SDB Satellite Derived Bathymetry

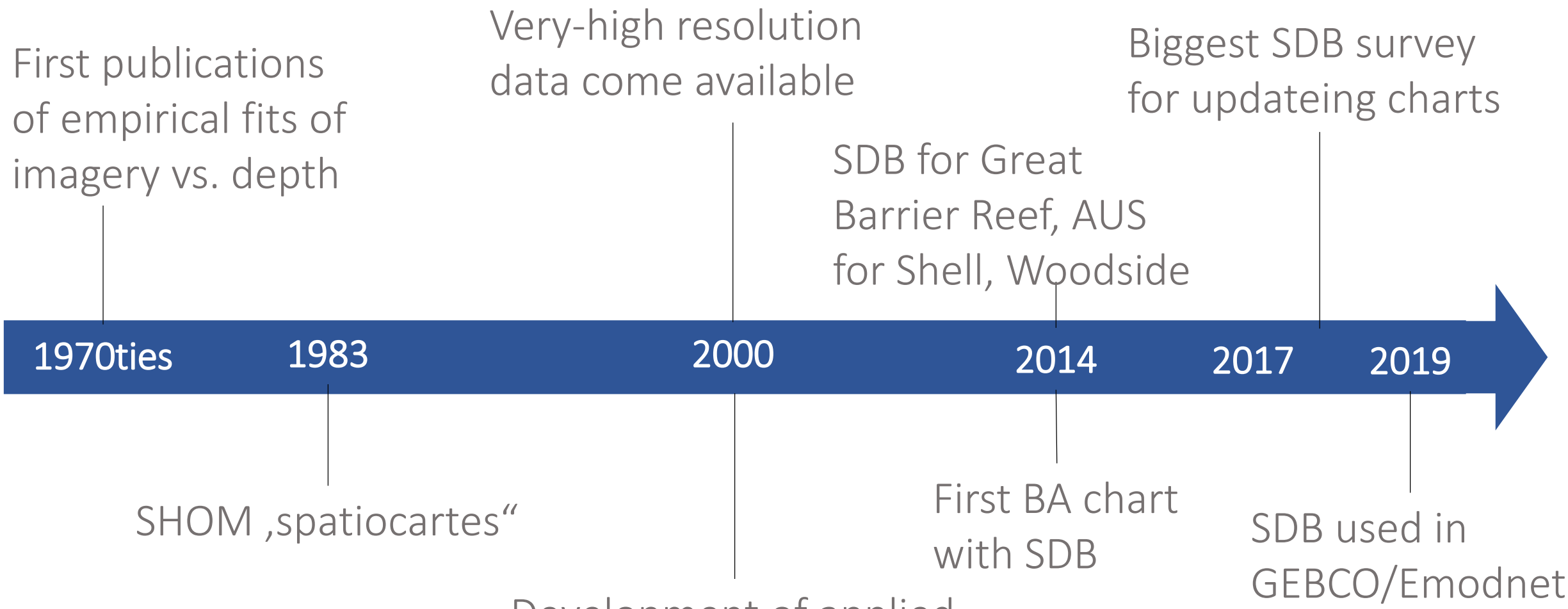
Capacity Building | Training | Certification

Why & How

Thomas Heege

EOMAP Germany / Australia

Satellite-Derived Bathymetry: Evolving technology

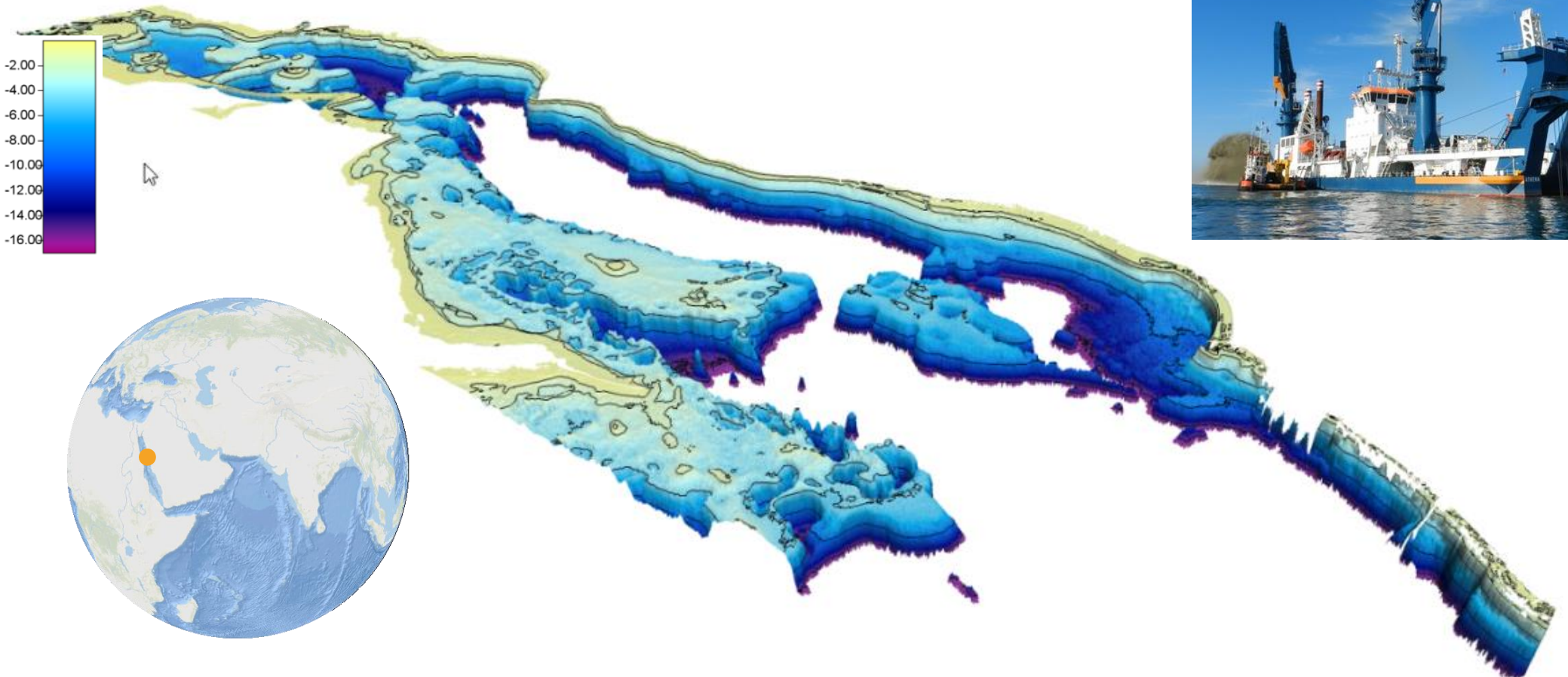


SDB mapping projects: past 2 years 2017/2018

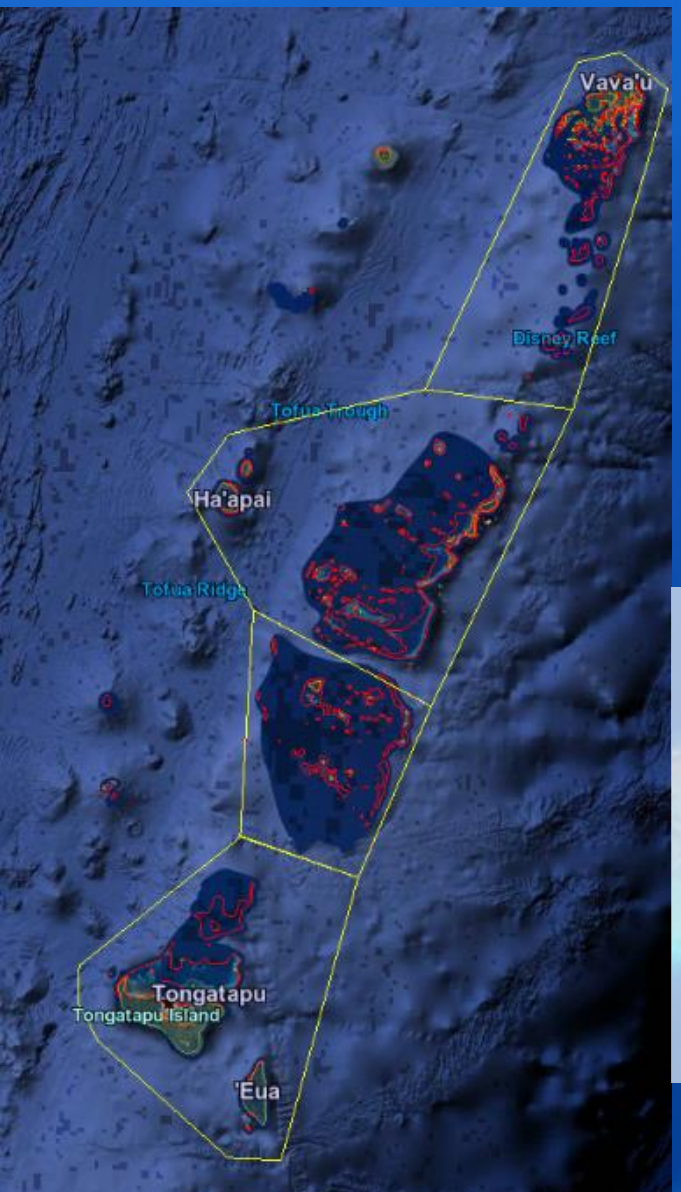
Satellite-Derived Bathymetry for industry applications

Can our csd Athena enter the area safely?

Self-propelled cutter suction dredger Athena:



Integrated survey for Tonga (and surrounding)



Total area: 400,000 sq km,

SDB area: approx 6,500 sq km shallow water mapped for LINZ (NZ Hydrographic Office)

Objective: Bathymetric surveys to update nautical

Team: Ixsurvey (acoustic and ALB), EOMAP (SDB)

Role of SDB

Reconnaissance

various SDB approaches depending on quality requirements

Independent mapping capability

for unsurveyed, outdated or remote areas
for highest quality requirements, independent level of confidence

Good reasons to update charts now

implement ‚**best data available**‘

expand portfolio of survey tools

SDB

now established and under control?

Contracted or in-house production standards available?

Capacity building & training required
to increase transparency and take-up on SDB data

QA/QC requirements when calibrating SDB data

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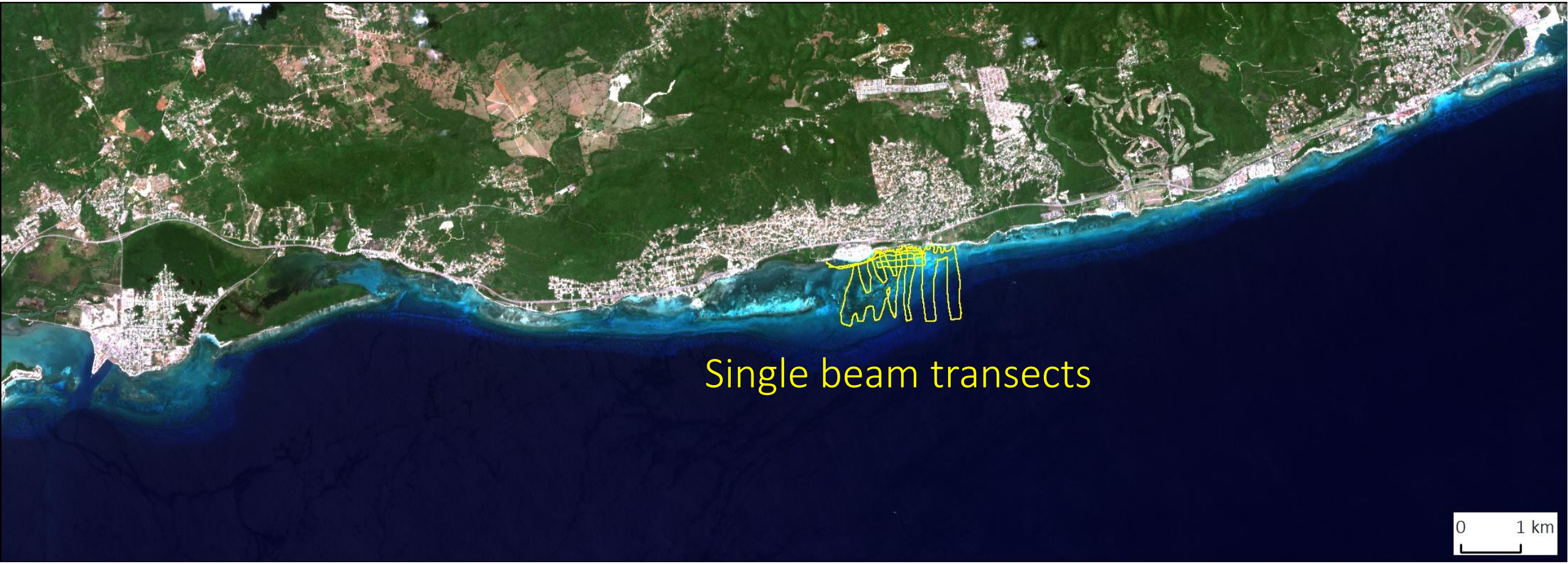
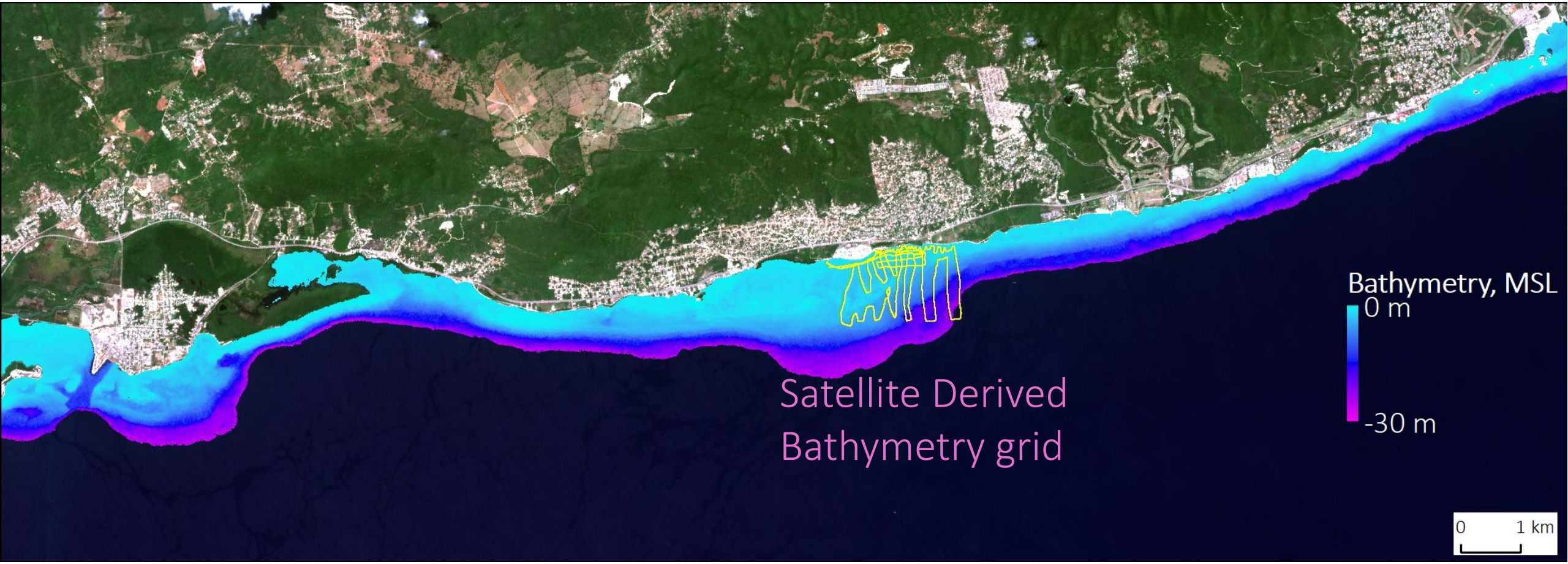
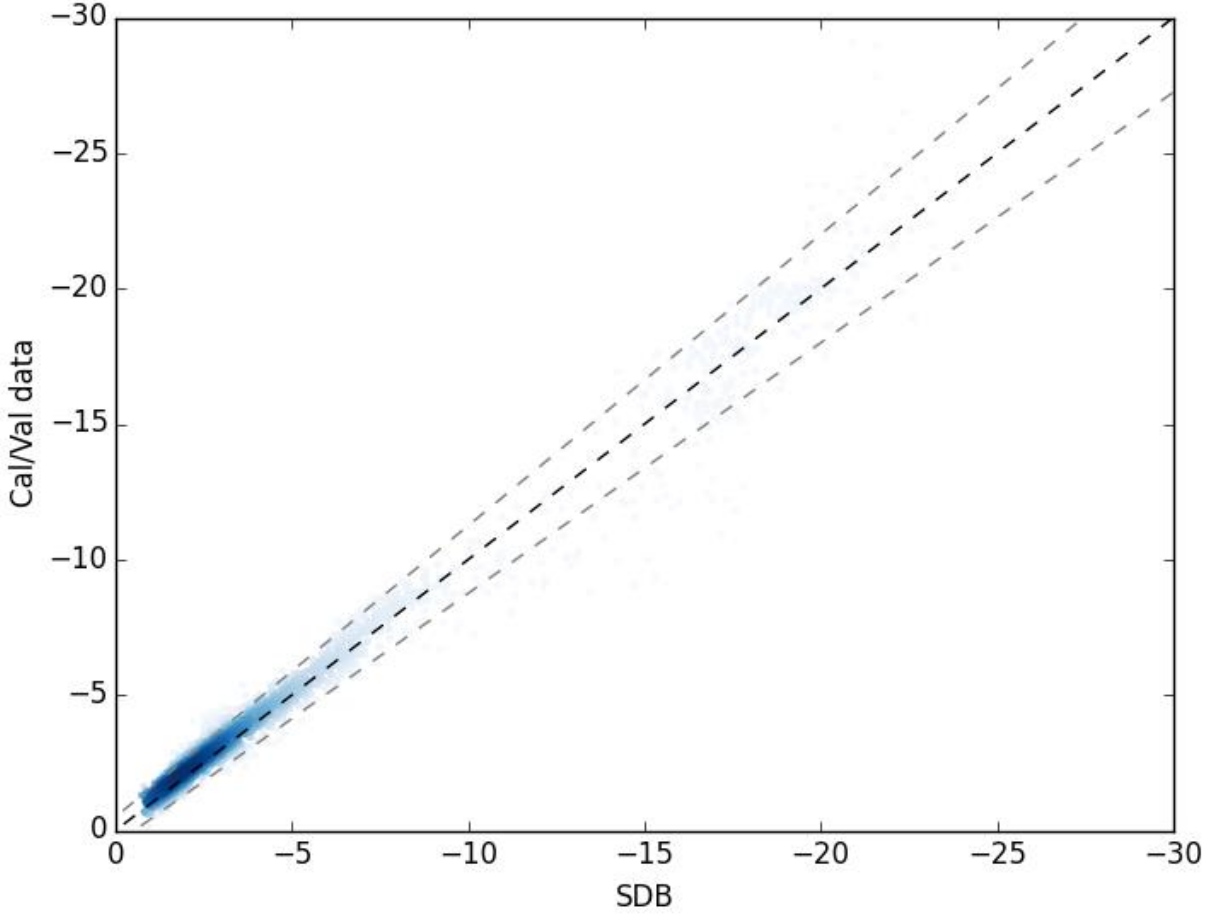


QA/QC requirements when calibrating SDB data



QA/QC requirements when calibrating SDB data



90% of SDB data within 50cm accuracy compared to single beam transects

QA/QC requirements when calibrating SDB data

Exemplary QA/QC processing steps

- **Pre-processing**

  Selection of appropriate satellite and/or airborne sensors

  Selection of appropriate recording / environmental condition (geometry, season, ..) and scene(s)

- **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, ….

  Correction of effects of atmosphere

  Correction of effects of adjacency effects

  Correction of effects of sunglitter

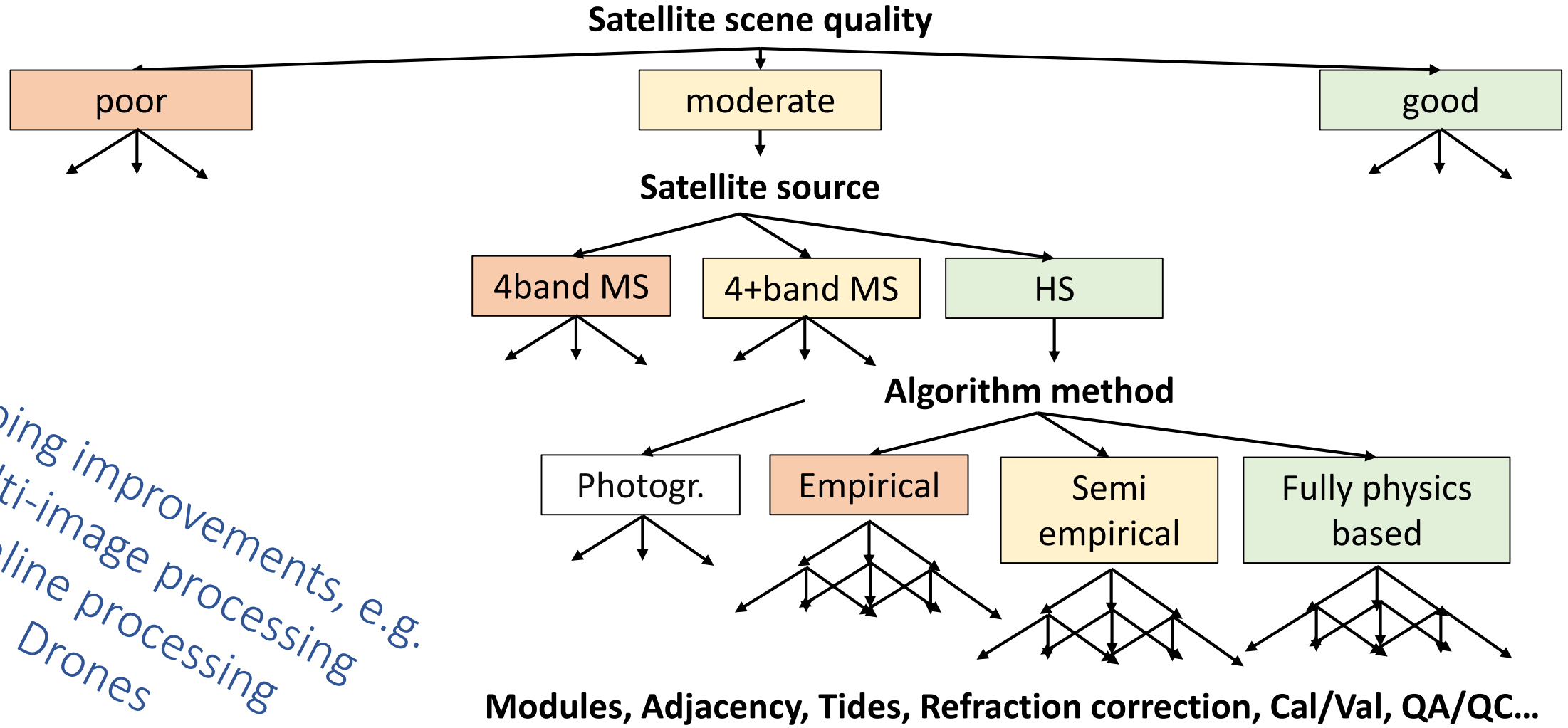
  Correction of effects of water absorbers and backscatter

  Coupled seafloor albedo and water column thickness calculation

  Error propagation, uncertainty processing

  ……

Term SDB: Diversity of approaches

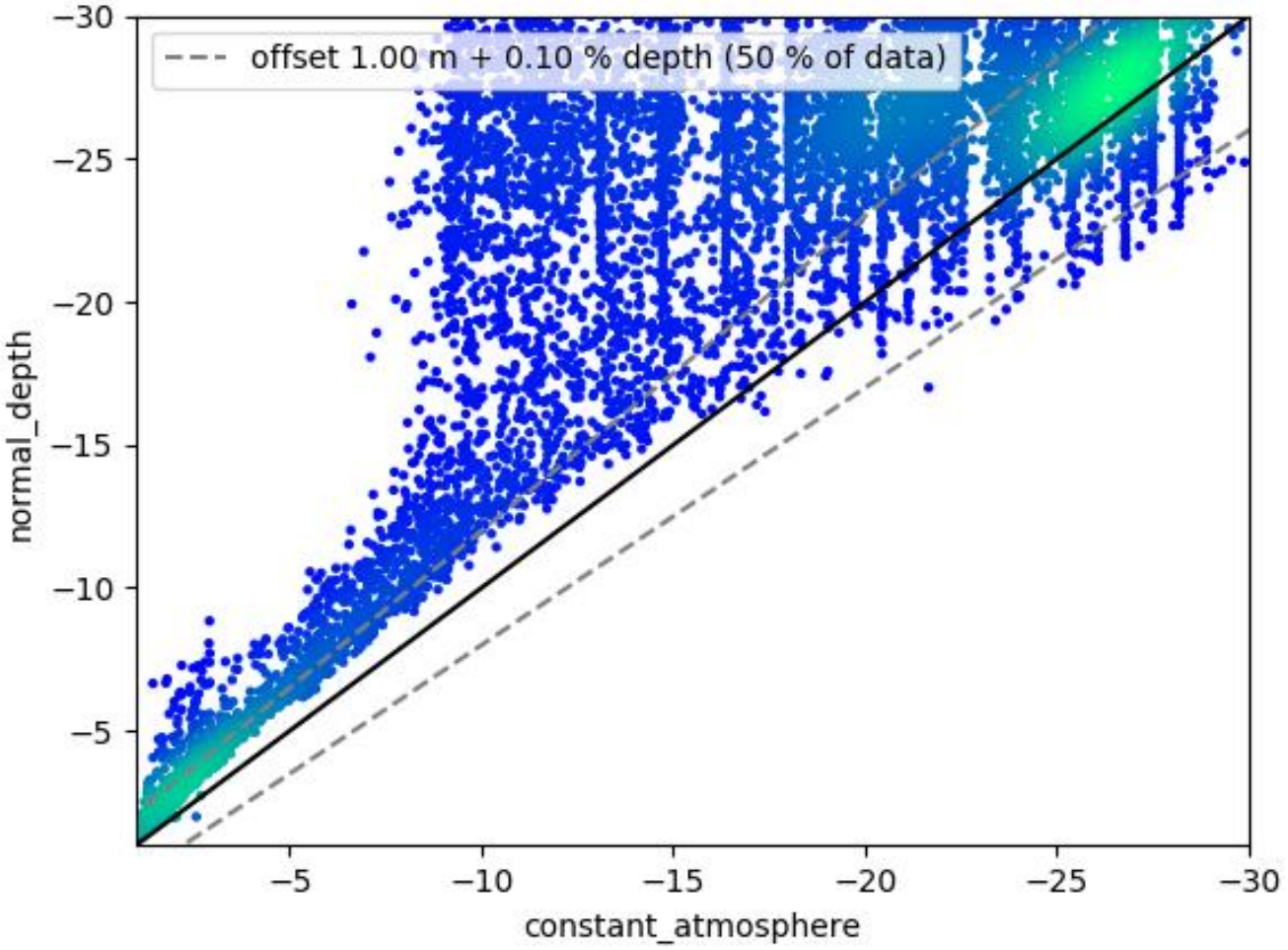


Ongoing improvements, e.g.
Multi-image processing
Online processing
Drones

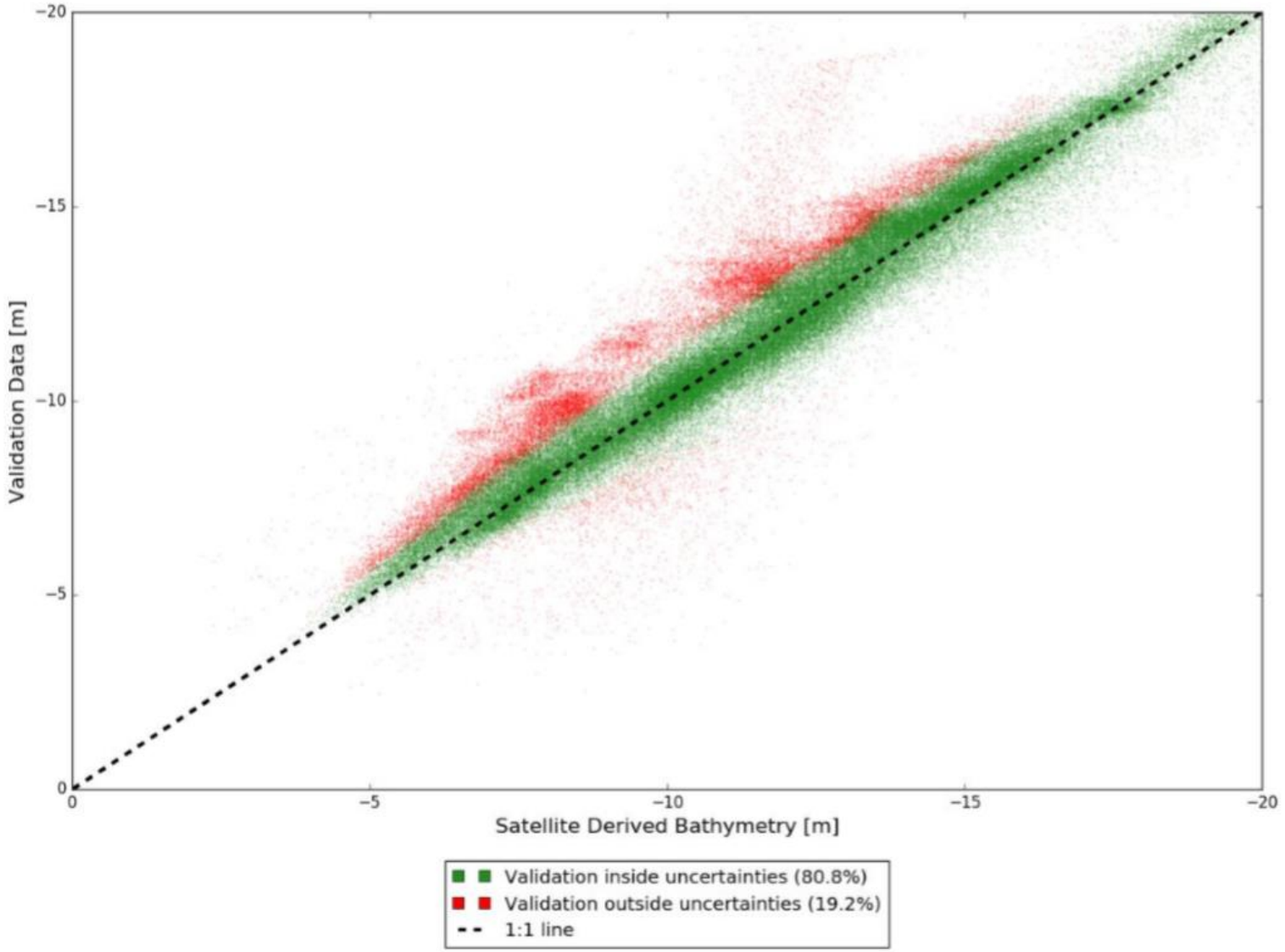
Quality of SDB result

Strong impact of various quality assurance mechanisms, e.g.:

Atmospheric correction AC: Fixed AC conditions versus variable AC retrieval



Demand to improve QA mechanisms for e.g. independent uncertainty & zone of confidence calculation



SDB for hydrographers

Capacity building & training

Best practices: methods & strength/weakness
Relevant QA-procedures, production guidelines

Standards

Standards reflecting SDB characteristics – now & in future

SDB capacity building | training | certification

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

Understanding & Exchange **SDB day**‘s 2018 / 2019 / 202 **HO‘s, industry, provider, RND**

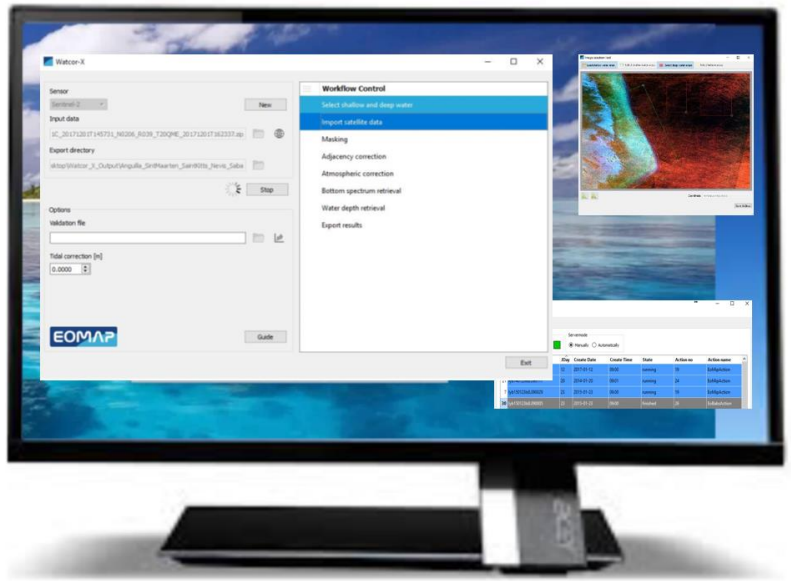
SDB capacity building | training | certification

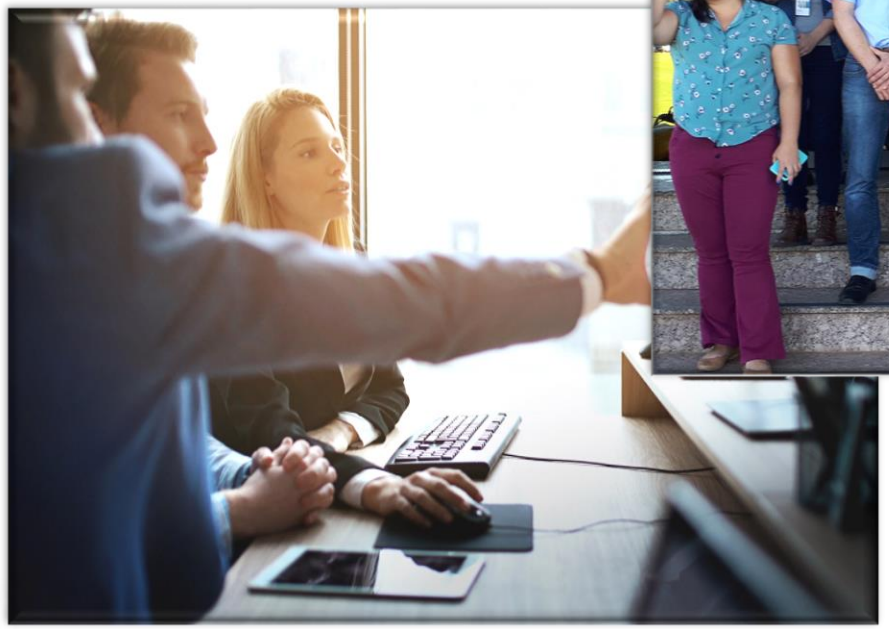
Introductions	IHO & Regional Commissions e.g. NIOHC, EAHC, SWPHC
Understanding & Exchange	SDB day‘s 2018 / 2019 / 2020
Standards	Supporting IHO in HSPT3, GEBCO / Seabed 2030 Ausseabed etc.
Training	SDB production and integration training eLearning: Online processing course & support
Certification	SDB Qualification levels for hydrographers

Hands-on workshops, building in-house capabilities

e.g. June 2018 Germany, Watcor-X May 2019 Australia, 2019 Brazil eoLytics training

Watcor-X stand-alone processing software





eoLytics:

cloud based SDB-light

Water quality, other EO products

EOMAP

SDB training for *remote hydrographers* through CBSC

Experience and transparency on all SDB levels for HO‘s

Day 1 – Introduction (lectures and discussion)

Day 2 – SDB data processing: training session 1 (mixed lecture and hands-on)

Day 3 – SDB data processing: training session 2 (hands on, exercises, uncertainties)

Day 4 – SDB data processing: training session 3

SDB data processing and QA workshop 2019

Technical workshop:

sensors, algorithms, QA, Uncertainties, object and seabed detection

Training course:

hands-on software training, post-processing, assessment of uncertainties

Physics based, empirical, photogram.

Date:

8-10th October 2019

Location:

Munich/Seefeld, Germany

Registration:

Register at info@eomap.com

Certification 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 approaches
ion trainer	Production of independent SDB, advanced QC & confidence levels, SDB Trainer

Welcome to EOMAP HQ near Munich,

to request SDB training under CBHC for your region

to build online capacity building capacities in collaboration

to use our online web processing capabilities on various SDB approaches and other satellite products

to licence SDB software for your inhouse demand

EOMAP HQ
Schloss Seefeld, DE