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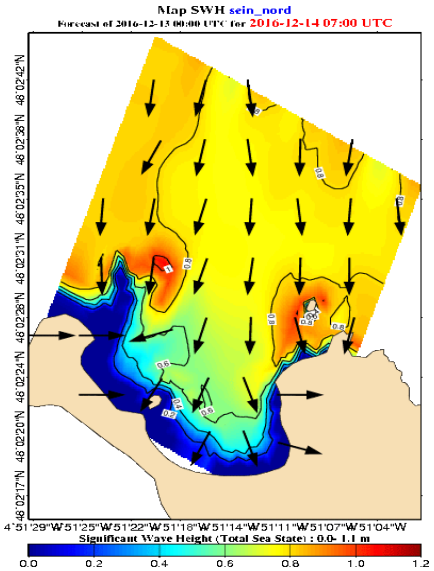
Bathysat

A processing chain for operational production of qualified SDB at large scale

(SDB : Satellite Derived Bathymetry)

RECONNAISSANCE TOOL

Bathymetric knowledge in remote areas



Support to coastal hydrodynamic model

➔ French EEZ coastal areas: SDB target = 0-15m depth (or 10-30m in specific situation)

BEACH PROFILE EVOLUTION MODEL

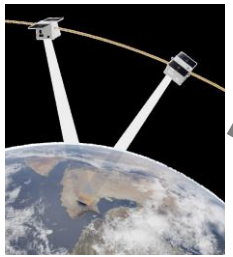
Forcing conditions

Waves

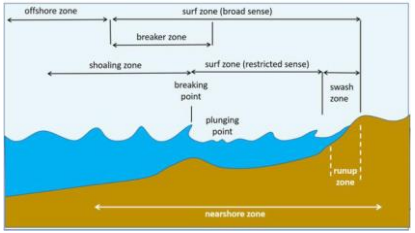
Tide

Sediment paramaters

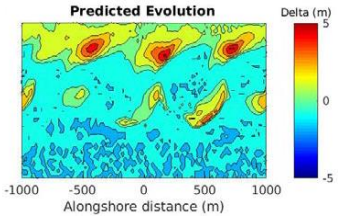
DTM



Short-term model

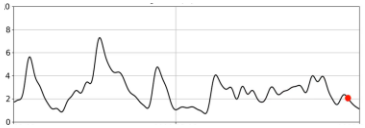


Results

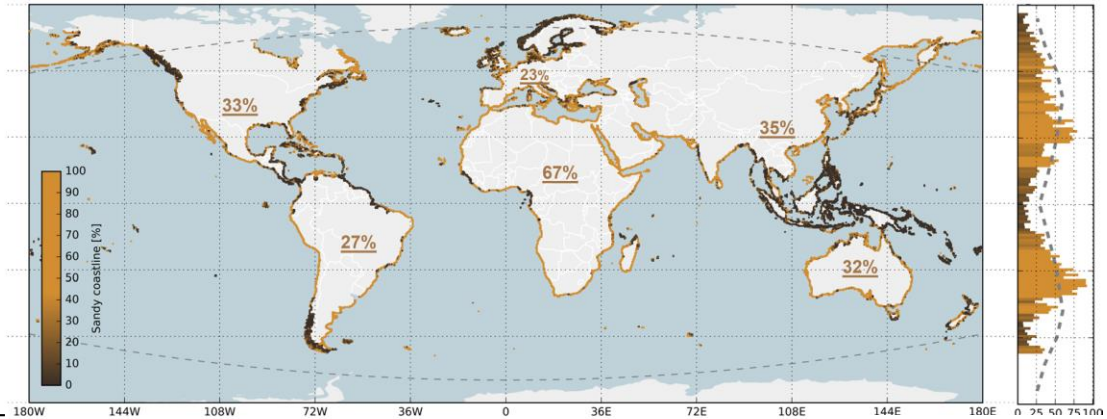


Waves prediction

Bathymetry prediction

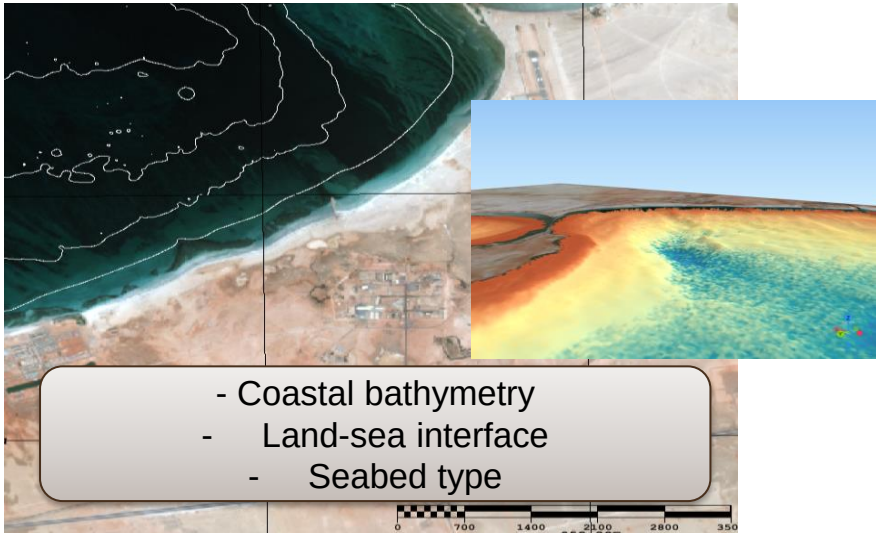


➔ At a beach scale but with <u>a global distribution of sandy shorelines</u>

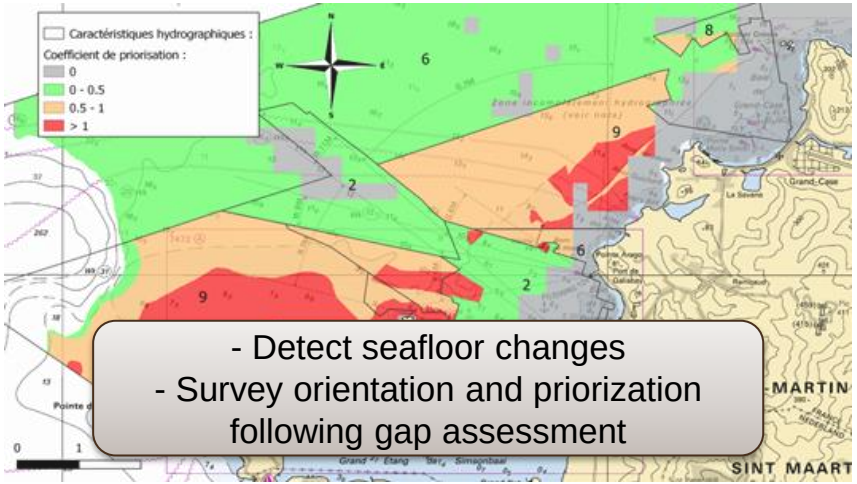


Luijendijk et al. 2018

SUPPORT TO PLANNING



Environment description

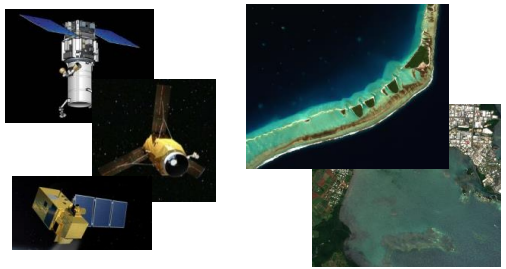


Survey planning

UPDATE THE WORKFLOW TO IMPROVE APPLICATIONS

Development of new SDB modeling chain :

- As efficient and automated as possible
- Producing SDB without any in-situ bathymetric data
- Being able to estimate the reliability of the products
- Being in control of the overall system



Orthorectified satellite images
(multispectral sensor)

Bathysat

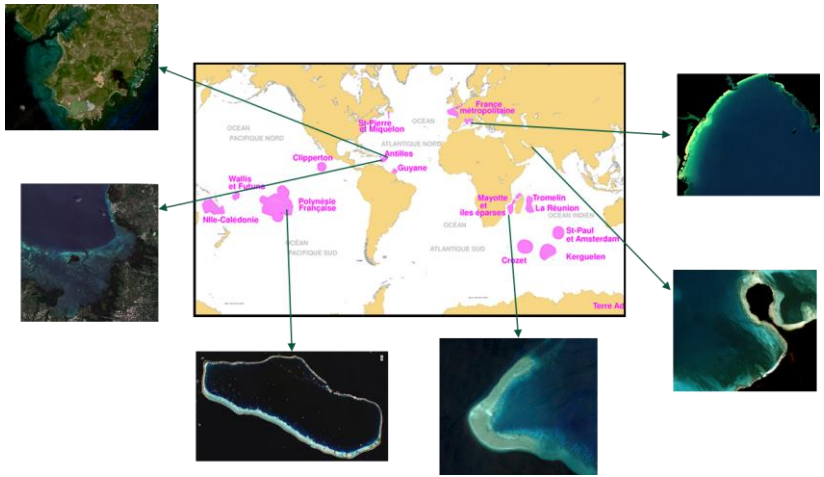
Bathy product

Map of uncertainties

Metadata

ACHIEVABLE PERFORMANCES

- Concept validation of SDB without using in situ bathymetric data : under certain conditions (best results achieved : rmse < 2m)
- Definition of a technical scope to achieve good performances (multi-image processing, Sentinel-2 sensor when a 10m resolution is enough, give preference to study areas not too large, global target depths: 0 - 15m)



CONTROL PROCESS

Theoritical uncertainties

σ (DN)

↓ ← *RUT (Radiometric Uncertainty **Tool**)*

σ (Reflectance image TOA)

↓ Atmospheric radiative transfer model ← *Linearisation*

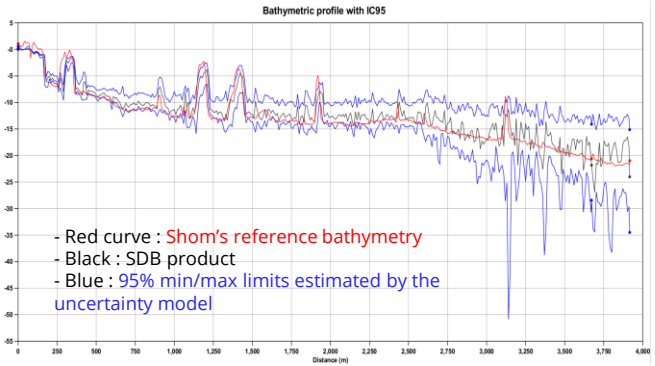
σ (Surface reflectance image)

↓ Sunglint correction

↓ Semi-analytical radiative transfer model

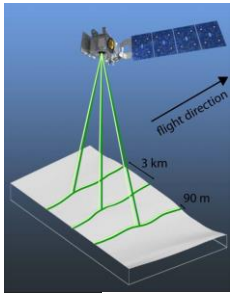
↓ IC95 (z)

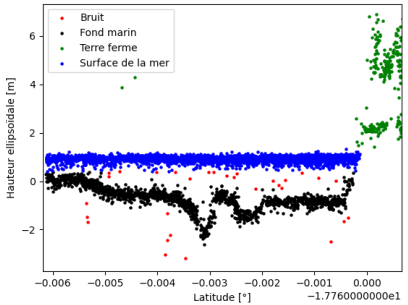
Estimates by Max Likelihood criteria
Uncertainties by Likelihood ratio statistic



External remote sensing data

work in progress

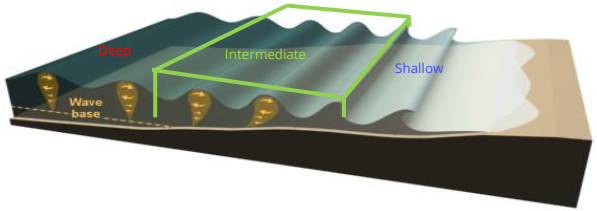




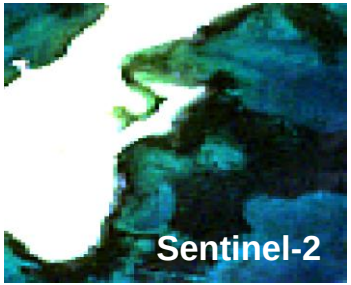
WORK IN PROGRESS

ADDITIONAL MEANS

Wave-Based Inversion



VHR MS images



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MERCI !