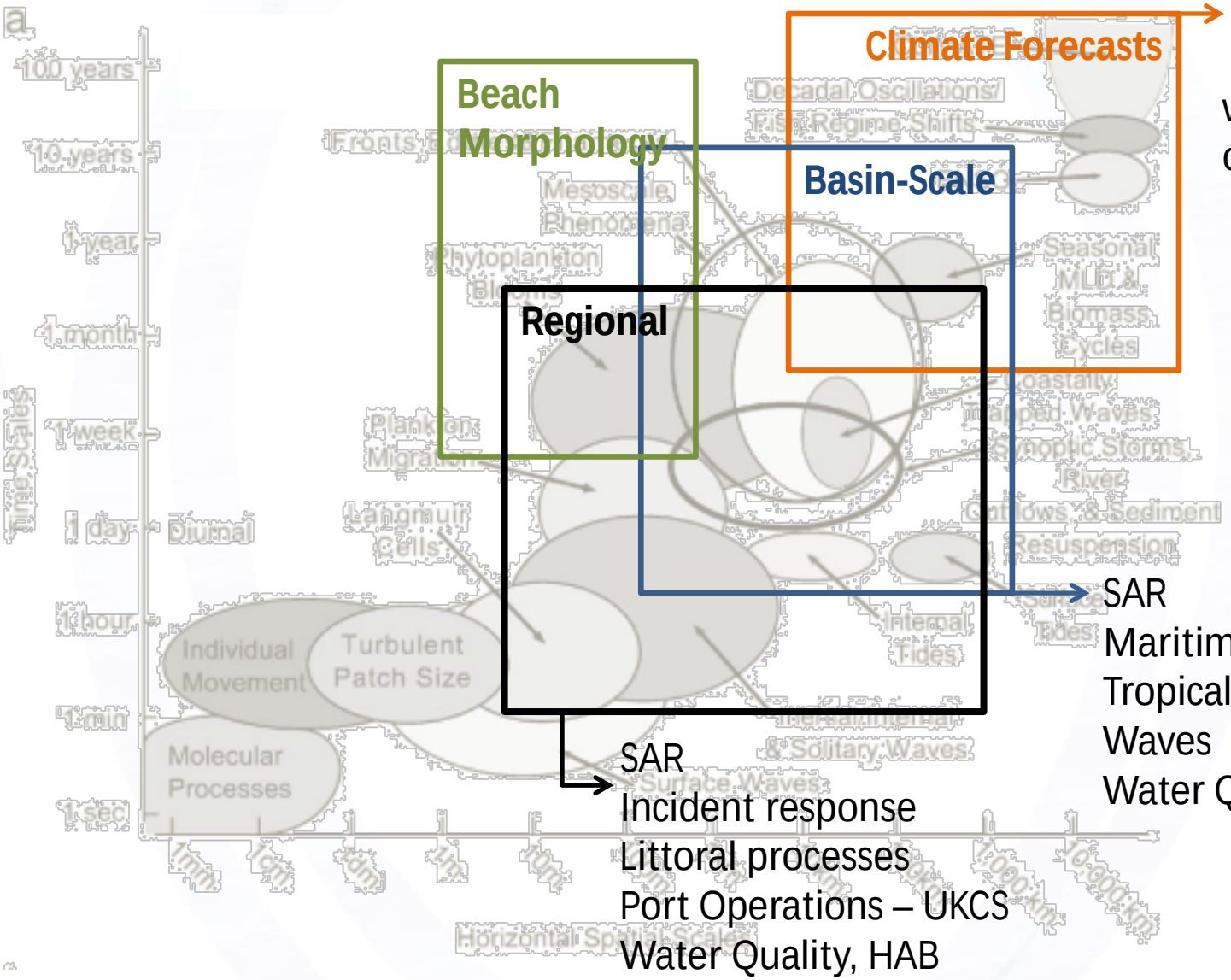
Space and time scales - observations



Space and time scales - uses



Hierarchy: capabilities, scales and applications

Ecosystems

BGC & material transport

Physics

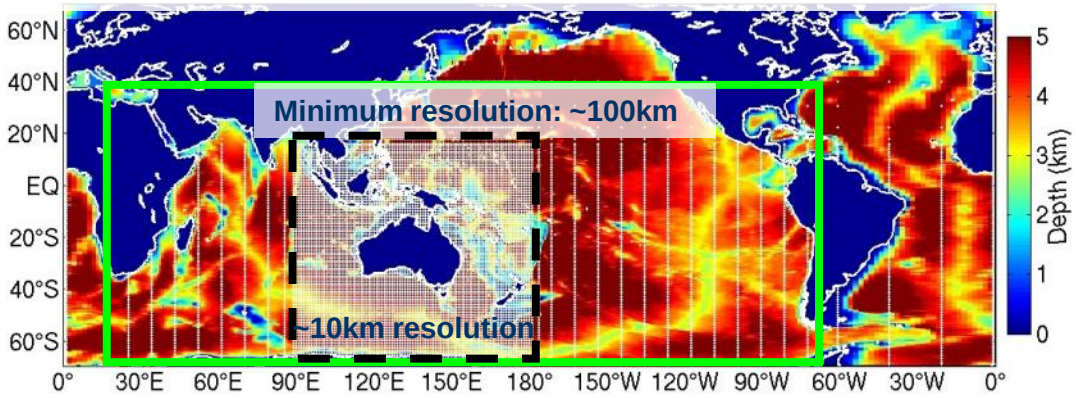
Ecosystem response and dynamics

What determines the level of maturity?

- Adequacy of the underpinning science

What accelerates the science?

- Business drivers for the information that the capability provides



BLUElink> Ocean Forecasting Australia

Lower

Maturity

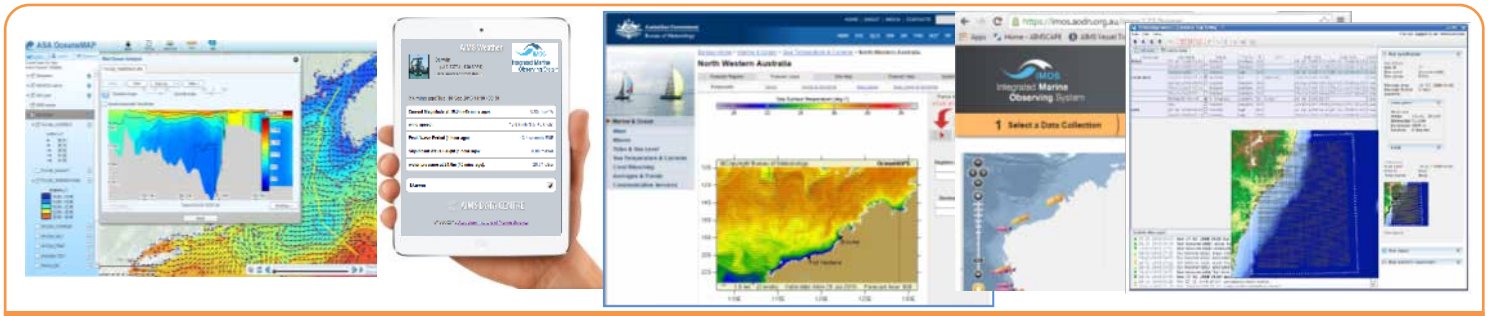
High

Global **Regional shelf** **Local/Littoral**

Increasing Resolution

Components

Systematic delivery



Services and Product Delivery

Data Products

Operational Observing Systems

Ocean Modelling Systems

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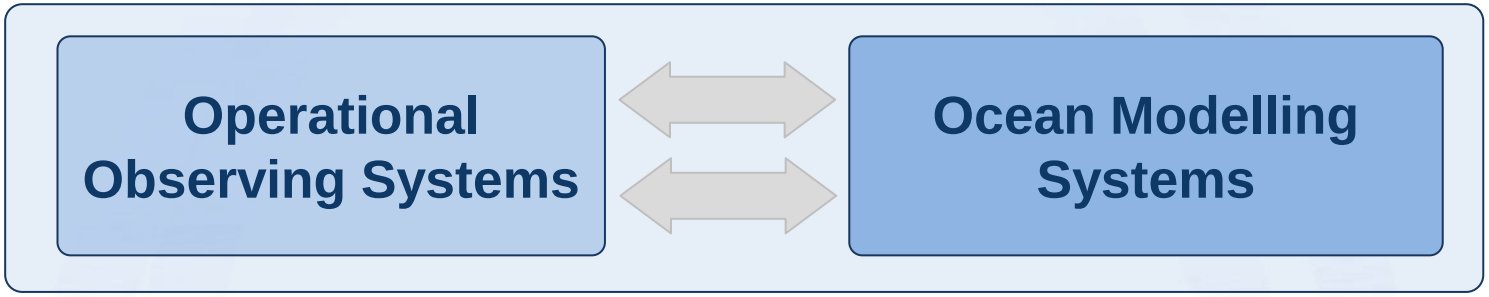
Components: Observing systems



- As the development of new data streams & applications progresses, so to must a systematic approach to formulating specific requirements for supporting ocean observations on the basis of improved understanding of data utility.
- Strong potential for interaction with modelling systems to inform observing system design

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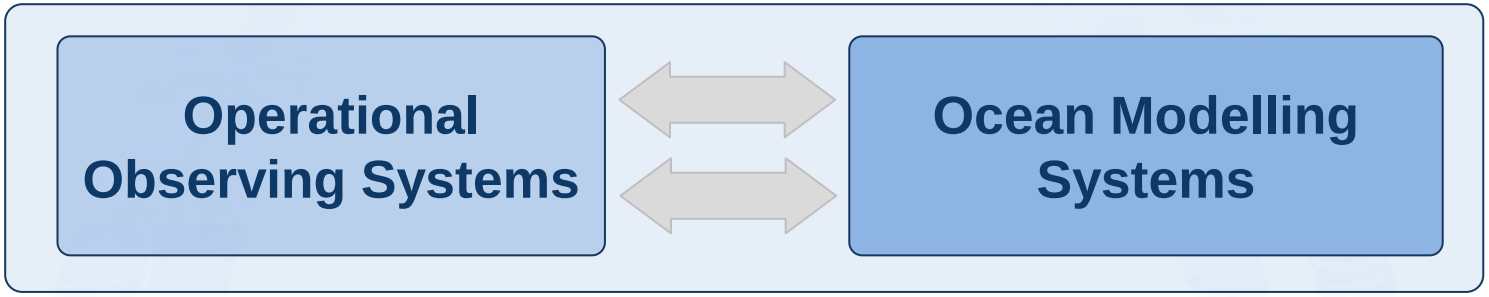
Components: Modelling systems



- New observing platforms and increased opportunities & challenges for assimilation
  - gliders (Shell/NOAA Gulf of Mexico)
  - radars
  - Increasing delivery frequency of satellite data
- Quantifying uncertainty/confidence and propagating through hierarchy products
- Approaches & timescales:
  - transition from dynamic to statistical downscaling

Components: Interoperable Information systems and service delivery

- Critical to enable rapid information transfer and uptake
- Interoperability of products and outputs
- Layering and integration of multiple data sets and information
- Development of standard protocols, formats, vocabulary services, etc e.g.
  - Data Cube (NCI/GA/CSIRO/….)
  - RPS Env Data Server
  - eReefs information

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Case study eReefs – informing Policy

An ***integrated operational system*** of

- critical data sources
- forecasting and hindcasting models
- visualisation and reporting tools

Span the paddock-to-ocean scale

Guide investment in WQ improvement

Driver - Reef Plans

$375M - 2013-2018

$200M - 2008-2013

Case study eReefs – informing Policy

scenarios

land practice change
climate change
coastal development

assessing & reporting

Impact assessment
Reef Report Card
State of Environment

(use case examples)

maritime operations

incident response
operational management

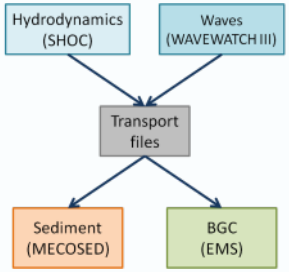
forecasting

bleaching events
floods/storms
temperature

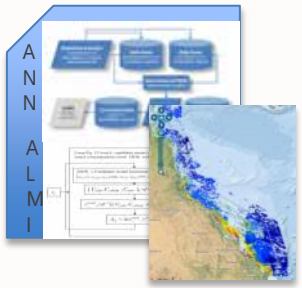
Data and visualisation services

Data Products

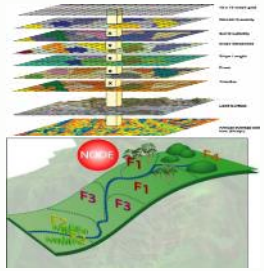
Research components



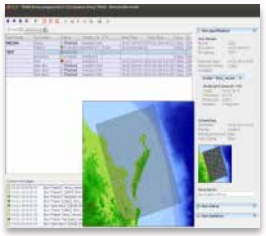
Regional models



Observations



Catchment forecasts

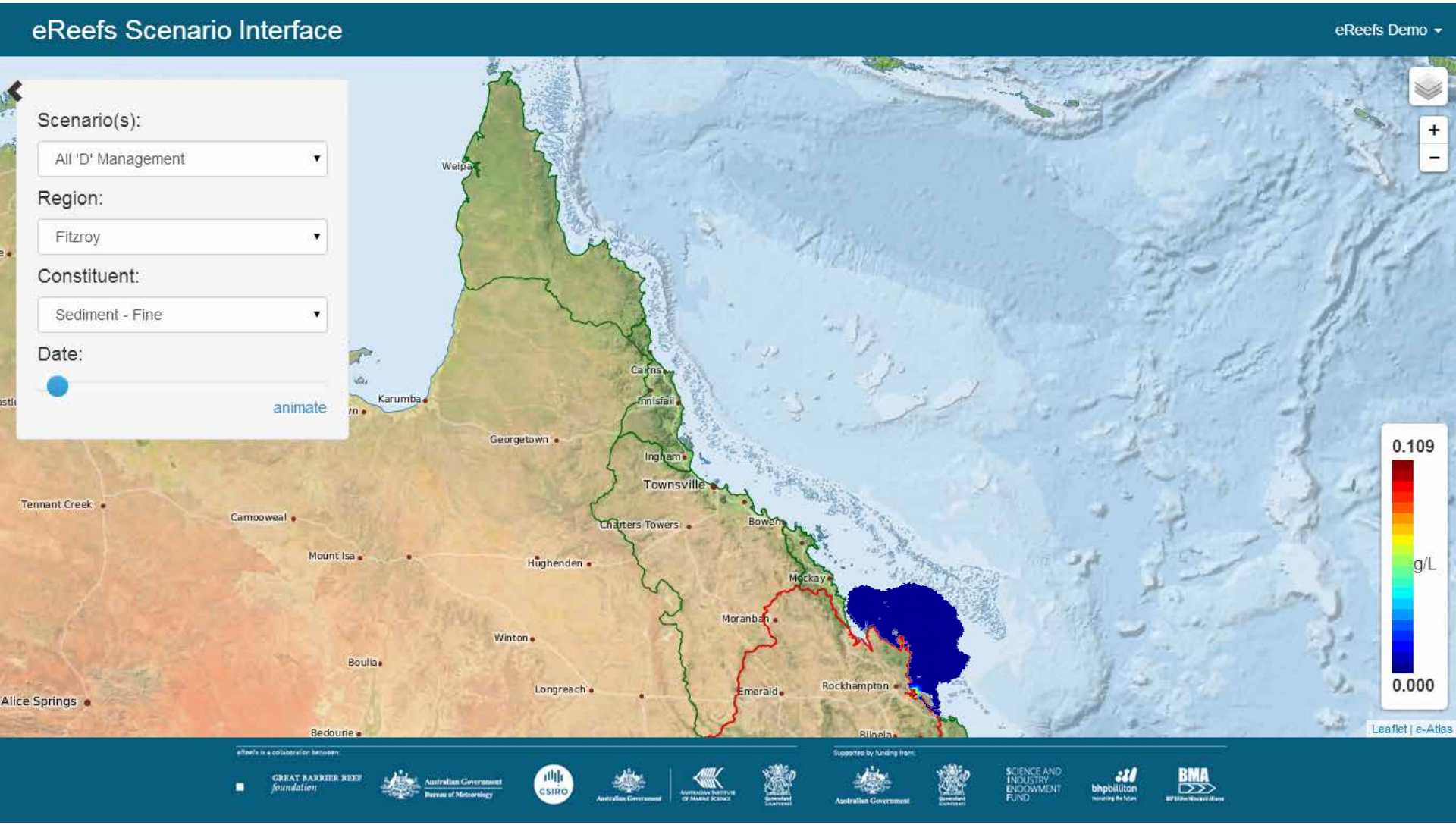


Relocatable model

Andy Steven CSIRO

Case study eReefs – informing Policy

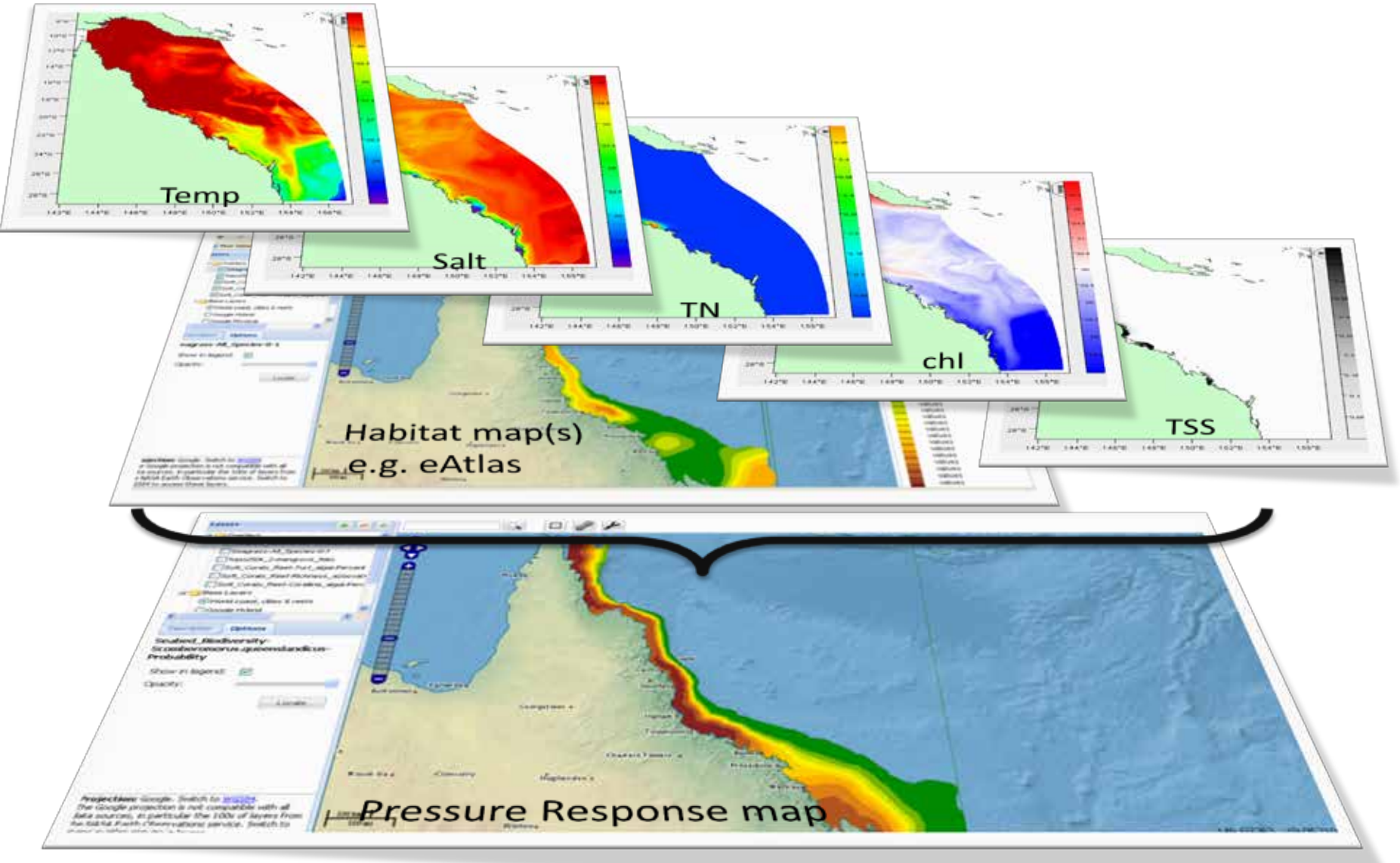
Demonstration scenario tool: River Plumes



Jonathan Hodge CSIRO

Case study eReefs – informing Policy

From ecosystem drivers to responses – layering



Case study – Management of maritime activities

Operational Dredge plume modelling

- Provide overview of dredge plumes from parrallel dredging operations
- Assess potential cumulative effects
- Forecasting of dredge plumes to identify risks of Trigger Level Exceedences.

Driver – improved operational efficiency

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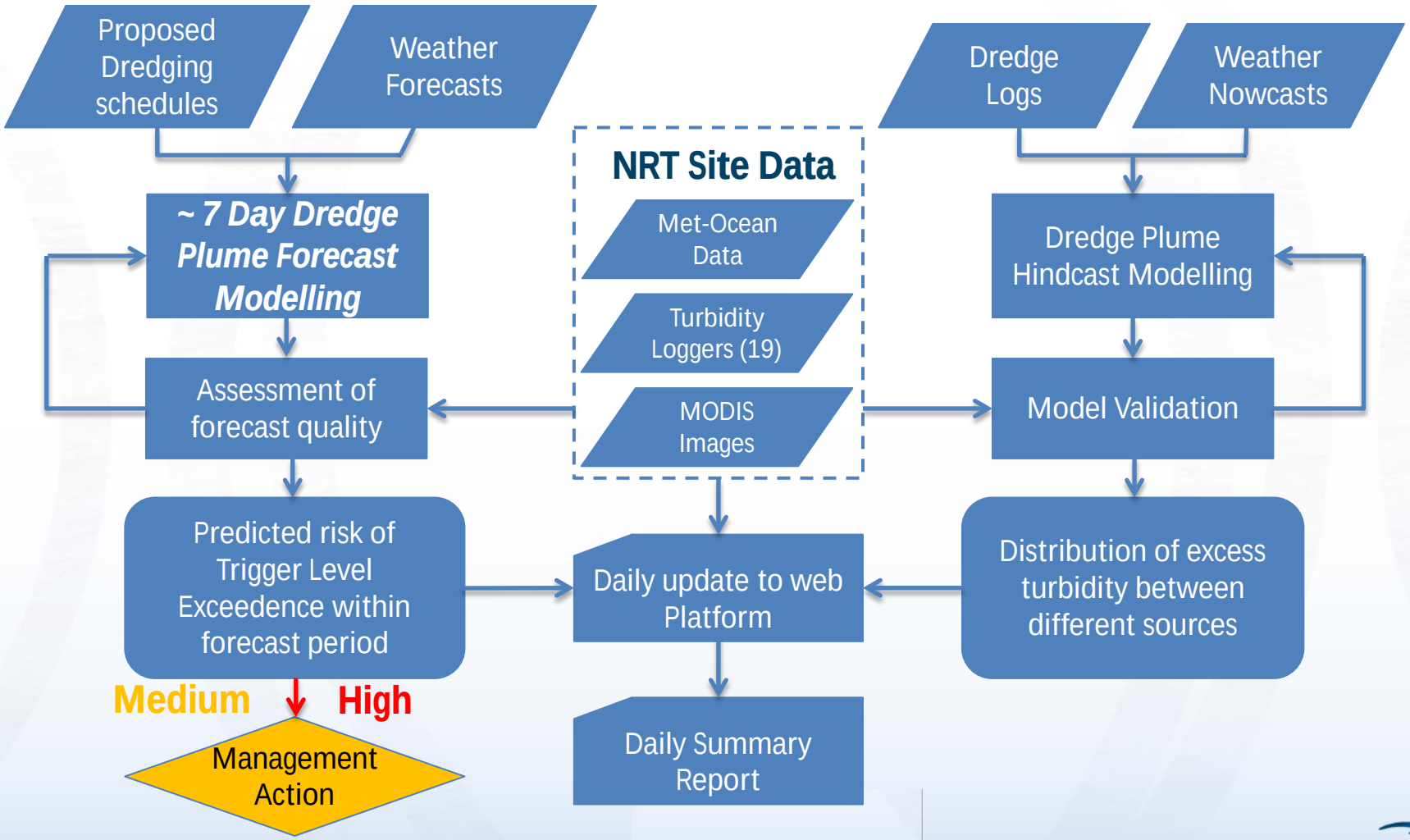
Case study – Management of maritime activities

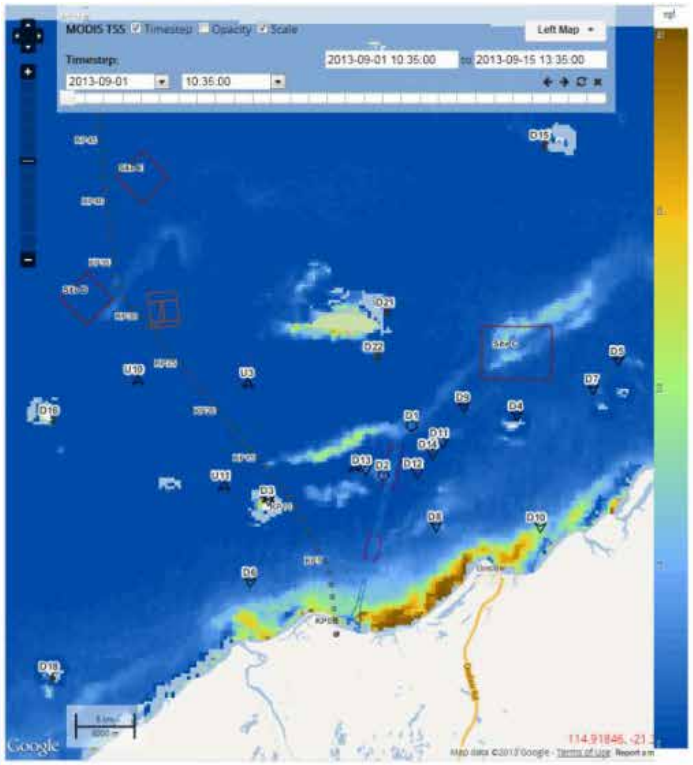
Operational Dredge plume modelling – Standard Daily Routine



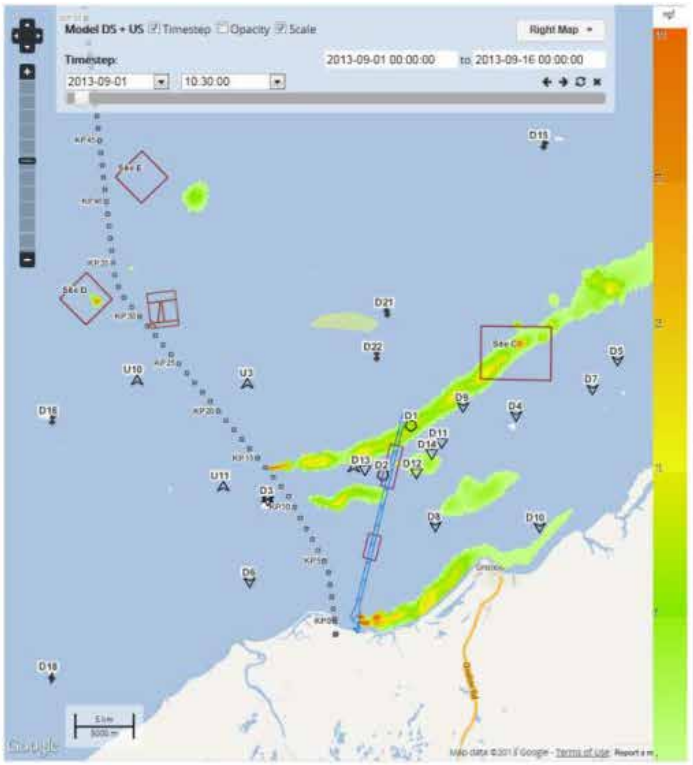
Case study – Management of maritime activities

Web-based visualisation interface

MODIS imagery



Plume Forecast



DHI

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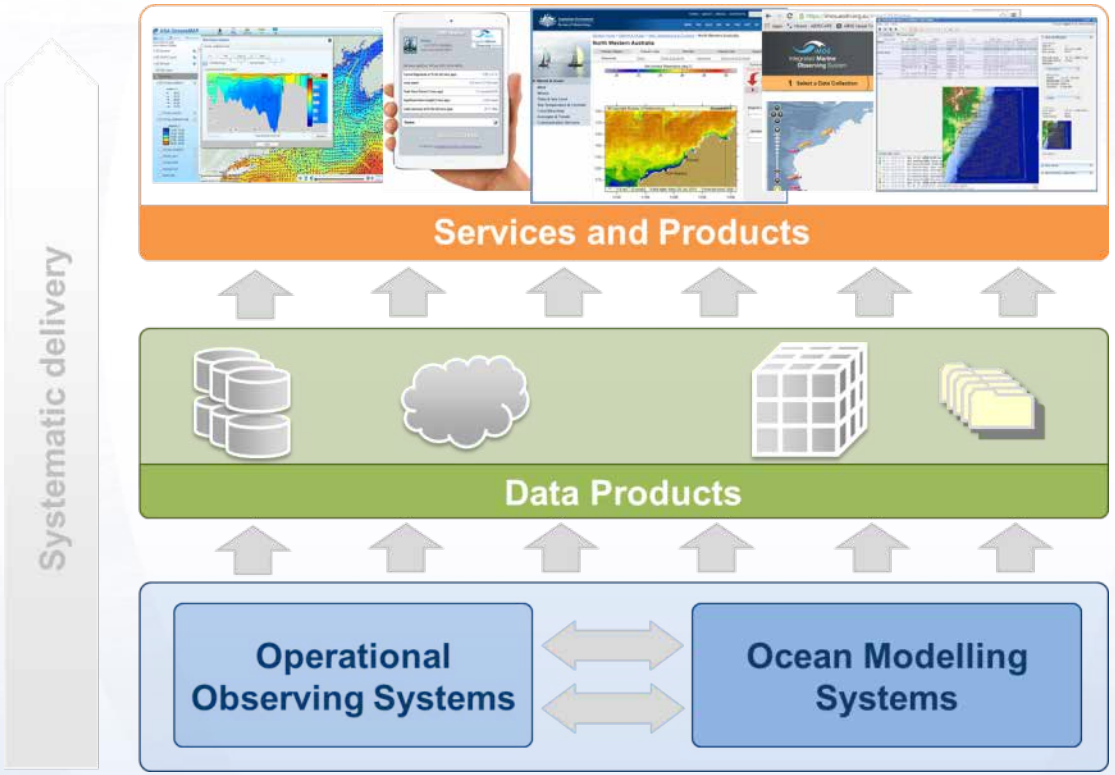
Thank you



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