Transparency in shallow water SDB

QA-Mechanisms and software capabilities

Thomas Heege

EOMAP Germany

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Most cost-efficient | fastest data collection | any scales

Most prone to QA/QC processes

NOT: under all conditions

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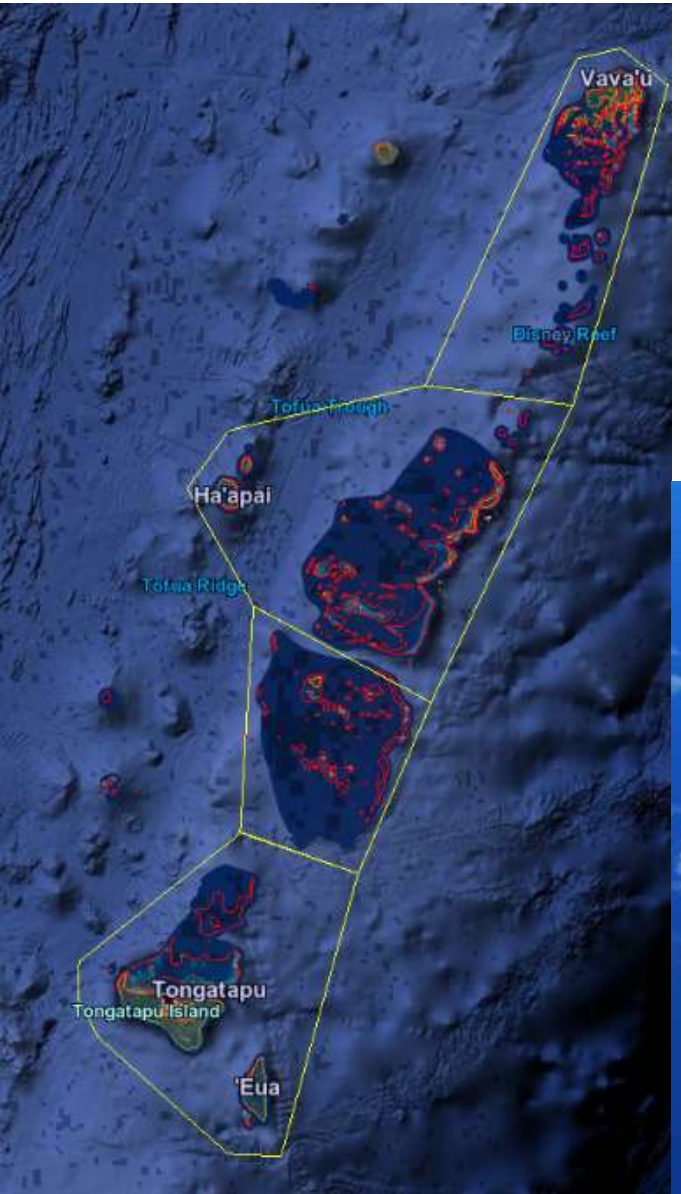
SDB to support charting: Tonga mapping for LINZ



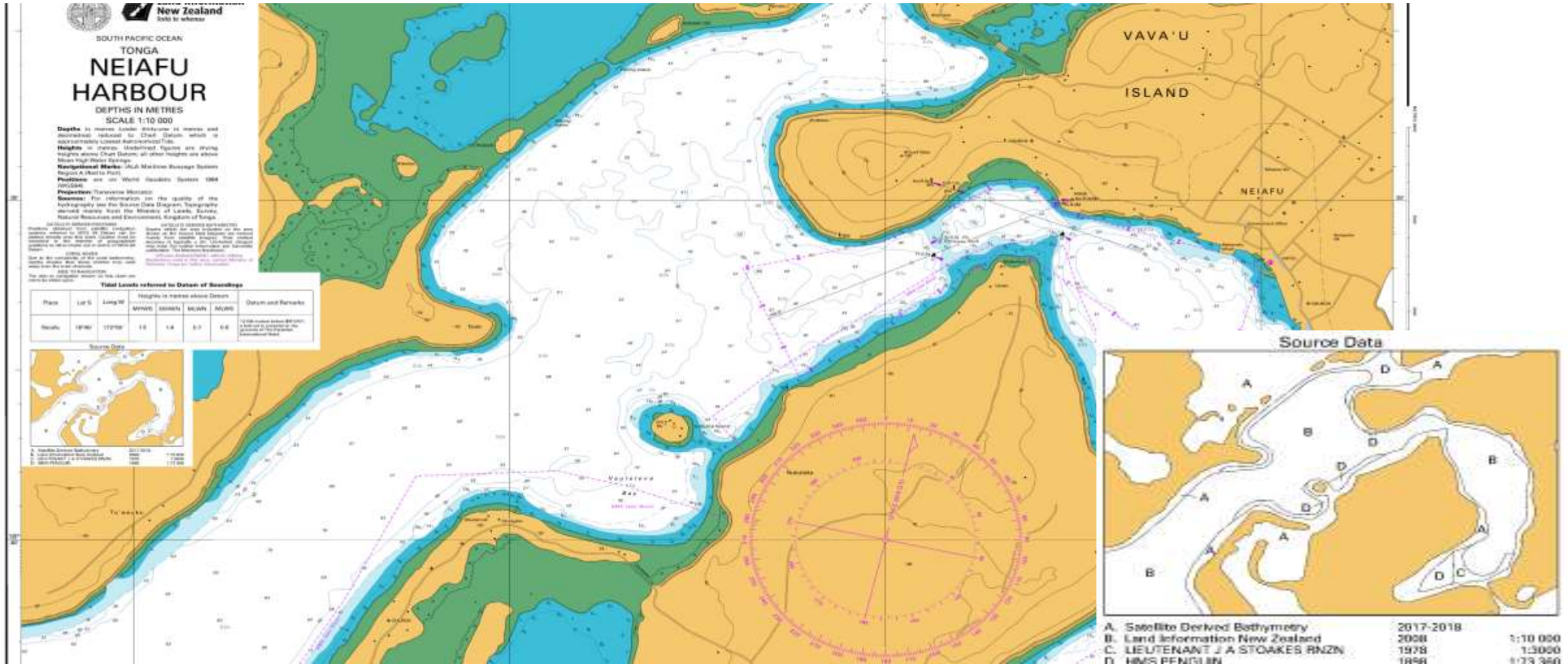
- 400,000 sq km, 6,500 sq km in 2m resolution mapped for LINZ in teaming with IXsurvey.
- Integrated SDB, MBES and ALB surveys

Adam Greenland, chief hydrographer LINZ 2018:

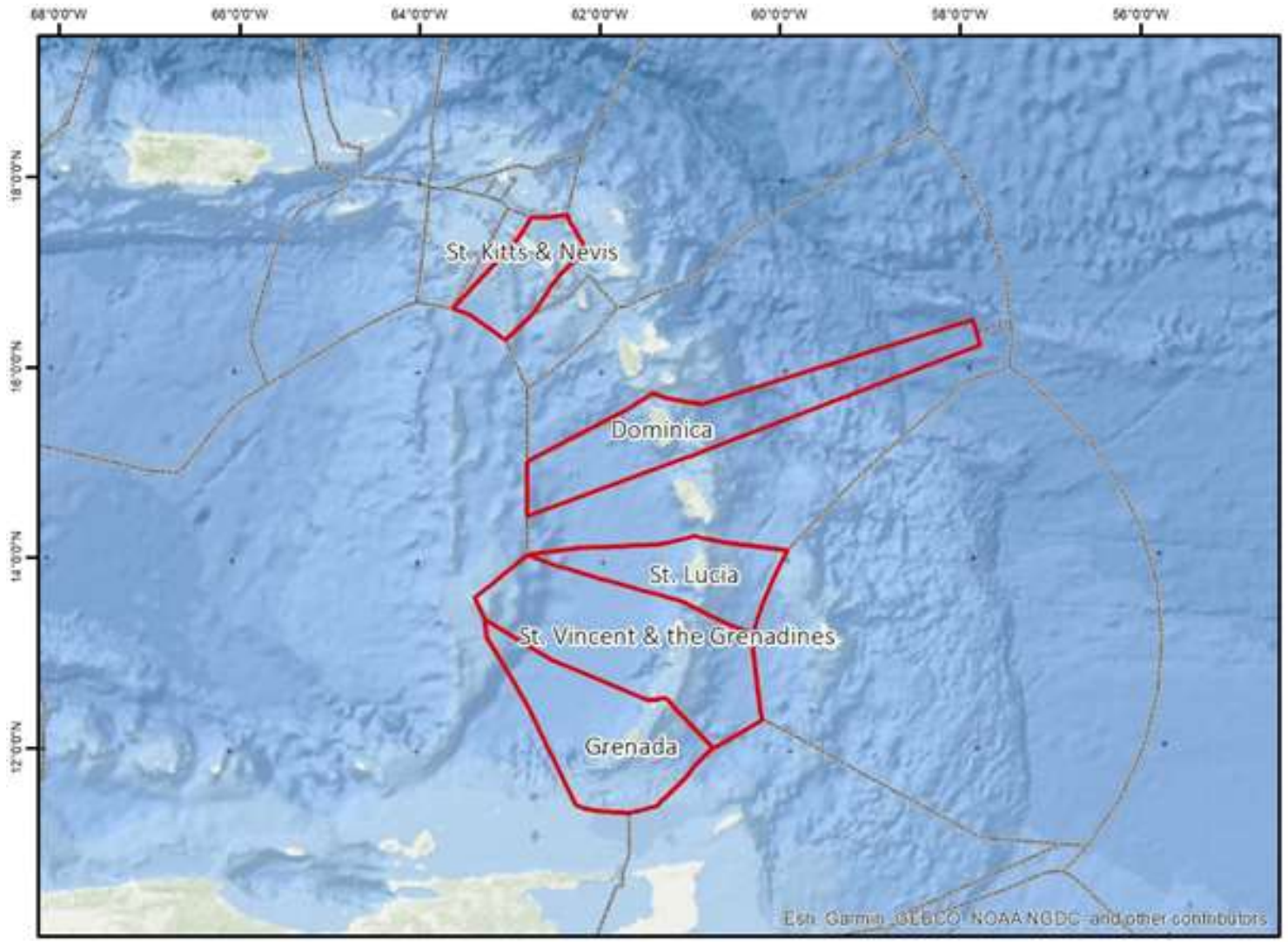
use ‚best data available‘

SDB to support charting: Tonga mapping for LINZ

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



SDB for *The Organisation Of Eastern Caribbean States (OECS)*



Saint Lucia
Saint Vincent
Grenadines
Grenada
Dominica
Saint Kitts
Nevis

Extreme High Resolution Satellite-Derived Bathymetry

9cm spatial resolution bathymetric grid:
Data fusion of airborne drone and satellite data

> 100 SDB contracts in 2 years

Great Barrier Reef SDB for monitoring progr. 2019

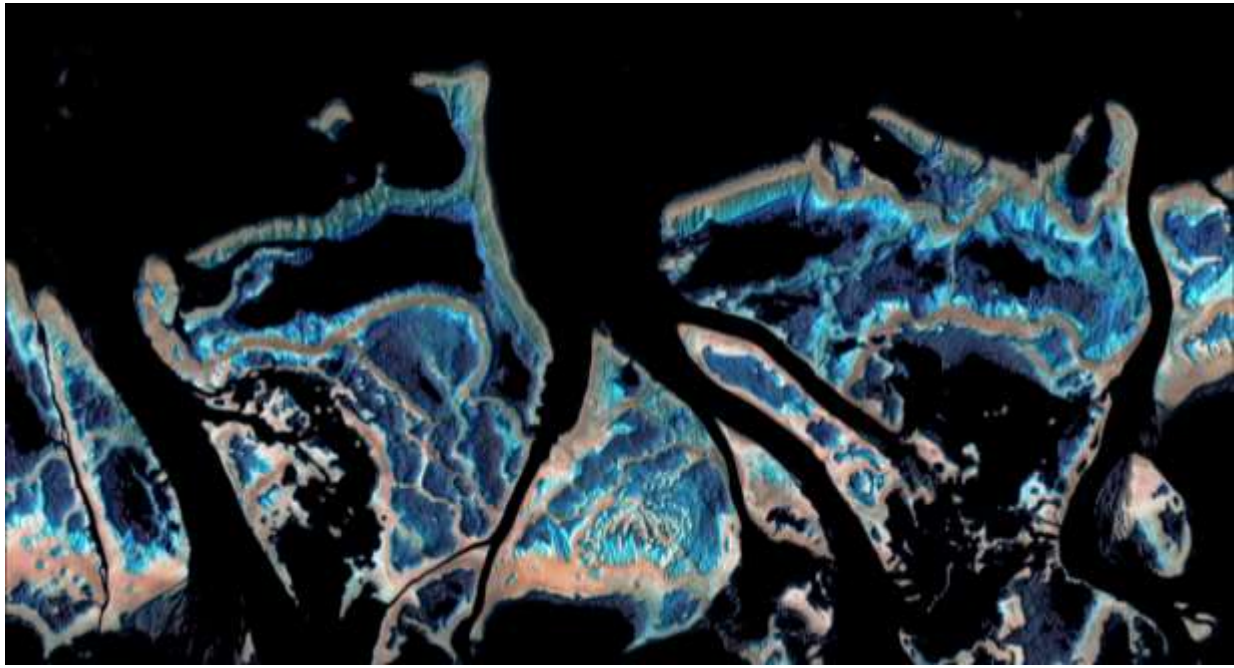
EMODnet data provision Europa 2018/2019

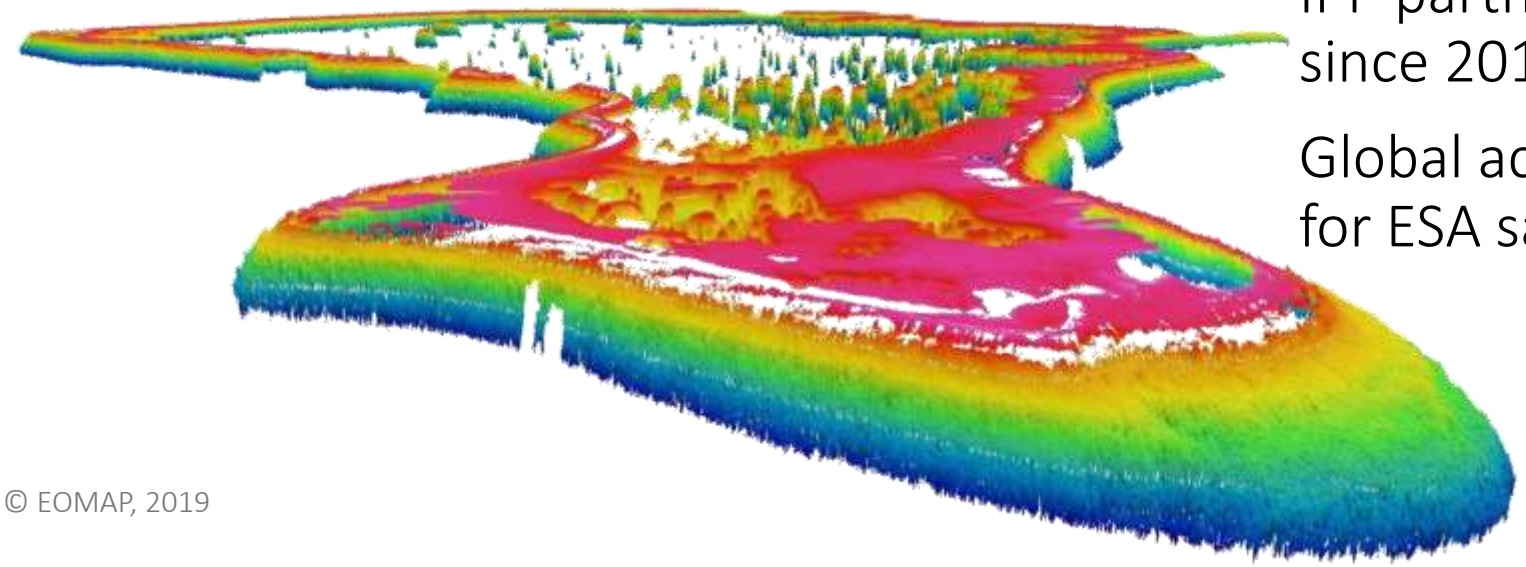
GEBCO & Seabed 2030 contributions

Updating BA charts for e.g. UKHO, Tuvalu 2018

Contracts with industry & partner Fugro

…





Various satellite data providers

IPP partnership Digitalglobe/Maxar & EOMAP since 2014

Global access and image acquisition trigger for ESA satellites and EU data centers

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SDB production in practice

Correction of environmental impacts

Traceable generation of independent SDB and uncertainties

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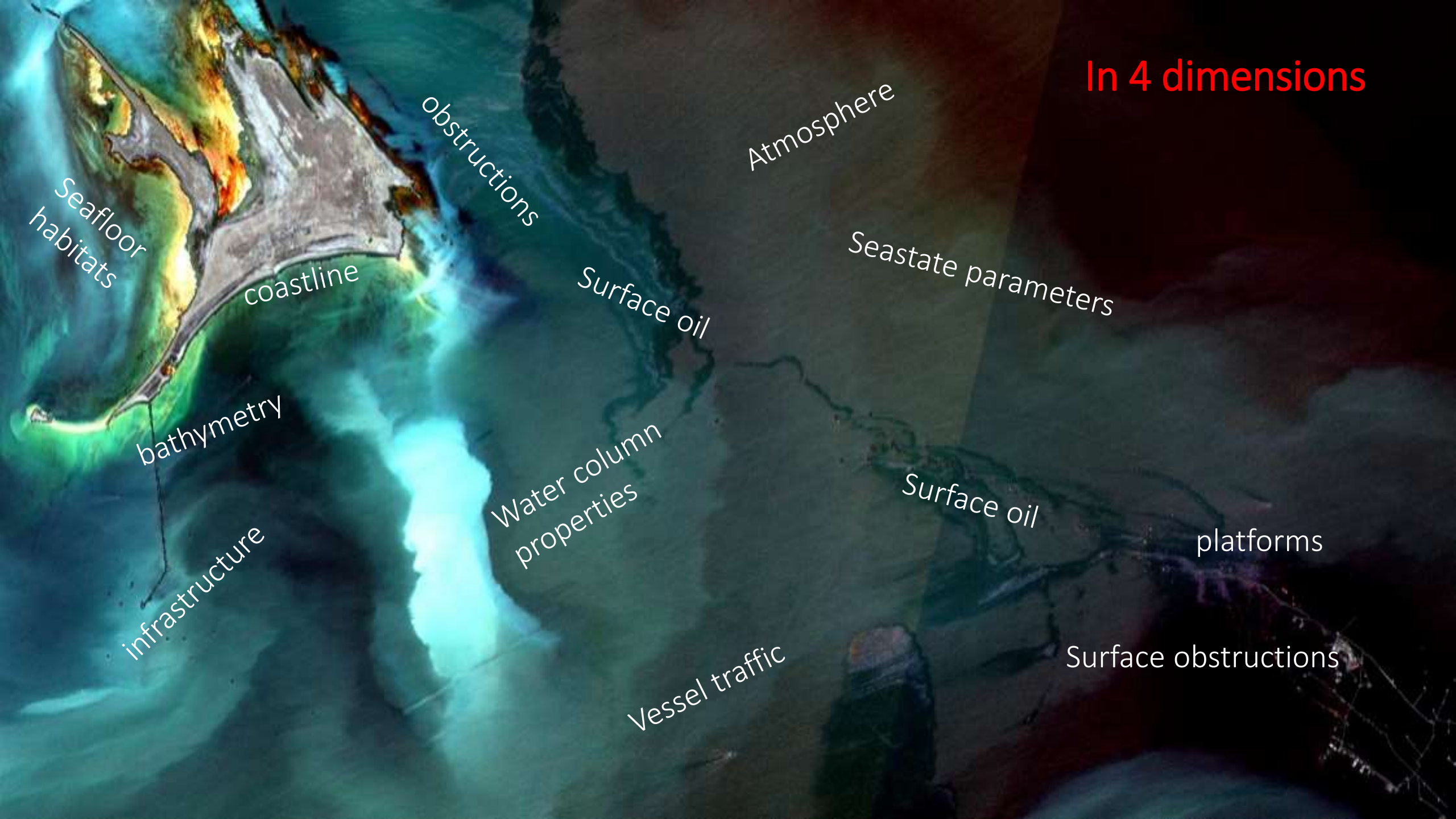
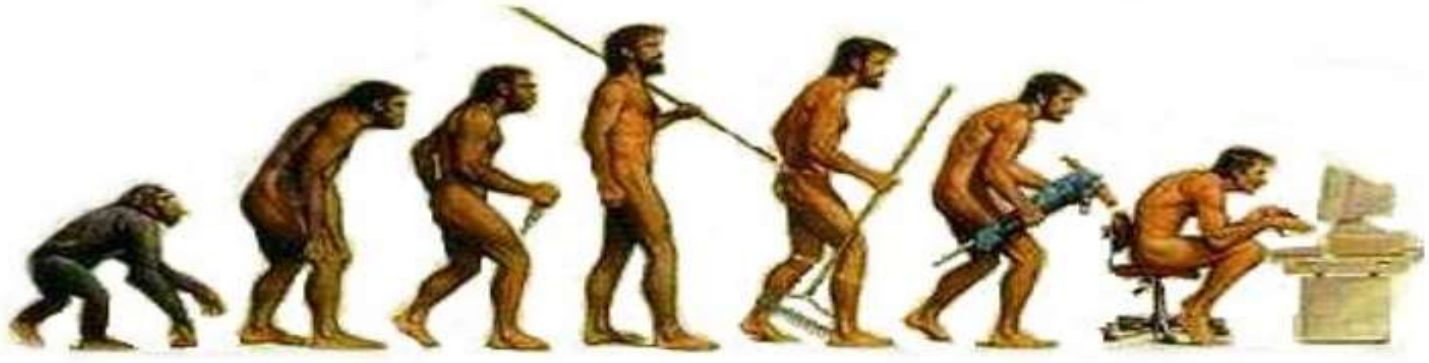

In 4 dimensions
Seafloor habitats
obstructions
Atmosphere
coastline
Surface oil
Seastate parameters
bathymetry
Water column properties
Surface oil
platforms
infrastructure
Vessel traffic
Surface obstructions

Evolution of Satellite-Derived Bathymetry



Manual interpr.
Stereo-photogr.

Empirical SDB
IHO cookbook

AI

semi physics based SDB

Fully physics based SDB

....

Bathymetry training data required

Training data not required

197x

1974

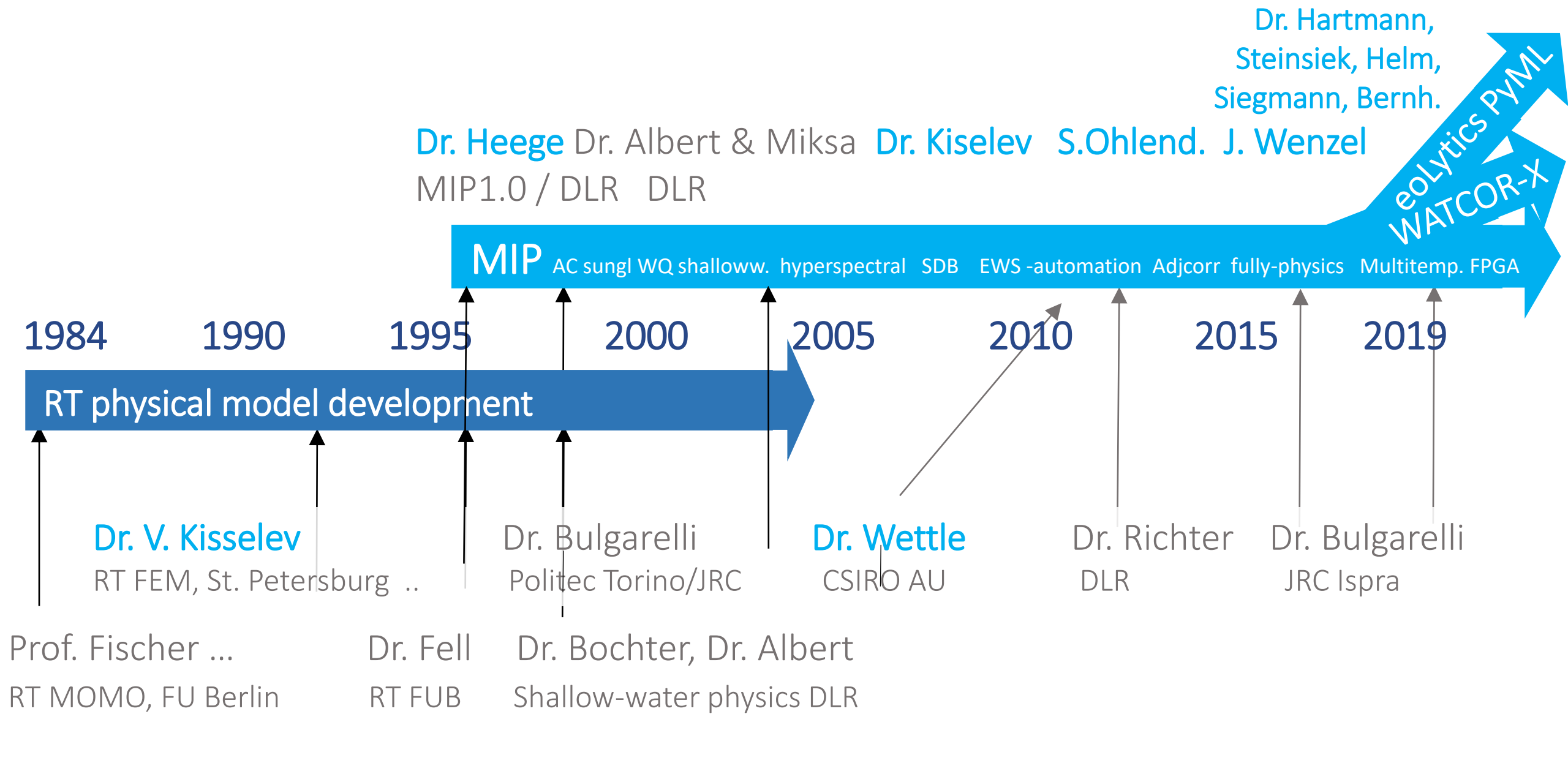
201x

2015

197x

198x

History on EOMAP‘s physics based Satellite-Derived Bathymetry



QA/QC processing

- **Pre-processing**

  Selection of appropriate satellite and airborne sensors,

  Selection of appropriate recording / environmental condition (geometry, season, ..), multiple scenes …

  …

- **Post-processing:**

  Tidal effects

  Horizontal displacement with water depth through water refraction

  Data cleaning: Manual / semi-automated interpretation

  Cal/Val process if in-situ data are accessible

  Creation of ISO conform metadata

  …

- **Image data processing: corrections and QC procedures**

  Classification of area of interest into land, cloud, water, breaking waves, ….

  Pixelwise correction of effects of atmosphere, adjacency effects, sunglitter …

  Correction of effects of water constituents absorption and scattering in the water column

  Coupled seafloor albedo and water column thickness calculation

  Error propagation, uncertainty processing

  ….

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Lost in the jungle ?

Scientifically	Correction of environmental impacts Scientific traceable SDB generation
Practice	Automation & qualified staff
Economically	Balancing automation and manual QA/QC process

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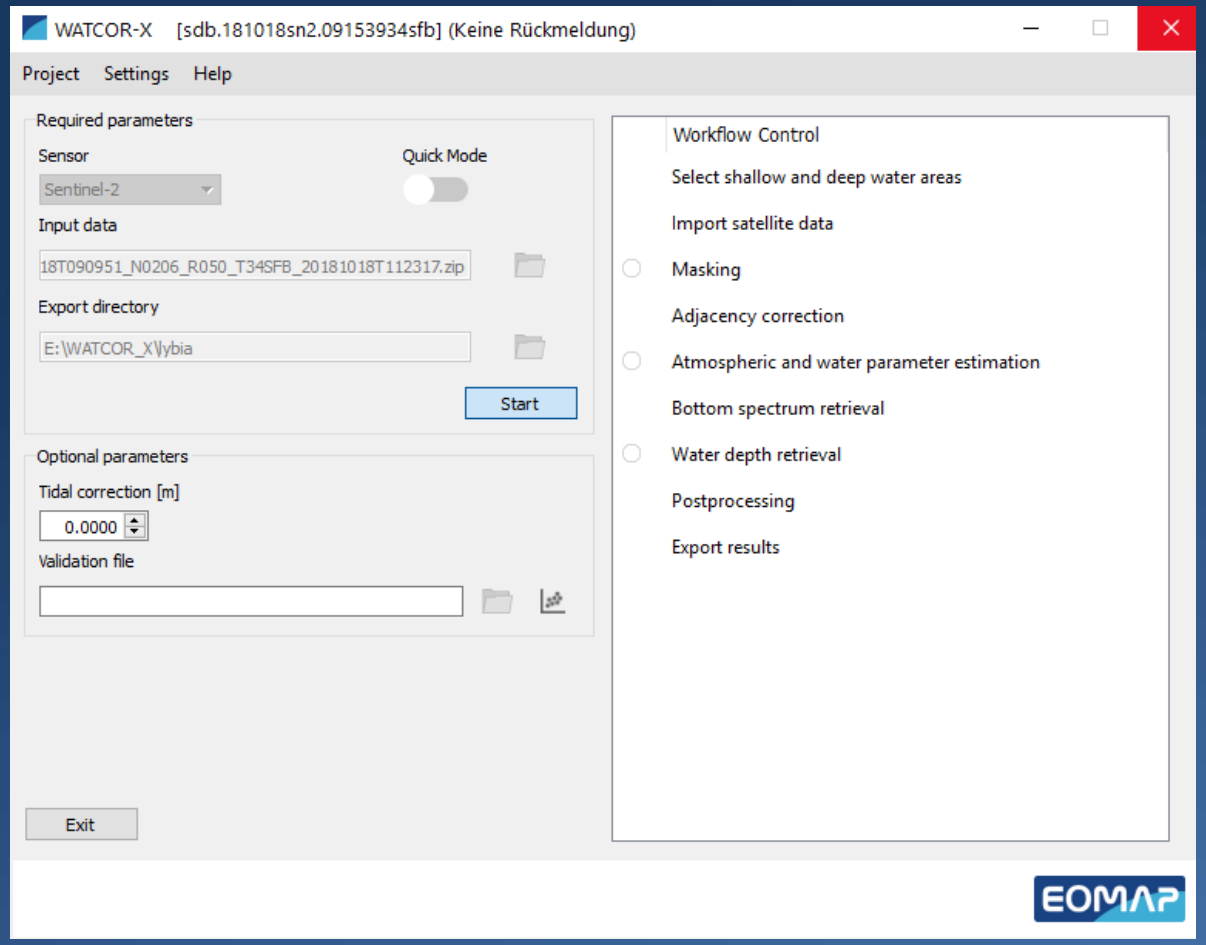
Lost in the jungle ?



Watcor-X

... easy to use

... high automation level

... highest scientific level

... highest transparency

... professional configuration

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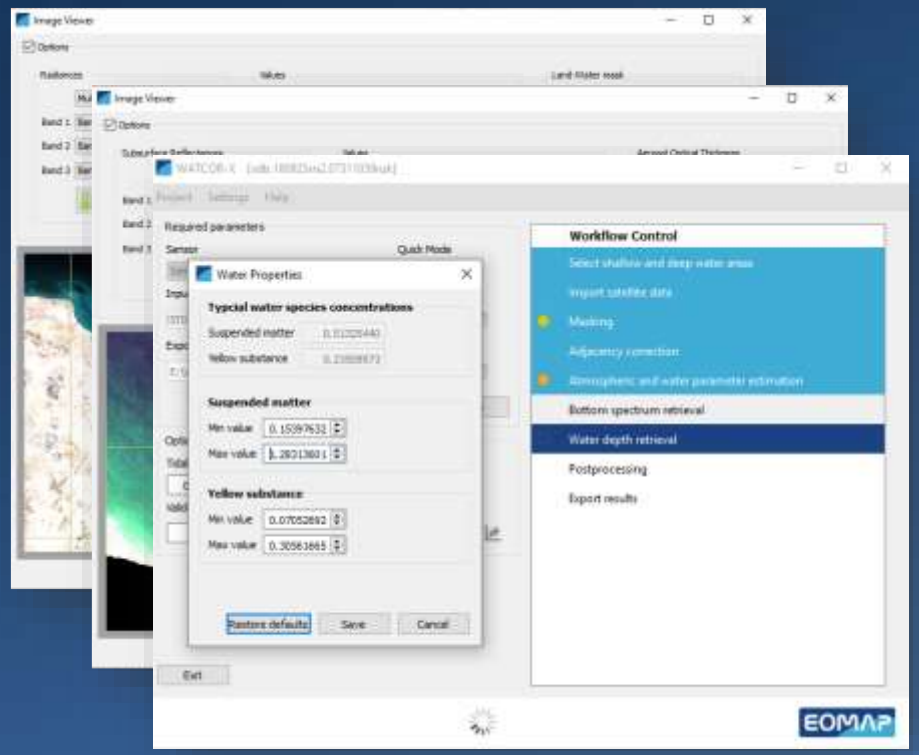
Transparency and traceability

Desktop Software

Watcor-X

Standardized, repeatable and traceable processes



All data and side products accessible and open

© EOMAP, 2019

SDB capacity building | training | certification

Introductions IHO & Regional Commissions e.g. NIOHC, EAHC, SWPHC

Understanding & Exchange **SDB day**‘s 2018 / 2019 / 2020 **HO‘s, industry, provider, RND**

see: www.sdbday.org

Training, workshops, building in-house capabilities

2019: 3 countries

Watcor-X stand-alone processing software

eoLytics:

cloud based SDB-light

Water quality, other EO data

Training for remote hydrographers

Level 1 Implementing — Approaches, best practices & application range
Standards & QA requirements

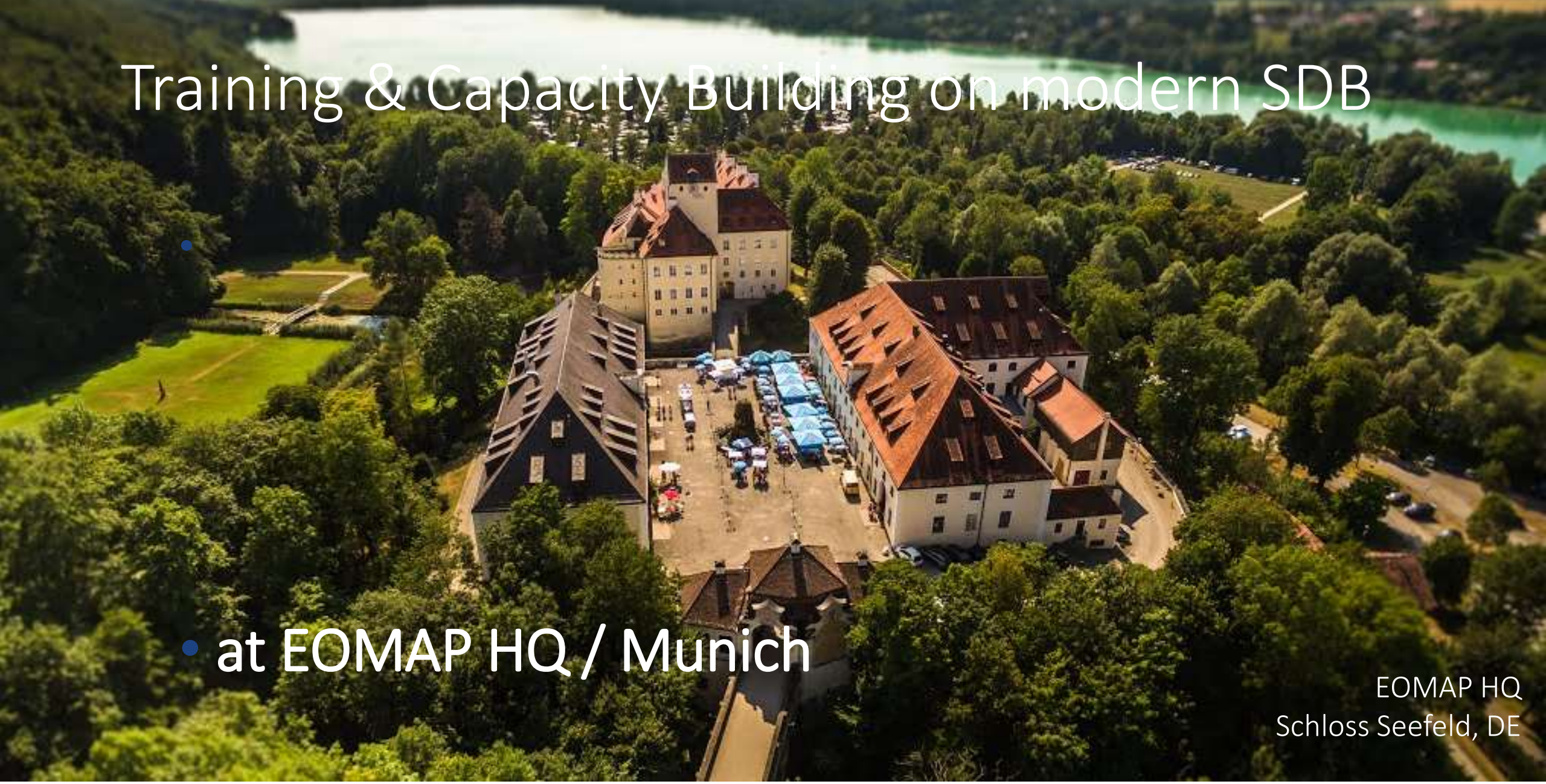
Level 2 Production — Production and QA basics
for all main SDB approach

Level 3 Production trainer — Production of
confidence

Training & Capacity Building on modern SDB

- through CBSC
- training in the countries
- online-training through eoLytics
- at EOMAP

Training & Capacity Building on modern SDB



- at EOMAP HQ / Munich

EOMAP HQ
Schloss Seefeld, DE

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