# EOMVS

### **SDB-ONLINE** COUCH SURVEYING WITH SDB-ONLINE.EOMAP.COM

Hydro 22

2022-12-07 | Dr. Knut Hartmann & Mona Reithmeier

### WHO IS EOMAP?



Private high-tech company



Focusing on satellite data analytics, IT solutions, webapps and api



Specialised on aquatic environments



International team of 40+ employees



Serving HOs, engineering, academia, costal zone managers...



ΕΟΜΛΡ

EOMV5

### SATELLITE DERIVED BATHYMETRY (SDB)

#### Definition

- Calculation of shallow water bathymetric grids using multipsectral satellite data
- Approx 1 time Secchi Disc depth coverage

#### Pros

- Access to all shallow waters globally, depending on water clarity
- Rapid and low cost compared to other survey methods
- Continous monitoring of seabed
- Carbon neutral

## EXAMPLE GRAND CAYMAN





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## **UPSCALING? ... UNCERTAINTIES?**

## SATELLITE DERIVED BATHYMETRY - UPSCALING

#### **Requirement for upscaling**

- No dependencies on local data / empirical equations
- Minimum user interaction
- High performant processing system
- Based on satellite sources with sufficient archive & access
- Water level integration
- API and webapp interfaces
- Vertical accuracy verification



ΕΟΜΛΡ

## SATELLITE DERIVED BATHYMETRY - UPSCALING

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- Physics based SDB
  - Automatic modus
- AWS cloud backend
- ESA's Sentinel-2 integrated
- Integration of tidal model
- done
- → slides





### **PHYSICS BASED SDB**

(Inverse) modelling of the sunlight from sensor to surface, so called inversion of the radiative transfer equation.

Based on multi- or hyperspectral imagery

No dependencies on local bathymetry data or pre-knowledge



The project has received funding from the European Union's Horizon 2020 Research and Innovation Programmeunder Grant Agreement No 101004221¶



### AUTOMATIC MODE

AI based satellite image ranking and selection (optional)

Muliple imagery can be combined in the process – cloud and gap free

Tidal data are integrated

API access to the backend of SDB-online



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**CLOUD BACKEND** 





The project-has-received-funding-from-the-European-Union's-Horizon-2020-Research-and-Innovation-Programmeunder-Grant-Agreement-No-101004221¶

ΕΟΜΛΡ

### SDB-ONLINE.EOMAP.COM





Support Mona Reithmeier Reithmeier@eomap.de







### SDB VALIDATION STUDY FOR SDB-ONLINE (RTE INVERSION SAAS)



### **SDB-ONLINE VALIDATION, HOOPER INLET, CA**

SDB, 10m resolution (m)



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### **SDB-ONLINE VALIDATION, LAKE MICHIGAN, US**

-20 k

-15

-10

SDB, 10m resolution (m)

-5

0

120° W

100° W

80° W

60° W

40° W

20° W

Survey data SDB results (SDB-Online software) Survey data Lake Michigan, US SDB data Lake Michigan, US 7 .6 15.9° ·6.21 Z z z 45.85° I 45.85° 45.85° | z Z Z z 20 45.75° P -20 -25 0 z Nº7 15.7° N m below LAT 85.6° W 85.55° W 85.45° W 85.4° W 85.35 85.5° W 85.6° W 85.55° W 85.5° W 85.45° W 85.4° W 85.35 85.6° W 85.55° W y=1.07\*x+0.74 Rsquare = 0.96 n = 1085024 O'Reilly, CA / Hooper Inlet, CA -- 1:1 line • SDB-Online fully automatic Dublin Bay, IE wake Michigan, US SDB results -5 Hastings, UK 10m Survey data used for -10Survey, Miami, US validation NOT for training! /Saint Maarten, NL -15

#### **Combined survey and SDB data**



Moray Firth, UK

Thames estuary, UK

/Côte d'Azur, FR

20° E

#### EOMV5

### SDB-ONLINE VALIDATION, LAKE MICHIGAN, US



### **SDB-ONLINE VALIDATION, THAMES ESTUARY UK**

SDB, 10m resolution (m)



120° W

100° W

80° W

60° W

40° W

20° W

20° E

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### **SDB POTENTIAL**

#### RELATIONSHIP BETWEEN SDB CUTOFF DEPTH AND WATER CLARITY





### **SDB-ONLINE**

#### UPDATES FOR 2023

- Ability to integrate on-site survey data
- Ability to integrate our ICESat-2 ATLAS Satellite-Lidar Bathymetry database
- Ability to use Very-High Resolution satellite data
- Initial seabed characterisation



## **SDB-ONLINE** YOUR OPPORTUNITIES

- Dense time-series of seabed movements!
- Fill data gaps
- Access remote or unaccessible sites
- Integrate it in your workflows / GIS / QPS / python scripts via api
- Use it on desktop or mobil
- Enjoy!

#### 2016 to 2021 time laps

6 km





### 01

02

**1st SDB online software** no on-site data needed!

Rapid access to SDB results scaleable cloud ressources – linked with satellite data archive

### 03

Just use it Use your browser, no hard or software requirements



**Support and capacity building** we're here to support – visit our booth!





Bavarian innovation award 2022



# **Contact us**





Germany (HQ) Australia USA Indonesia United Arab Emirates

\* \*

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