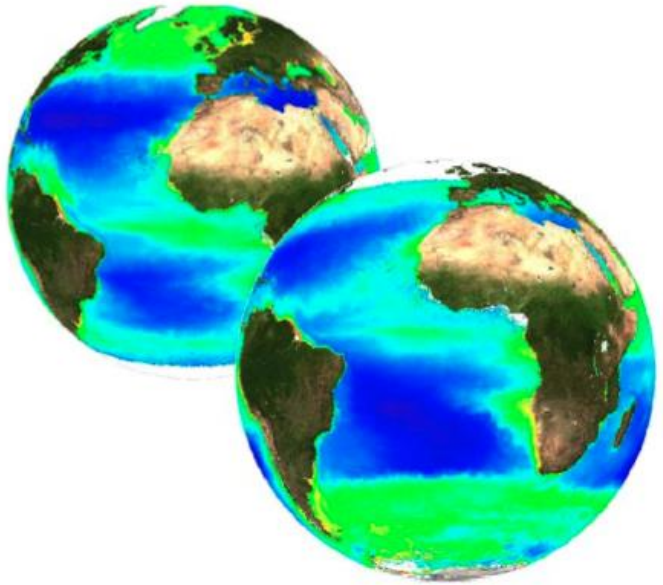
Télédétection satellitaires de la couleur des eaux aux interfaces terre-mer (embouchures de fleuves, baies et lagunes côtières)

David DOXARAN
OMTAB, LOV UMR7093 CNRS/SU

CES Couleur de l'Eau

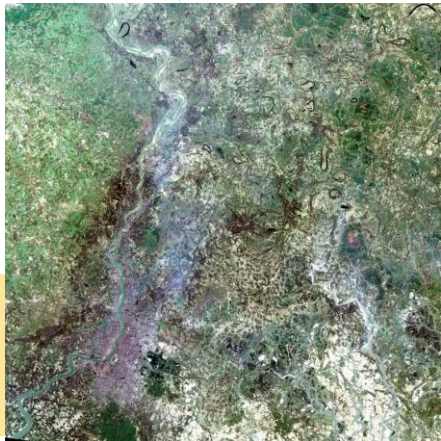
AG THEIA

26/03/2026



78 86 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 **24** 25 26 27 28 29

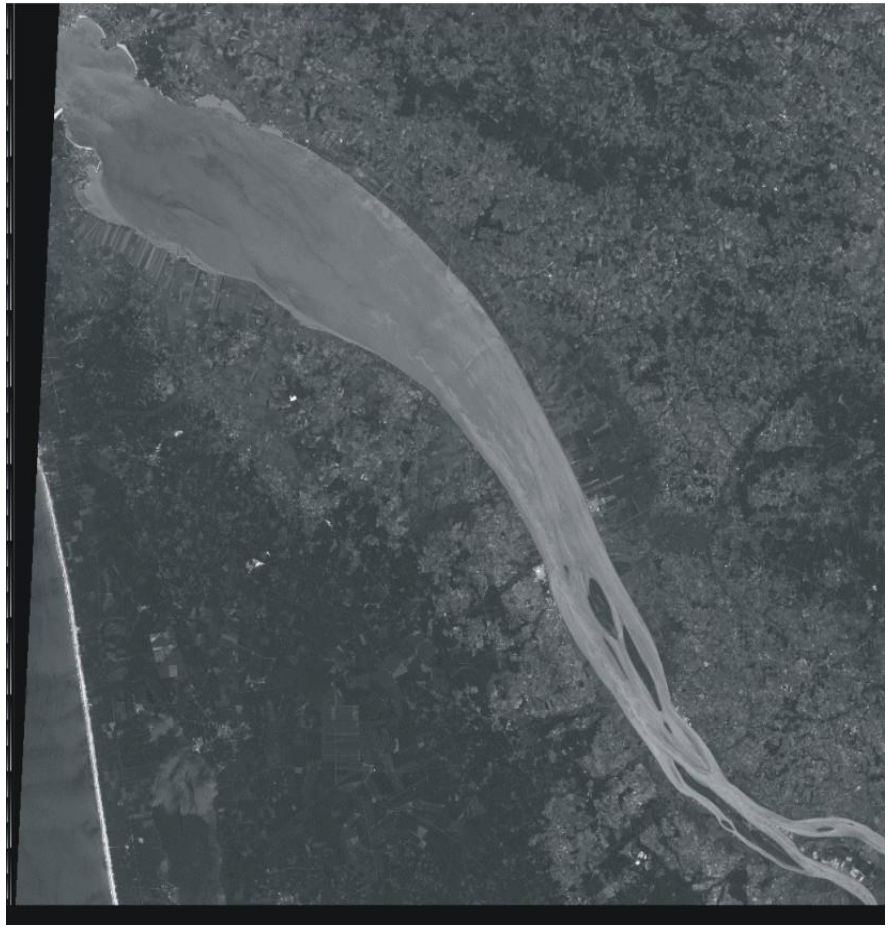
[Hi-Res] HSI (CHIME, ESA)
[Geo] [Hi-Res] HSI (GLIMR, NASA)
OLCI (Sentinel-3C, EC/ESA/EUMETSAT)
SABIA-MAR-A (CONAE)
[Hi-Res] OCI (PACE, NASA)
COCTS2/CZI2 (HY-1E, CNSA)
VIIRS (NOAA-21 formerly JPSS-2, NOAA/NASA)
OCM-3 (Oceansat-3, ISRO)
COCTS/CZI (HY-1D, CNSA)
[Geo] GOCI-II (GeoKompsat-2B, KARI/KIOST)
COCTS/CZI (HY-1C, CNSA)
OLCI (Sentinel-3B, EC/ESA/EUMETSAT)
SGLI (GCOM-C, JAXA)
VIIRS (JPSS-1, NOAA/NASA)
OLCI (Sentinel-3A, EC/ESA/EUMETSAT)
VIIRS (Suomi NPP, NOAA)
[Geo] GOCI (COMS, KARI/KIOST)
OCM-2 (Oceansat-2, ISRO)
COCTS/CZI (HY-1B, SOA)
POLDER-3 (Parasol, CNES)
GLI/POLDER-2 (ADEOS-2, NASDA/CNES)
COCTS/CZI (HY-1A, SOA)
MODIS (Aqua, NASA)
MERIS (Envisat, ESA)
OSMI (Kompsat-1, KARI/KORDI)
MODIS (Terra, NASA)
OCM (Oceansat-1, ISRO)
SeaWiFS (Orb-View2, NASA)
OCTS/POLDER (ADEOS, NASDA/CNES)
MOS (IRS-P3, DLR)
CZCS (Nimbus-7, NASA)



Série Landsat (1972-), SPOT……..Sentinel2-MSI

MODIS-Terra/AQUA, VIIRS, OLCI (Ocean and Land Colour Instrument)

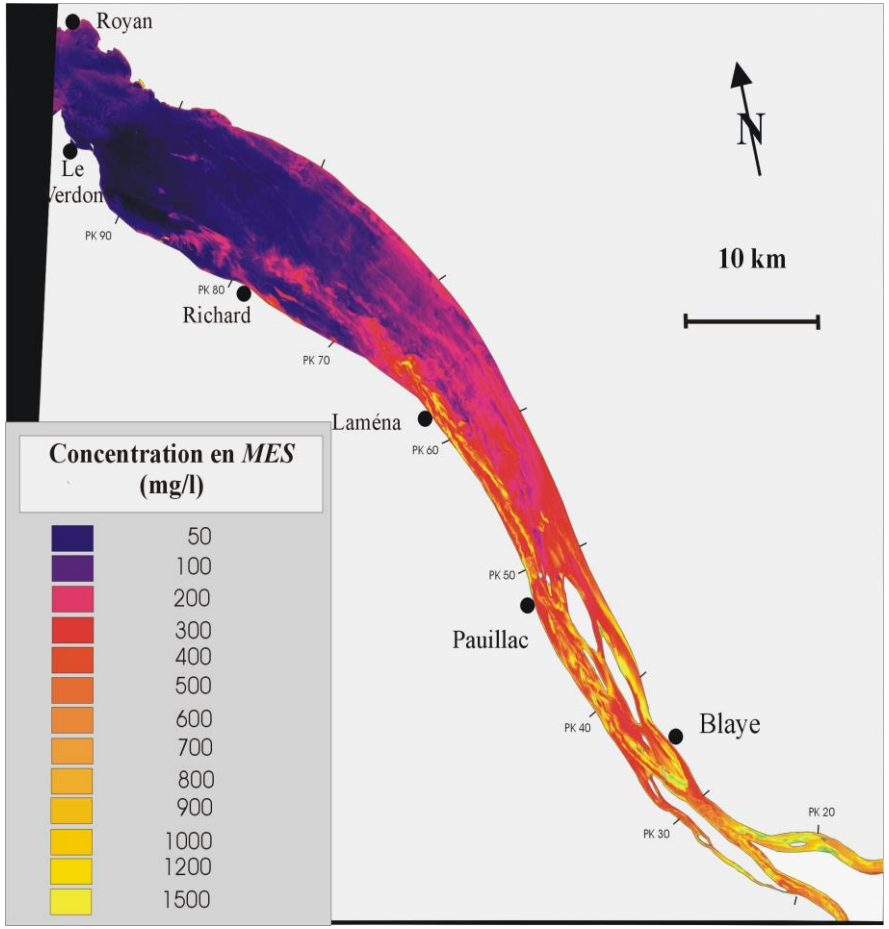
Estuaires (piégeage temporaire des apports fluviaux)



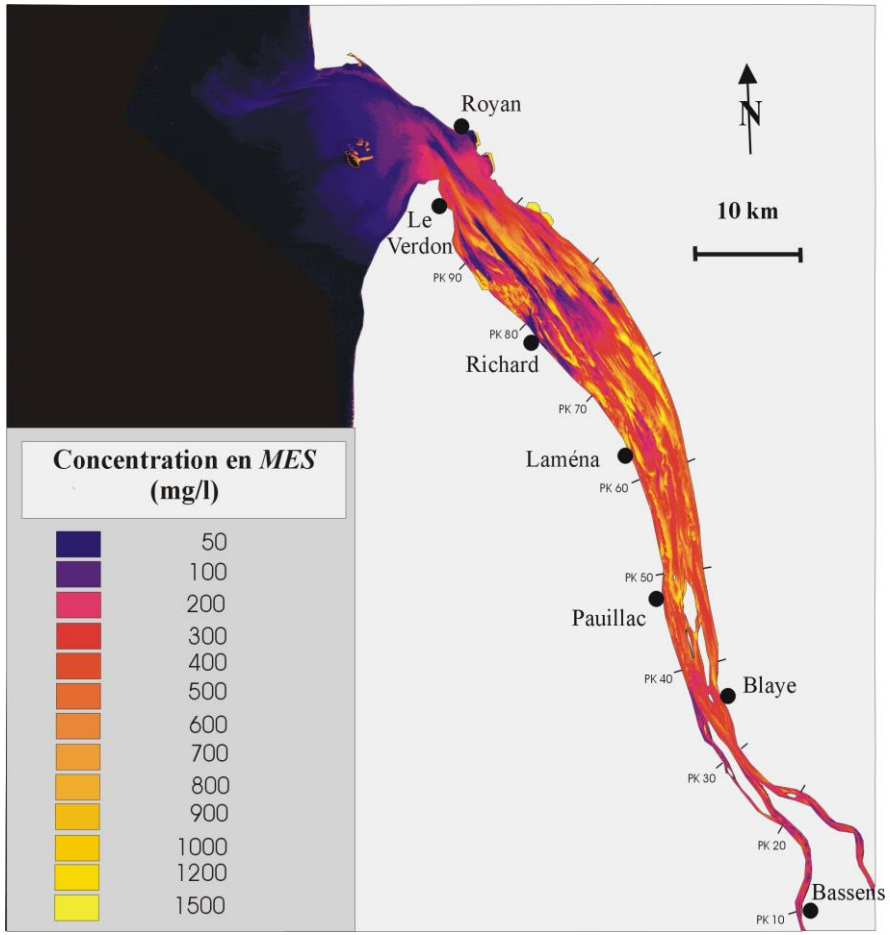
SPOT image 14/07/1996
Low river flow

Landsat image 08/03/2000
High river flow

Estuaires (piégeage temporaire des apports fluviaux)



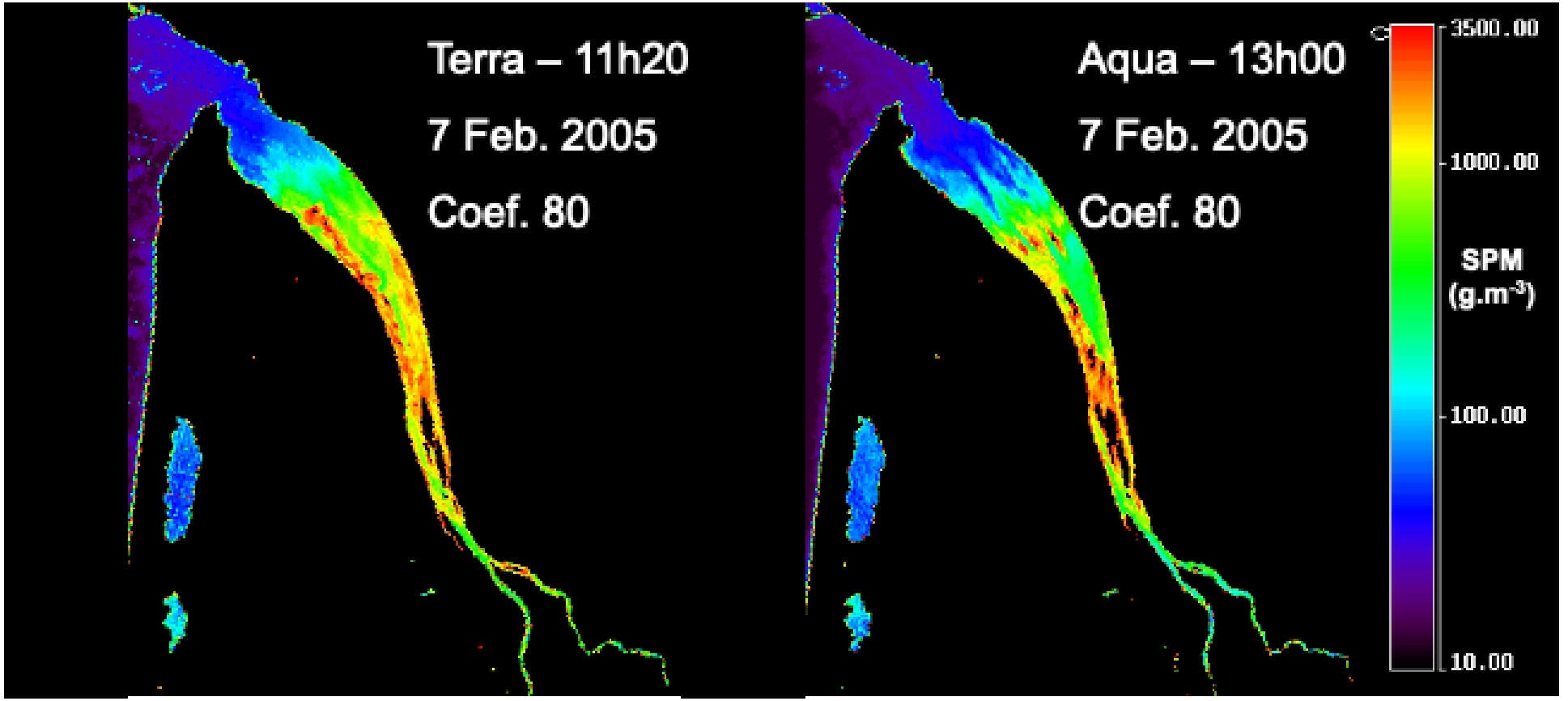
SPOT image 14/07/1996
Low river flow



Landsat image 08/03/2000
High river flow

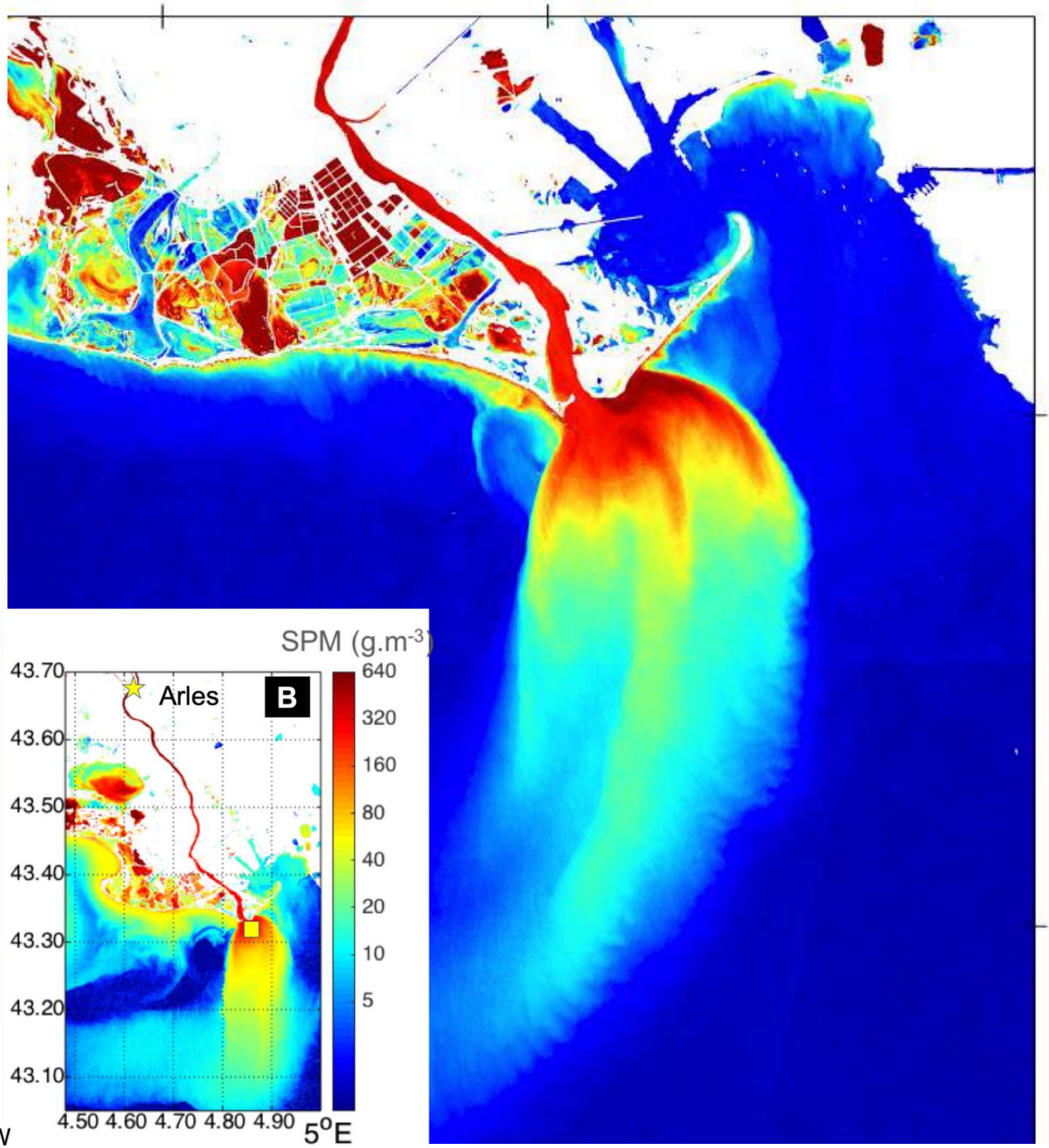
MODIS-Terra

MODIS-Aqua

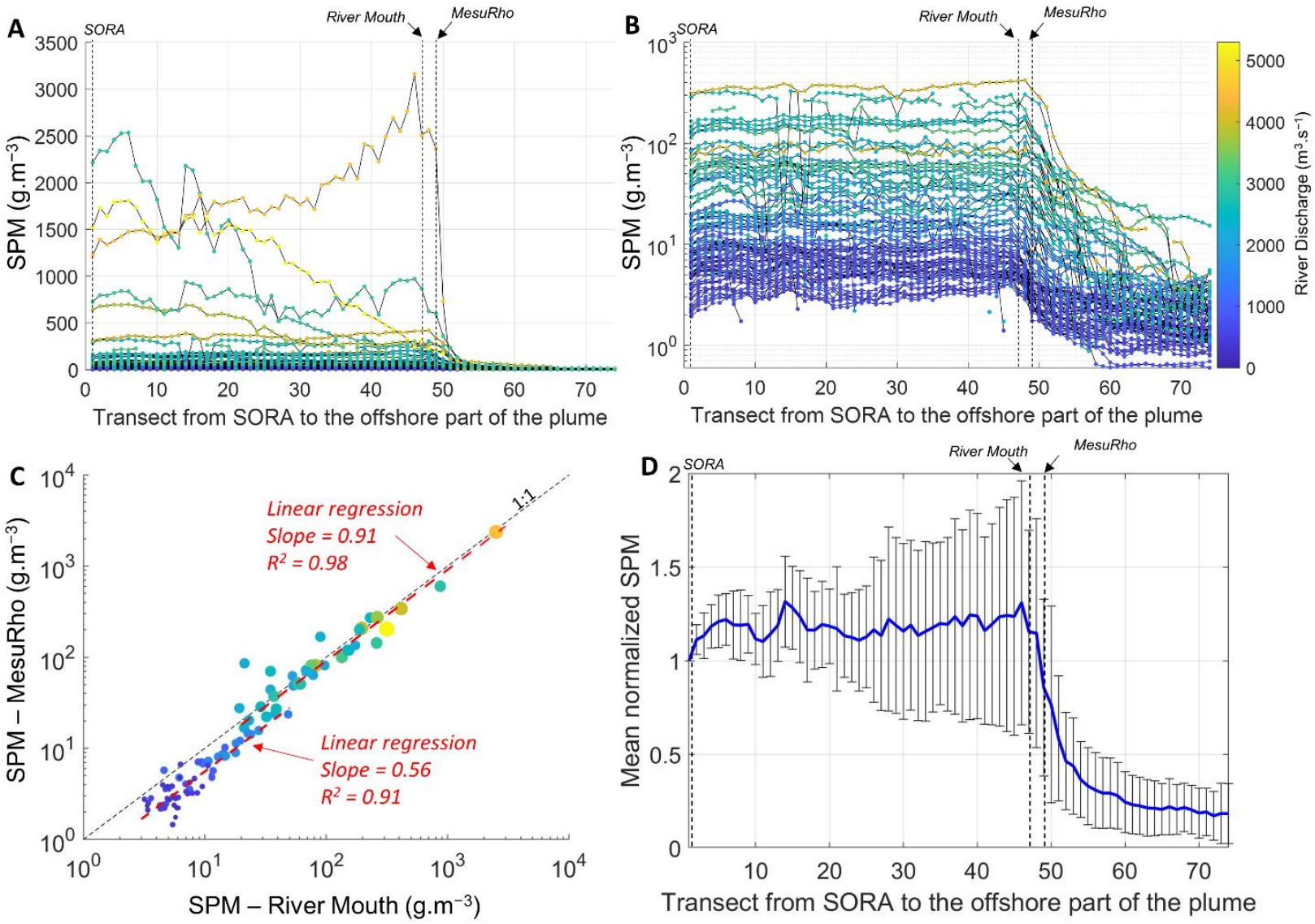


➔ 25 ans d'observations bi-diurnes

Embouchures de fleuves

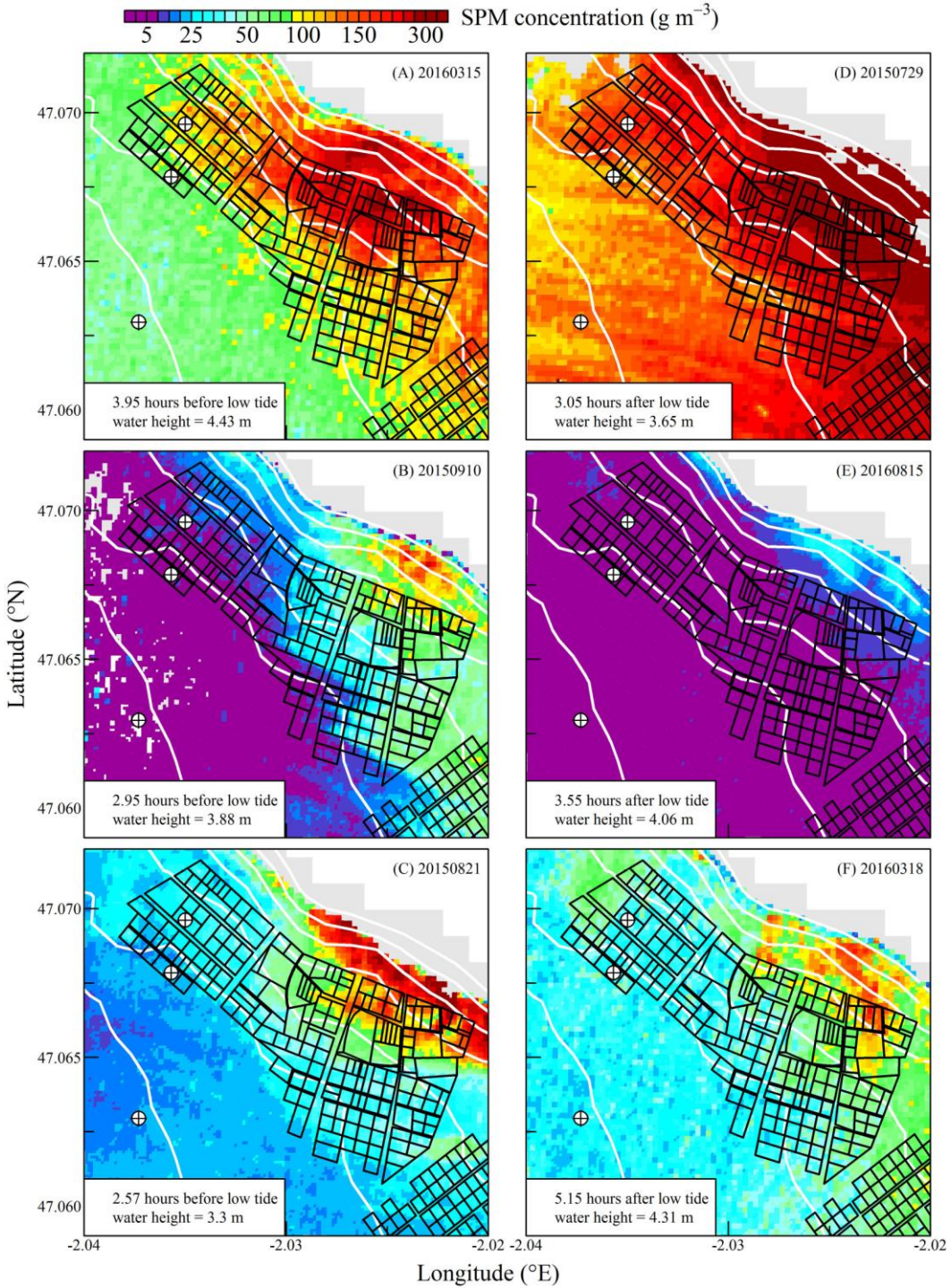


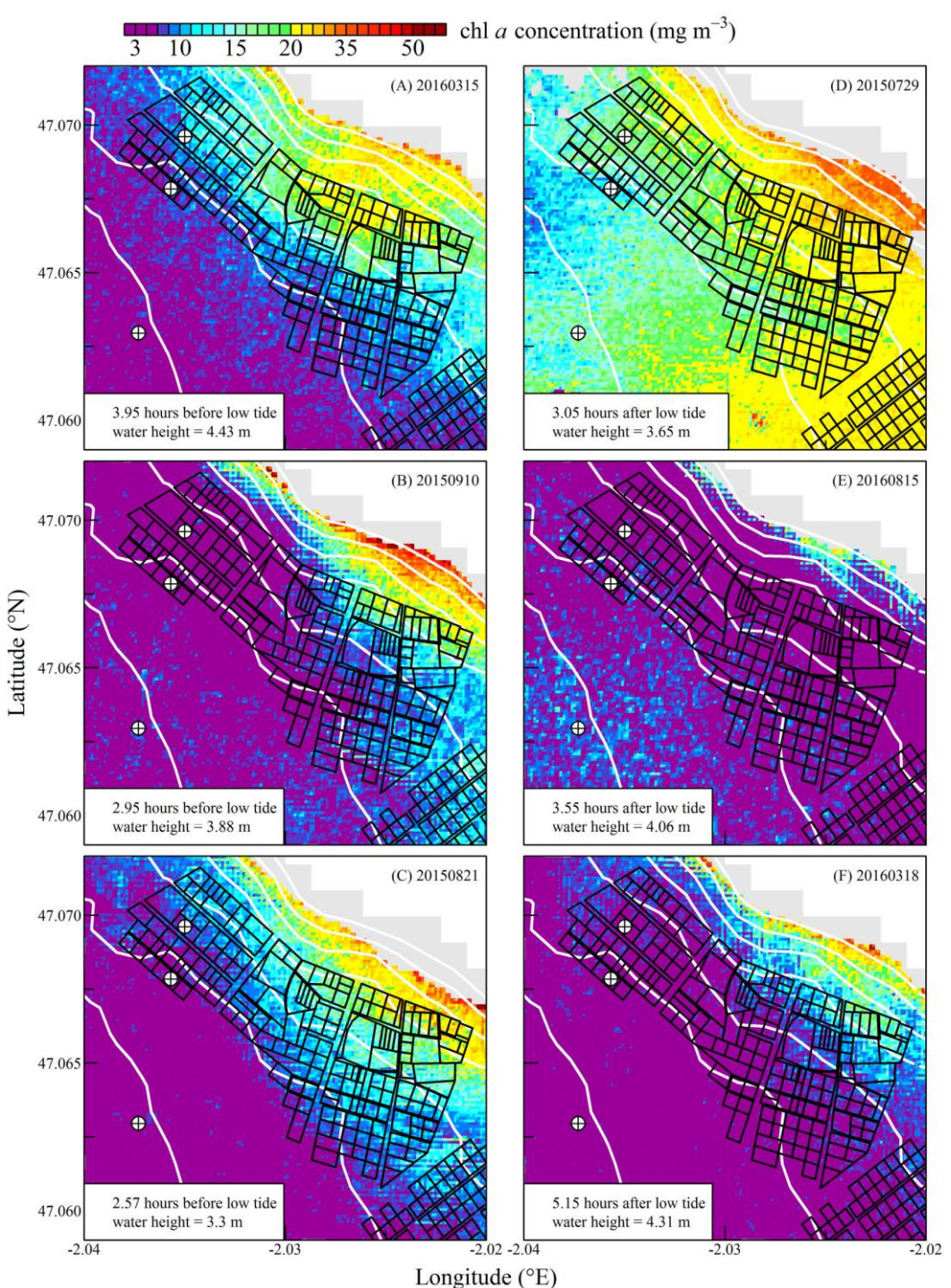
Embouchures de fleuves



Baies (ostréiculture)

Gernez et al. (2014, 2017)





FR2030
Magellium / LOV

Operational monitoring of the water quality of French lakes and rivers from space

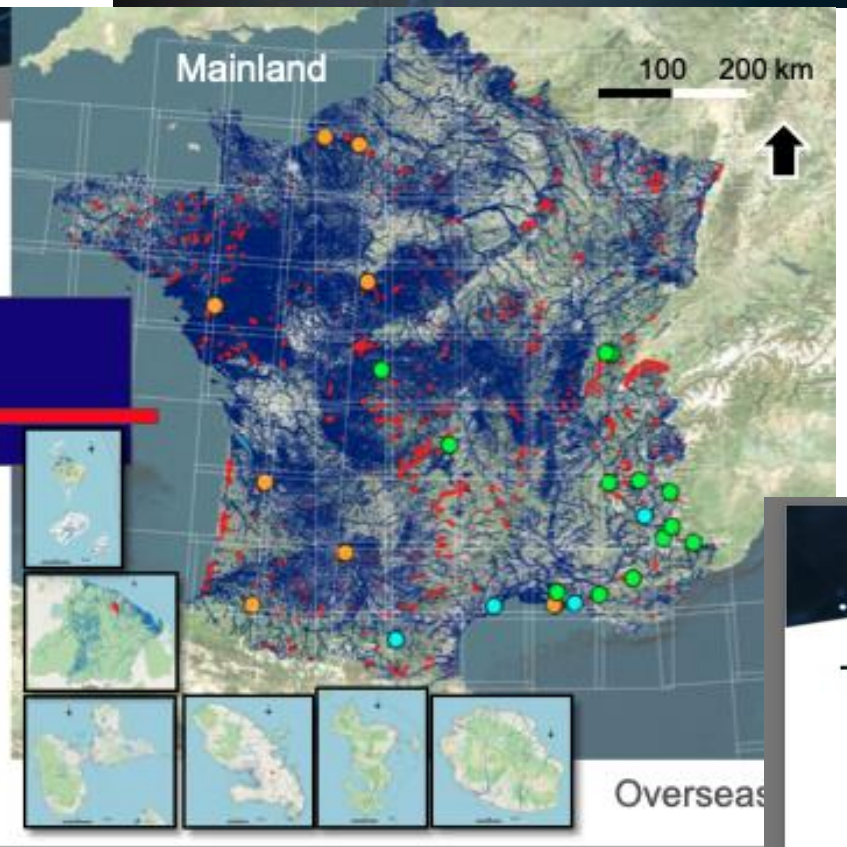
Surveillance challenges

Area ≃ **12 000 km²** (⅔ overseas)
ONLY ≃ 481 sites under the **WFD scope**

Surveillance of inland waters quality
- Superficial waters
- WFD-monitored wat. bodies

Thermal stations
- National network
- River autonomous (RT)
- Water bodies autonomous (RT)

Sentinel-2 tiles



Thank you for your attention

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guillaume.morin@magellium.fr

magellium Ltd.

FRANCE 2030

VORTEX.IO

eCLA PÔLE ÉCOSYSTÈMES LACUSTRES

RÉPUBLIQUE FRANÇAISE Liberté Égalité Fraternité

OFB OFFICE FRANÇAIS DE LA BIODIVERSITÉ

INRAE

GET

LOV

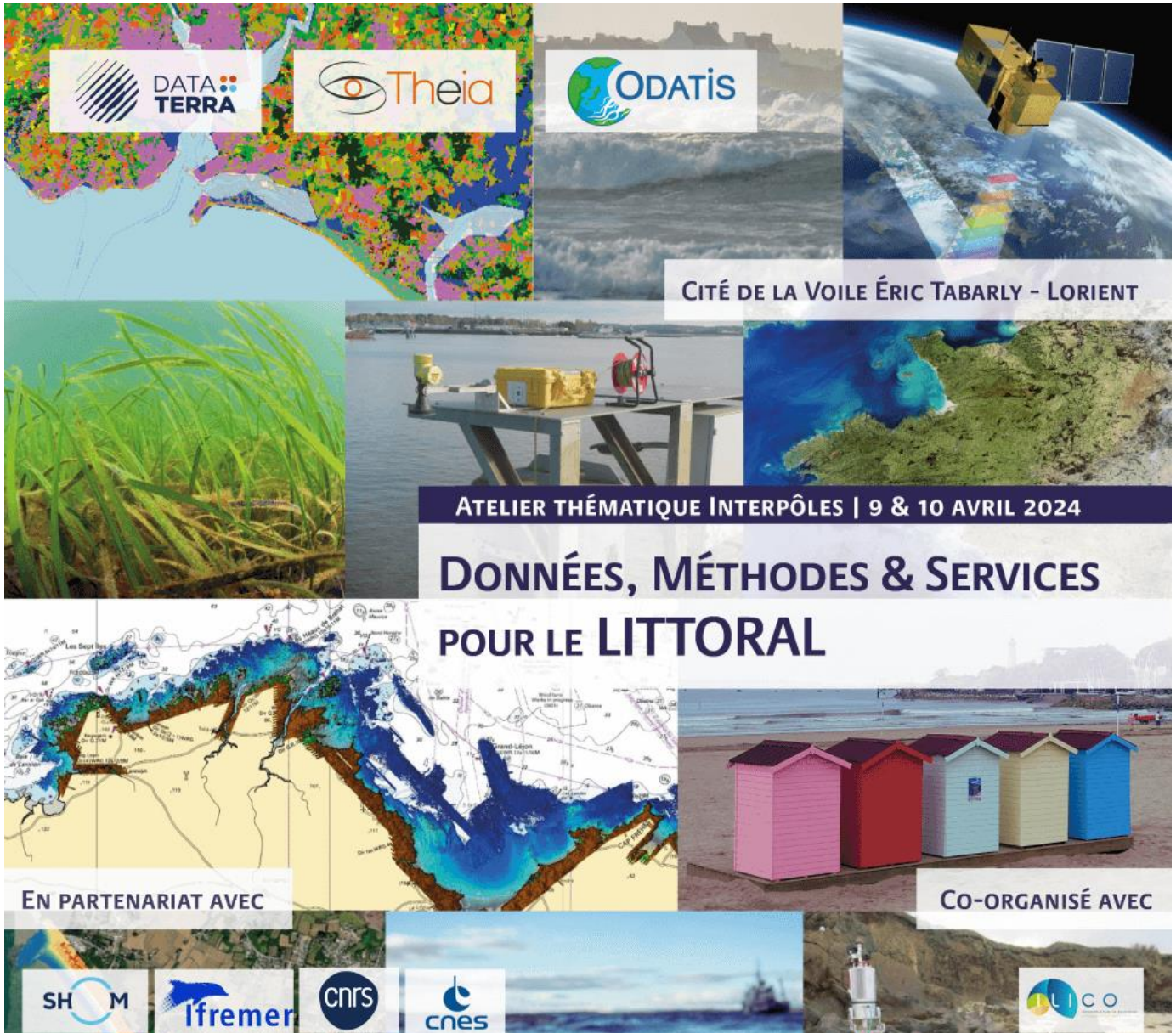
TRISHNA (CNES/ISRO) : SST & OC HR des eau continentales à côtières / Sols

Préparation (e.g., algorithmes à partir de S2-MSI et L9-OLI-TIRS, chaines de traitement)

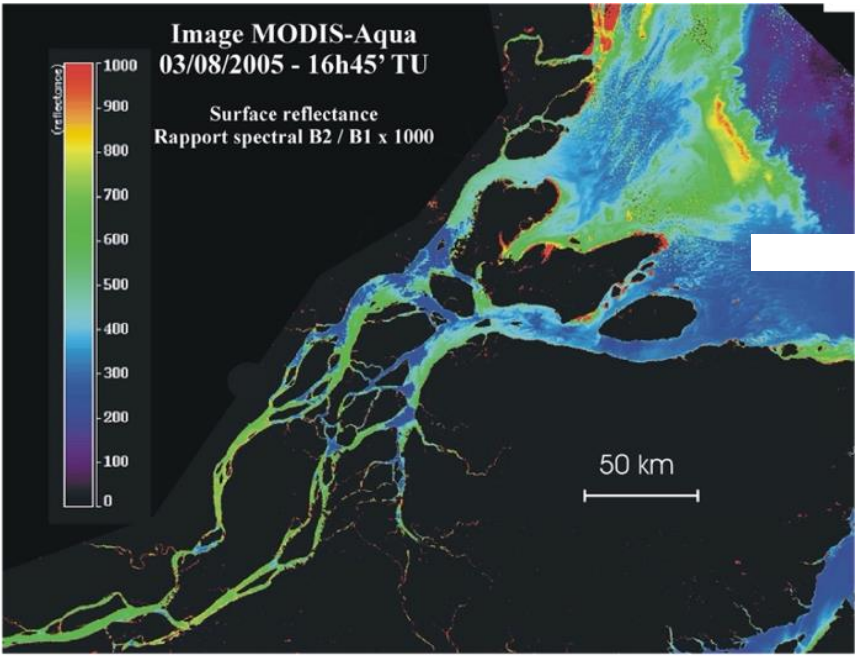
Measurement domain	Atmosphere, Ocean, Land, Snow & Ice
Measurement category	Cloud type, amount and cloud top temperature, Multi-purpose imagery (land), Surface temperature (land), Vegetation, Albedo and reflectance, Surface temperature (ocean), Sea ice cover, edge and thickness, Snow cover, edge and depth
Measurement detailed	Fire temperature, Vegetation type, Fire fractional cover, Earth surface albedo, Land cover, Land surface temperature, Sea surface temperature, Snow cover, Glacier cover, Cloud mask
Instruments	SWIR, TIR, VNIR
Instrument type	Imaging multi-spectral radiometers (vis/IR)

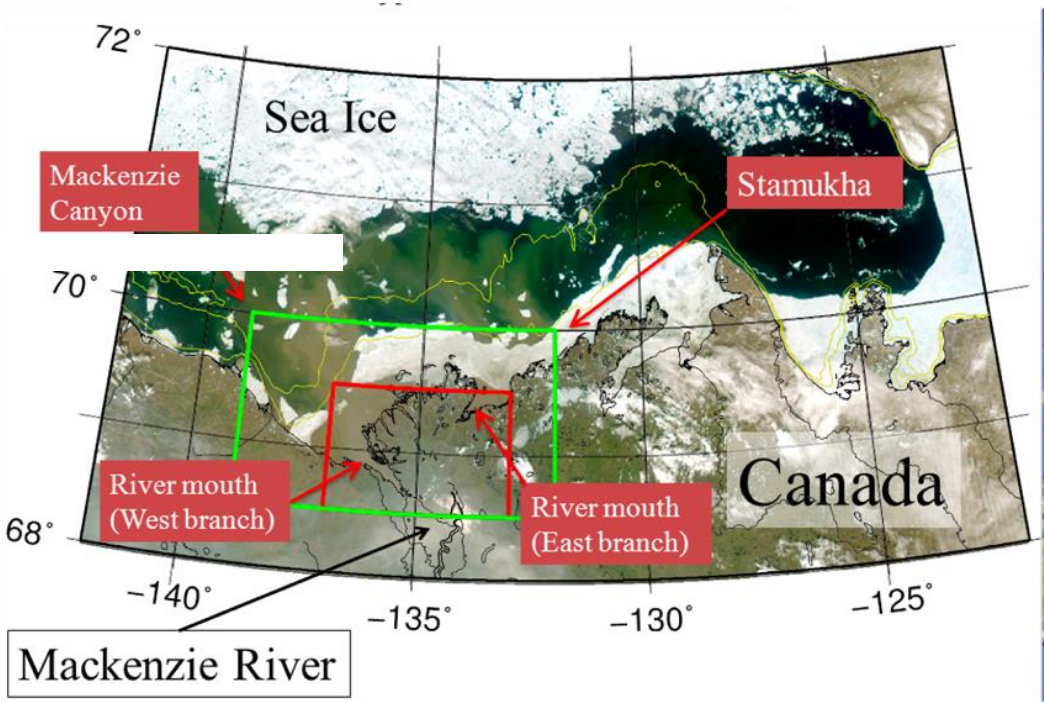
Futurs sites de validation (OC & SST)

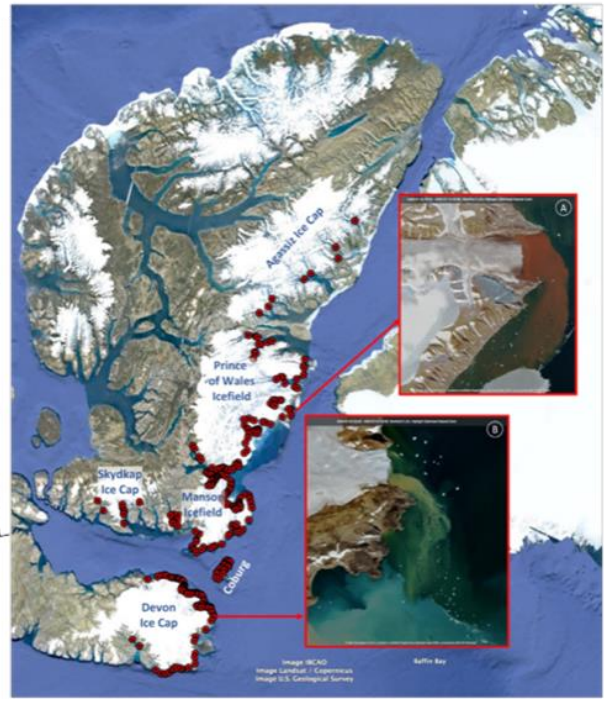
COMMUNICATION / ANIMATION



Sites d’étude Outre-Mer et arctiques ?

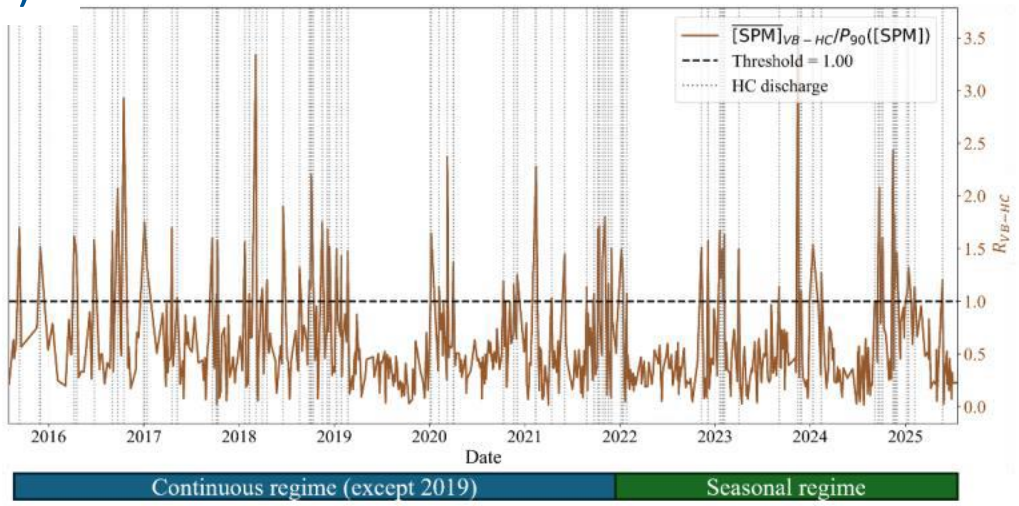


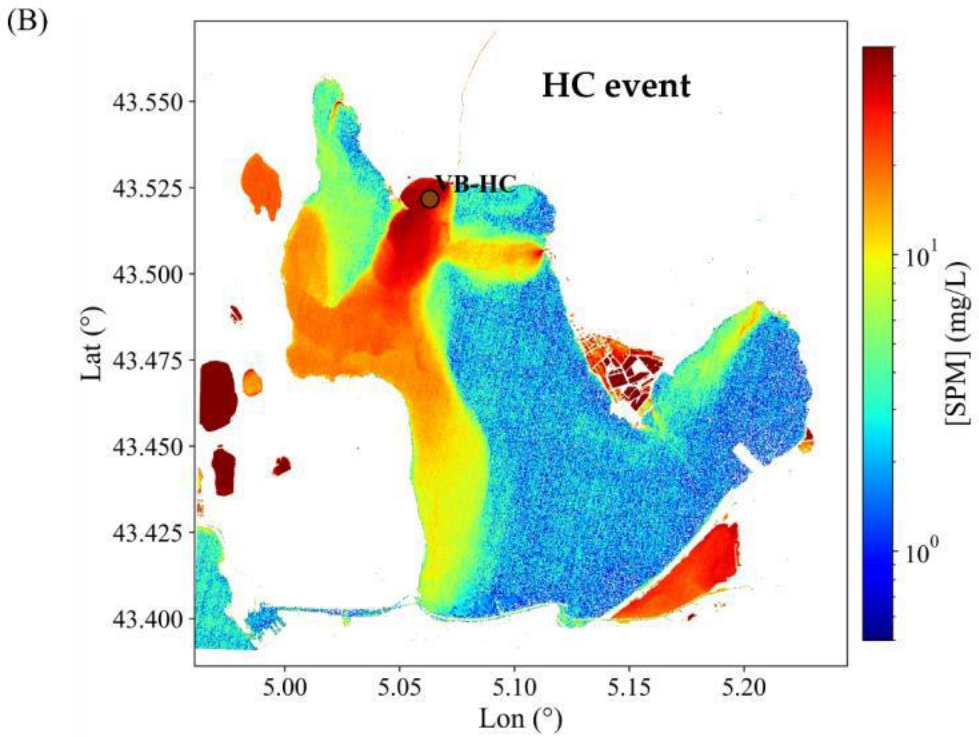


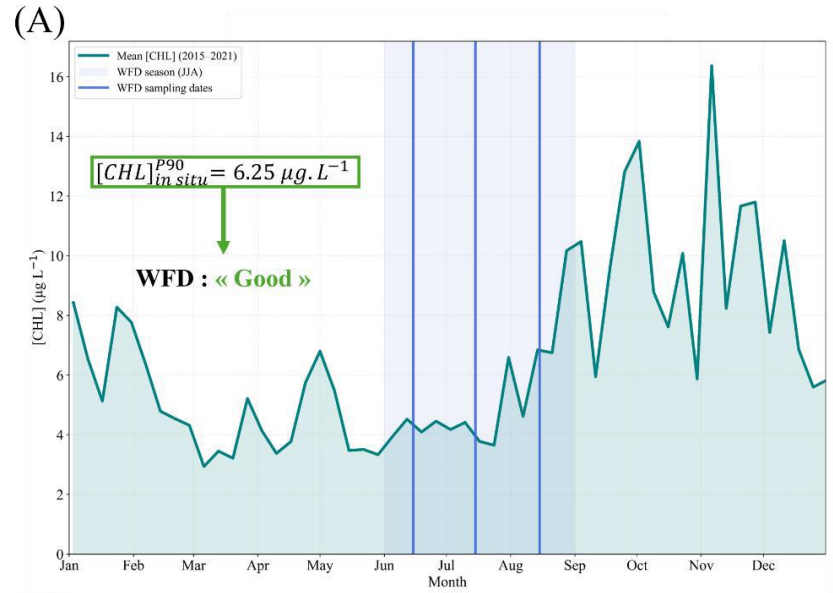


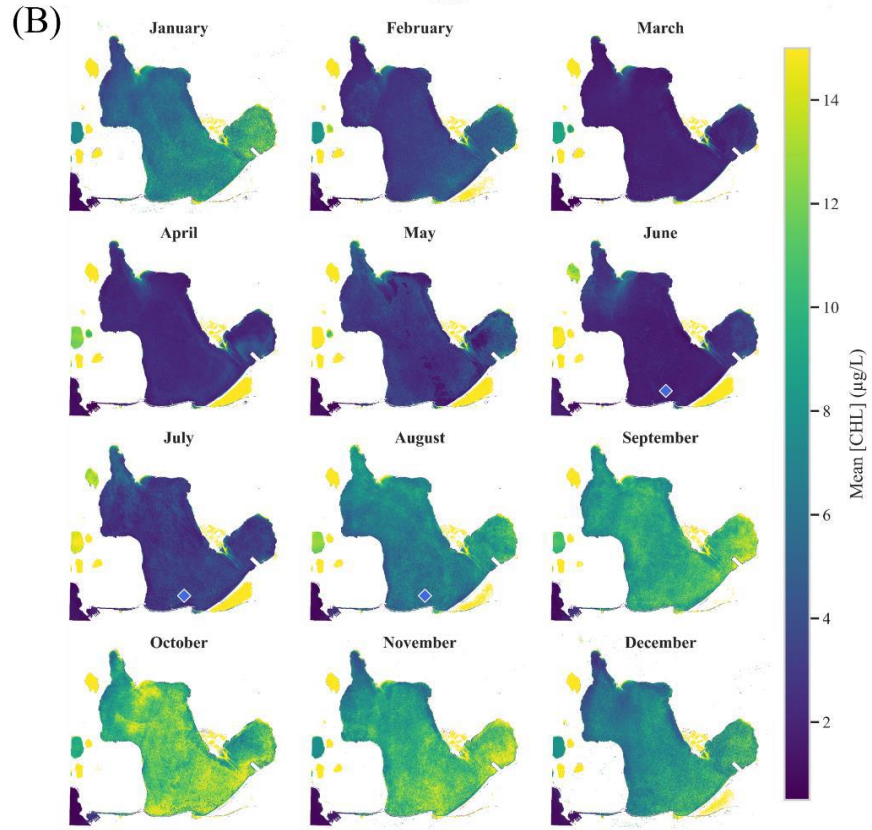
Lagunes côtières

(Martin et al. 2025; en rév.)









QUALITÉ DES EAUX / INDICATEURS ÉCOLOGIQUES

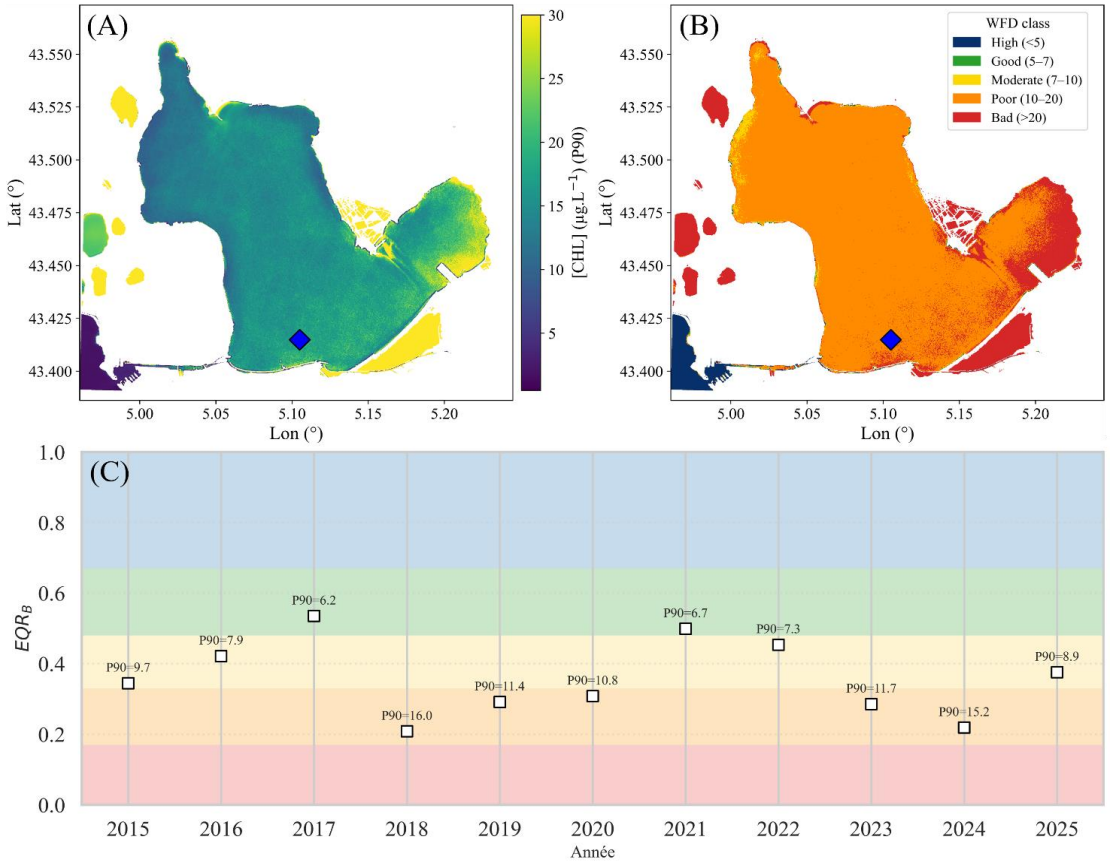
remote sensing

MDPI

Article

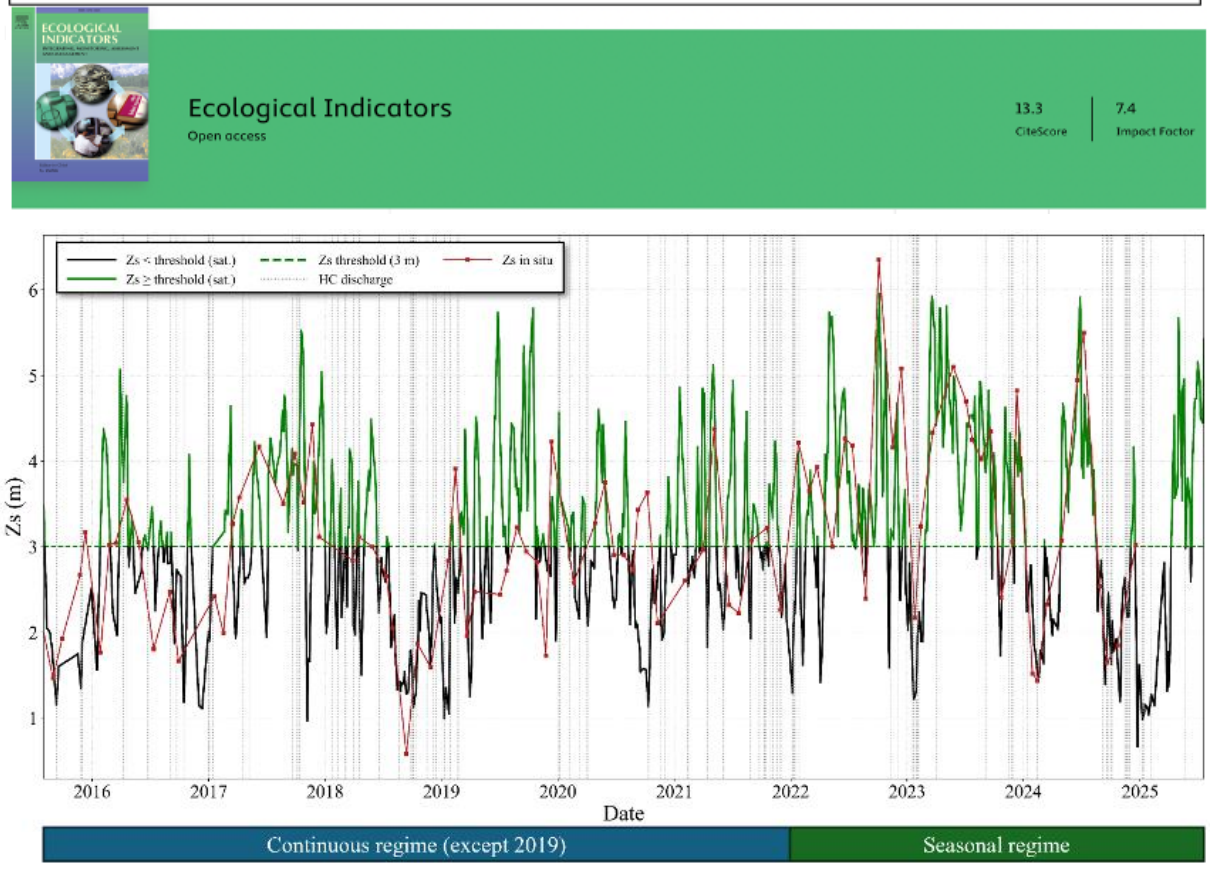
Towards Reliable High-Resolution Satellite Products for the Monitoring of Chlorophyll-a and Suspended Particulate Matter in Optically Shallow Coastal Lagoons

Samuel Martin [1,2,*], Philippe Bryère [2], Pierre Gernez [3], Pannimpullath Remanan Renosh [1] and David Doxaran [1]



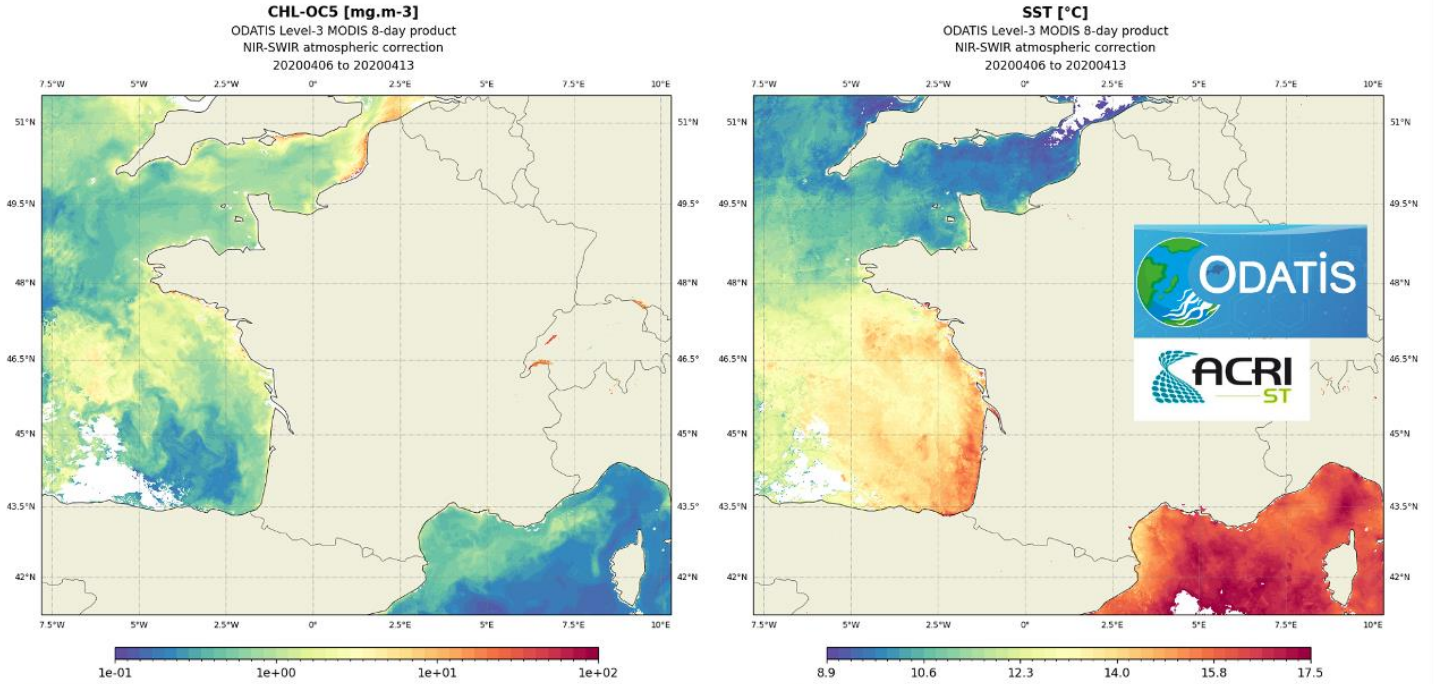
A decade of Sentinel-2 observations for Water Framework Directive assessment in an anthropized coastal lagoon: The Berre Lagoon (France)

Samuel Martin[1, 2*], Pierre Gernez[3], Philippe Bryère[2], Nicolas Mayot[4], Sylvain Rigaud[5], David Doxaran[1]

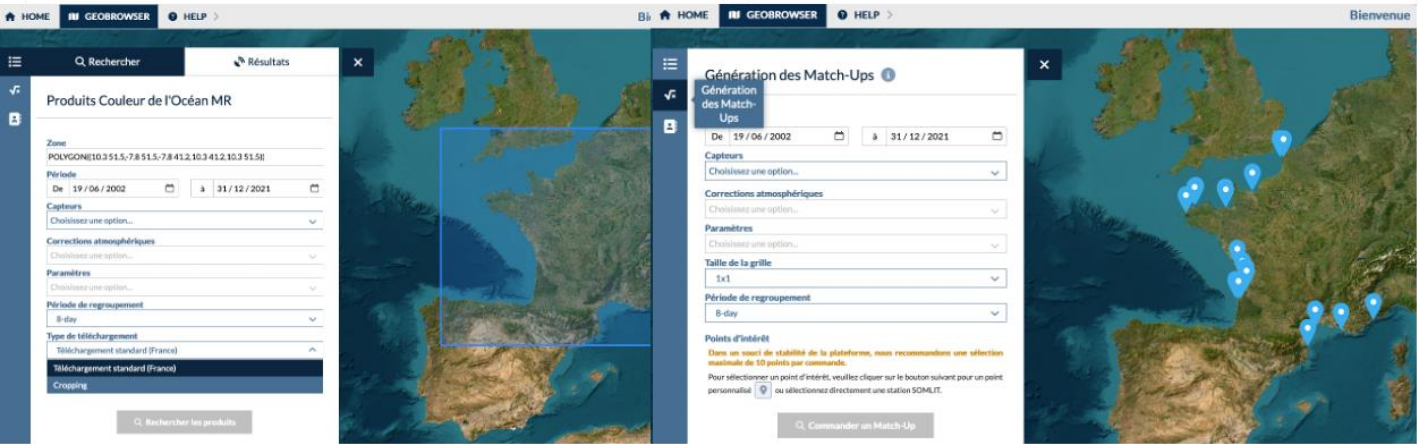


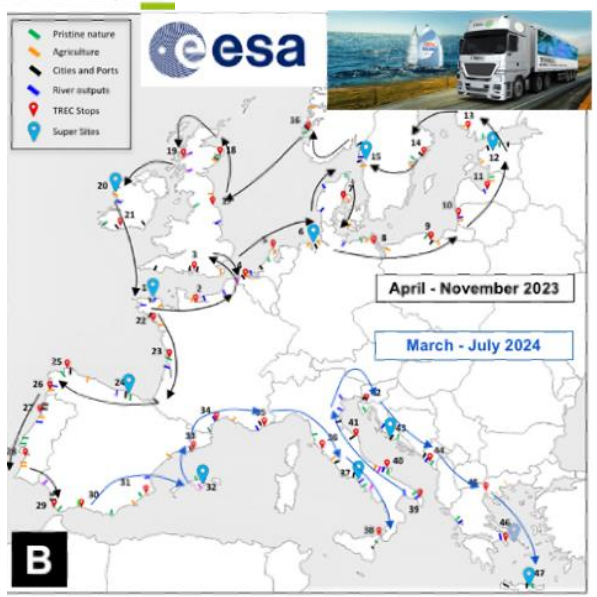
Calibration / Validation des produits satellitaires dérivés dans les eaux côtières

SST, Réflectance, IOPs, Turbidité, MES, Chla, CDOM, POC, DOC
Algorithmes développés en France et validés (e.g., stations SOMLIT)

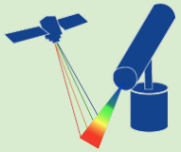


debubbler system



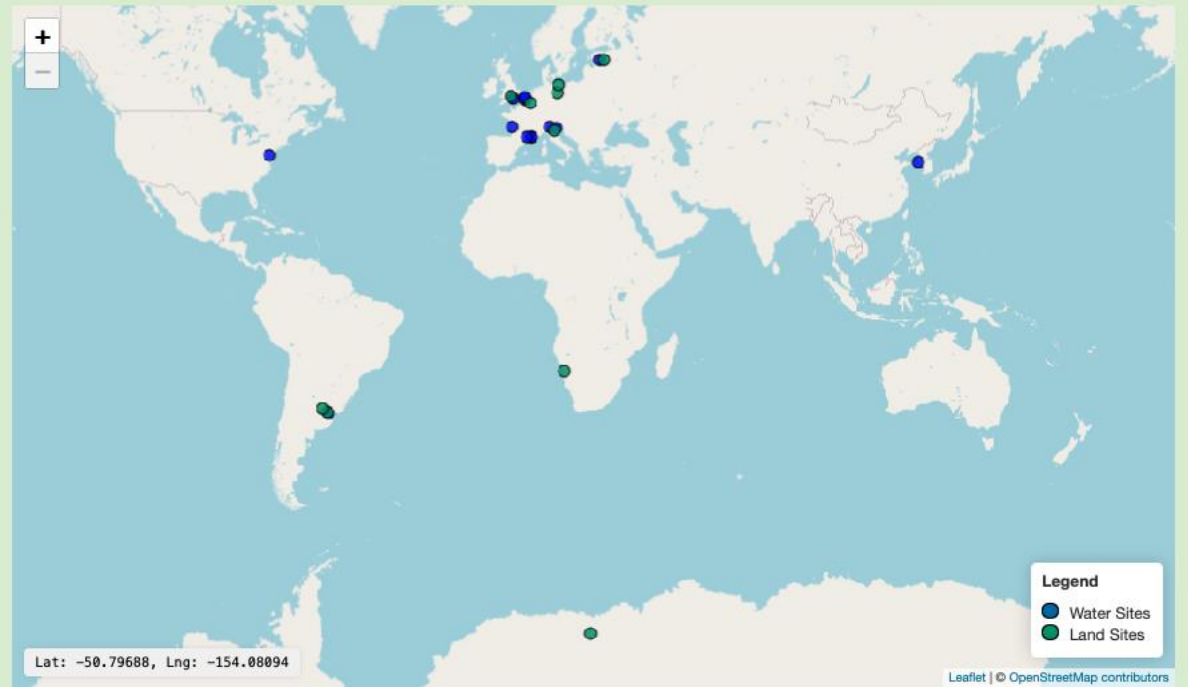


Validation des corrections atmosphériques (et +) le réseau HYPERNETS



HYPERNETS

A network of automated hyperspectral radiometers to validate water and land surface reflectance (380 - 1680 nm) from all satellite missions



HYPSTAR® (HYperspectral Pointable System for Terrestrial and Aquatic Radiometry)

HYPSTAR® system (9 water sites)

- Water type: Coastal, low to moderate turbidity
- Height: ~ 11 m
- First data: 2019-09-26
- Venice,Italy **(VEIT)**

- Water type: Inland clear water/ macrophytes
- Height: 6 m
- First data: 2022-06-09
- Lake Garda, Italy **(GAIT)**

- Water type: Coastal, very turbid
- Height: 8.5 m
- First data: 2021-12-16
- Rio del la Plata, Argentina **(LPAR)**

- Water type: Coastal, very turbid
- Height: ~ 8 m
- First data: 2023-02-26
- Zeebrugge/MOW1,Belgium **(M1BE)**

HYPSTAR® system (9 land sites)