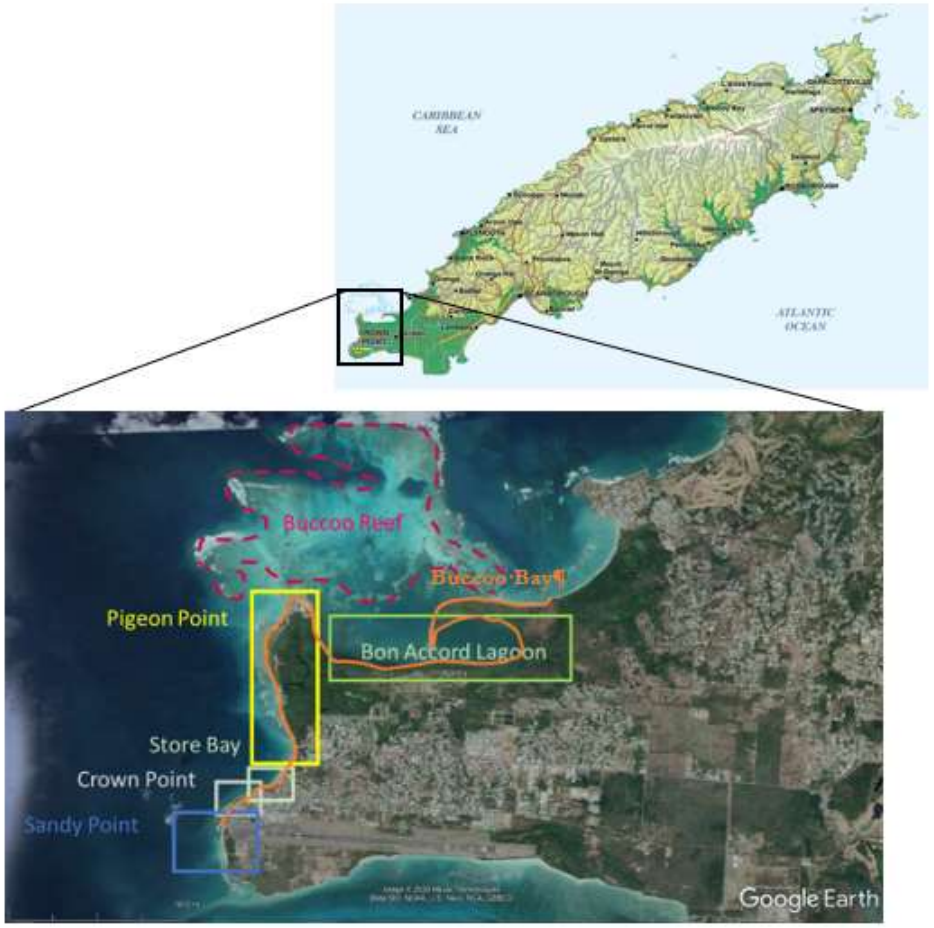
REMOTE SENSING APPLICABILITY TO UNDERSTAND COMPLEX COASTAL DYNAMICS

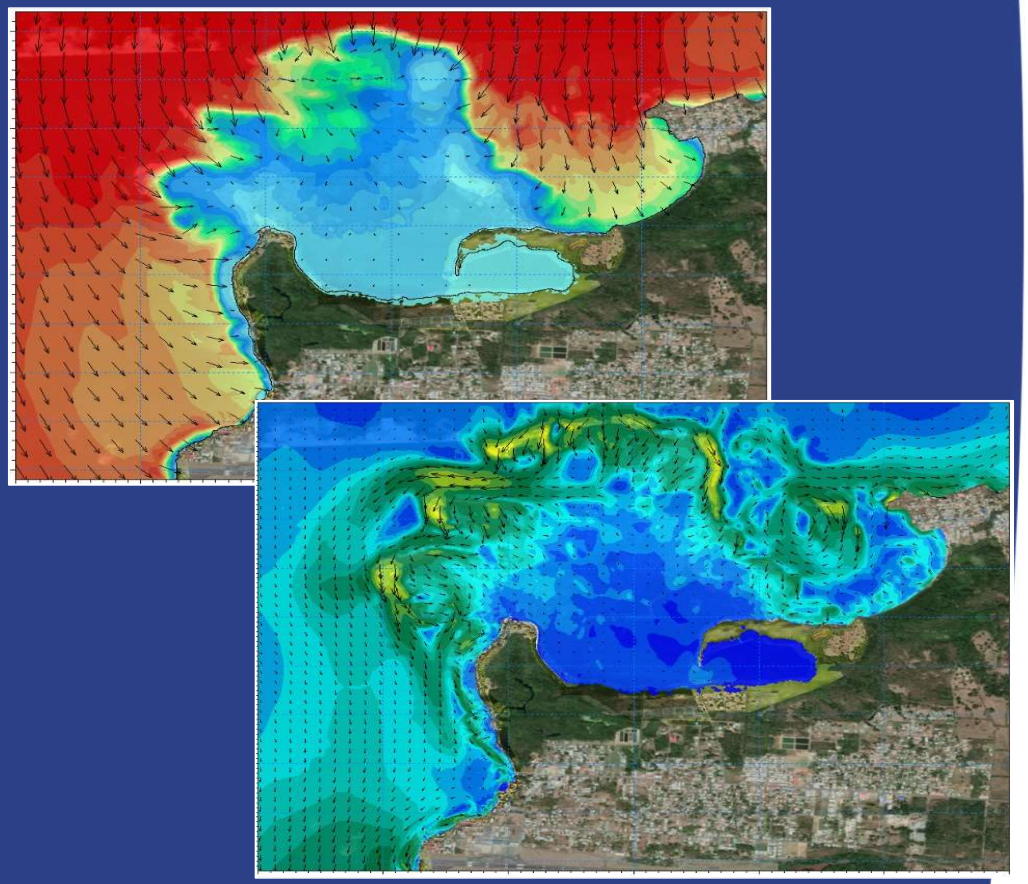
EOMAP | Edward Albada edward.albada@eomap.com

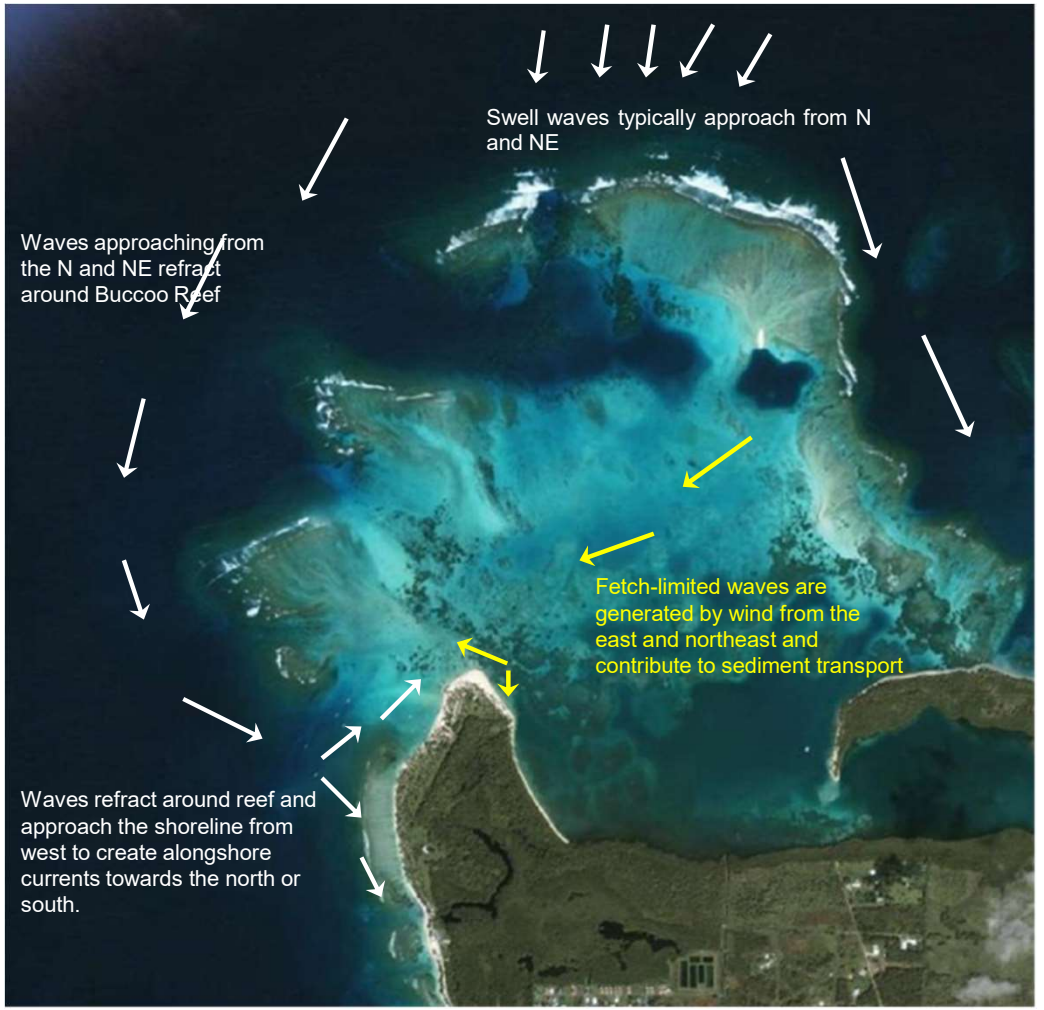
2022-10 -04

Project Site



Complexity of Site

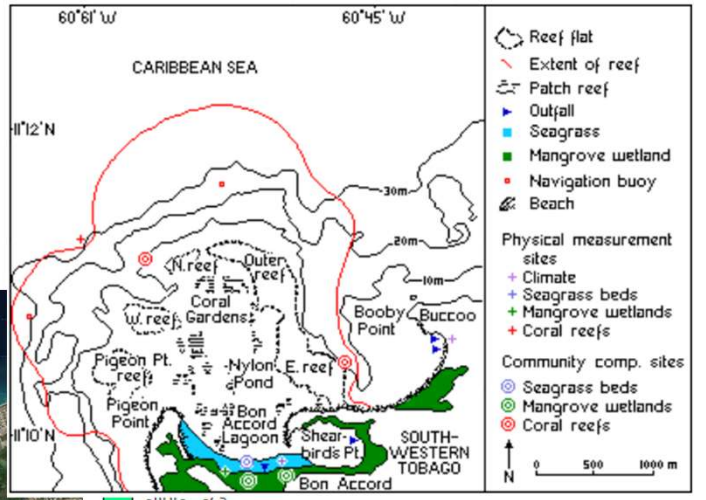


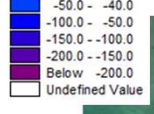


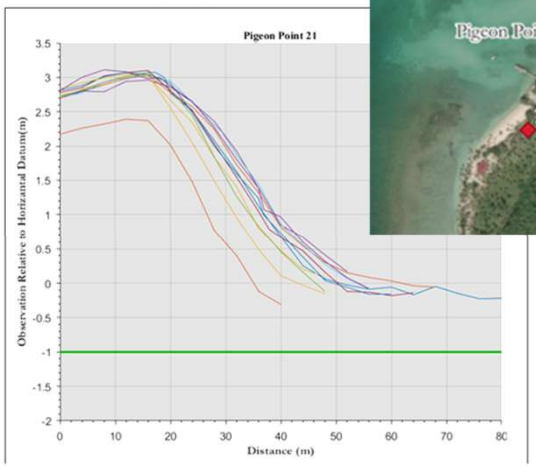
SMITH WARNER INTERNATIONAL EOMAP

Data constraints

- Sparce existing bathymetric data
  - Some offshore data
  - Limited transects in deeper waters
  - No bathymetry of reef
- Some beach profiles
  - Profiles from upper beach to -0.5 m only
- No spatial benthic mapping
  - Qualitative descriptions of reef condition

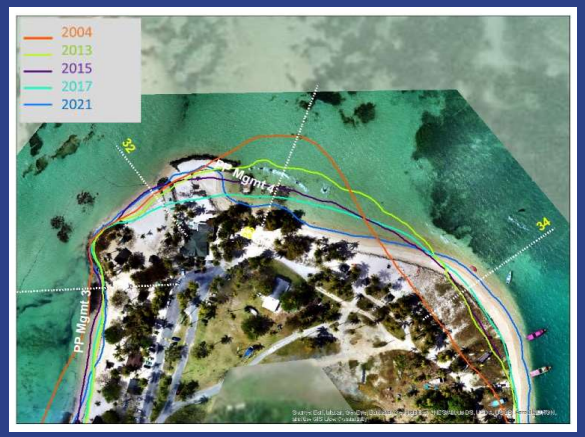


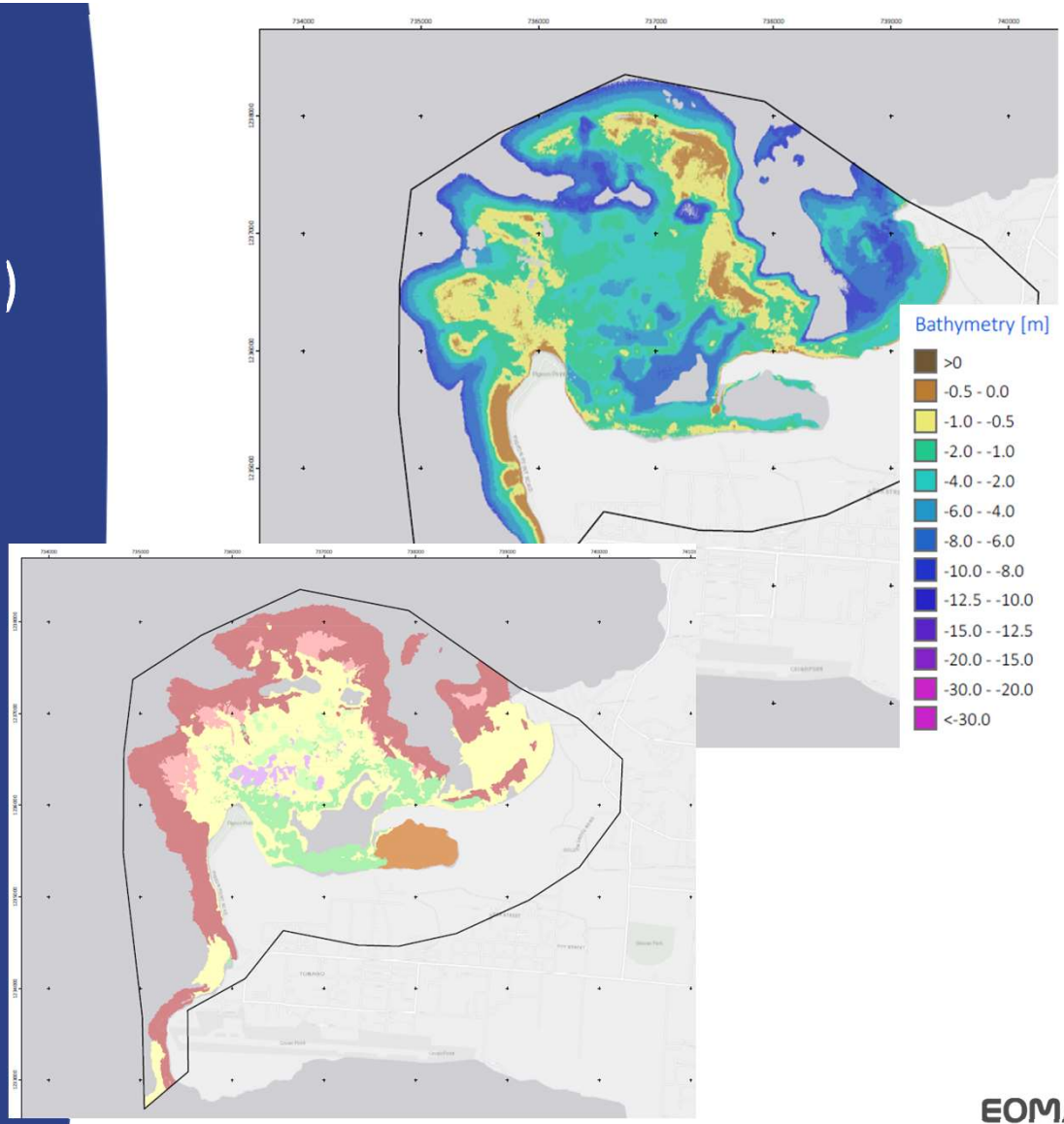




EOMAP data

- Satellite derived bathymetry (2m)
  - 2004, 2013, 2015, 2017, 2021
- Sea Floor classification
  - 2004, 2021
- Shoreline mapping
  - 2004, 2013, 2015, 2017, 2021





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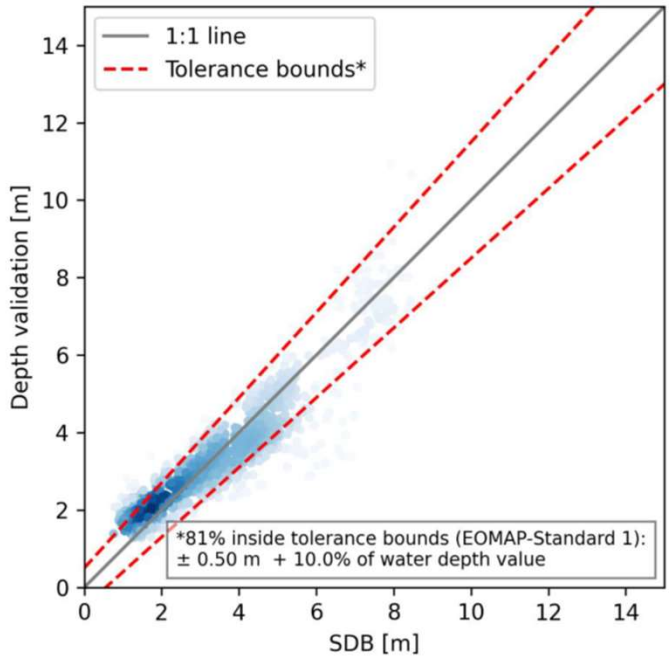
SDB Check

- Check against NASA's IceSAT-2 Atlas database
- 81% of the SDB data being within ±0.5m + 10%
- 96% within ±1m + 10%



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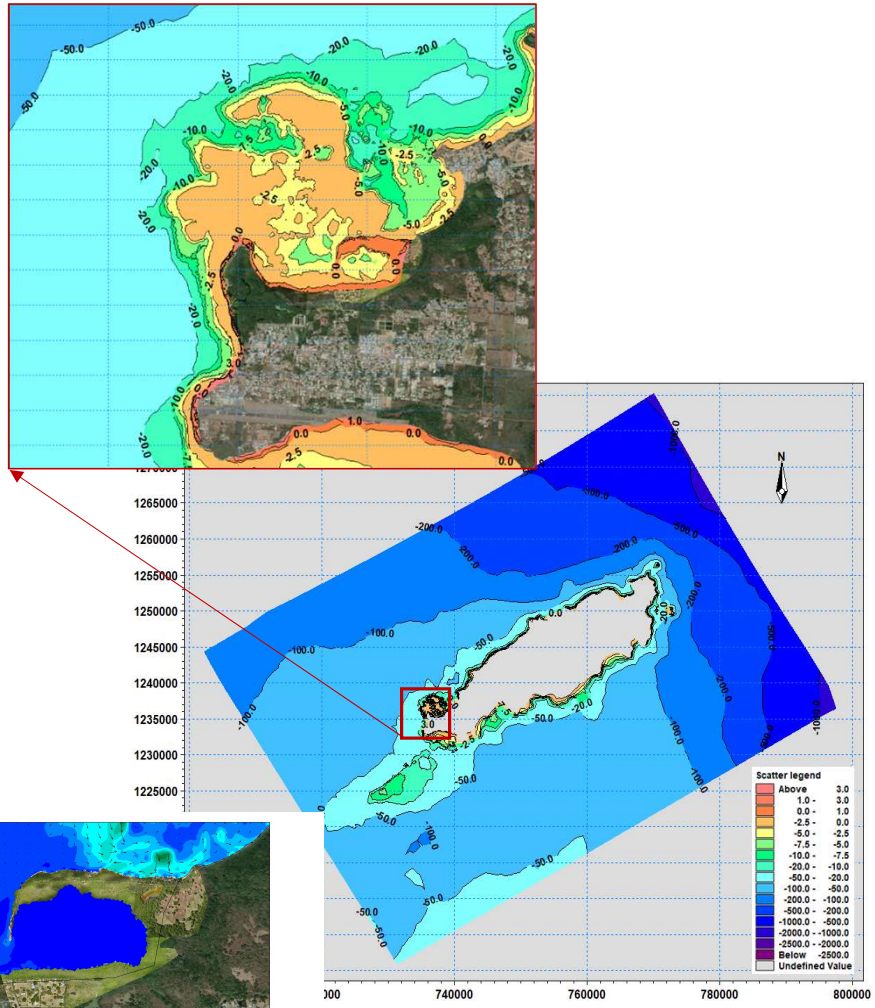
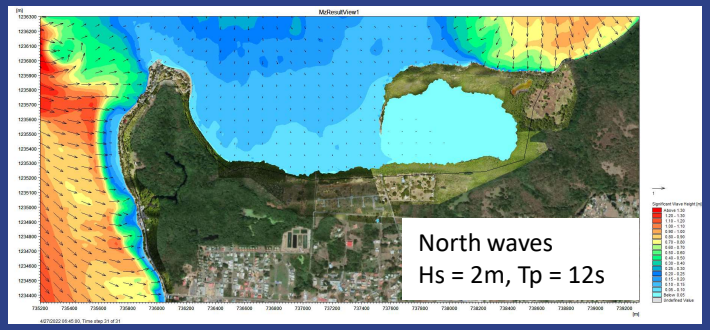
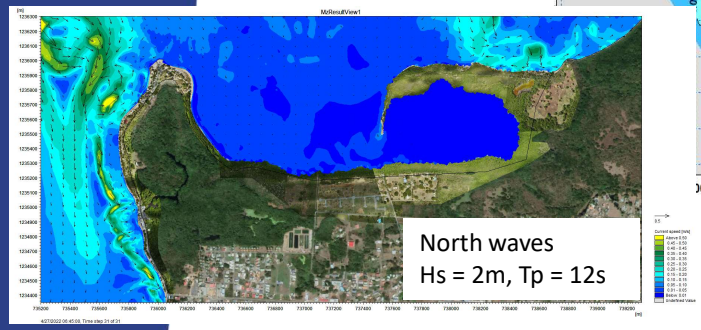
Modelling

- Comprehensive bathymetric mapping
- Modelling of waves, currents, sediment transport

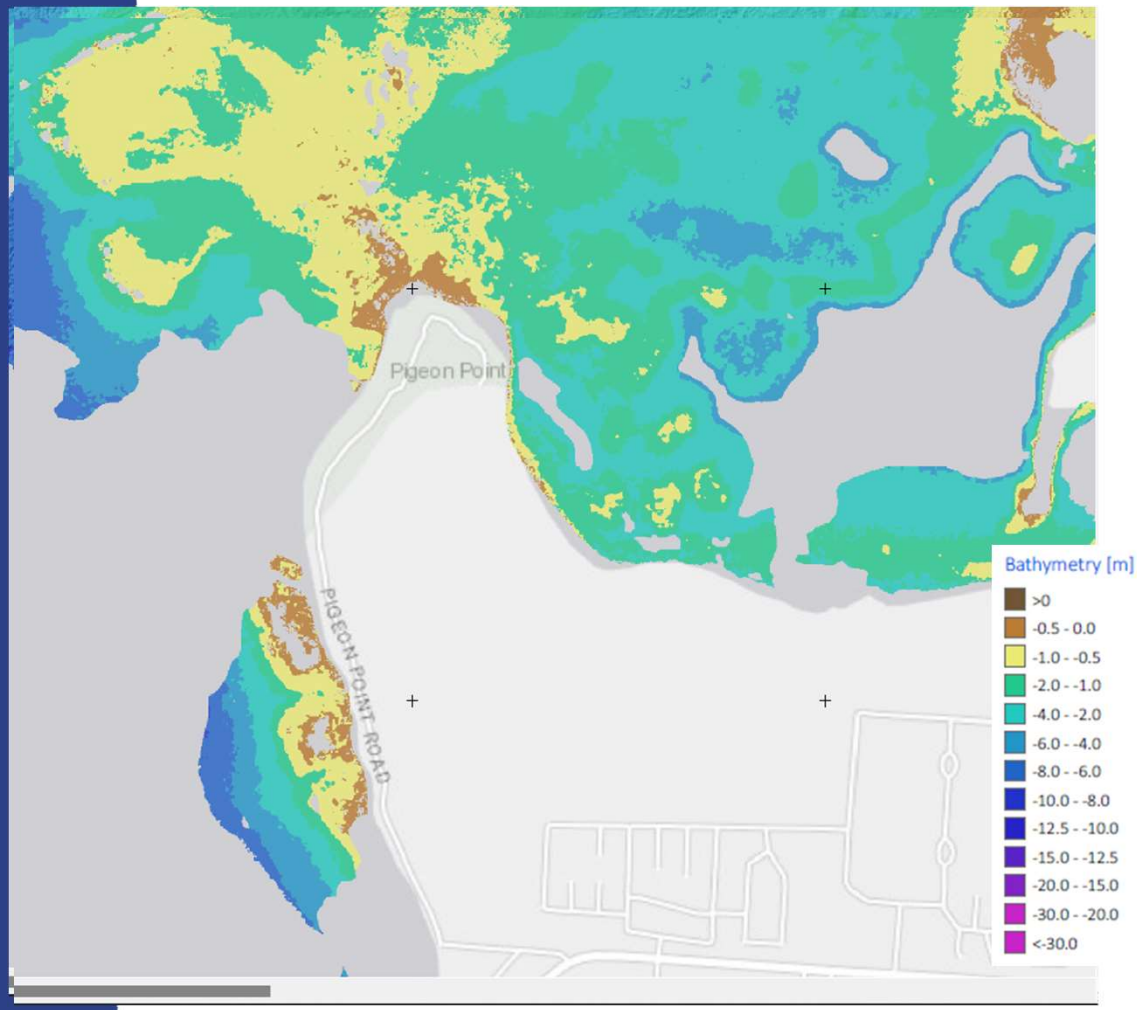






SDB “Time travel data”

- Historical evolution of seabed features
- Demonstration of formation of key shoreline features



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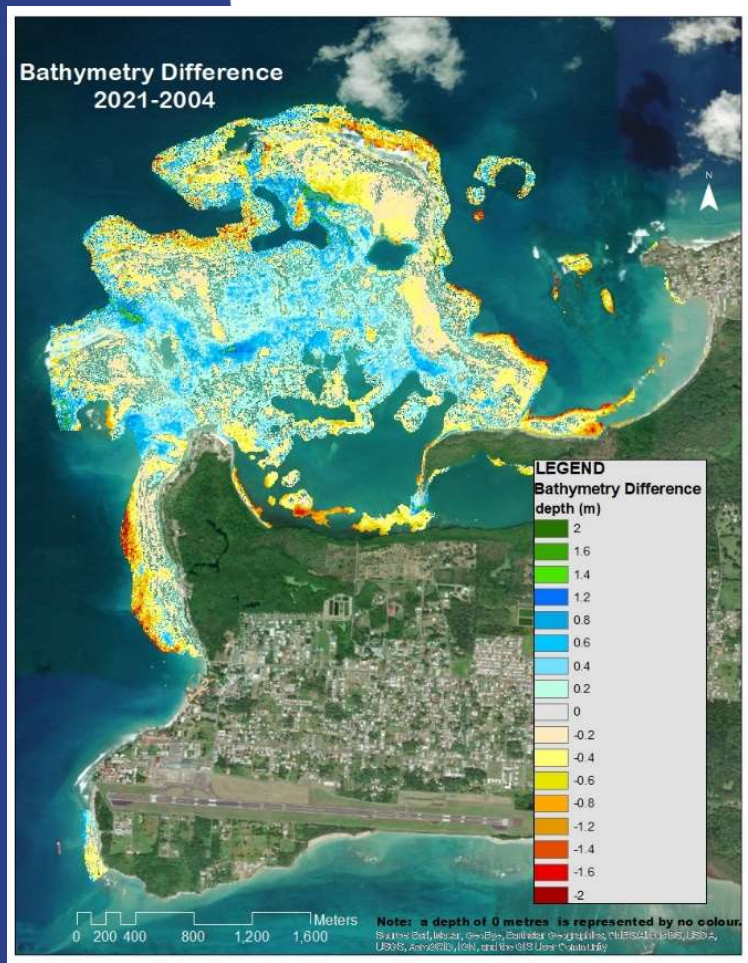
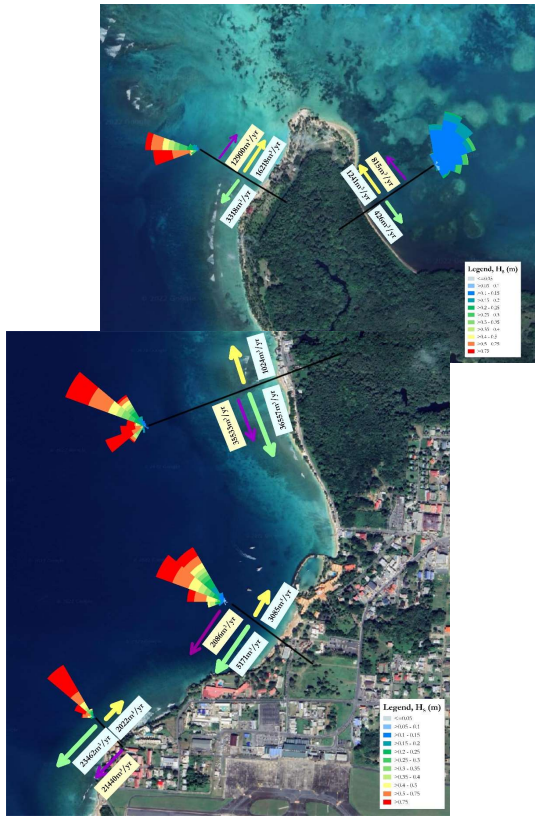
SDB Difference plots

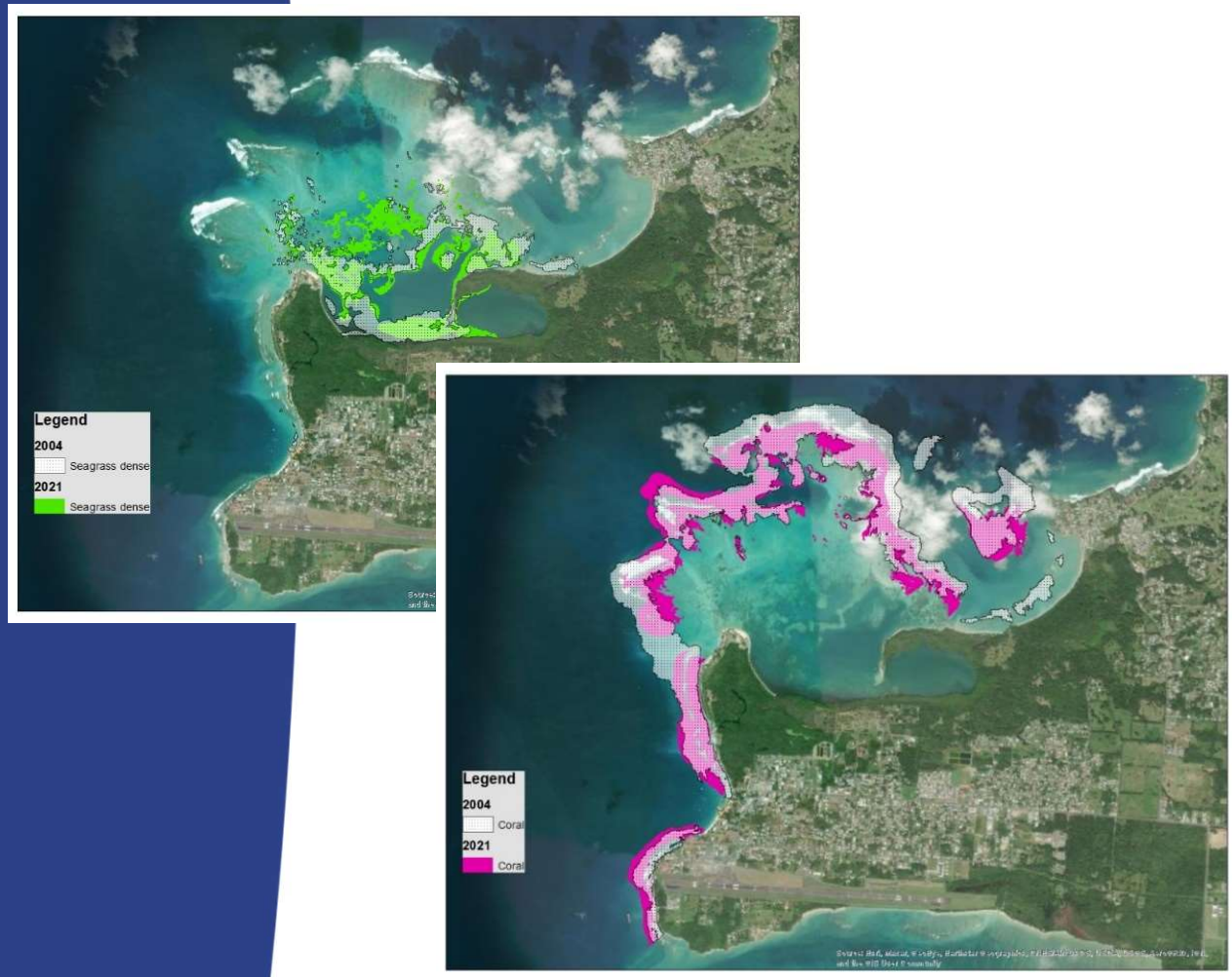
- Better understanding of spatial & temporal movement of sandbeds
- Volumetric analysis
- Sediment budget





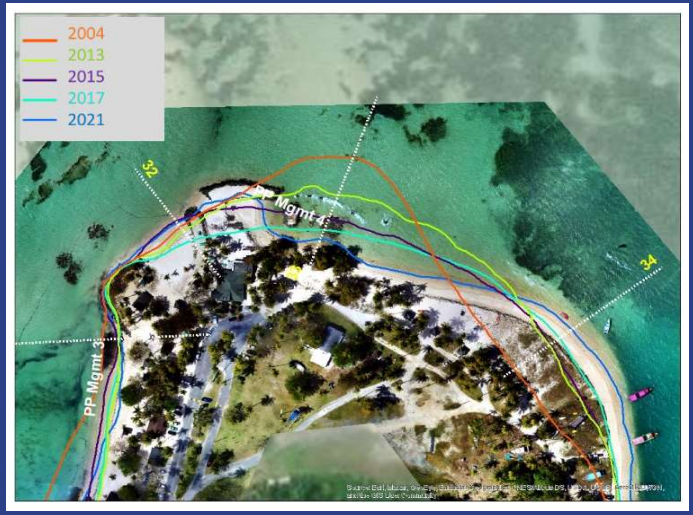
SFC Difference plots

- Identification of sensitive habitat areas
- Ability to track changes
- Significant (29%) decrease in coral cover 2004-2021
- Seagrass coverage area stable, BUT meadow locations have migrated



Understand structure impacts

- Structure built in 2020 with no feasibility assessment completed
- Highly dynamic shoreline
- Immediate shoreline reaction



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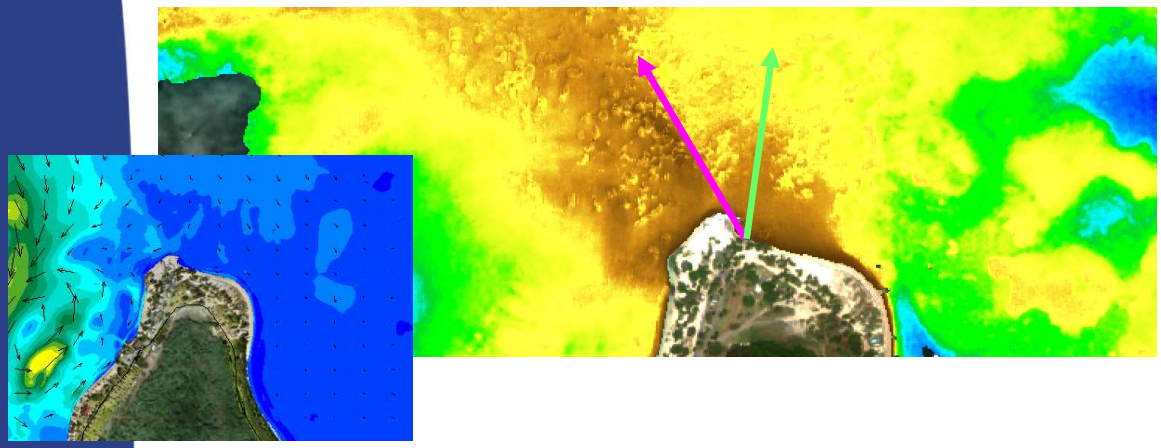
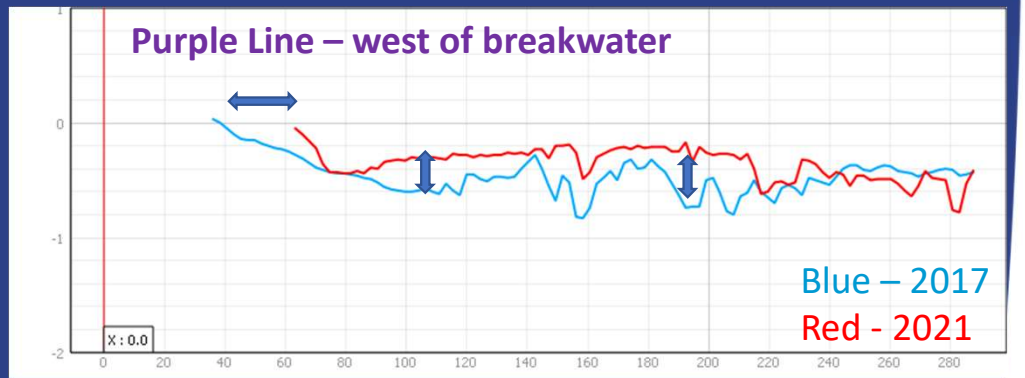
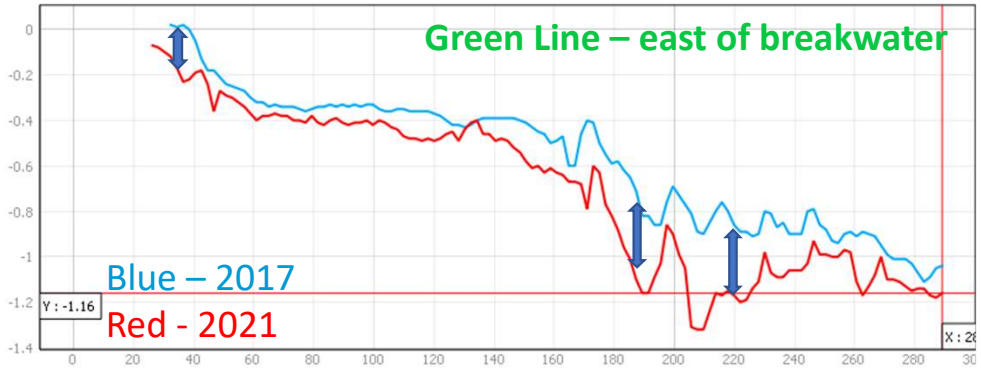
Understand structure impacts

- Demonstration of effects of structure
  - Accretion on updrift side
  - Erosion on downdrift side
- Justification for sound decision making







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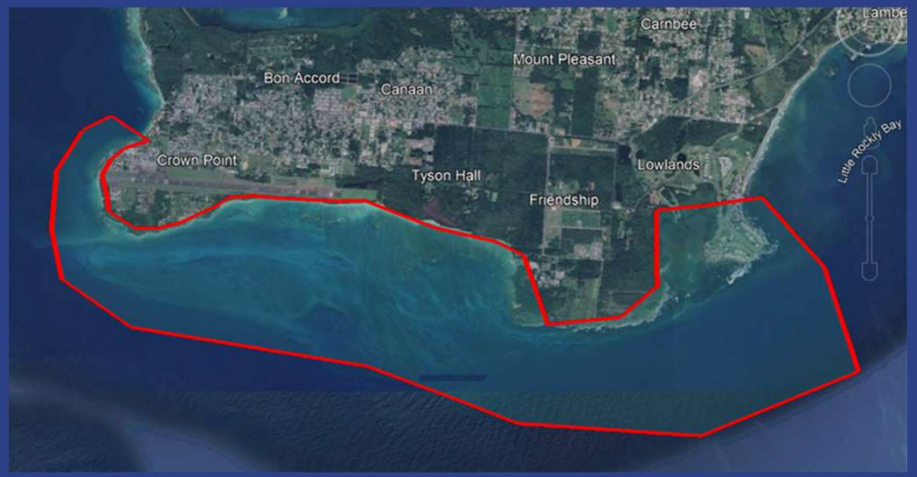
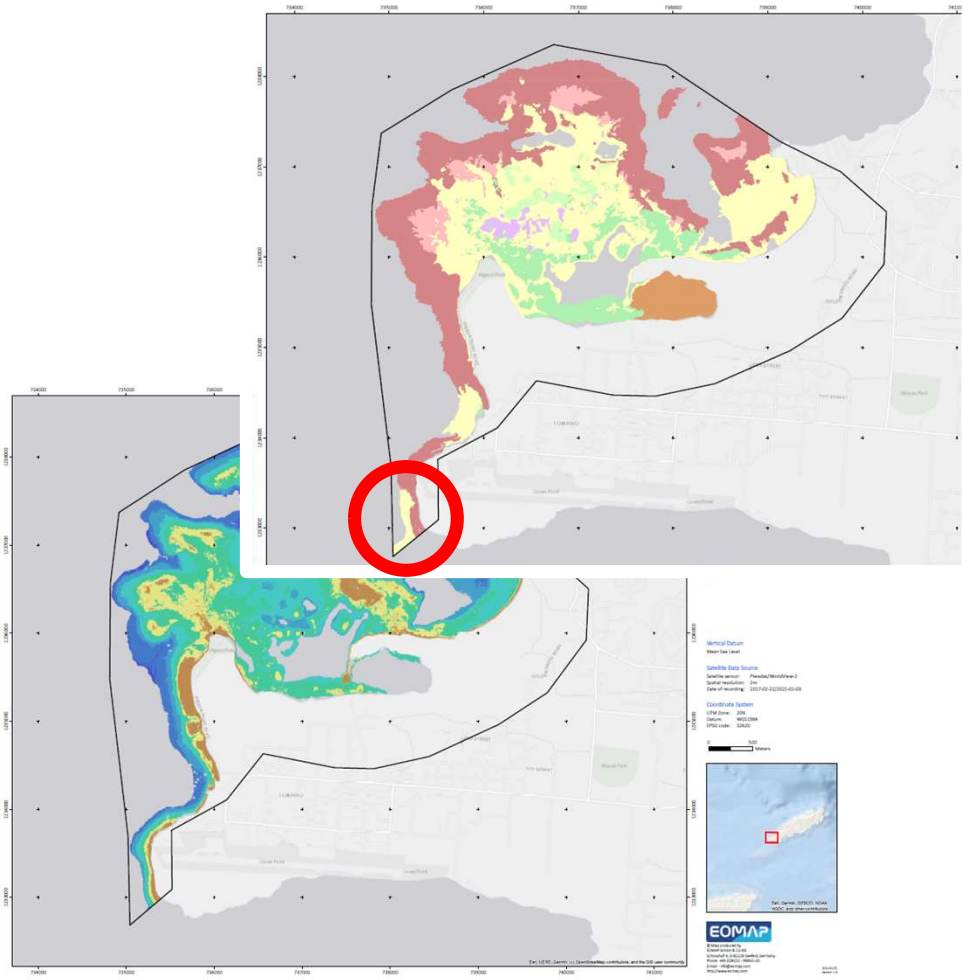
Added benefits

- SDB and SFC combined
  - Identify potential borrow areas for beach nourishment





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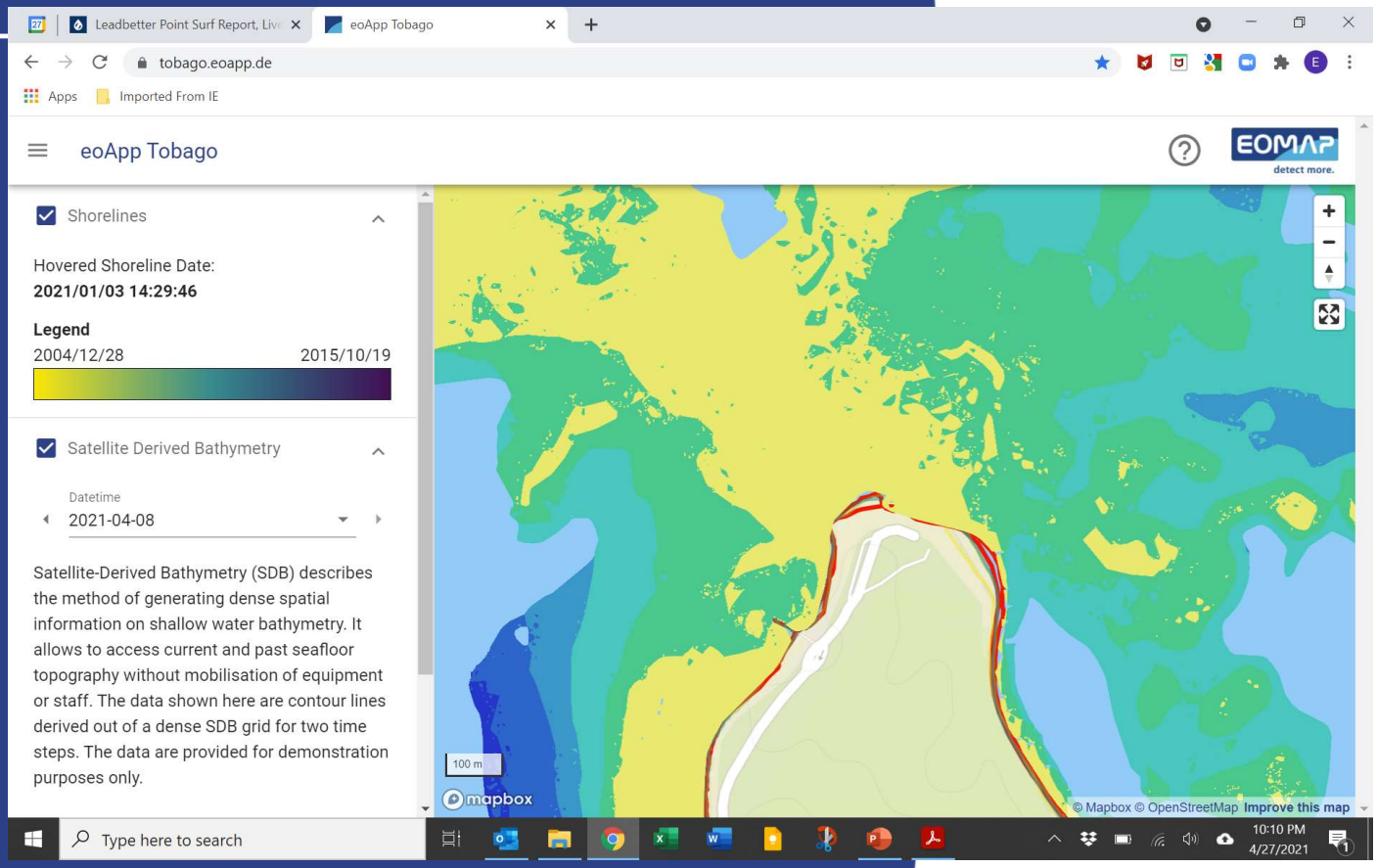
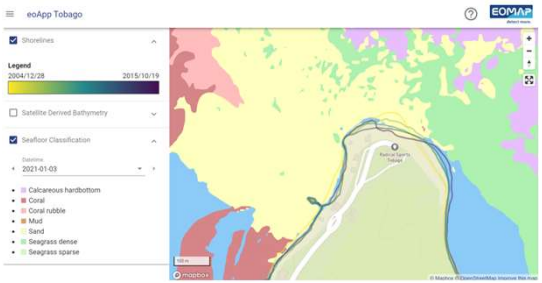
Webapp convenience





Webapp available at: https://www.tobago.eoapp.de/

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Summary of benefits

- Better data = improved modelling
- Minimize nearshore “guesswork”
- Understanding of coastline formation / coastal dynamics
- Quantification
  - Volumetric changes
  - Sediment budget
- Sand sourcing
- Webapp allows for a mechanism to showcase data
  - Convenient, accessible data storage
  - Transparency
  - Public relations
  - Project awareness

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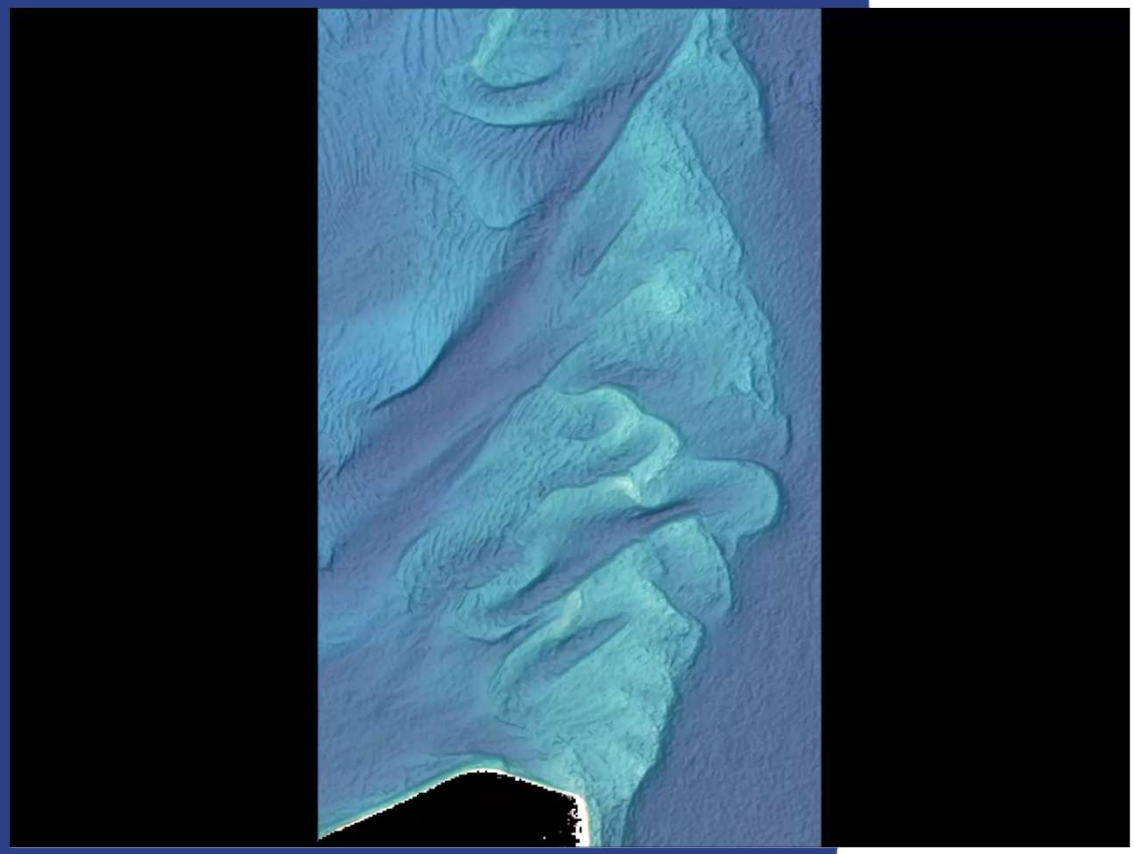
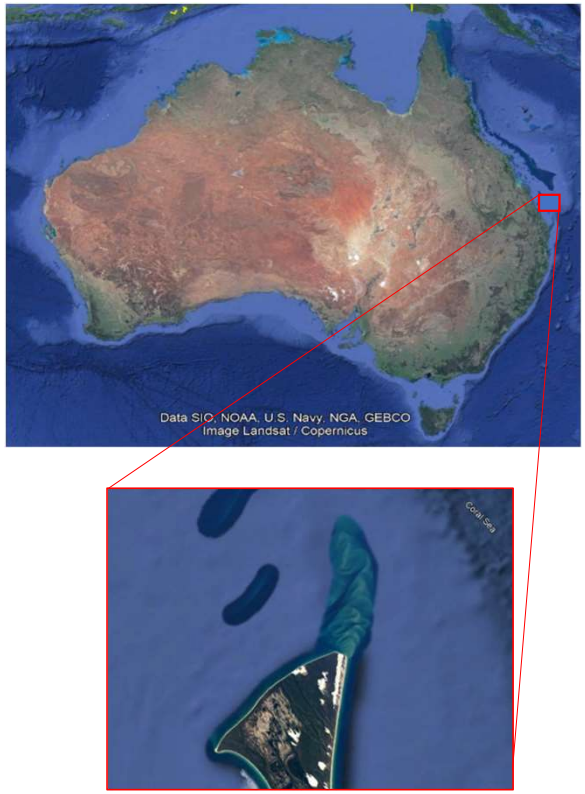
Really dynamic seabed application





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Thank you!

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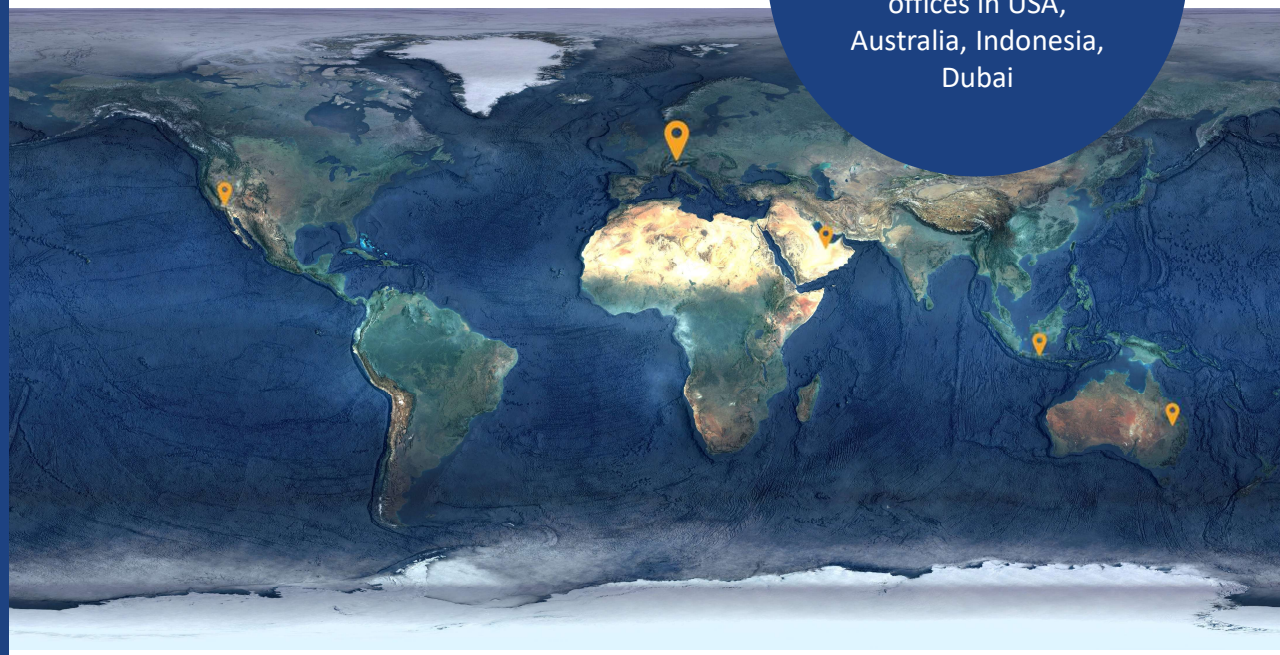
Internet: eomap.com

Germany (HQ)
USA
Indonesia
UAE
Australia

WHO IS EOMAP?

- Private high-tech company
- Focusing on satellite data analytics and software solutions
- Specialised on aquatic environments
- International team of +30 employees
- Serving engineering companies, governments, inter-governmental organizations and academia



HQ in Germany with offices in USA, Australia, Indonesia, Dubai

OUR CLIENTS AND PARTNERS

- Hydrographic Offices, Government agencies and Defence (UNESCO, ESA)
- Environmental organisations and water agencies (IHA, WHO)
- Port management authorities and dredging operators (VanOord)
- Coastal engineering and offshore industries (Fugro)
- Funding institutions, academia and NGOs (Horizon Europe)
- Satellite operators (Maxar, Planet, Airbus)