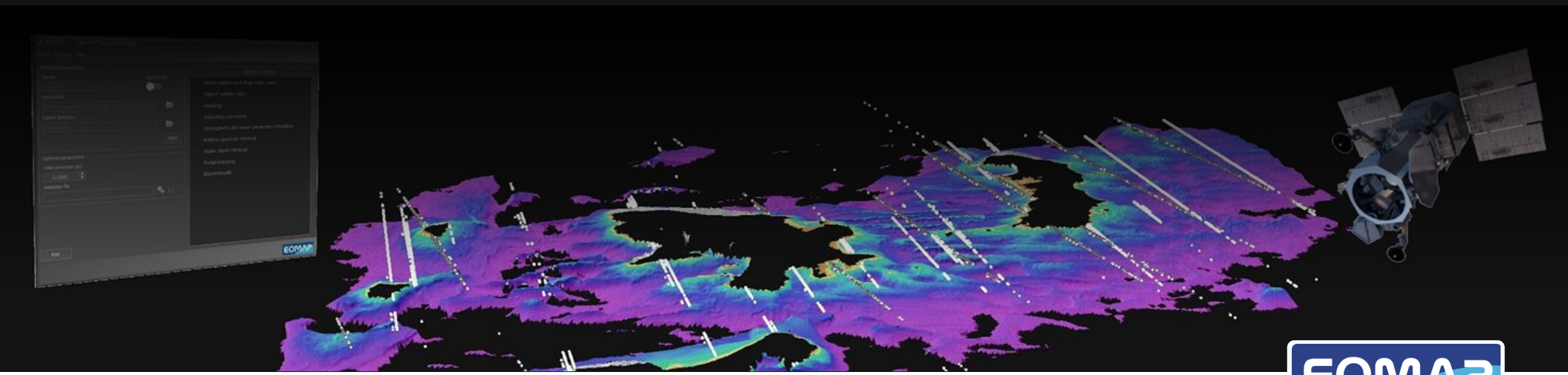
EOMAP's Aquatic Earth Observation services

Mapping and monitoring coastal and aquatic environments

Slides on use cases from Middle East



eomap.com
info@eomap.de

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EOMAP - Mapping & monitoring aquatic environments

- Founded in 2006 with HQ in Germany and offices in Australia, Indonesia, USA and United Arab Emirates.
- Service and software provider for coastal and offshore stakeholders.
- Top ranked framework provider for hydrographic offices and industry.
- EOMAP's data are found in nautical charts, EU bathymetry grids, GEBCO and day-to-day use of coastal stakeholders.

EU SME champion

EU awards for technology, 2011 and 2013

GEOSPATIAL WORLD AWARDS

Geospatial world award winner 2017

MAXAR TECHNOLOGIES

planet.

Information Program Partner

EMODnet

Data provider

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EOMAP analytics

Automatic workflows to derive quantitative data out of satellite data archives (based on light inversion models – physics based methods)

Geostatistical measures on satellite data archives
e.g. detection of anomalies on mangrove growth

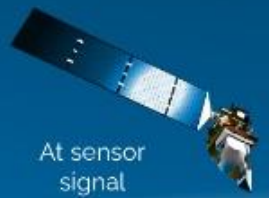
Image recognition procedures for object detection (based on KI)
e.g. plastic detection of airborne imagery

Photogrammetric approaches
e.g. for topographic models

Semi-manual image interpretation
e.g. aquatic emerged species classification

HINDSIGHT

Monitoring



At sensor signal

Absorption & scattering by atmostphere

At sensor signal

Incident solar radiation

Earth-observation-based water quality monitoring data provides near real-time information on water quality including turbidity, chlorophyll-a, surface water temperature and total suspended matter

Surface temperature

Reflection

Thermal emission

Shallow water

Water leaving radiance

Deep water

In-situ measurements

Emerged vegetation

Floating vegetation

Submerged vegetation

Depth

PHYTOPLANKTONa

CDOM

SPM

CYANOBACTERIA

Euphotic depth

Secchi depth

Chlorophyll-a

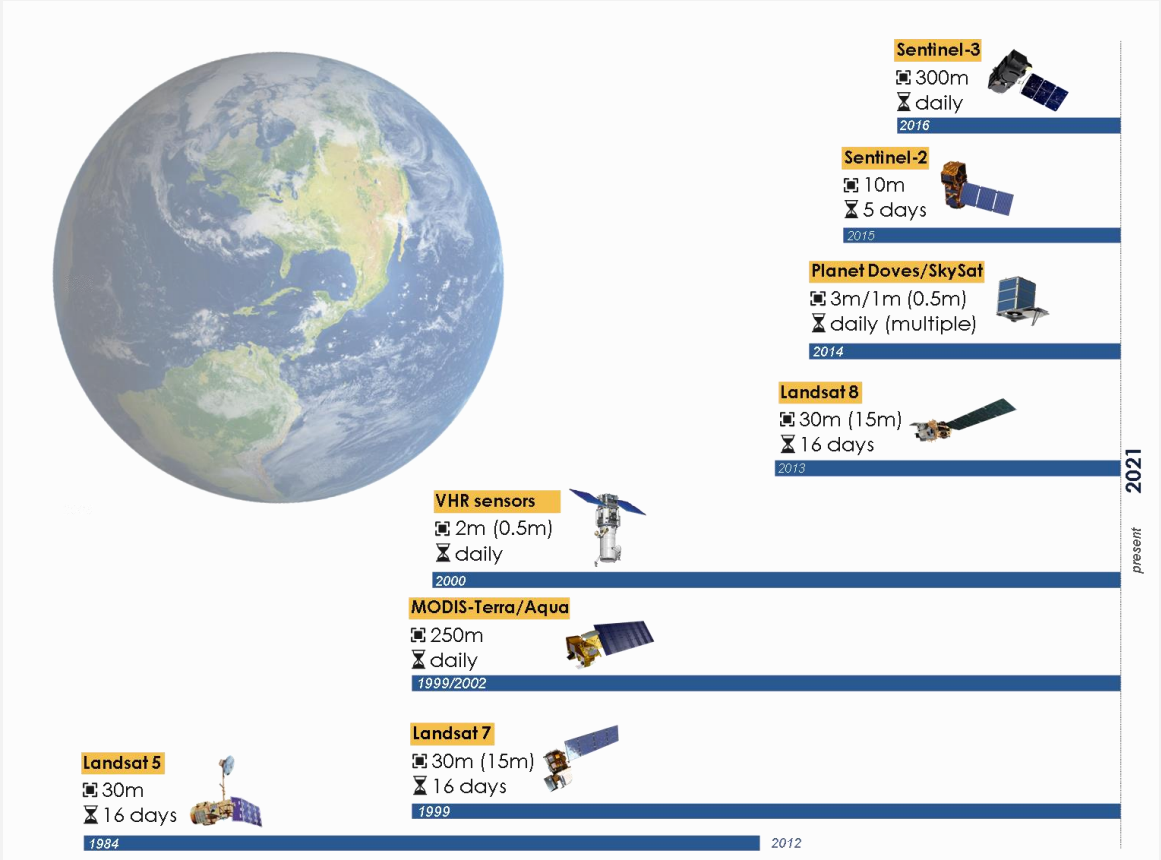
Turbidity & Suspended matter

Harmful Algae blooms

Increases situational intelligence
Seeing a clear picture of exactly what is happening across the bodies of water which you and your teams are responsible for means you can understand what's happening and take action more quickly.

Source: IWA, PrimeWater project

Satellite sources



- Access to governmental and commercial satellite data of various resolution
- Archives date back to several decades
- Global data coverage
- EOMAP is Information Program Partner to Maxar and Partner to Planet (both leading providers of commercial imagery)

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Showcases
Bathymetry

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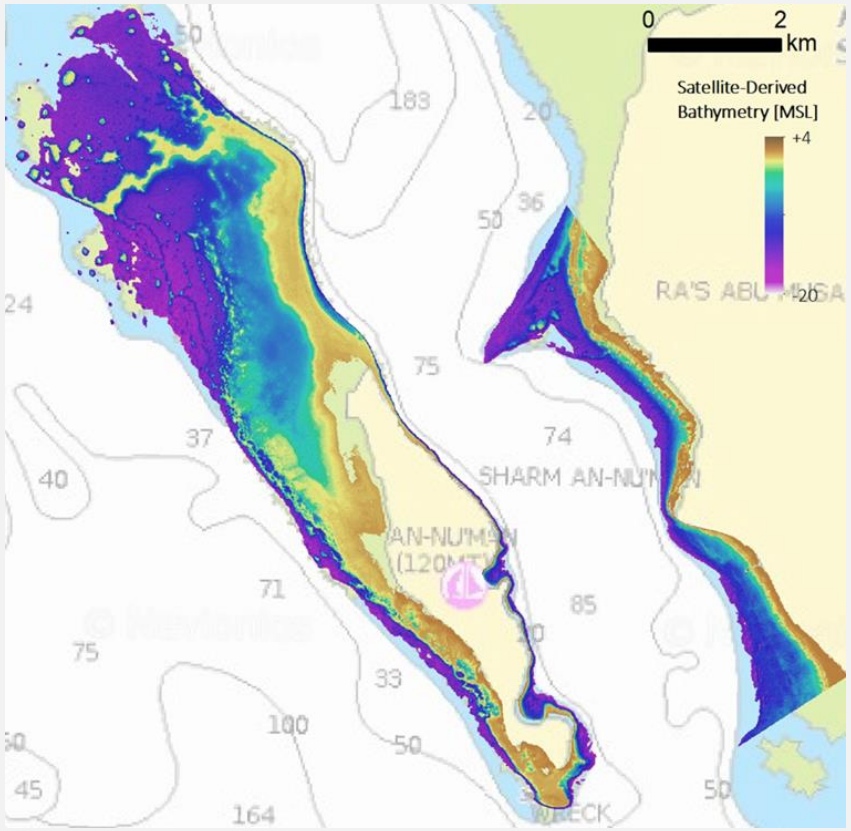
Summary
Bathymetry Advantages

- Access to historic and recent satellite imagery
- Very high resolution mapping of shallow water bathymetry, from shoreline down to depth of -10 (Gulf) to -25m (Red Sea)
- No on-site survey or mobilization of equipment needed
- Use Cases: Update of nautical charts, hydrodynamic modelling, survey support, coastal zone management, etc.



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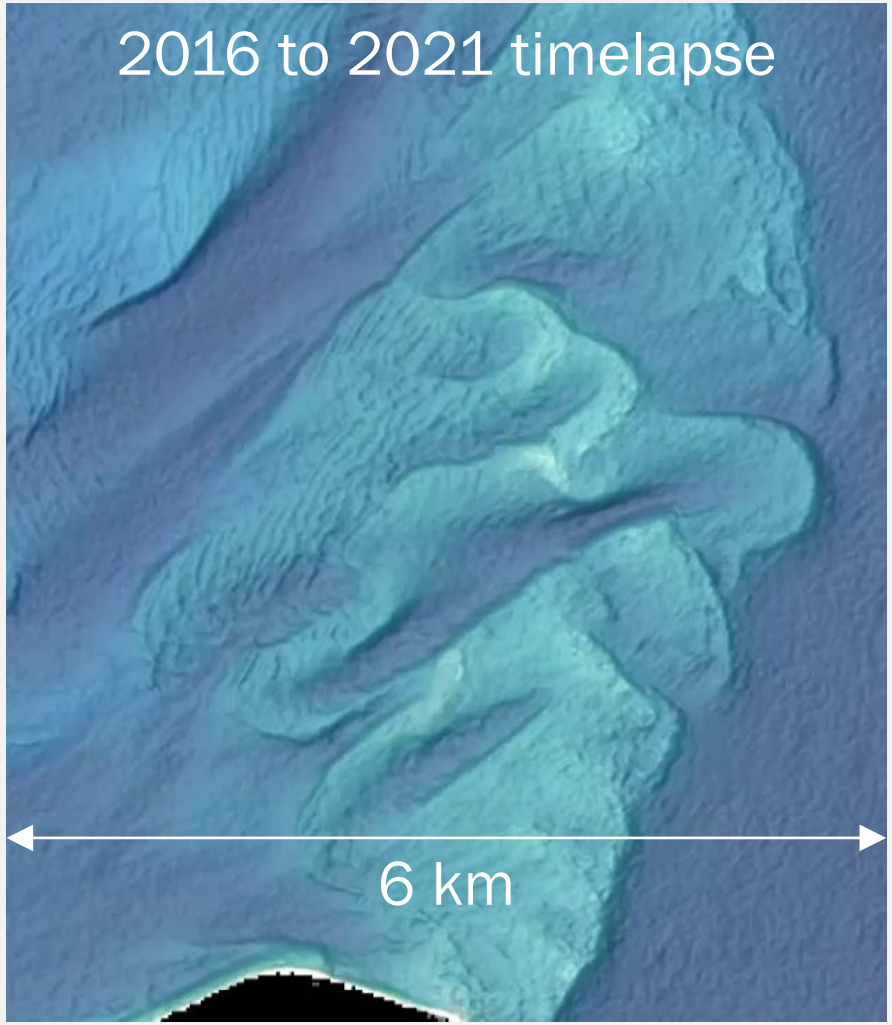
Shallow water monitoring with EOMAP

Map the gaps and monitor what you've mapped

- **Monitoring** bathymetry over time allows to understand dynamics and future trends
- Satellite-Derived Bathymetry allows a unique access to past (almost 30 years) and ongoing seabed changes.



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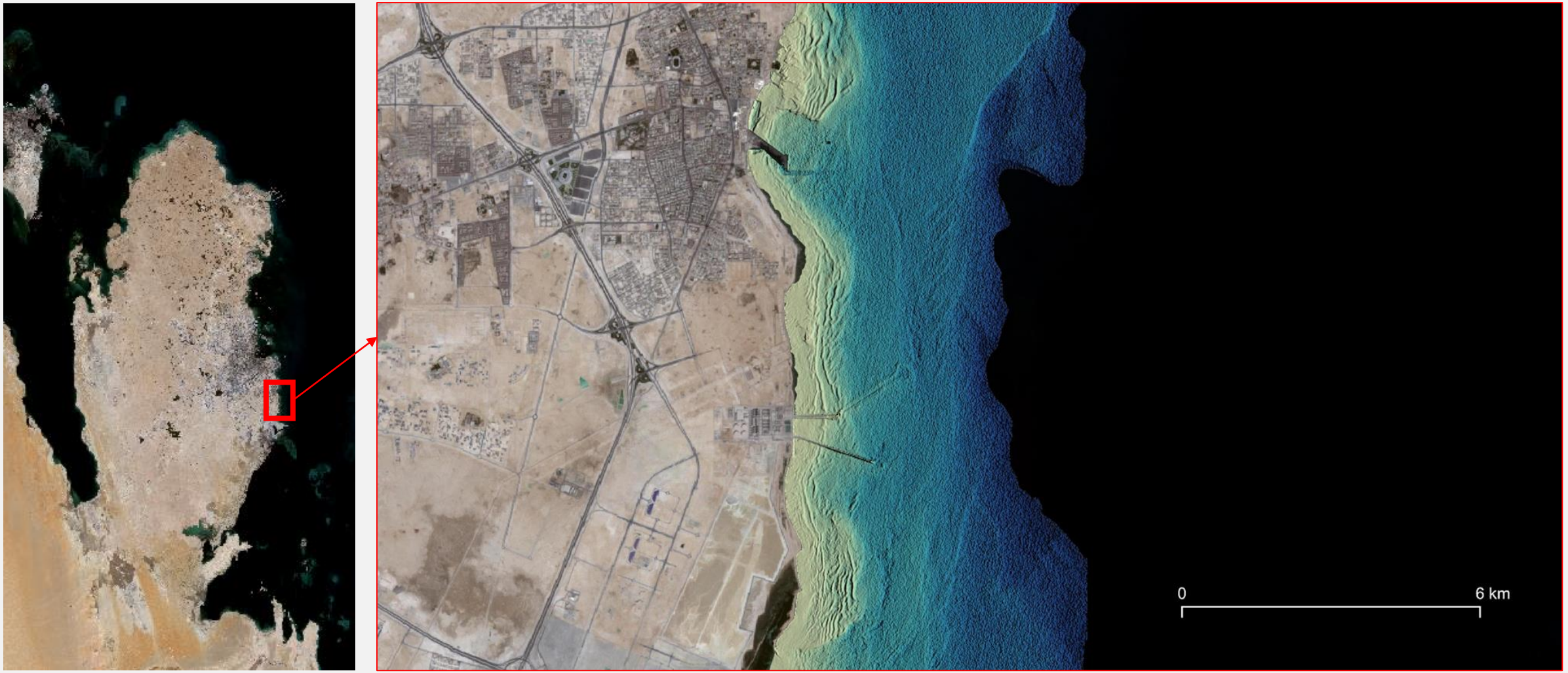
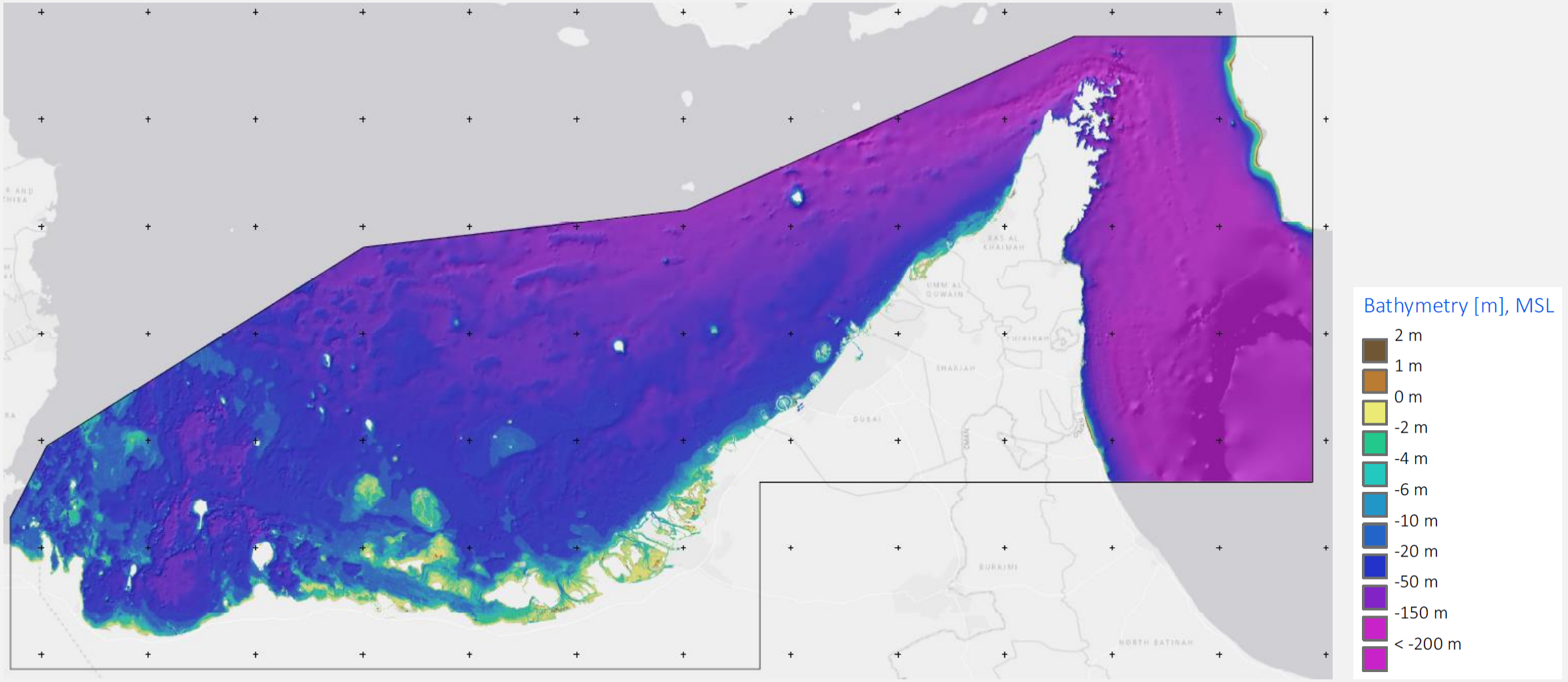
Satellite-Derived Bathymetry, example Qatar 1



Bathymetric model 90m spatial resolution, multi-source



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Satellite-Derived Bathymetry and Survey Data
- integrated survey approach -

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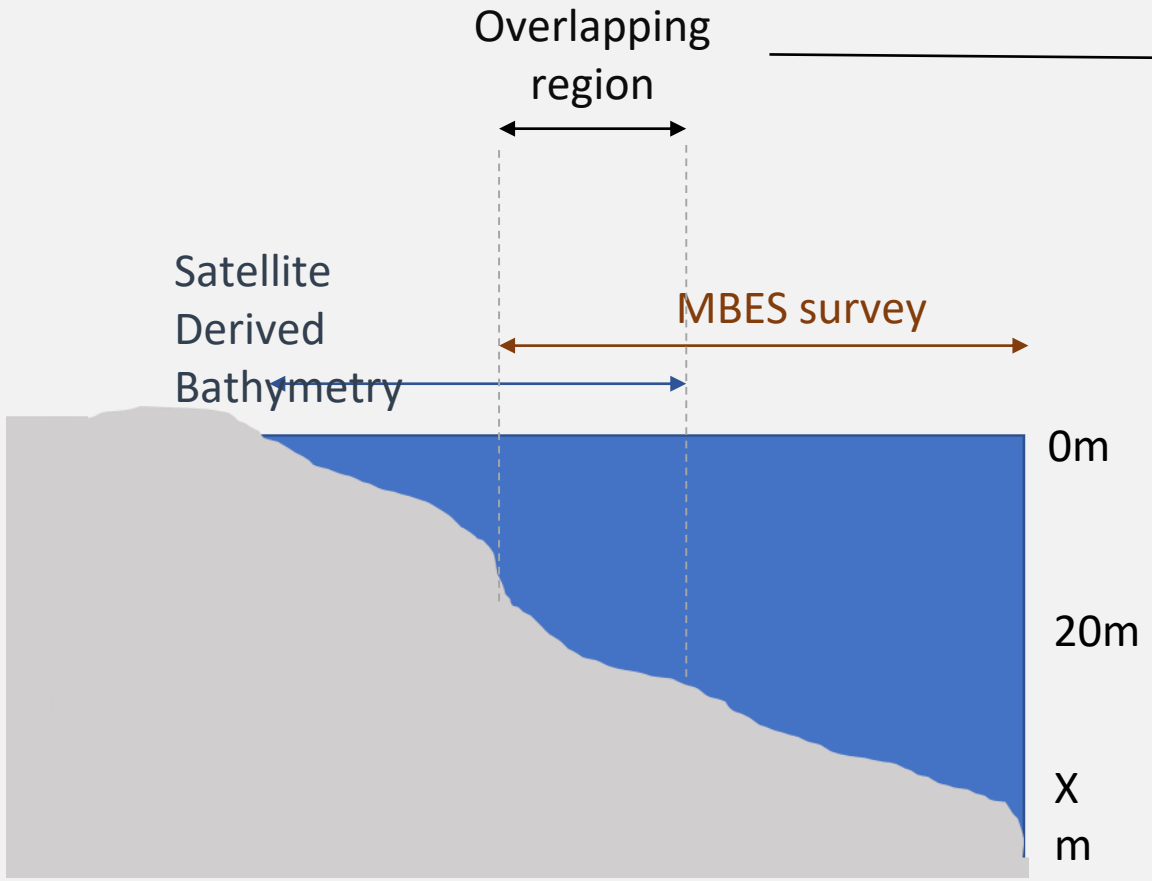
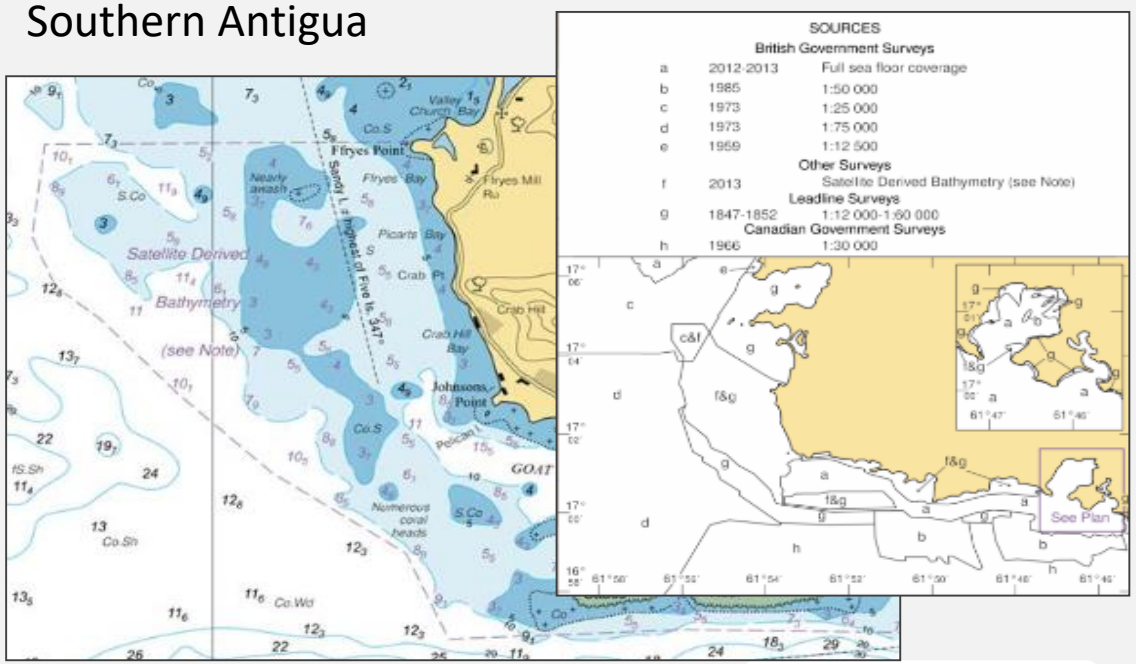
Integrated survey approach - SDB and MBES



British Admiralty Chart BA 2066
Southern Antigua



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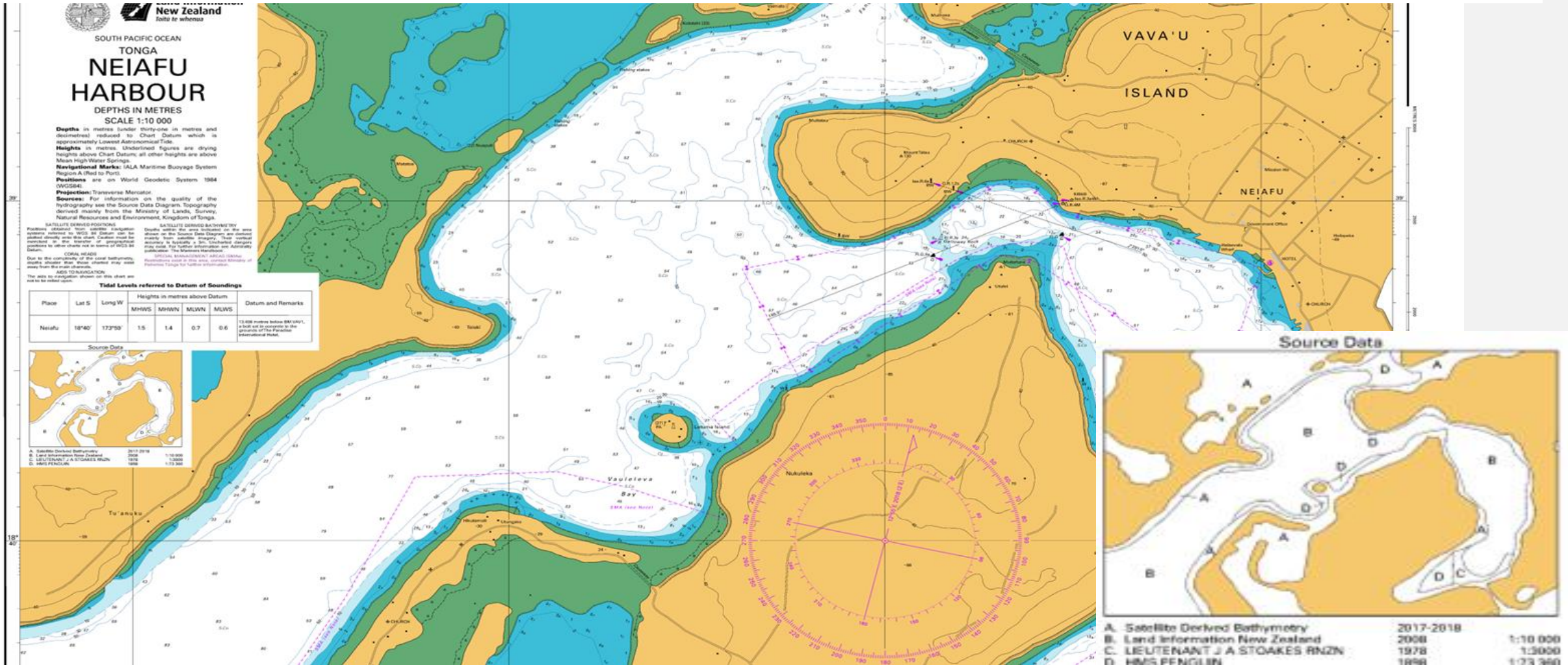
Integrated survey approach - SDB and MBES

EOMAP's SDB integrated into the most recent chart of Neiafu Harbour (LINZ).



Showcases
Seafloor mapping

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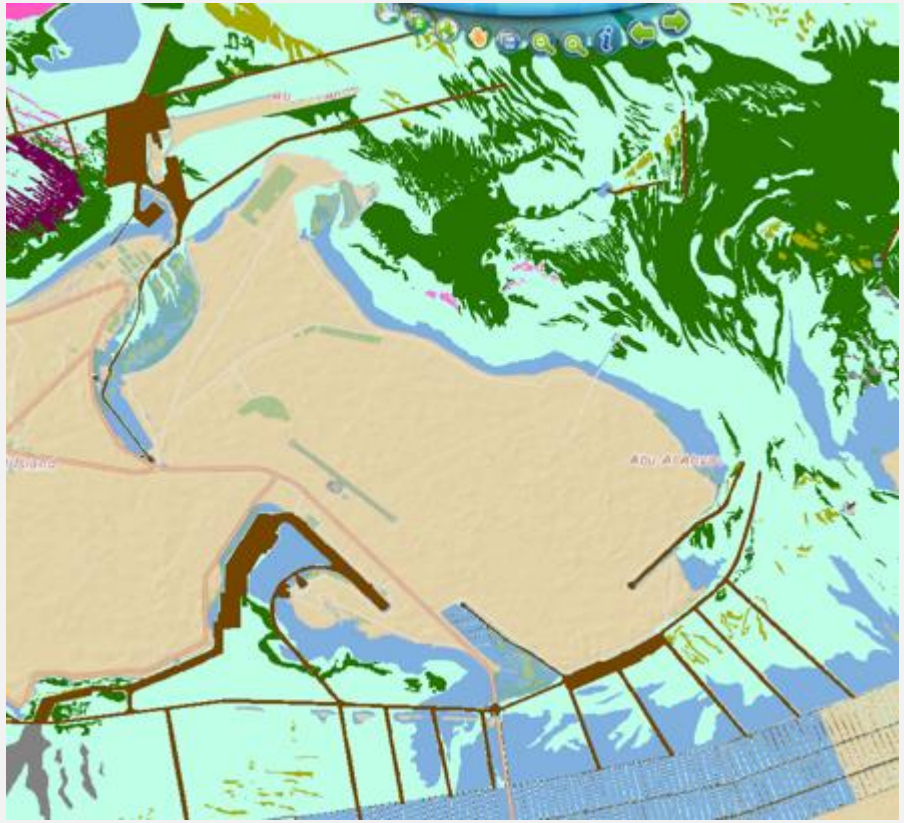
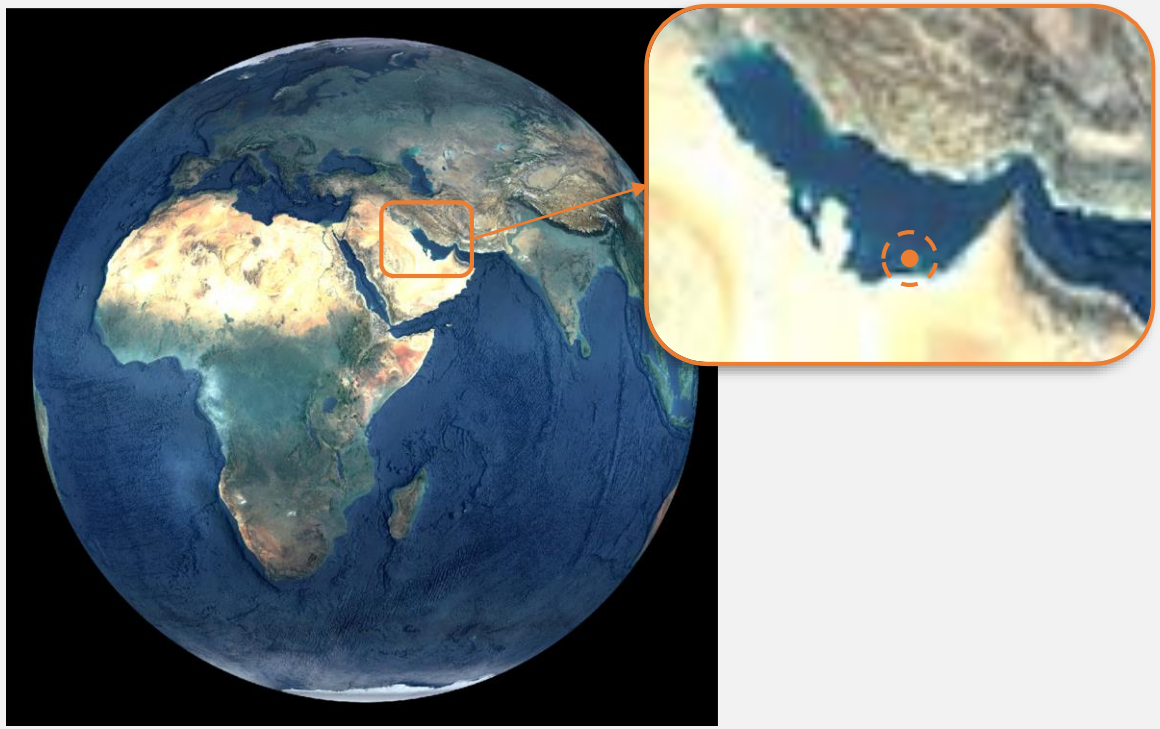
Summary
Seafloor mapping

- Access to historic and recent satellite imagery
- High resolution and spatial coverage from project to national scale
- Use Cases: Baseline mapping, EIAs, ecological studies

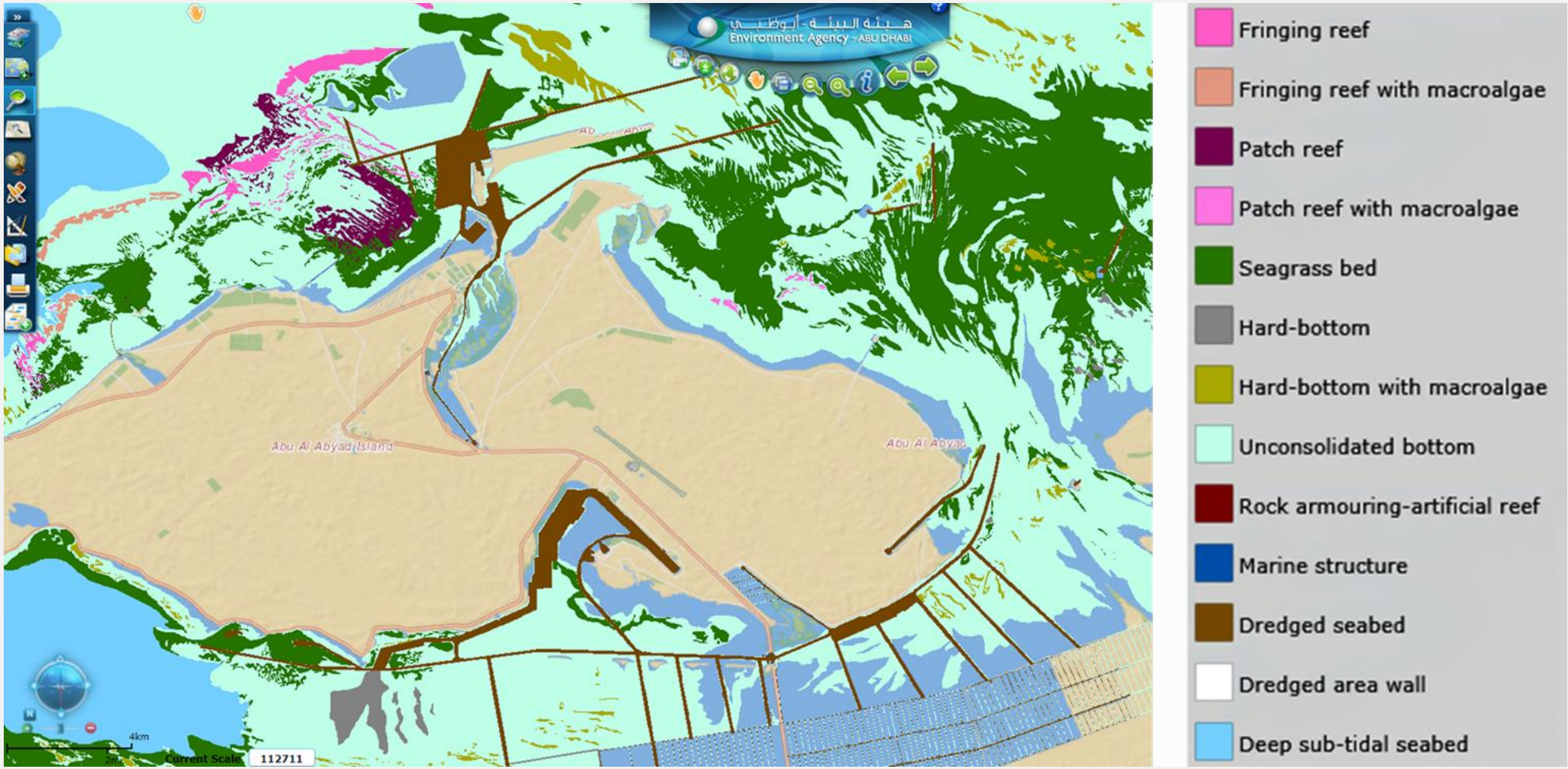


Seafloor mapping, Abu Dhabi



Site	Abu Dhabi waters
Scope	Seafloor habitat baseline
Delivery	Seafloor classification as vector files
Coverage	Shoreline down to -10 to 14m depth
Method	satellite-derived mapping
Client	Abu Dhabi Environmental Agency

Seafloor mapping, Abu Dhabi



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Showcases
Digital Elevation Models

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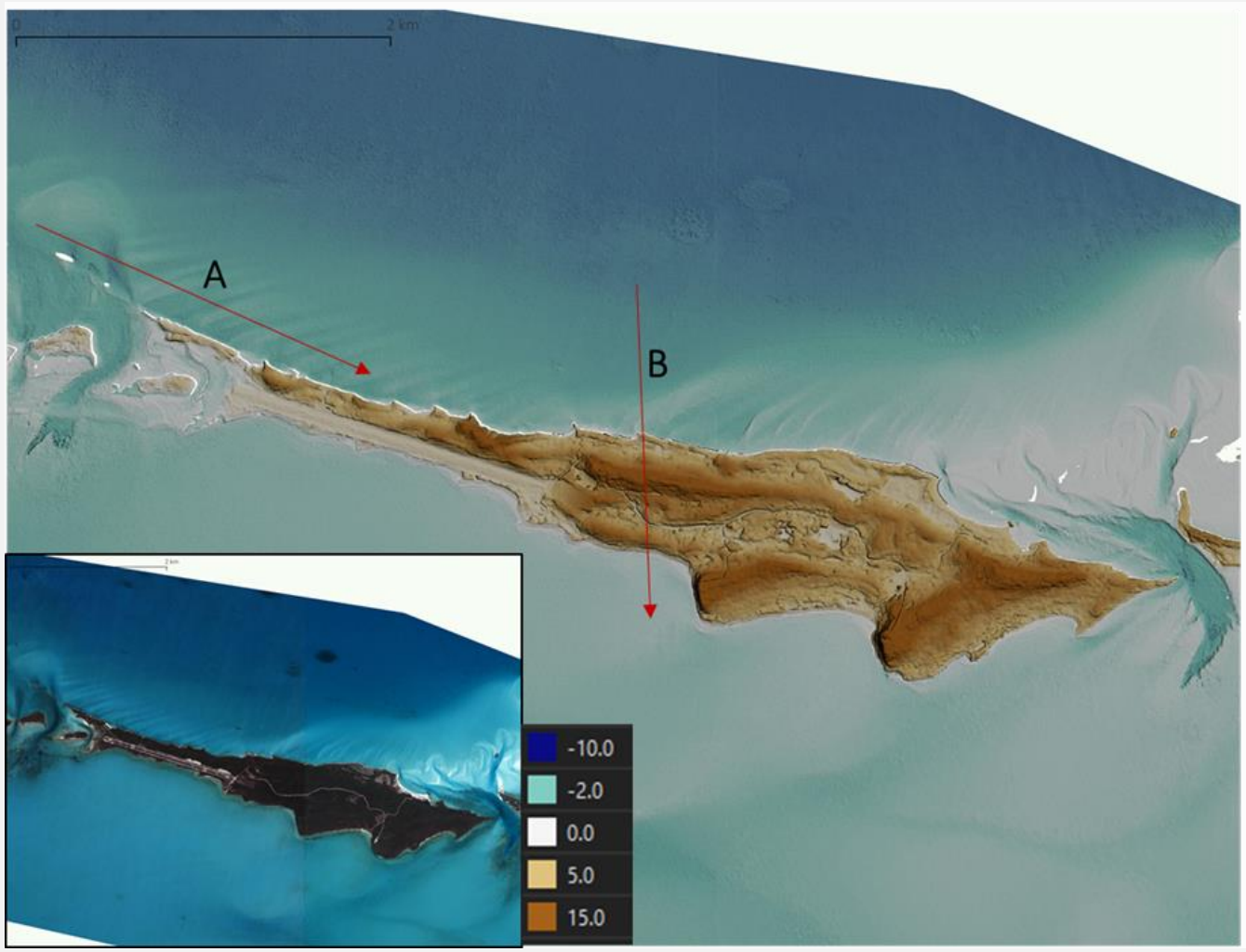
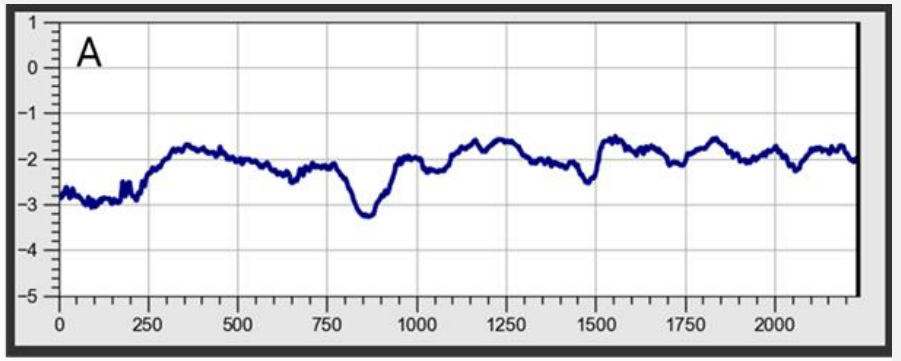
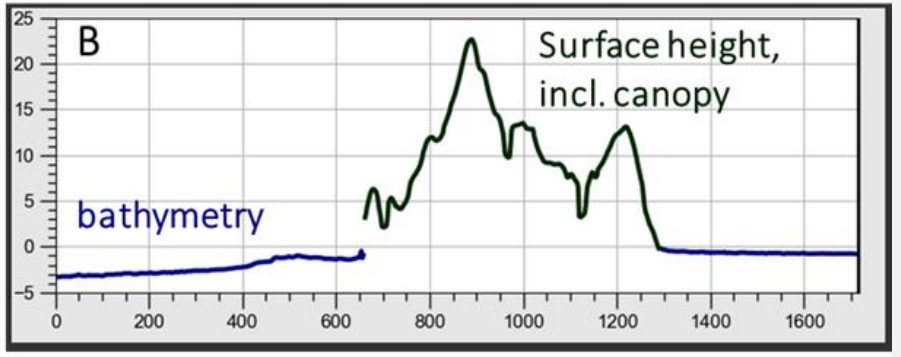
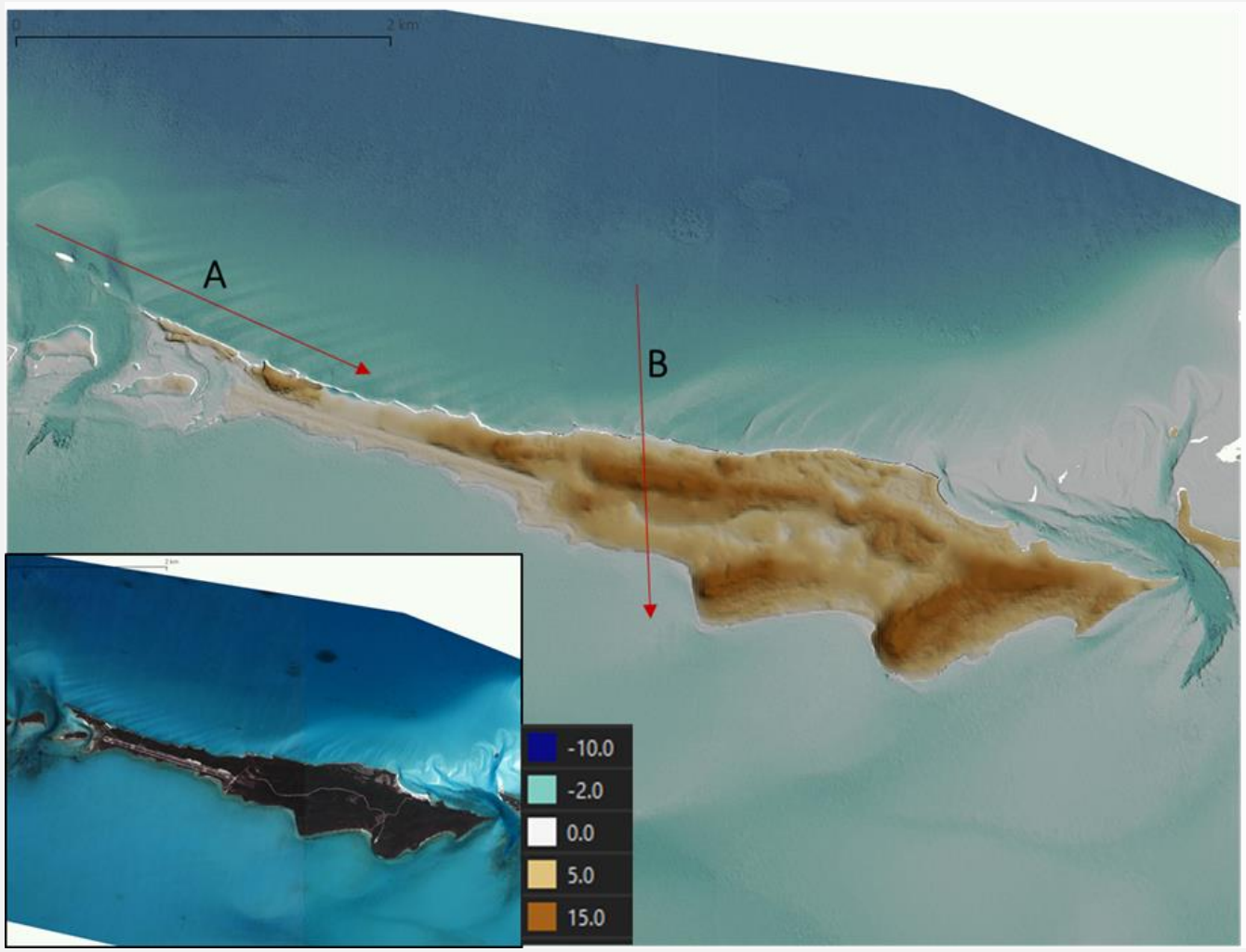
2m resolution Digital Surface Model combined with Satellite-Derived Bathymetry, Bahamas, Hog Cay

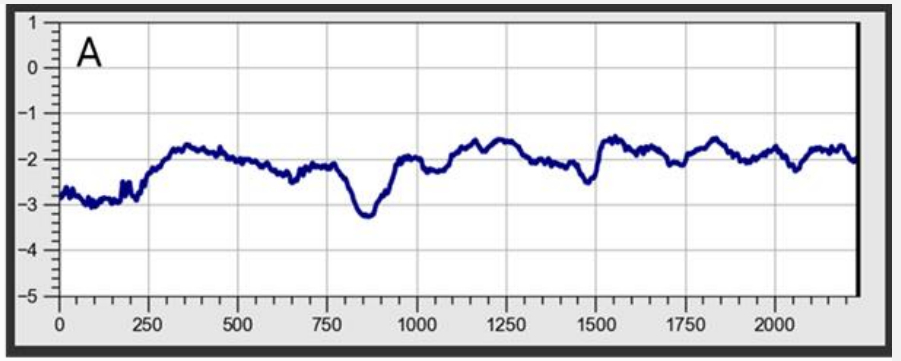


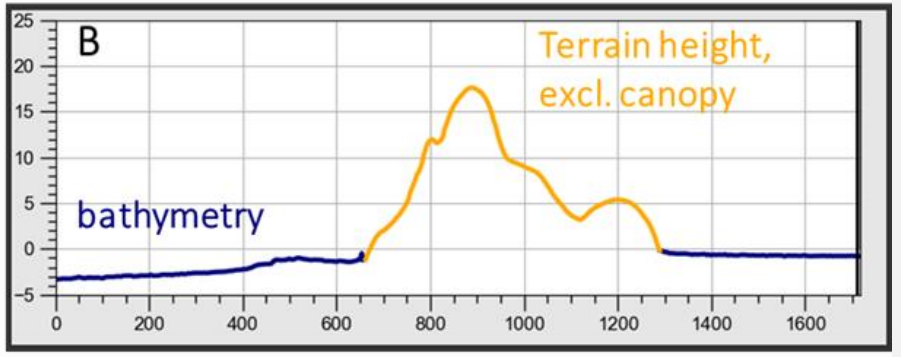




2m resolution Digital Terrain Model combined with Satellite-Derived Bathymetry, Bahamas, Hog Cay







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Showcases
Water Quality Monitoring

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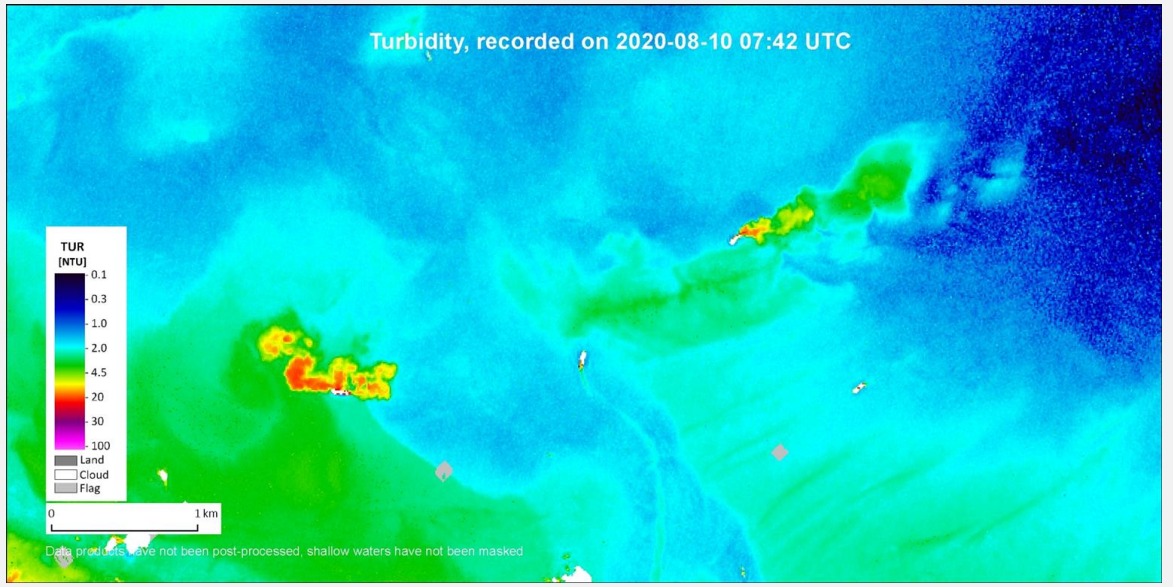
Summary
Water Quality Monitoring

- Access to historic and on-going information on turbidity, chlorophyll, water surface temperature and algae bloom
- Easy access and visualization through eoapp online portal
- No on-site campaigns are needed
- Use Cases: Baseline studies, dredging monitoring, EIA support, etc



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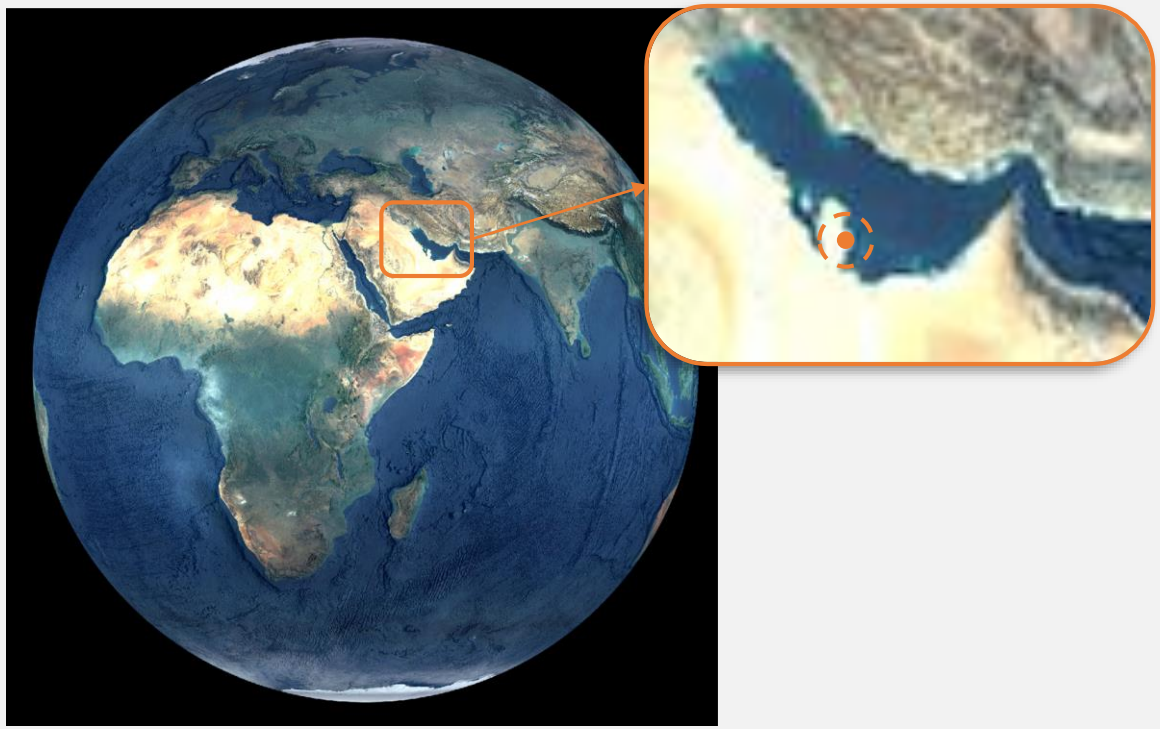
Water Quality monitoring, example Doha Port, Qatar

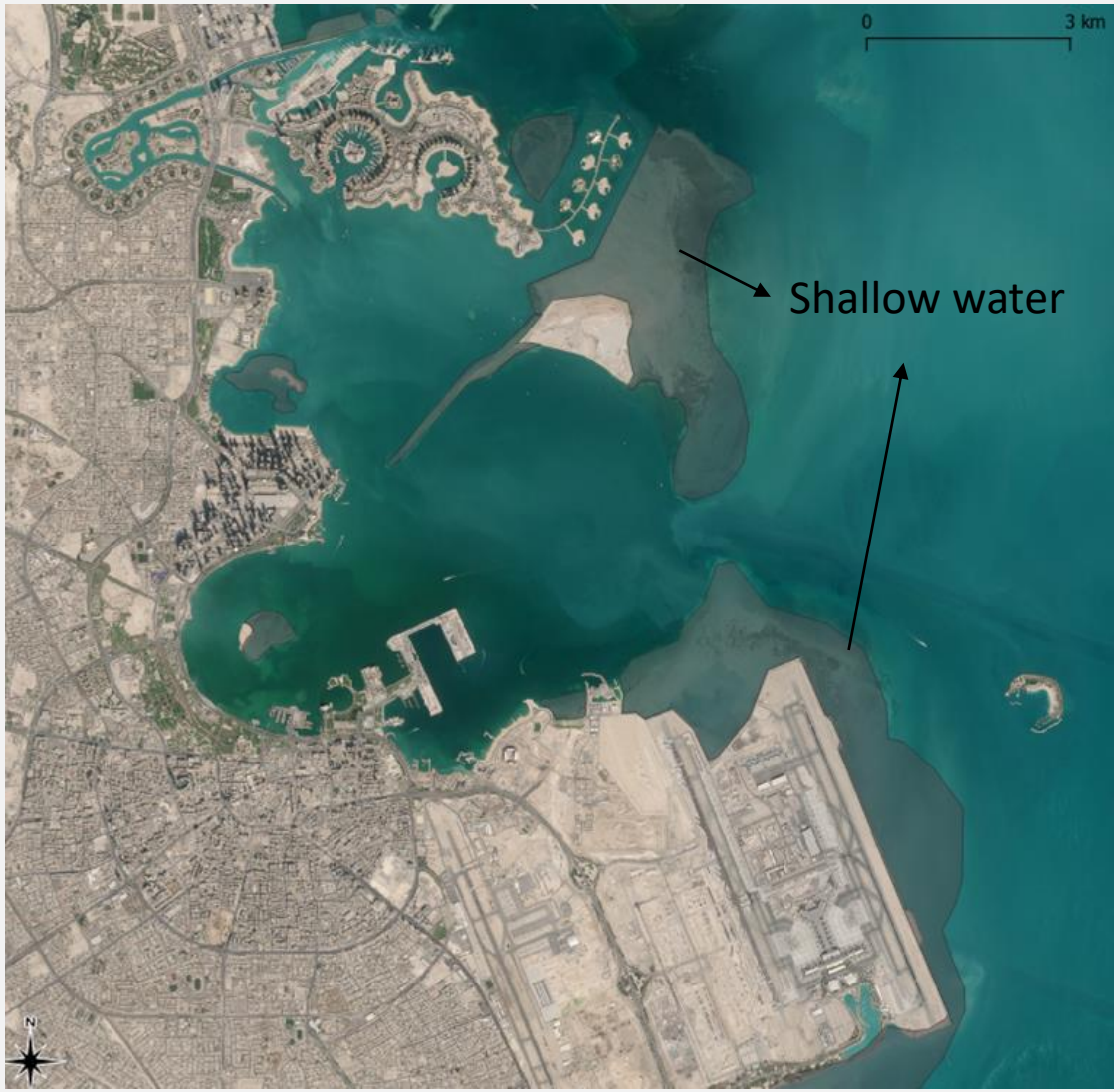


Site	Qatar, Doha
Scope	Baseline assessment and monitoring on turbidity
Delivery	Turbidity time series and statistical analysis
Coverage	Time series for selected location

Qatar, example 2: Water Quality monitoring

- High resolution water quality monitoring in 10m
- Every 5 days with Sentinel-2A/B
- Example from January -October 2021
- Identification of spatial and seasonal dynamics
- Analysis of optically deep water polygons

Doha harbour



- High resolution water quality monitoring in 10m
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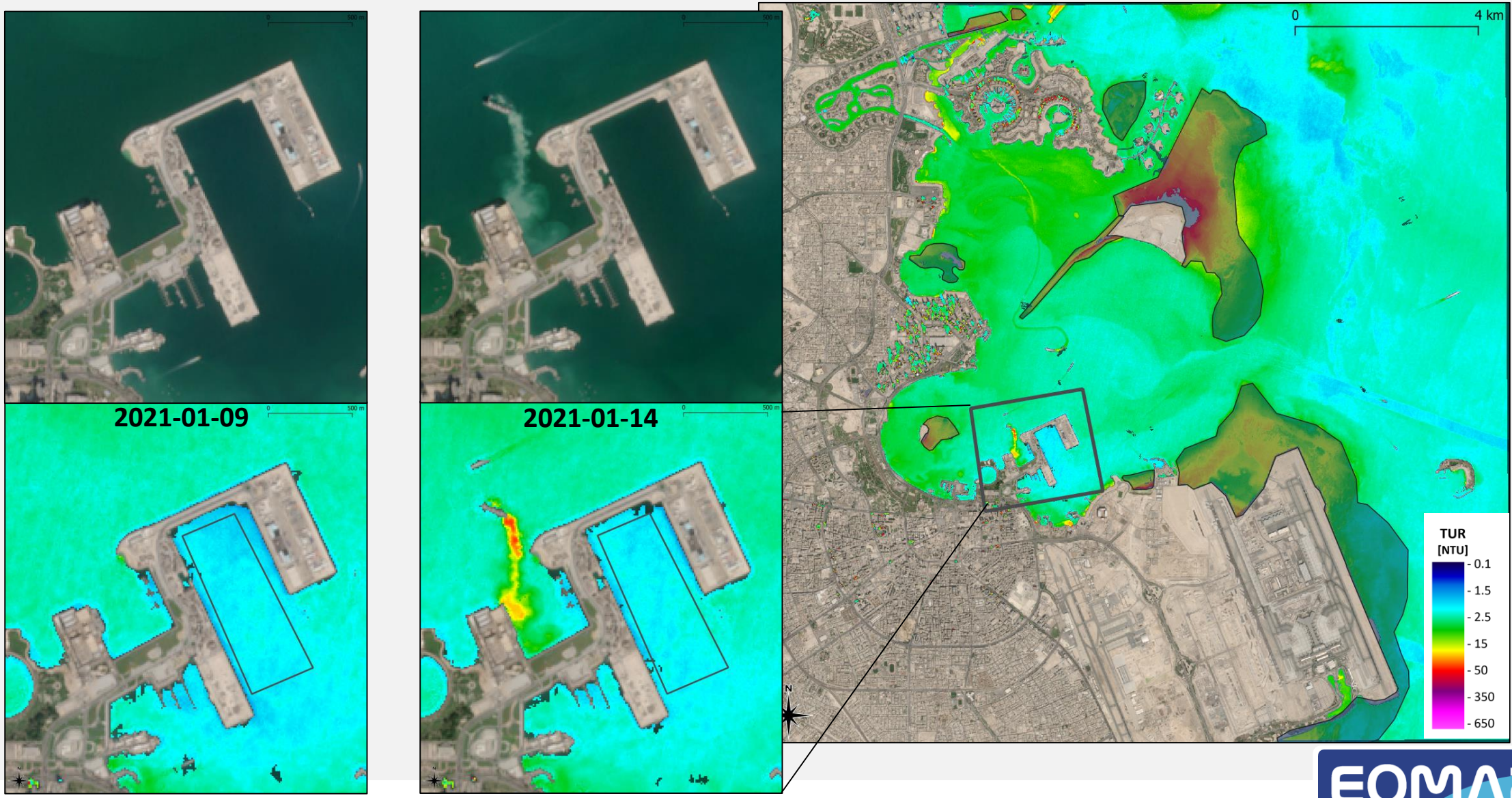
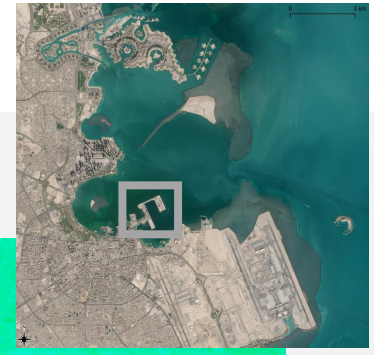
Turbidity Dynamics Example



Turbidity Dynamics Example



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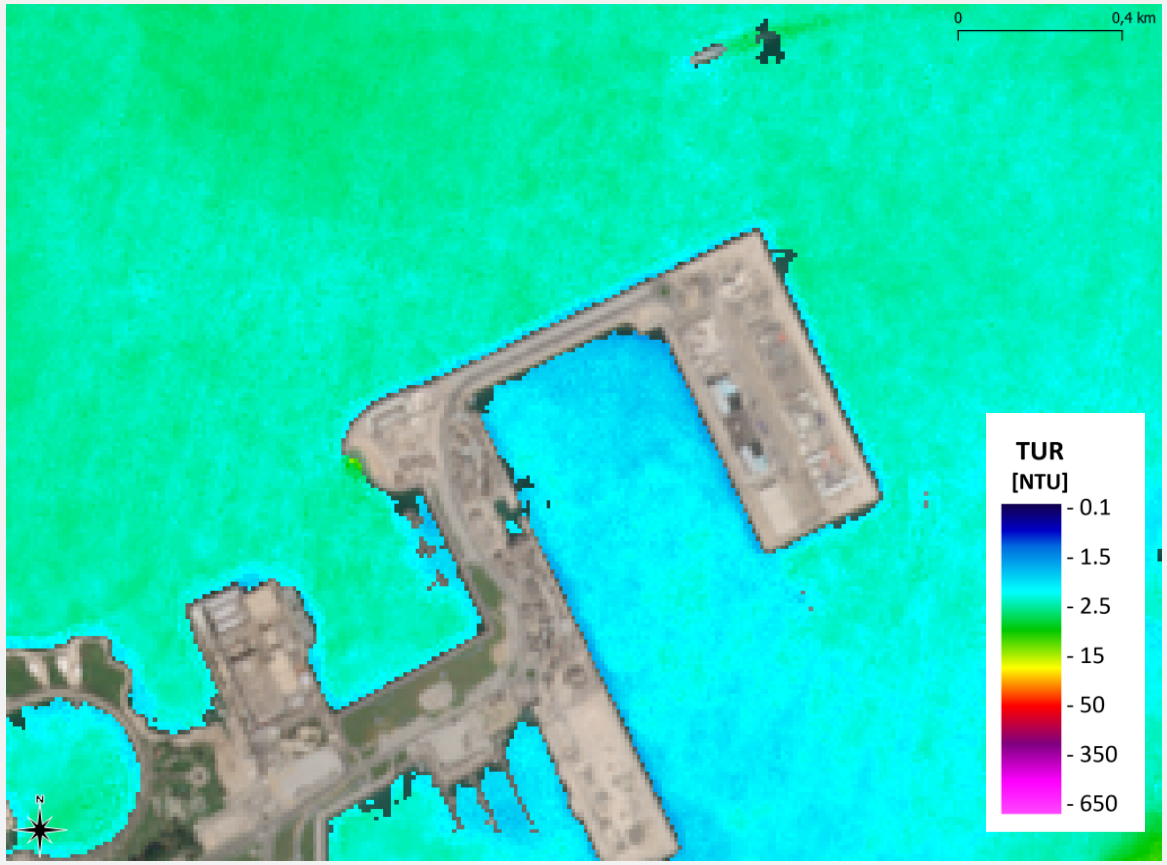

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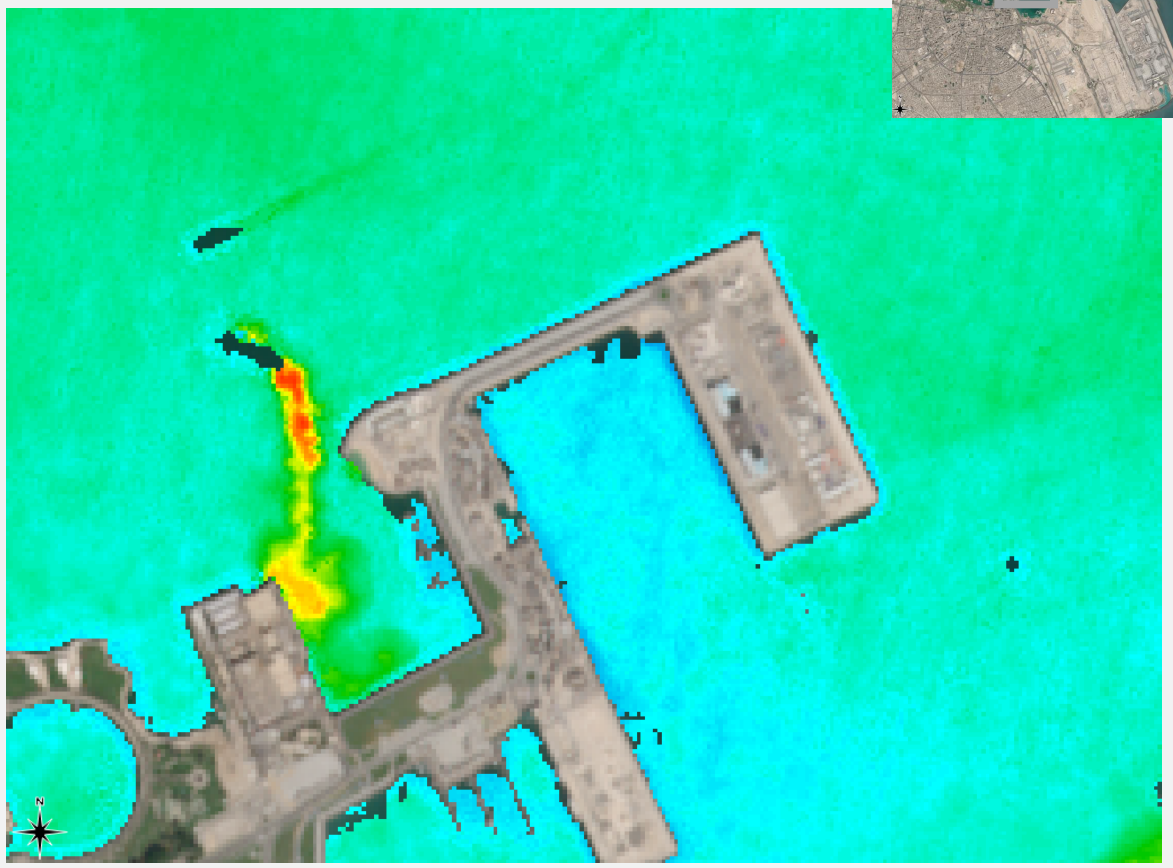

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