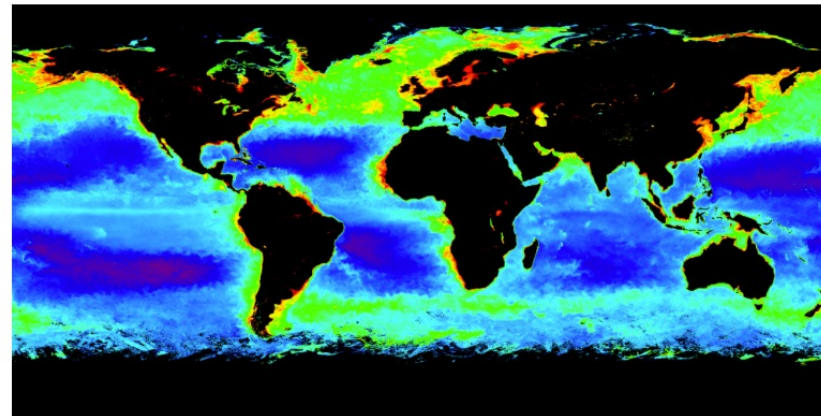


Télédétection de la couleur des eaux océaniques et côtières

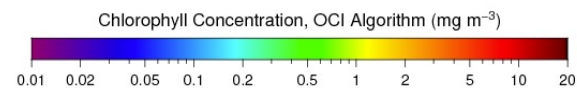
David Doxaran & Louis Terrats

LOV, CNRS/SU

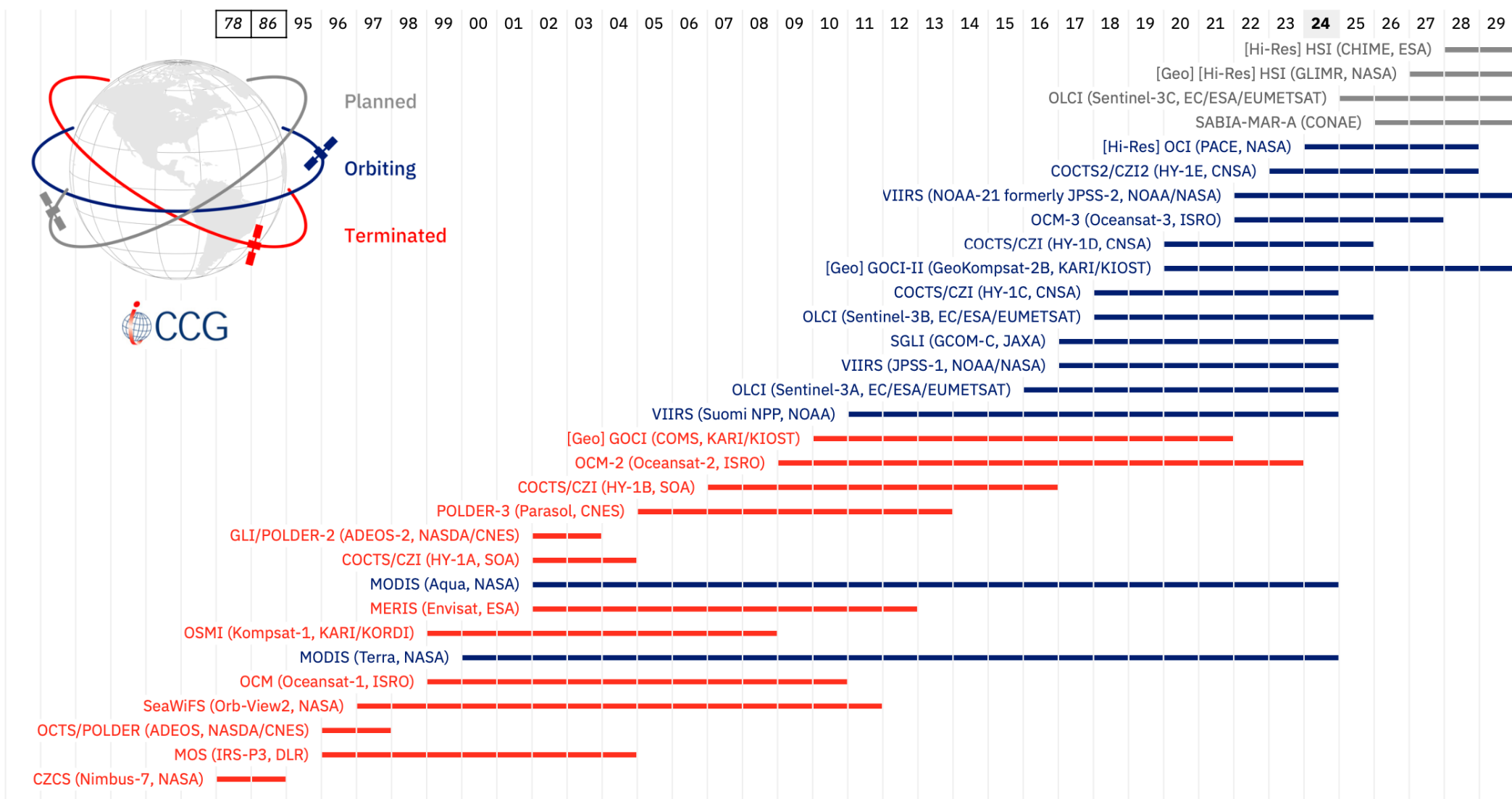
ODATIS CES Couleur de l'Océan



MODIS Aqua chlor_a seasonal composite for Spring 2014

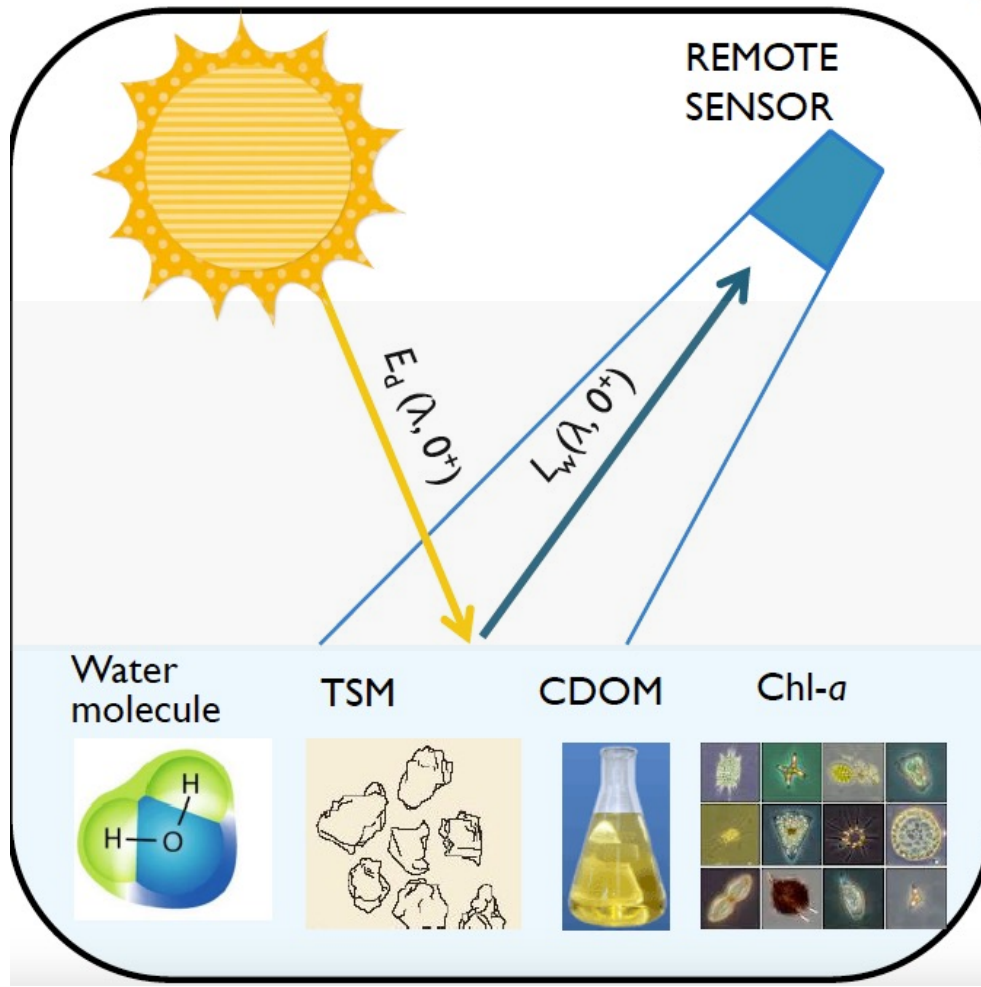


Historique des mesures satellitaires de la couleur de l'océan



SeaWiFS (1998, 1km, global, daily) > MODIS et MERIS (300 m) > S2-MSI (20 m) & S3-OLCI (300 m) ... GOCI (Geo), PACE (hyper)

Chaines de traitement et produits satellitaires, Cal/Val

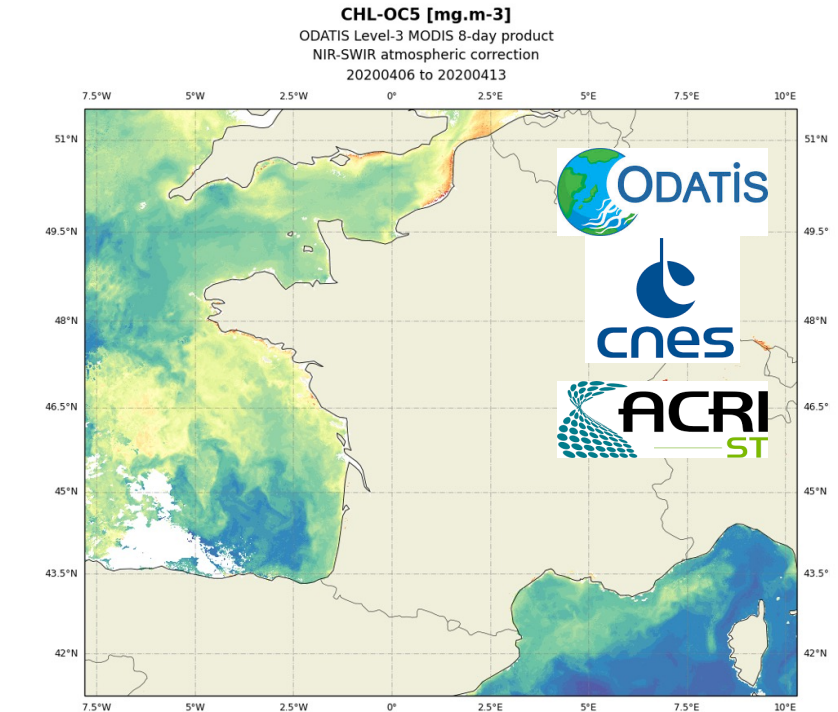
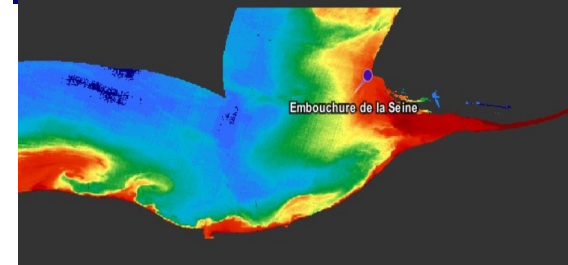
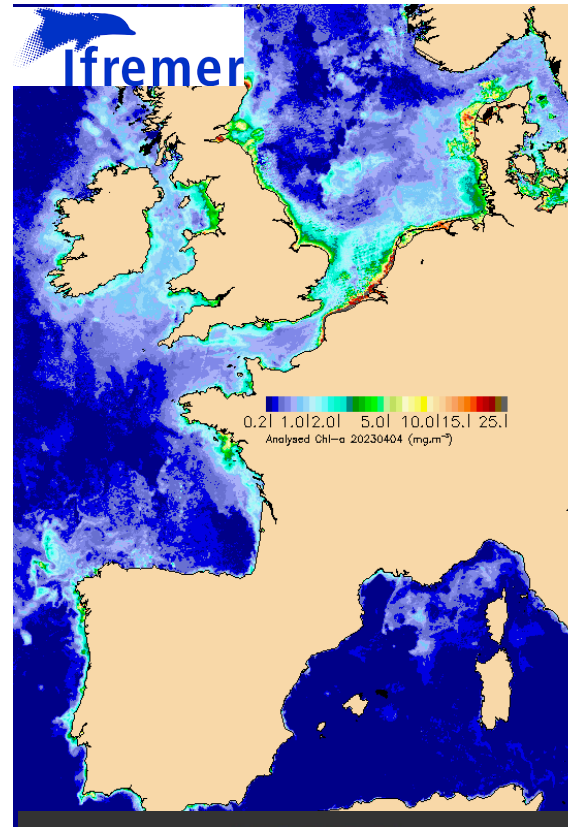
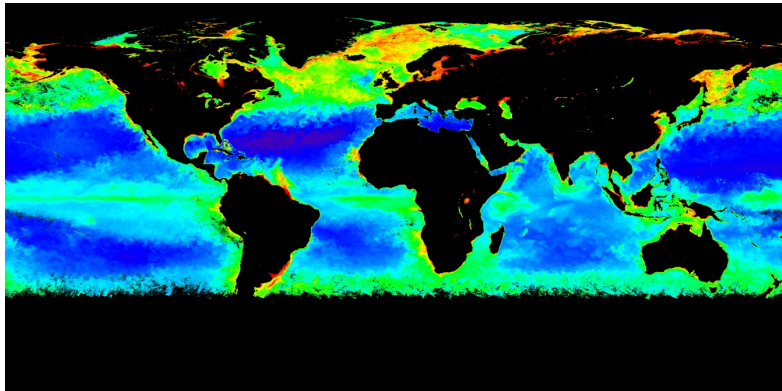
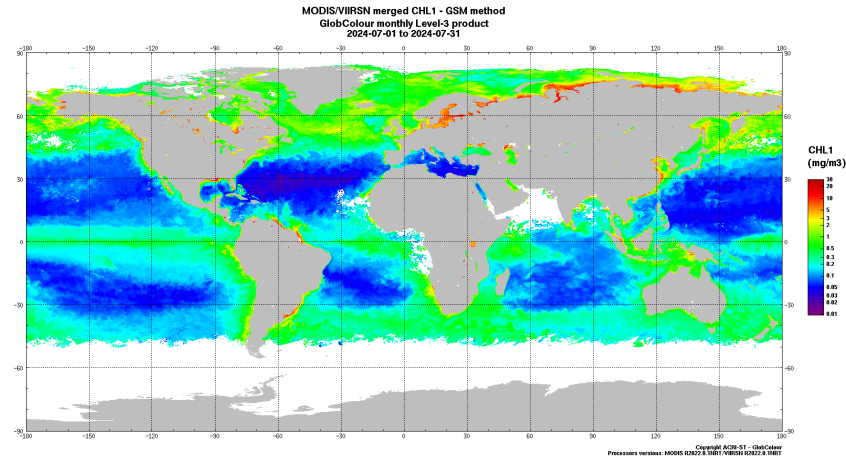


a , b_b , Z_{eu} , turbidité, PFTs, POC, PIC, DOC...

1. **Validation** de la réflectance de l'eau (corrections atmosphériques, environnement et interface)
2. **Validation** des paramètres dérivés (optiques et biogéochimiques)
3. **Calibration** régionale des algorithmes (réflectance de l'eau >> produits dérivés)

+ SST (infrarouge thermique)

Distribution produits satellitaires (Globcolour, OC-CCI, Sextant, ODATIS-MR, CMEMS-HR)



HOME GEOBROWSER HELP Bienvenue

Génération des Match-Ups

De 19/06/2002 à 31/12/2021

Captteurs
Choisissez une option...

Corrections atmosphériques
Choisissez une option...

Paramètres
Choisissez une option...

Taille de la grille
1x1

Période de regroupement
8-day

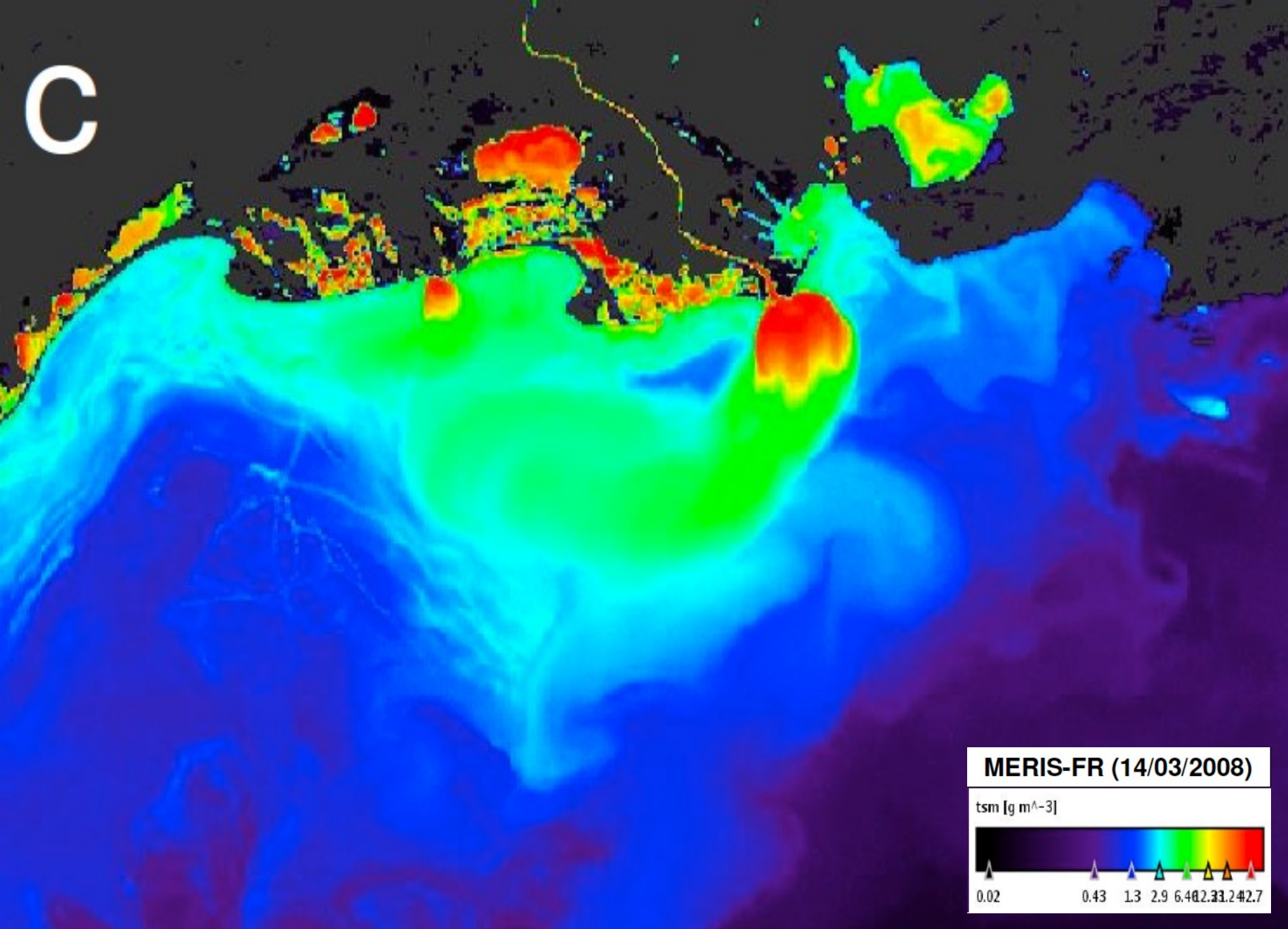
Points d'intérêt
Dans un souci de stabilité de la plateforme, nous recommandons une sélection maximale de 10 points par commande.
Pour sélectionner un point d'intérêt, veuillez cliquer sur le bouton suivant pour un point personnalisé ou sélectionnez directement une station SOMLIT.

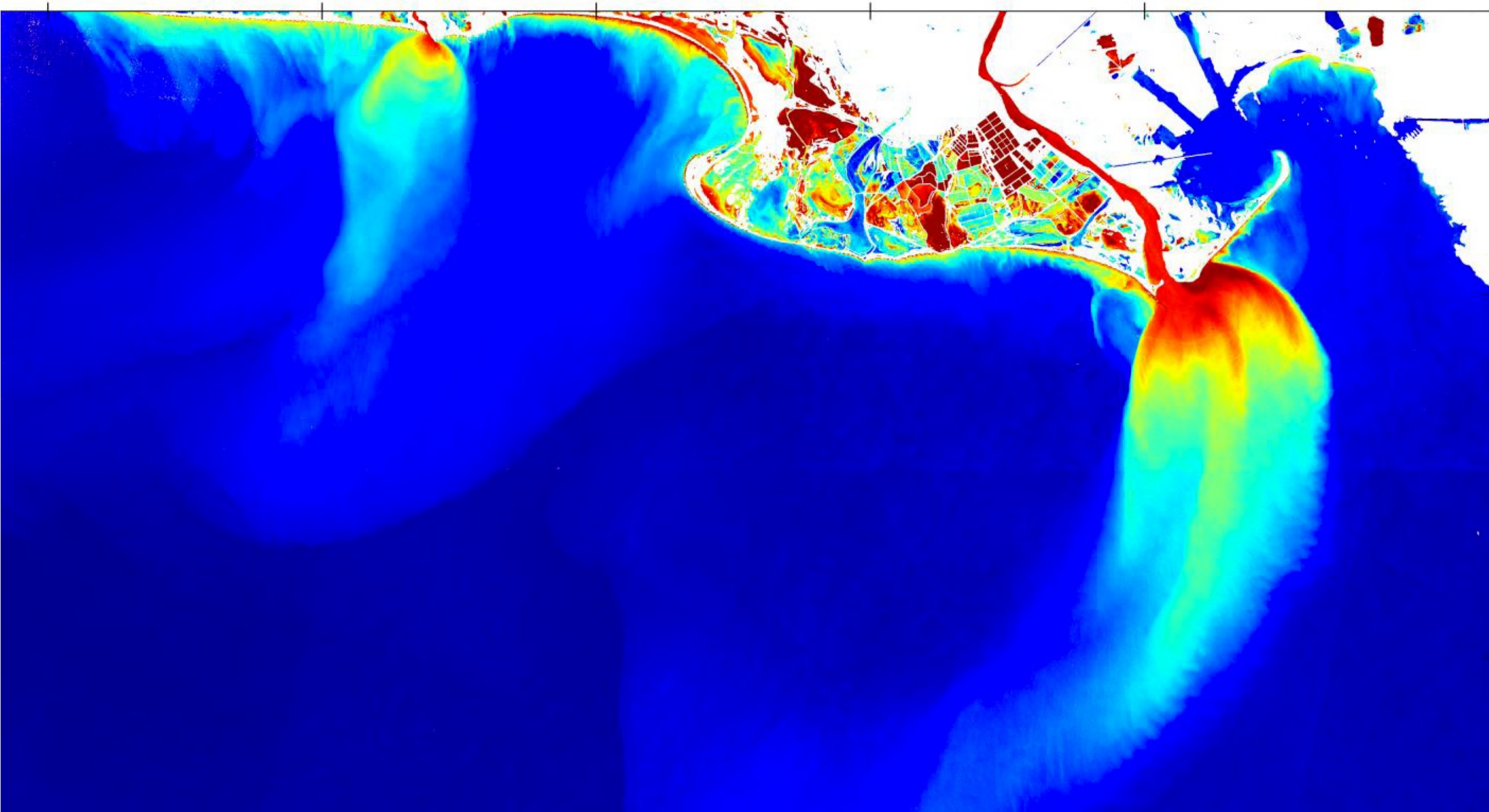
Commander un Match-Up

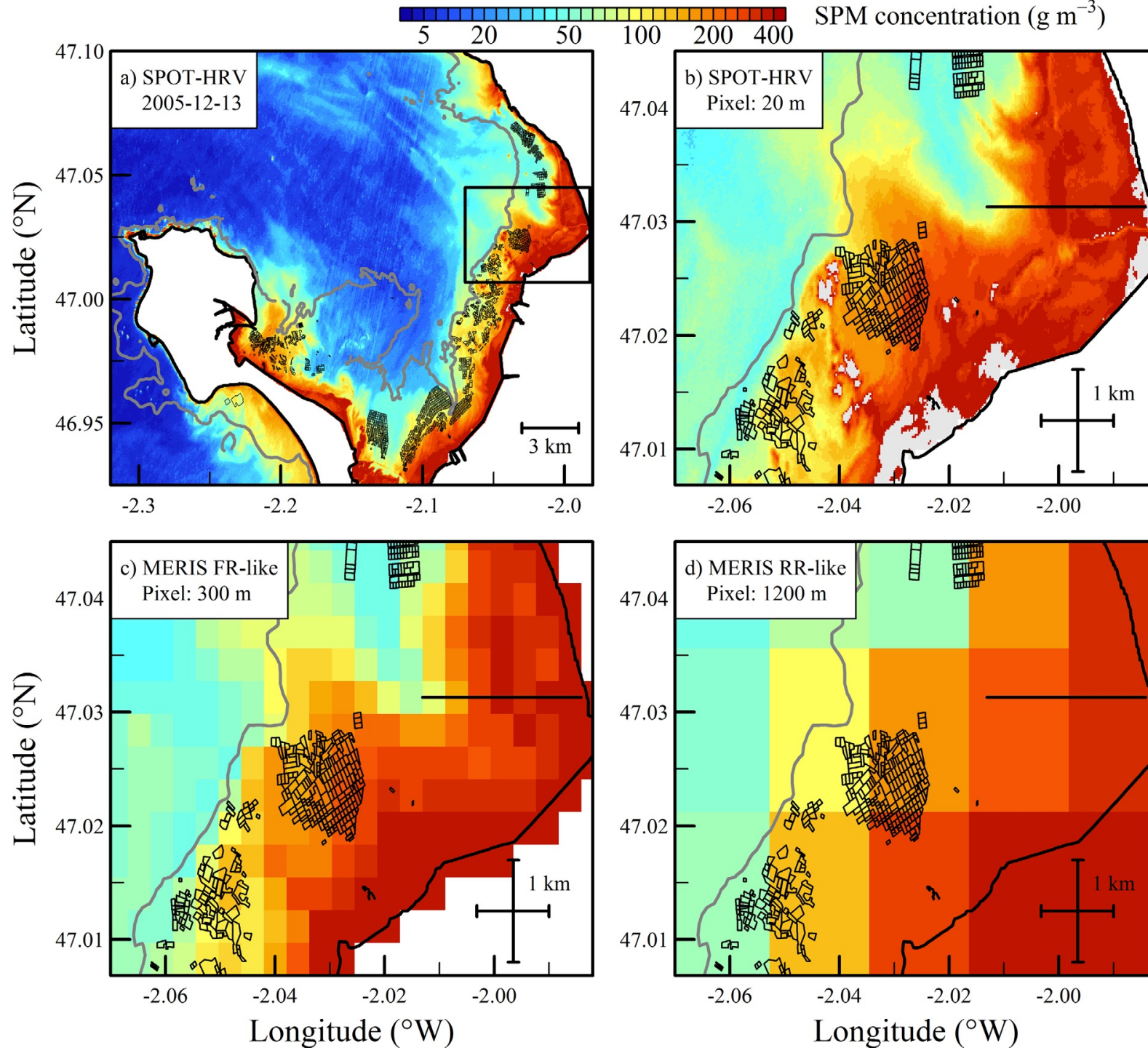
so mlit
Service d'Observation en Milieu Littoral

>> Séries temporelles (25 ans)

C

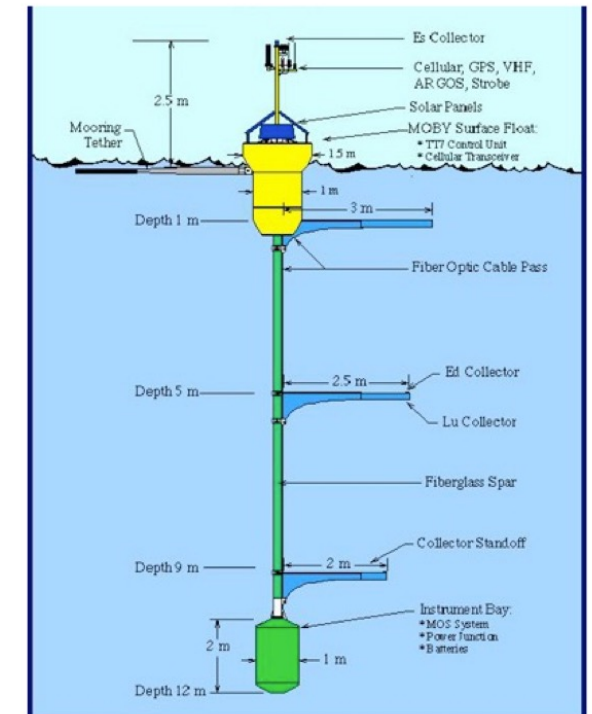
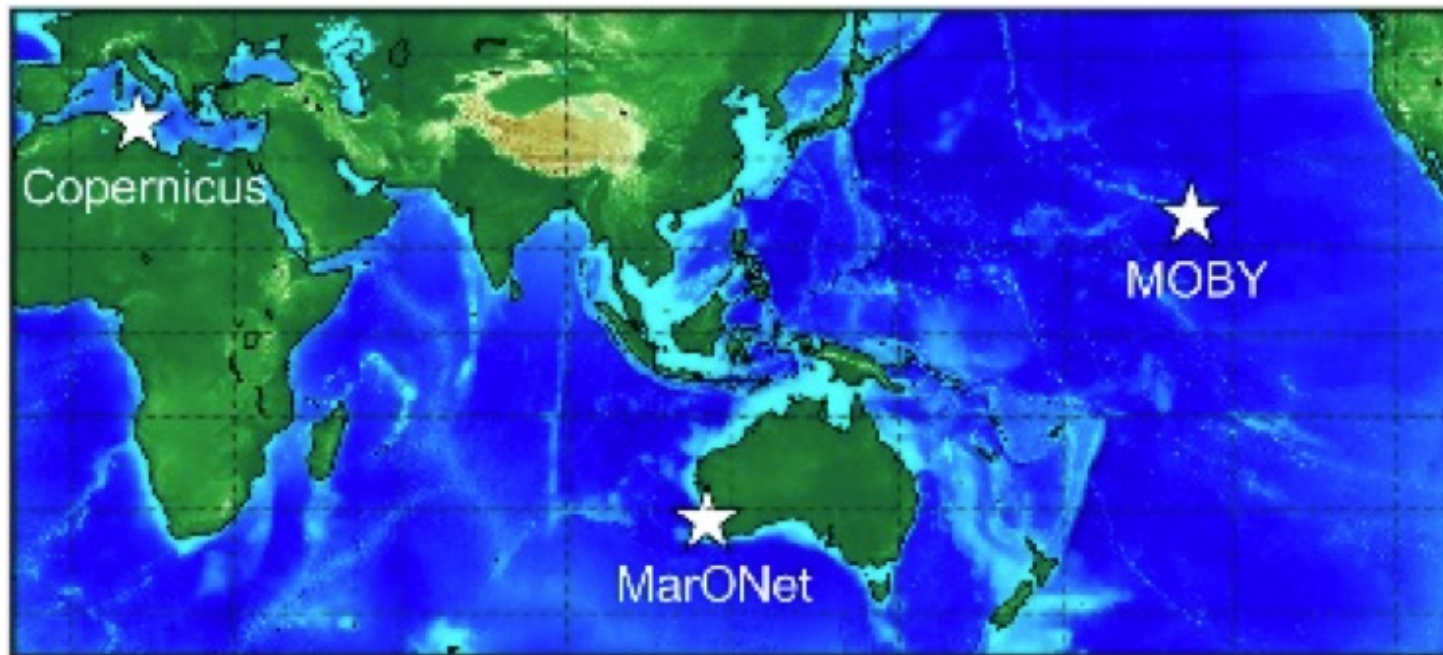






Cal/Val : cas du hauturier

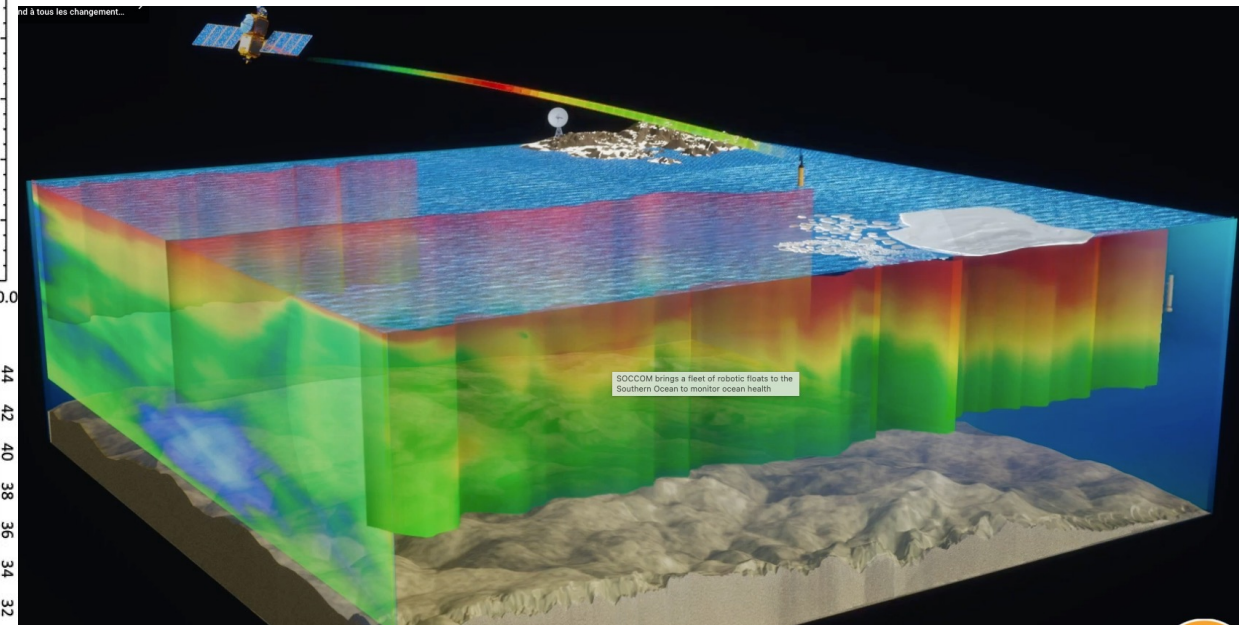
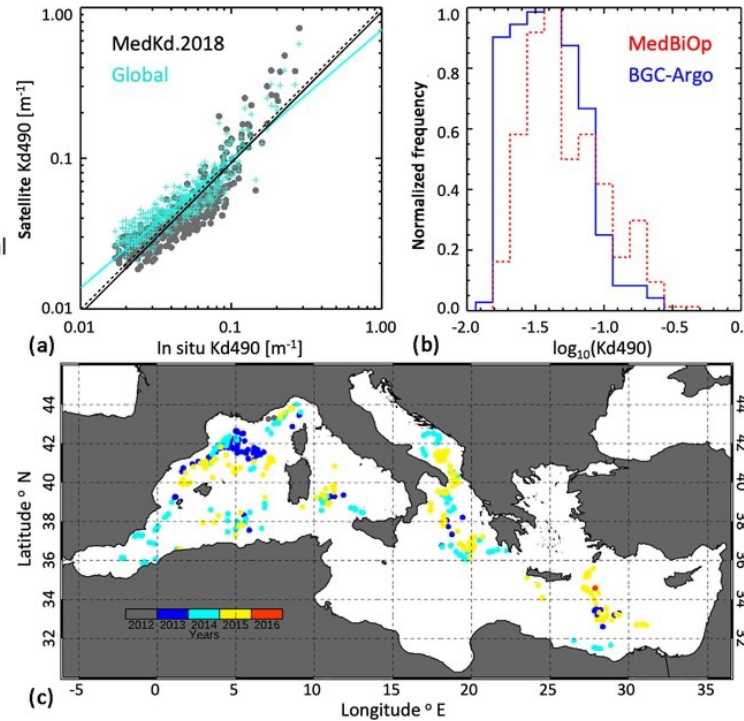
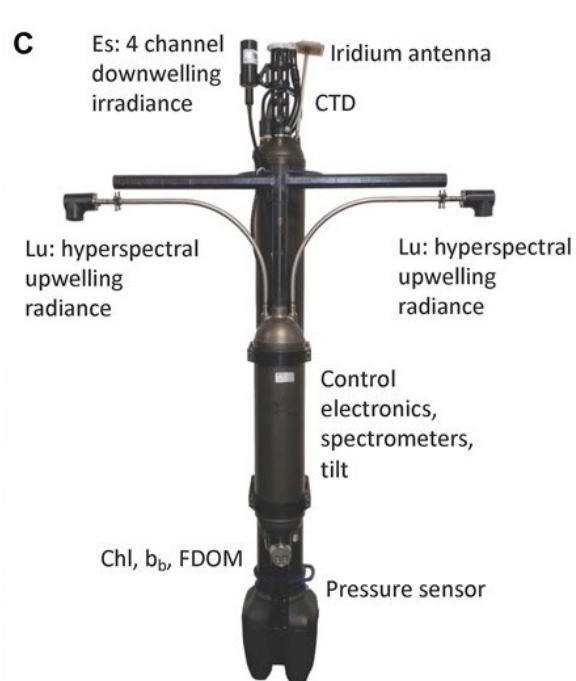
- Utilisation de mouillages fixes, radiométrie haute précision (calibration vicaine)
- Séries temporelles (> 20 ans) avec prélèvements et analyses d'échantillons d'eau (e.g., Boussole)
- Vers une homogénéisation des sites de mesures (instruments et protocoles)



Cal/val : cas du hauturier

Flotteurs-profileurs HyperNav, BGC-Argo...

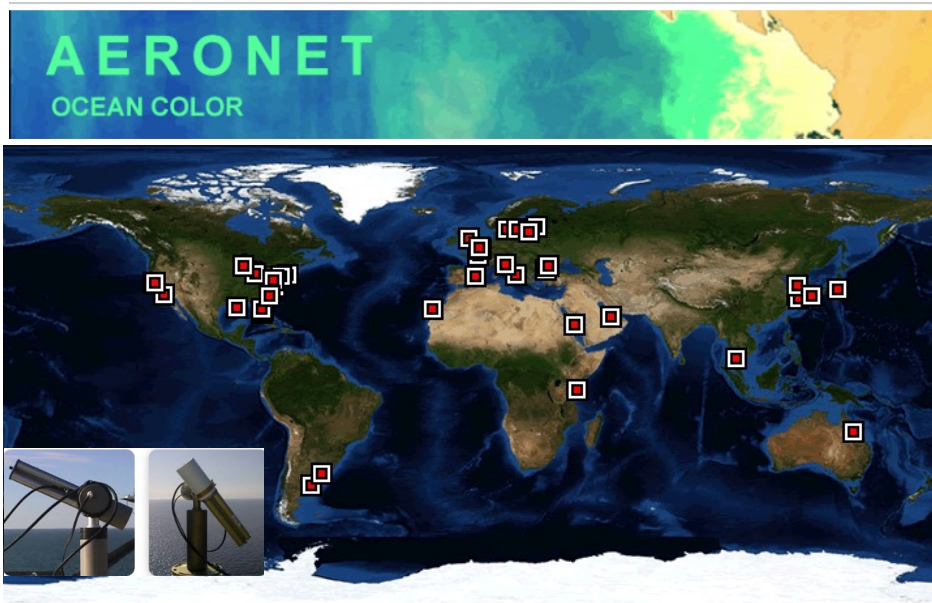
- Utilisation de flotteurs-profileurs pour la Cal/Val (radiométrie, Chla)
- Extrapolation sur la colonne d'eau (e.g., couche euphotique)
- Reconstruction 3D des propriétés optiques et biogéochimiques de l'océan



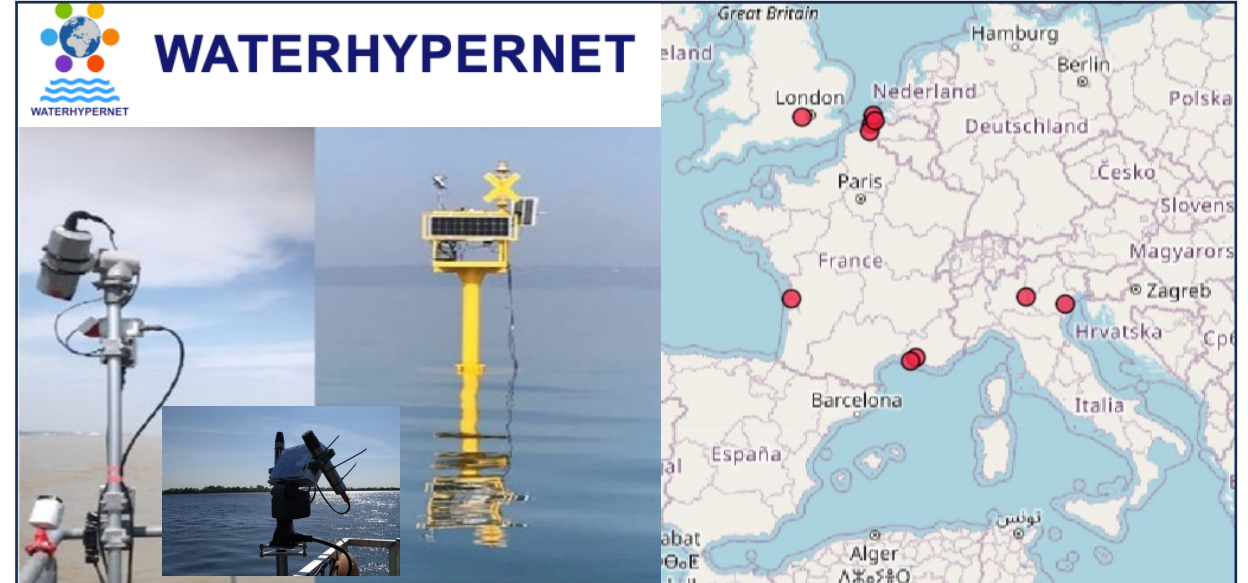
Cal/Val : cas du côtier/littoral

Réseaux Aeronet-OC, WaterHYPERNET

- Stations fixes autonomes de mesures radiométriques au-dessus de l'eau
- Eaux côtières, littorales à continentales



Réseau historique vieillissant (multi-spectral)
et couteux (peu de stations, 0 en France)

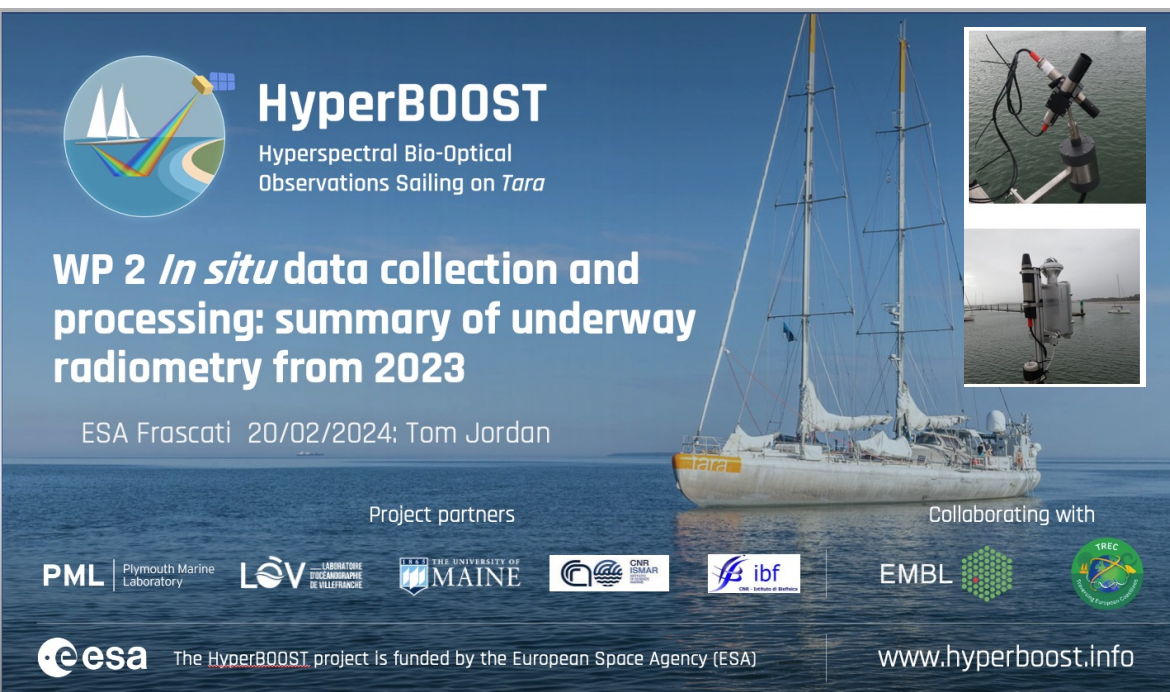


Nouveau réseau innovant (hyper-spectral)
peu couteux (déjà 3 sites en France)

Cal/Val : cas du côtier/littoral

Navires d'opportunités (e.g. FerryBox, Tara-Europa/HyperBOOST...)

- Systèmes autonomes (radiométrie, fluorométrie, absorption et diffusion de la lumière)
- Contrôles qualité des mesures et hétérogénéité des jeux de données
- Complémentarité avec les observations satellitaires (Cal/Val)



HyperBOOST
Hyperspectral Bio-Optical
Observations Sailing on *Tara*

WP 2 *In situ* data collection and processing: summary of underway radiometry from 2023

ESA Frascati 20/02/2024: Tom Jordan

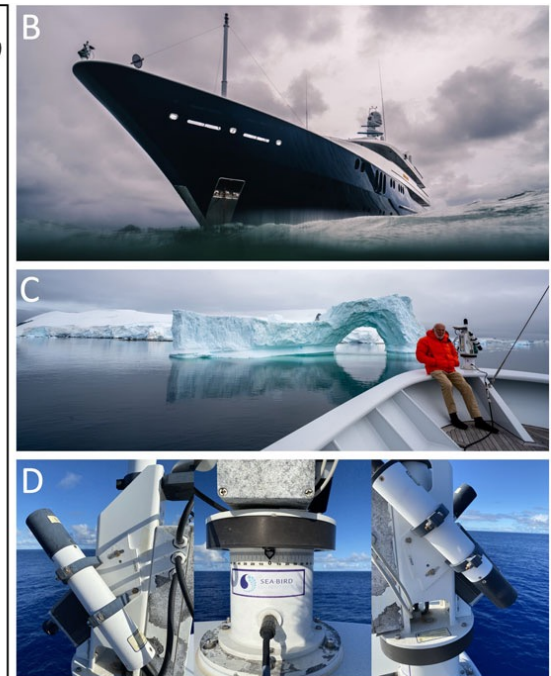
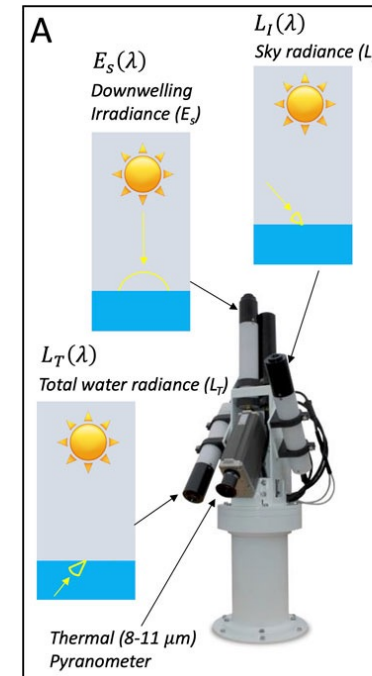
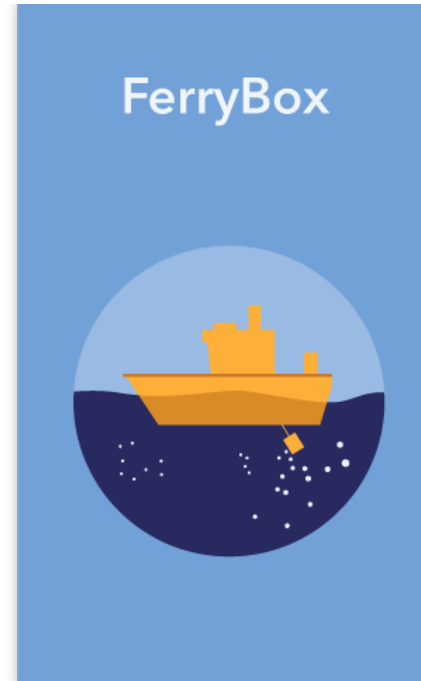
Project partners

Collaborating with

PML Plymouth Marine Laboratory | LOV Laboratoire d'Océanographie de Villefrance | THE UNIVERSITY OF MAINE | CNR ISMAR | ibf | EMBL | TRIC

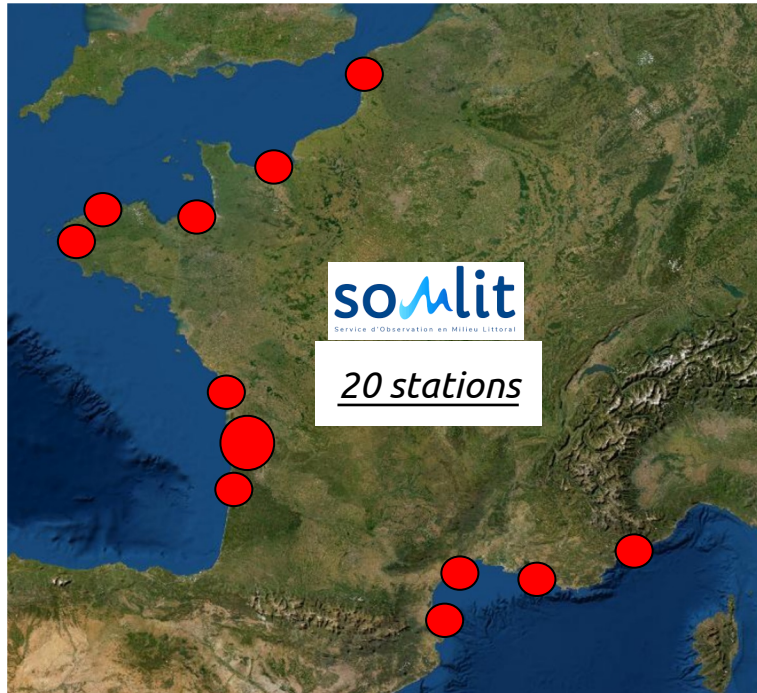
The HyperBOOST project is funded by the European Space Agency (ESA)

www.hyperboost.info

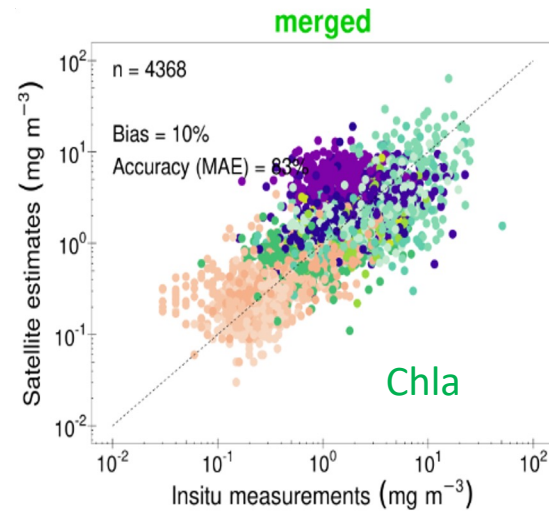
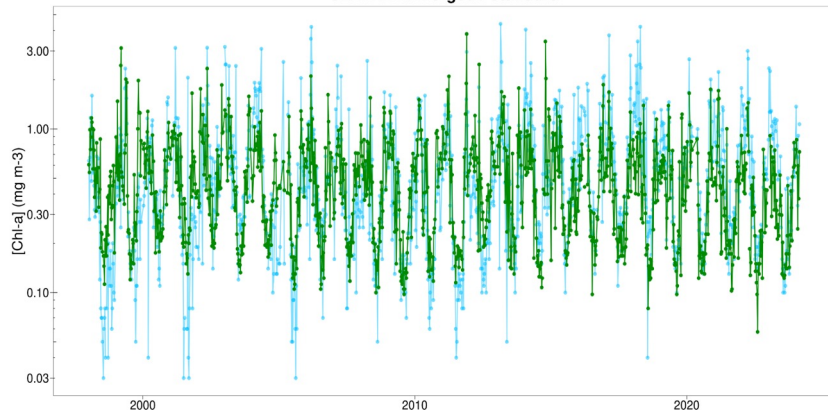


Cas du côtier/littoral :

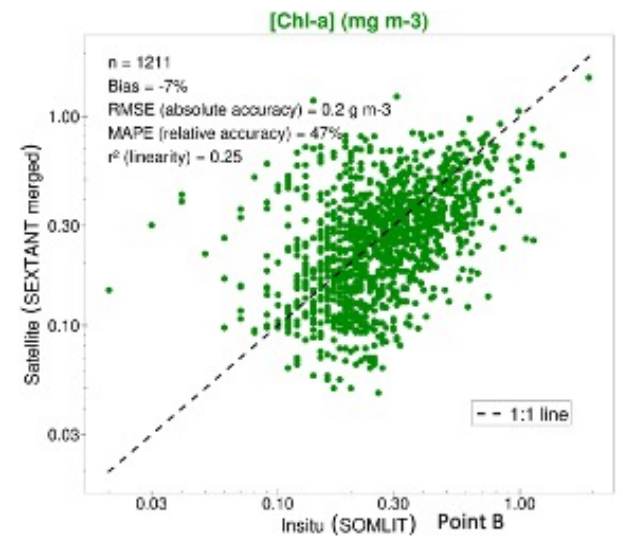
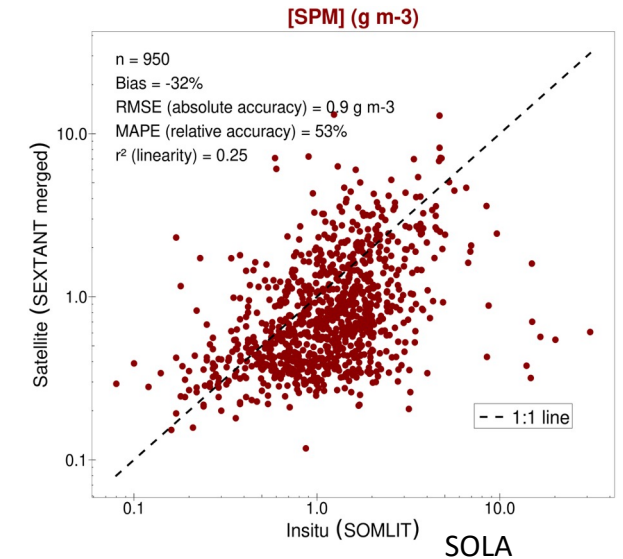
Cal/Val locales essentielles des produits satellitaires (e.g., réseaux IR-ILICO)



SEXTANT / merged / Standard



- Point L (Mch)
- Point C (Mch)
- Luc-sur-Mer (Mch)
- Smile (Mch)
- Bizeux (Brt)
- Le Buron (Brt)
- Cézembre (Brt)
- Estacade (Brt)
- Astan (Brt)
- Portzic (Brt)
- Antioche (GdG)
- pk 86 (GdG)
- pk 52 (GdG)
- pk 30 (GdG)
- Comprian (GdG)
- Eyrac (GdG)
- Bouee 13 (GdG)
- Sola (GdL)
- Sete (GdL)
- Frioul (GdL)
- Point B (GdL)



En cours et Perspectives



Observations « augmentées » (in situ + satellitaires) >> modèles

Références: IOCCG, FRSEN-SI



Front. Remote Sens., 17 July 2024

Sec. Multi- and Hyper-Spectral Imaging

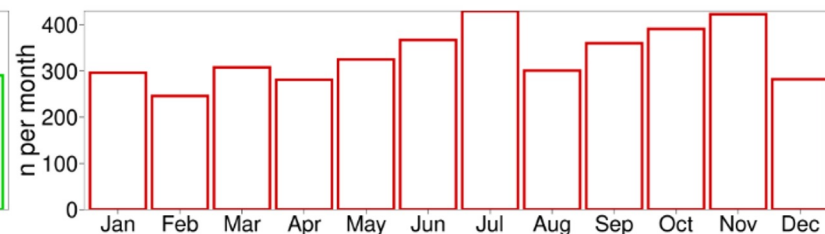
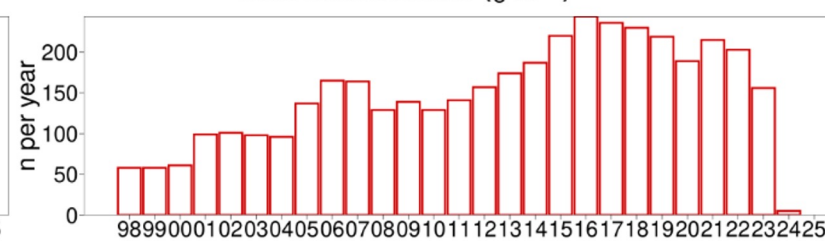
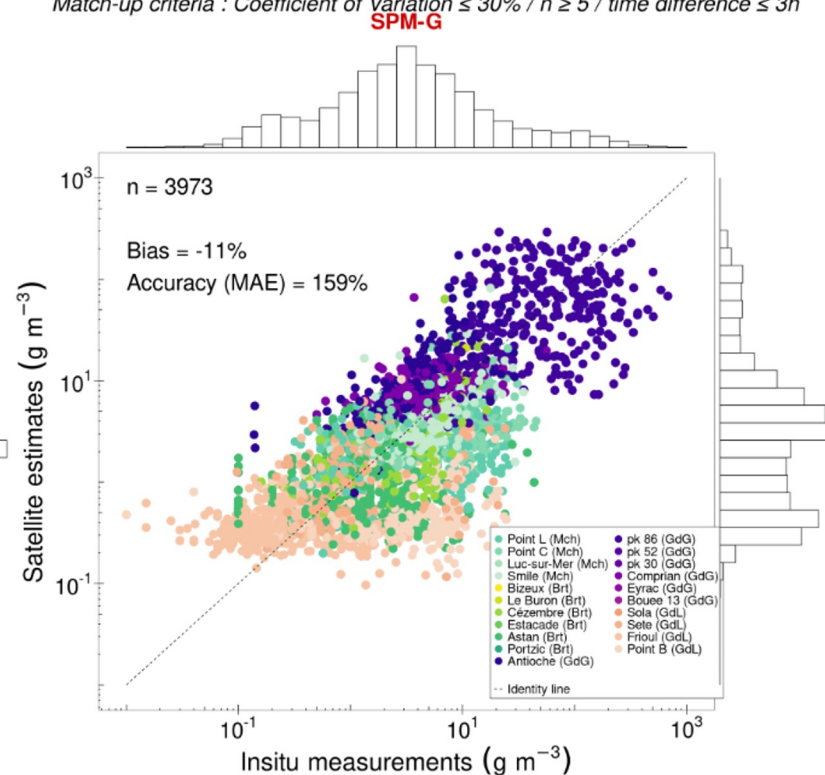
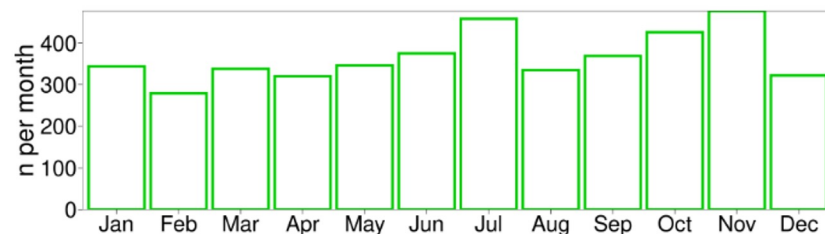
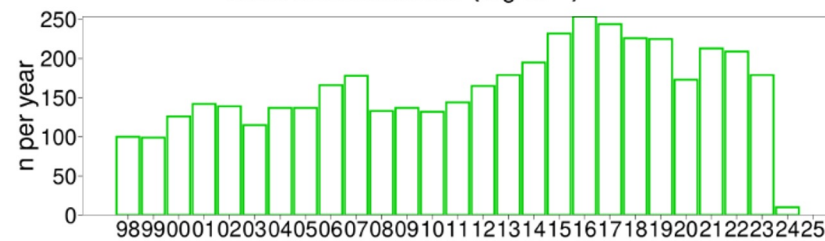
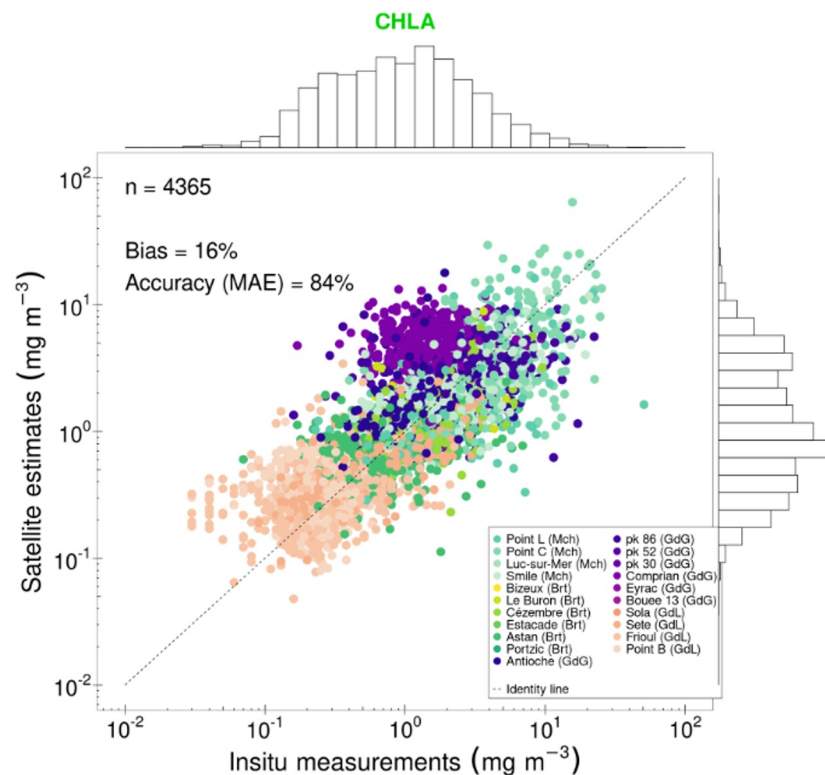
Volume 5 - 2024 | <https://doi.org/10.3389/frsen.2024.1333851>

This article is part of the Research Topic
Optical Radiometry and Satellite Validation

[View all 22 articles >](#)

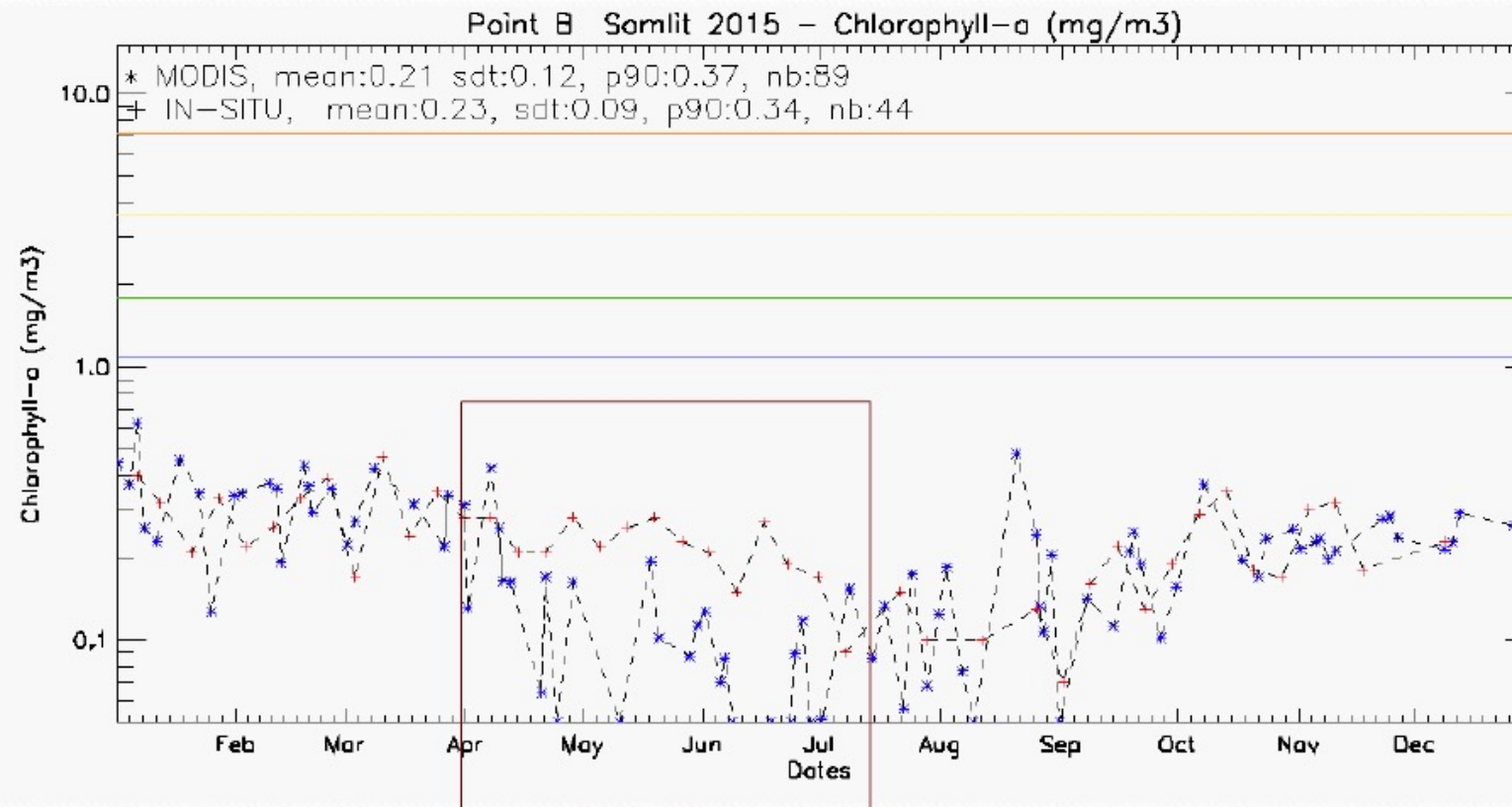
Match-up Satellite vs. SOMLIT measurements

Source = SEXTANT / Sensor = merged / Atm. correction = Standard
 Match-up criteria : Coefficient of Variation $\leq 30\%$ / $n \geq 5$ / time difference $\leq 3h$

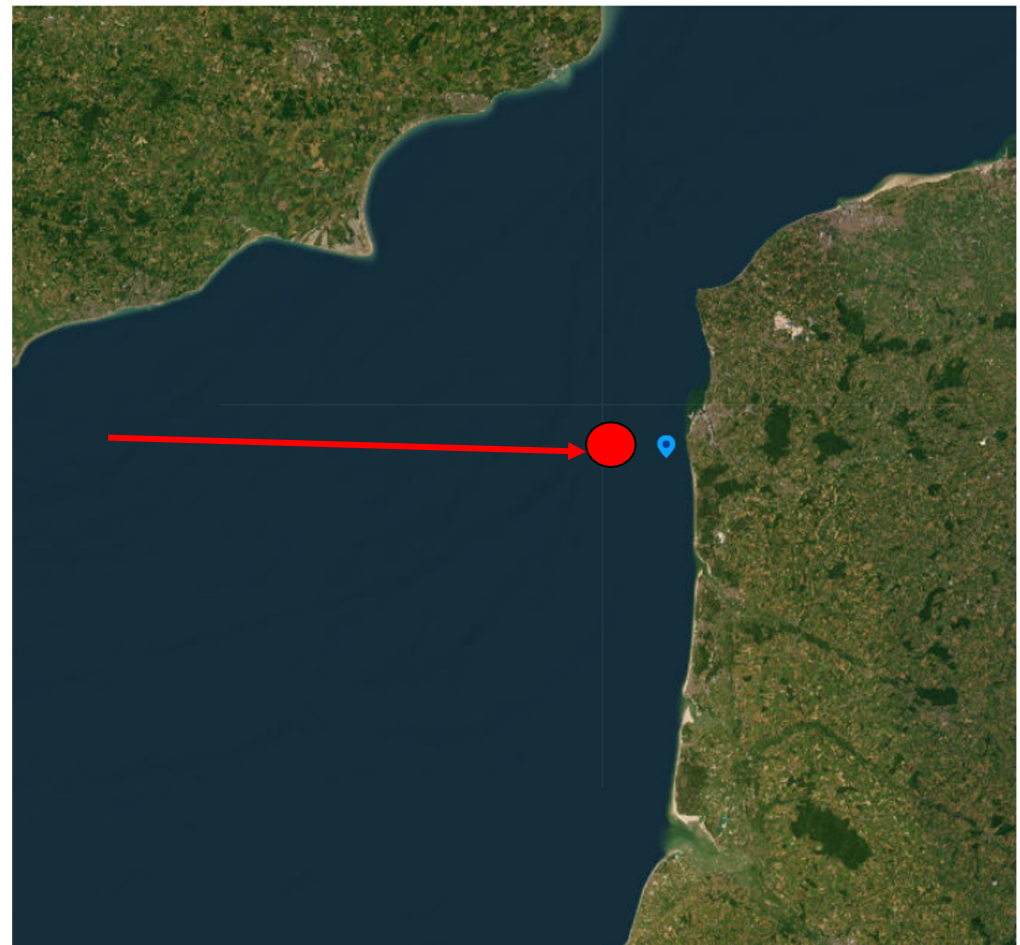
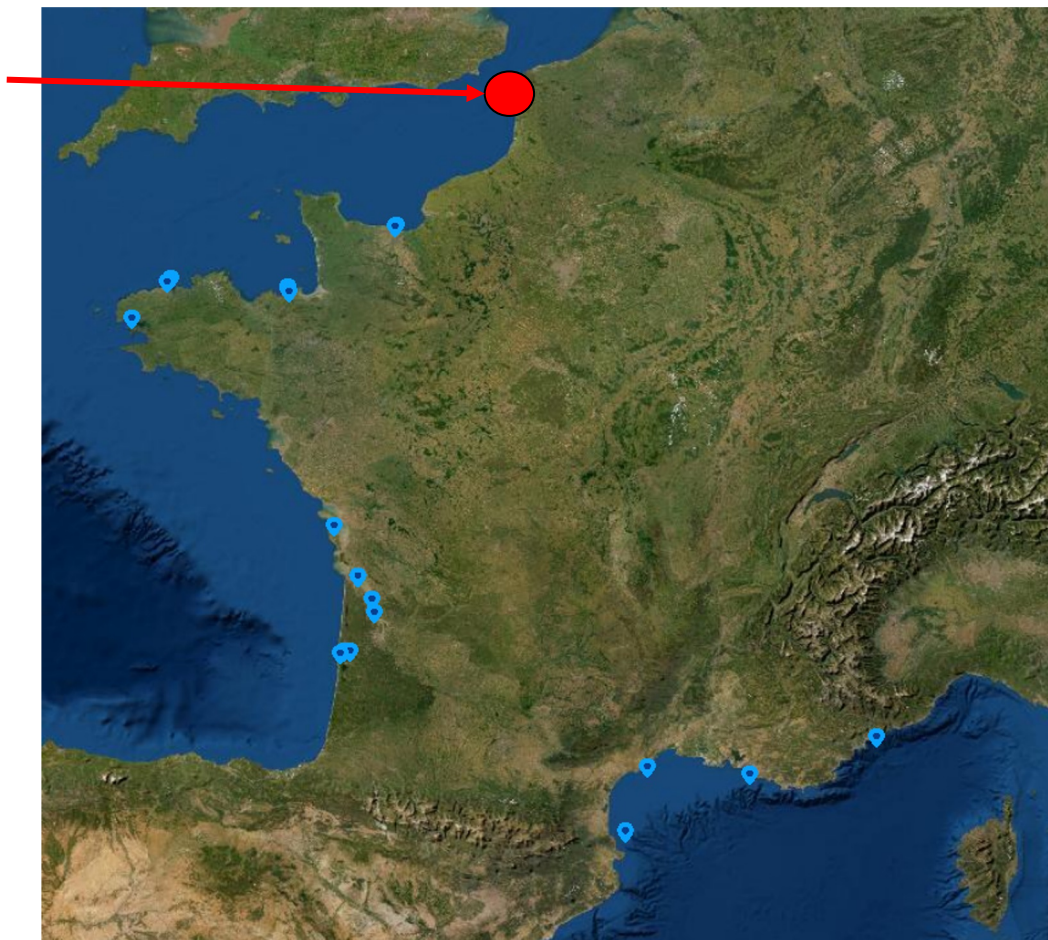


Qualification des résultats Point SOMLIT Villefranche B

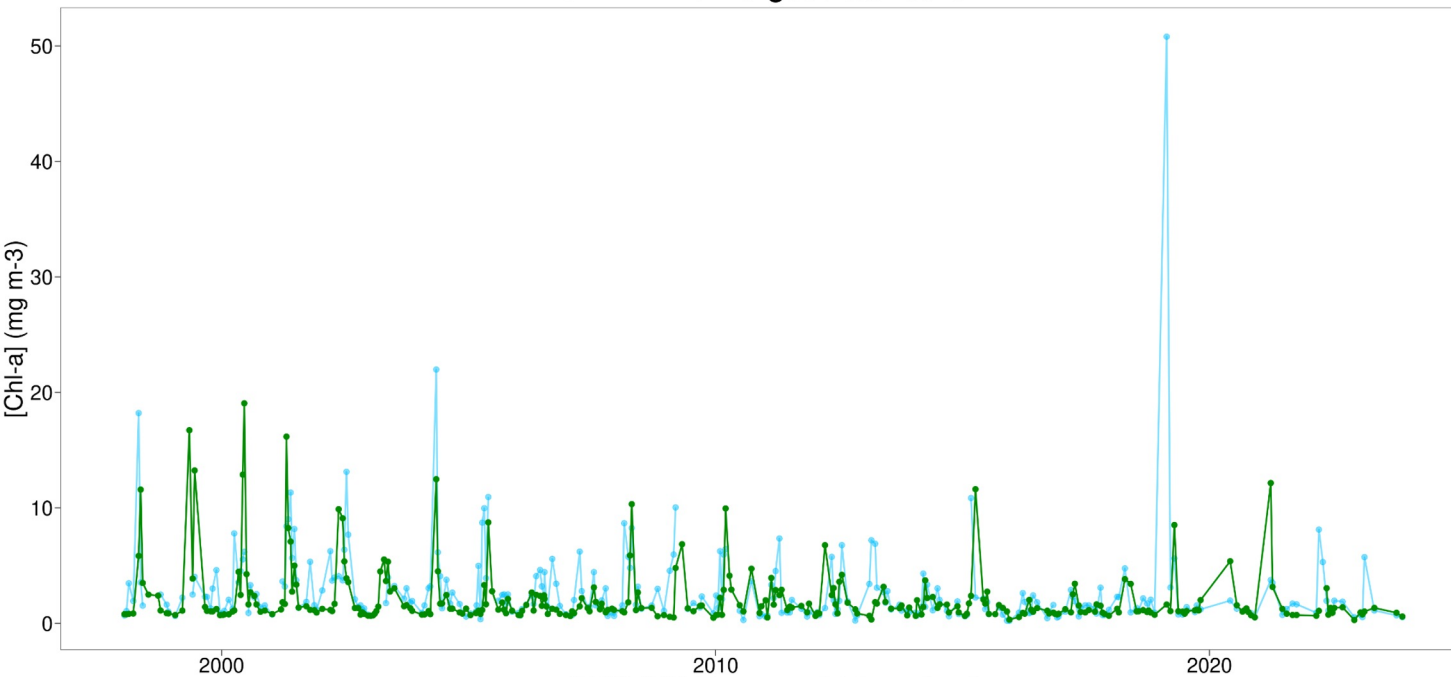
TCHLA



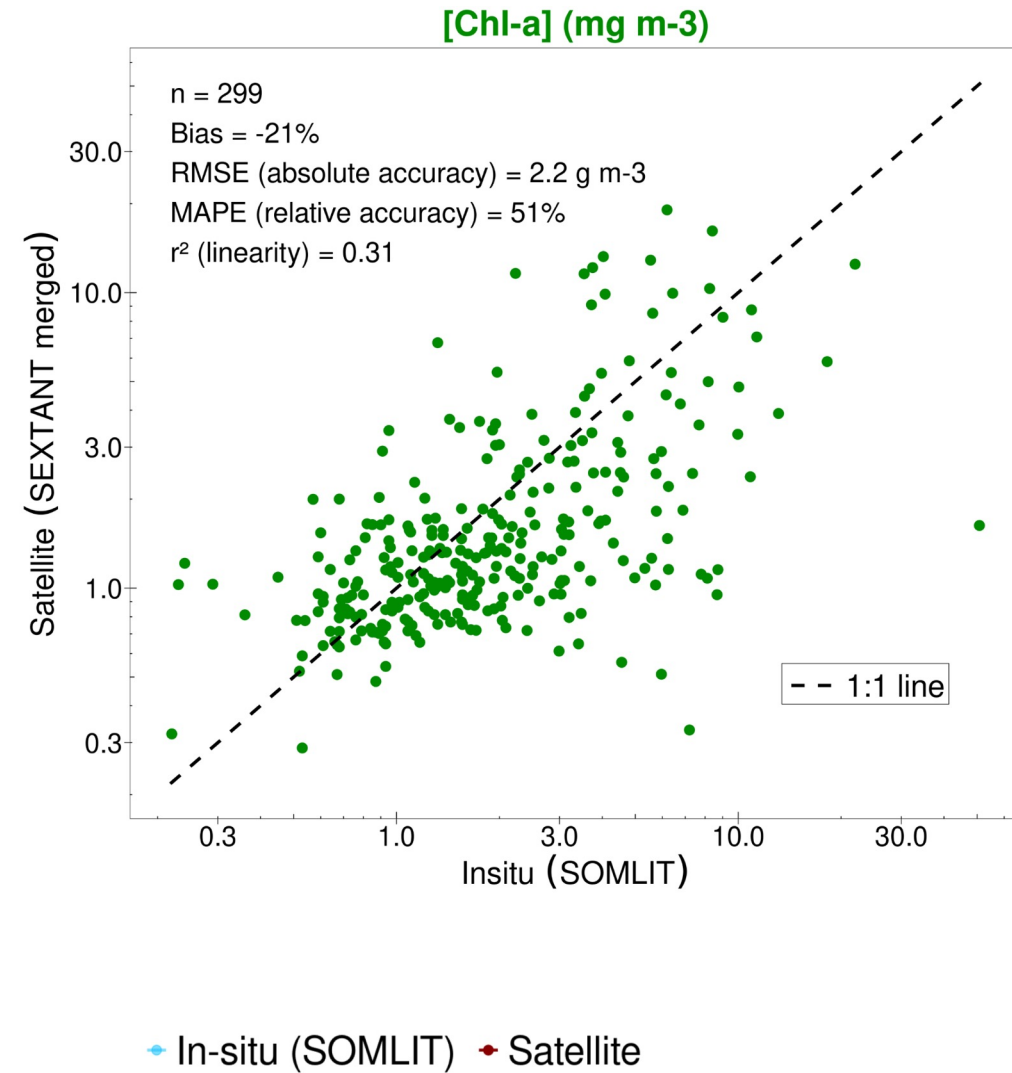
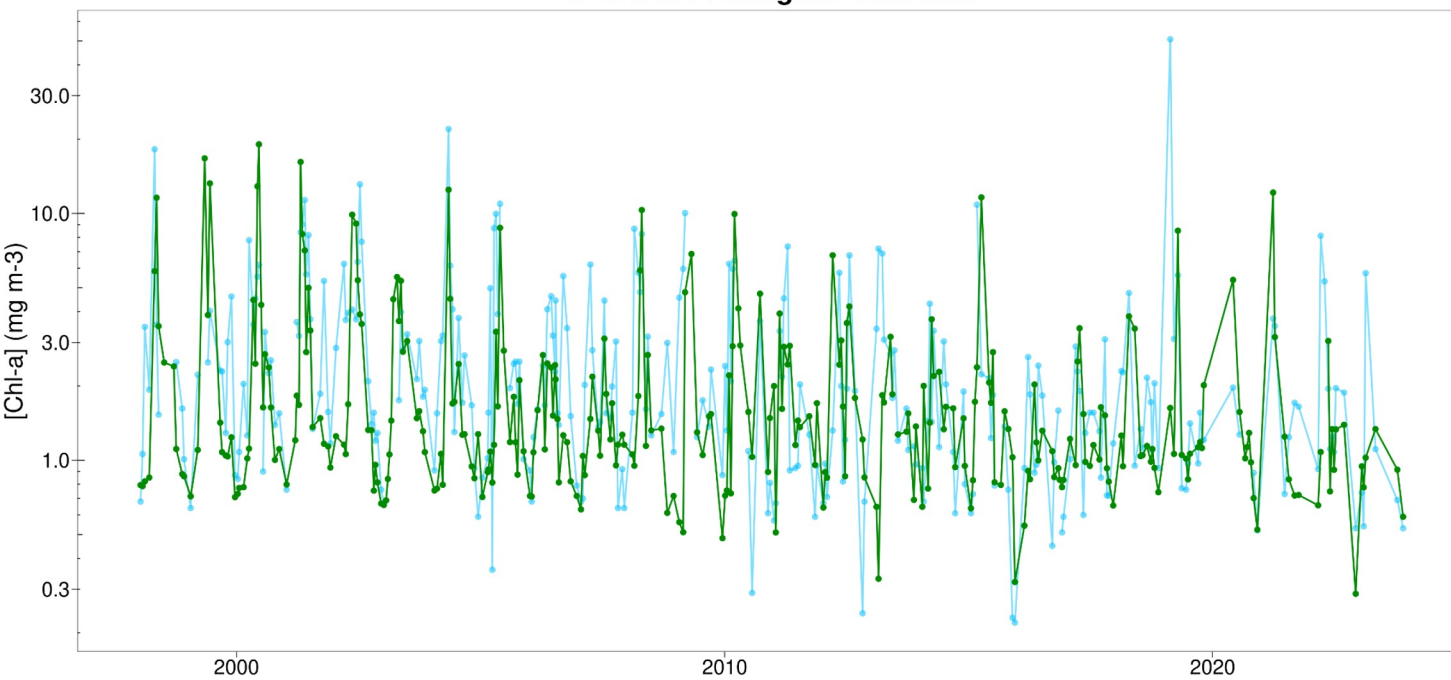
Station Point L



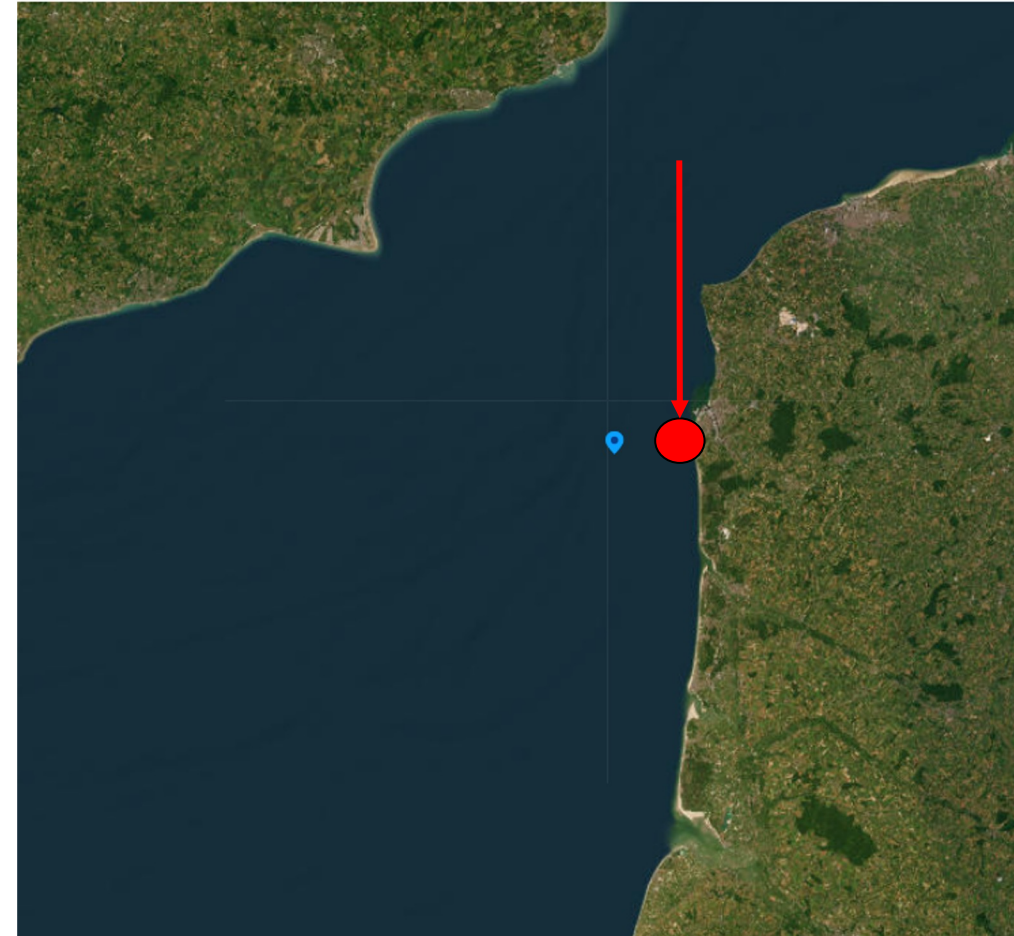
SEXTANT / merged / Standard

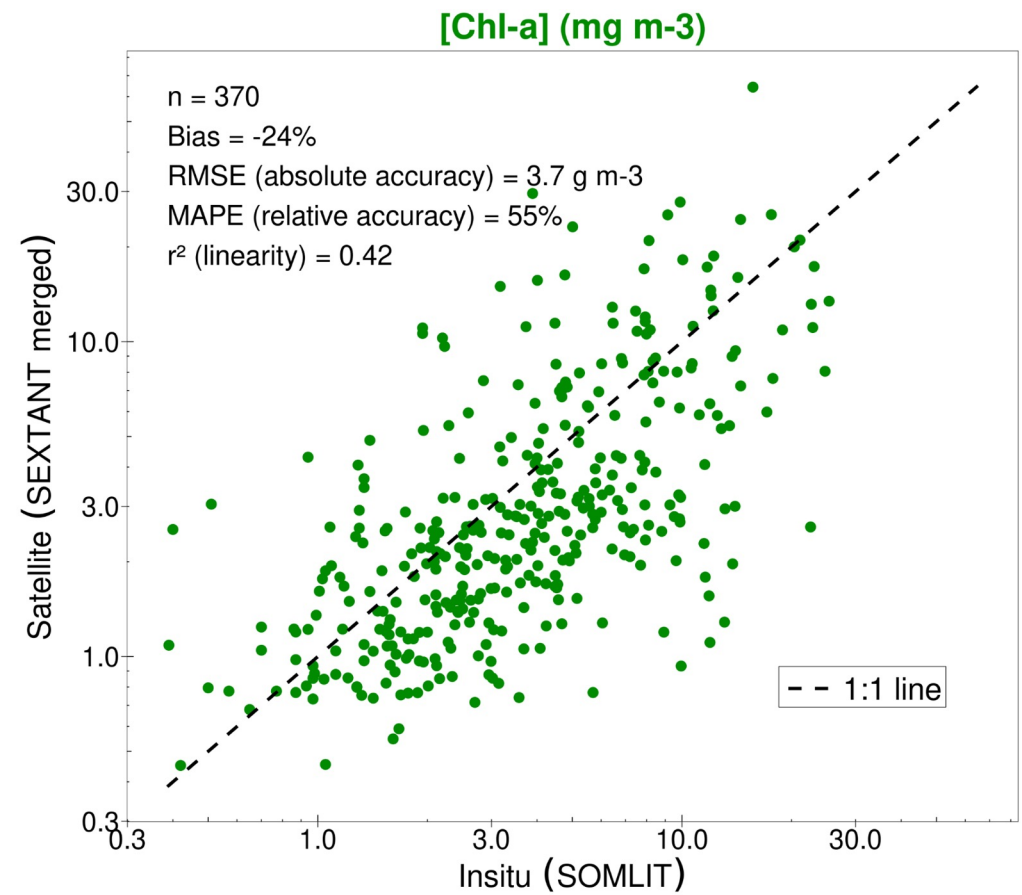
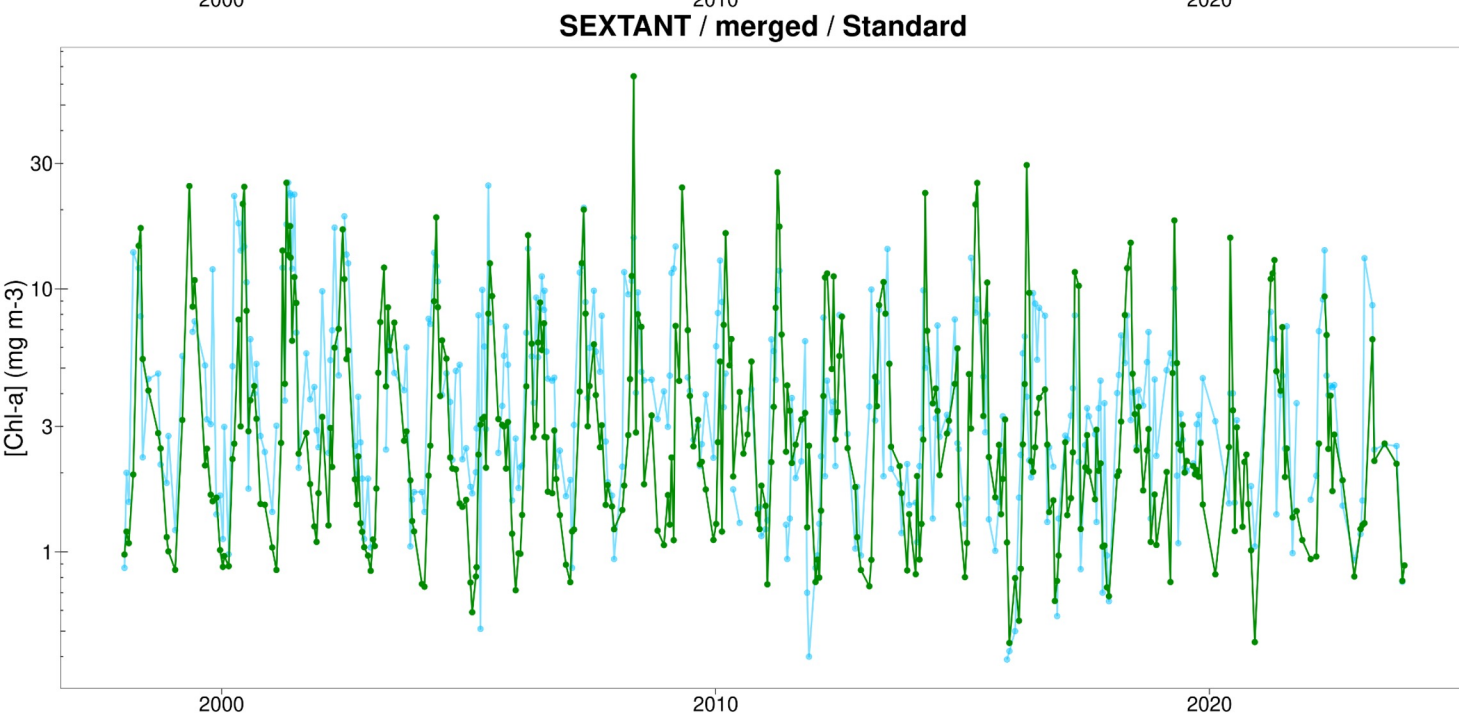
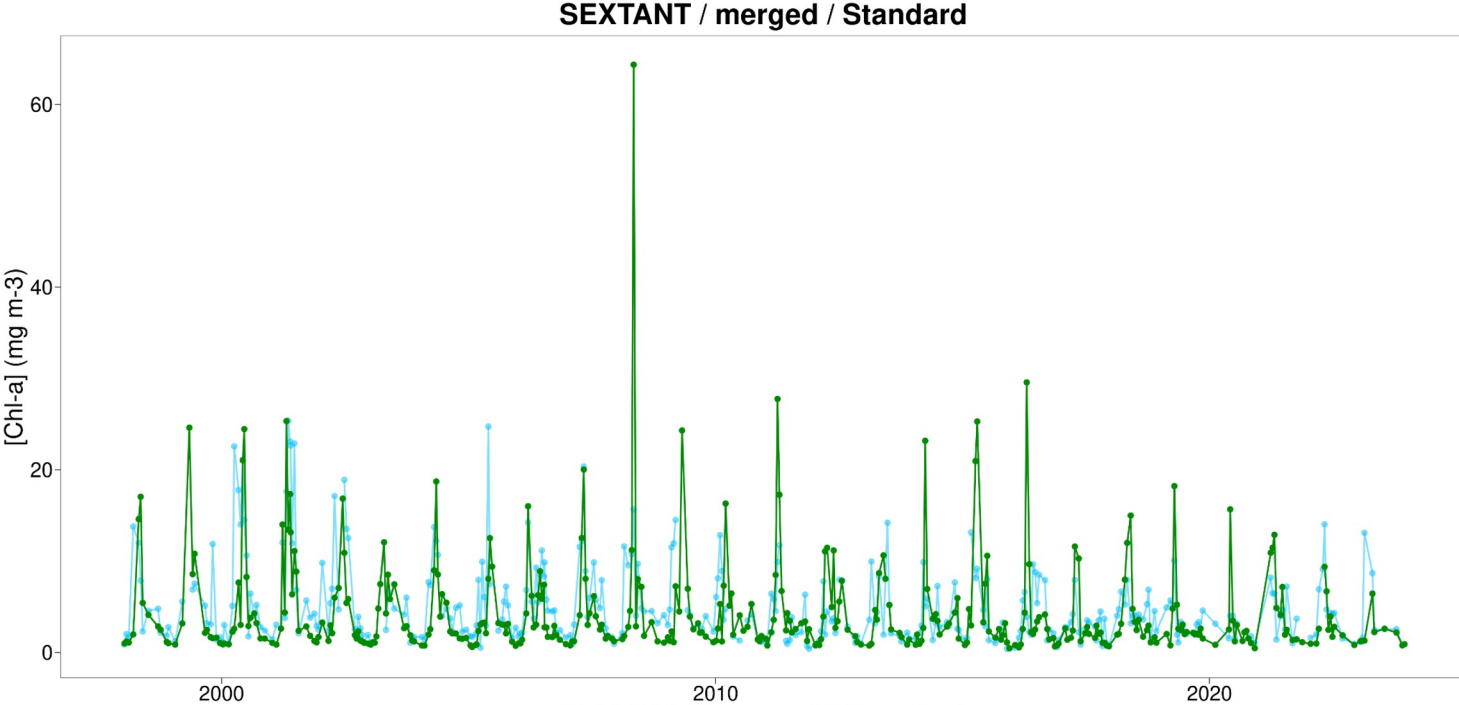


SEXTANT / merged / Standard

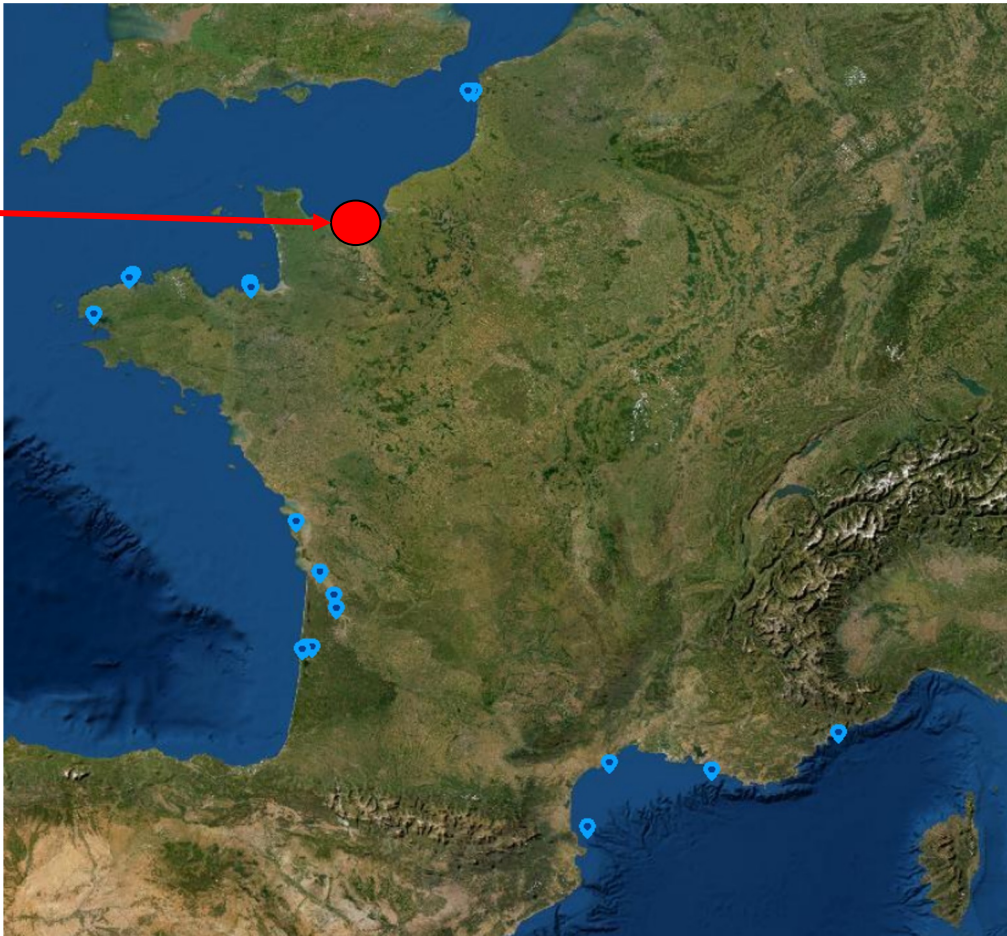


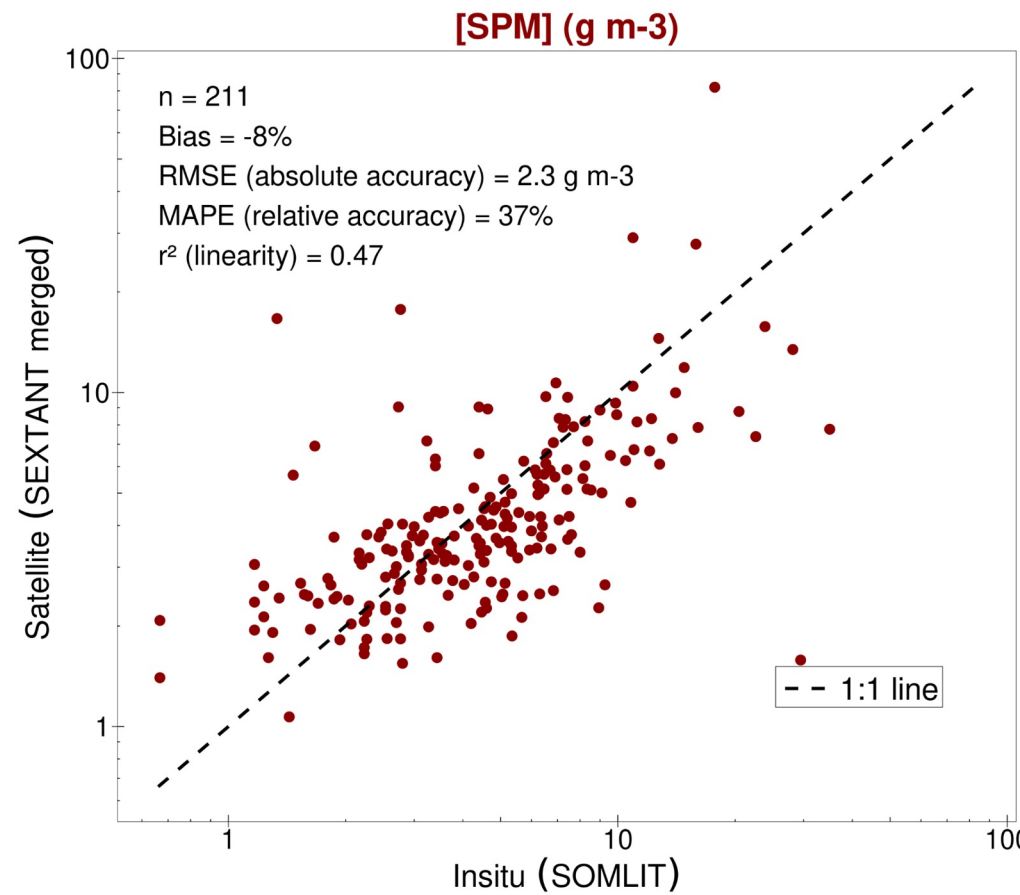
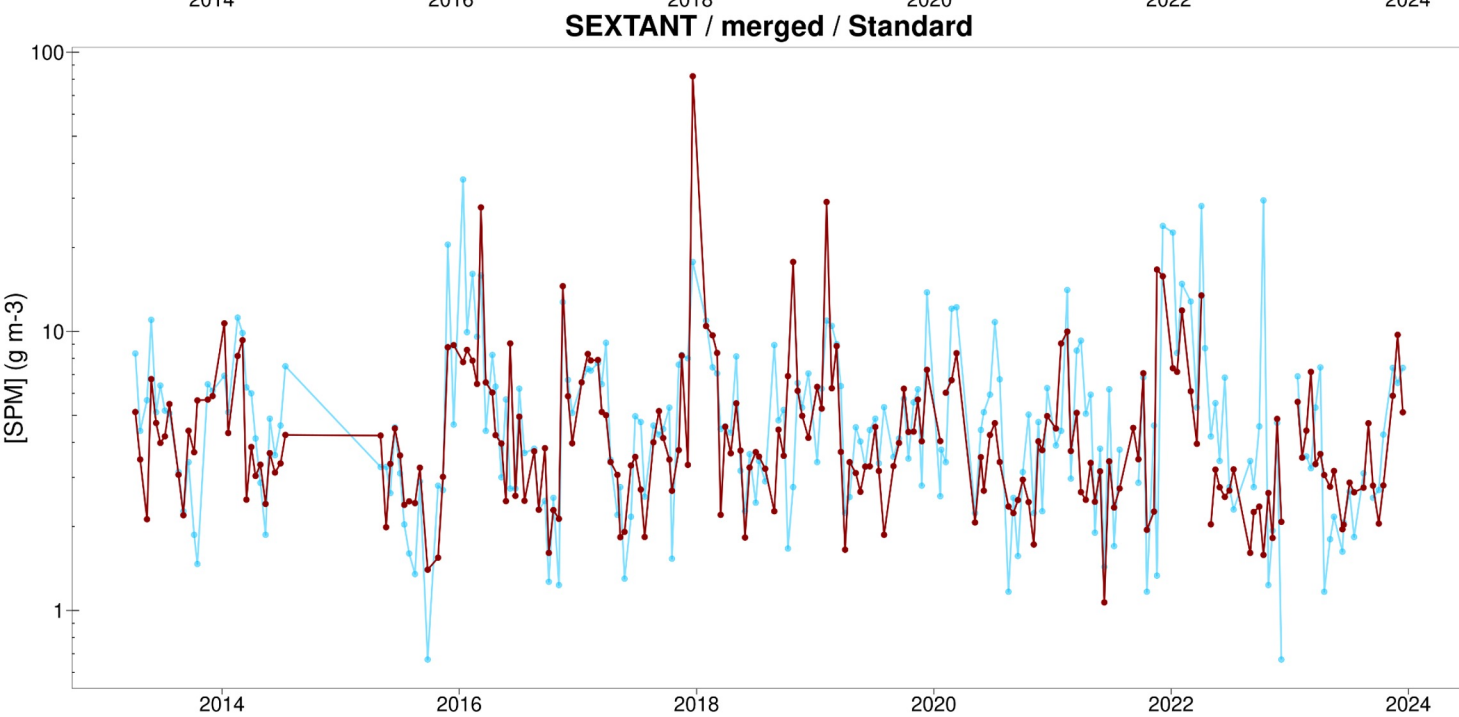
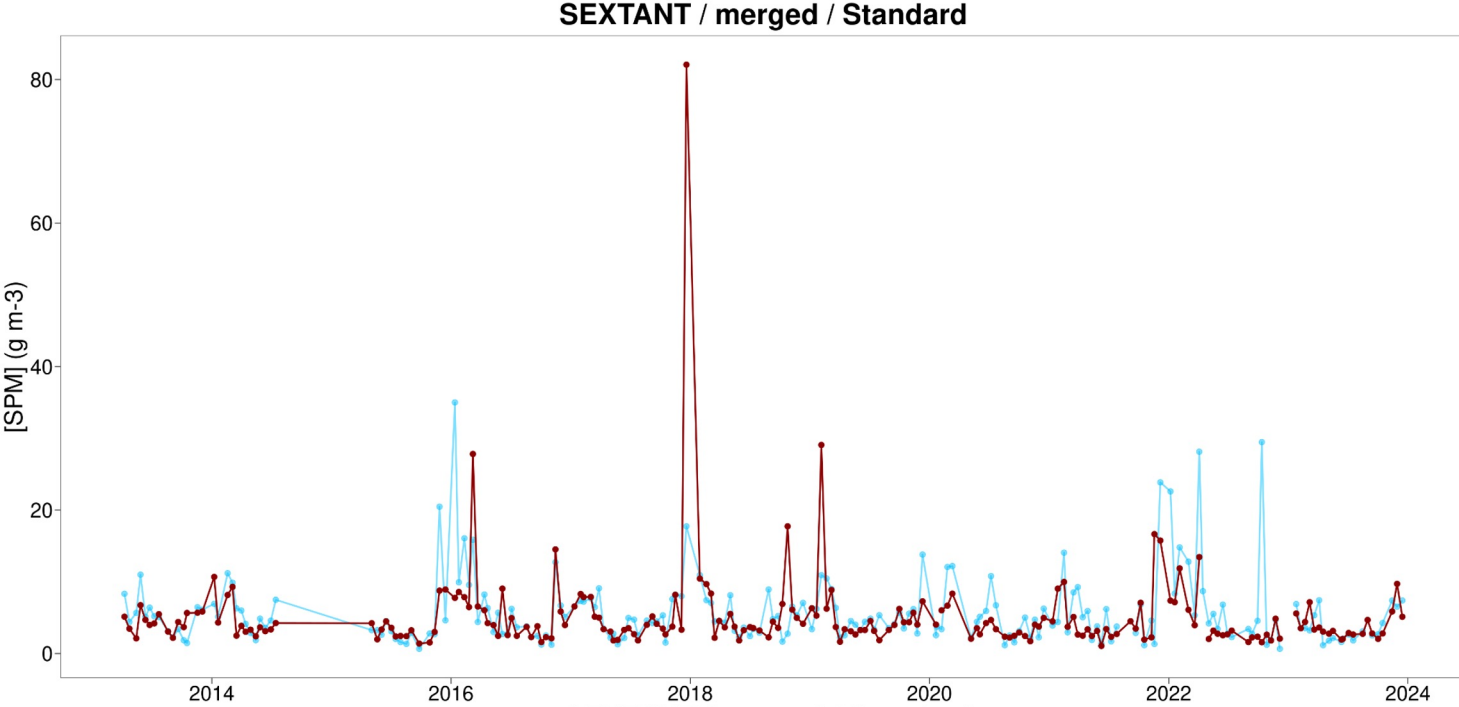
Station Point C



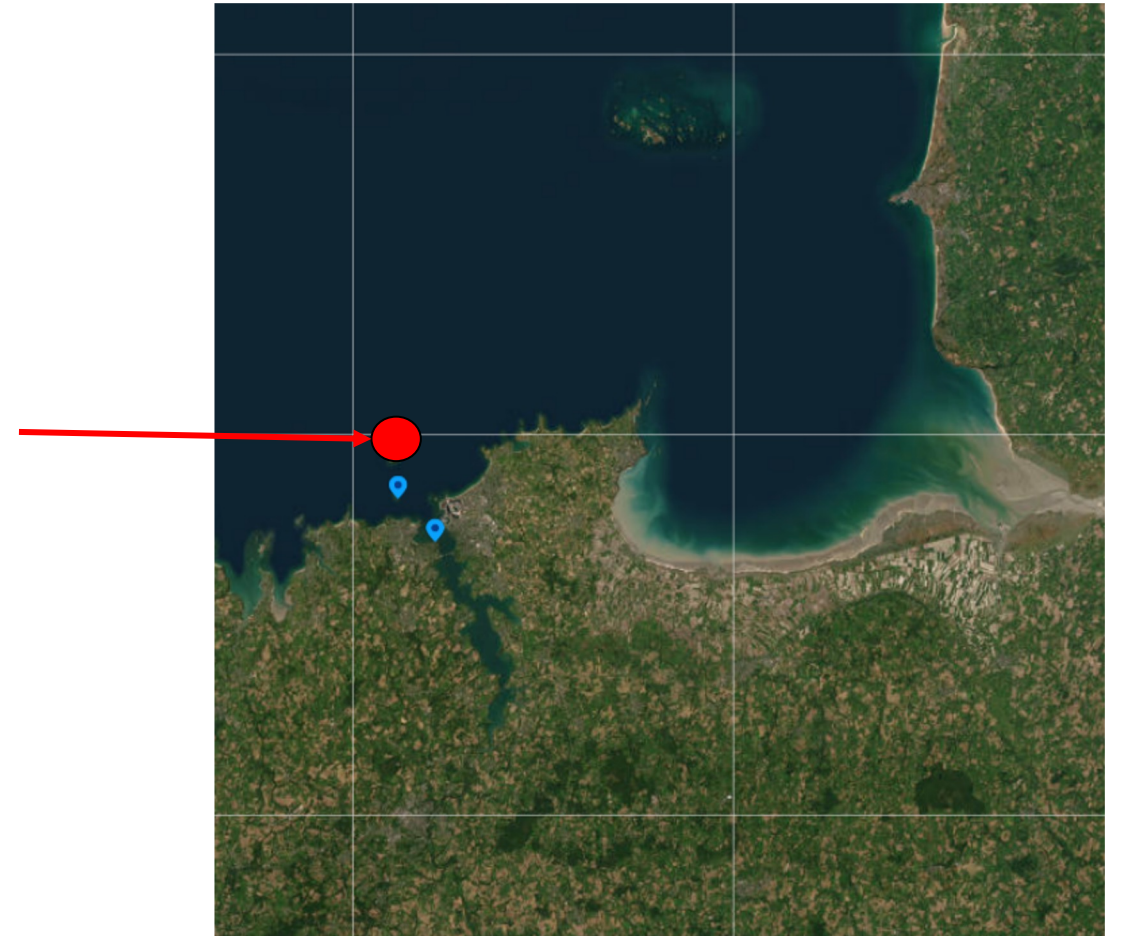


Station Smile

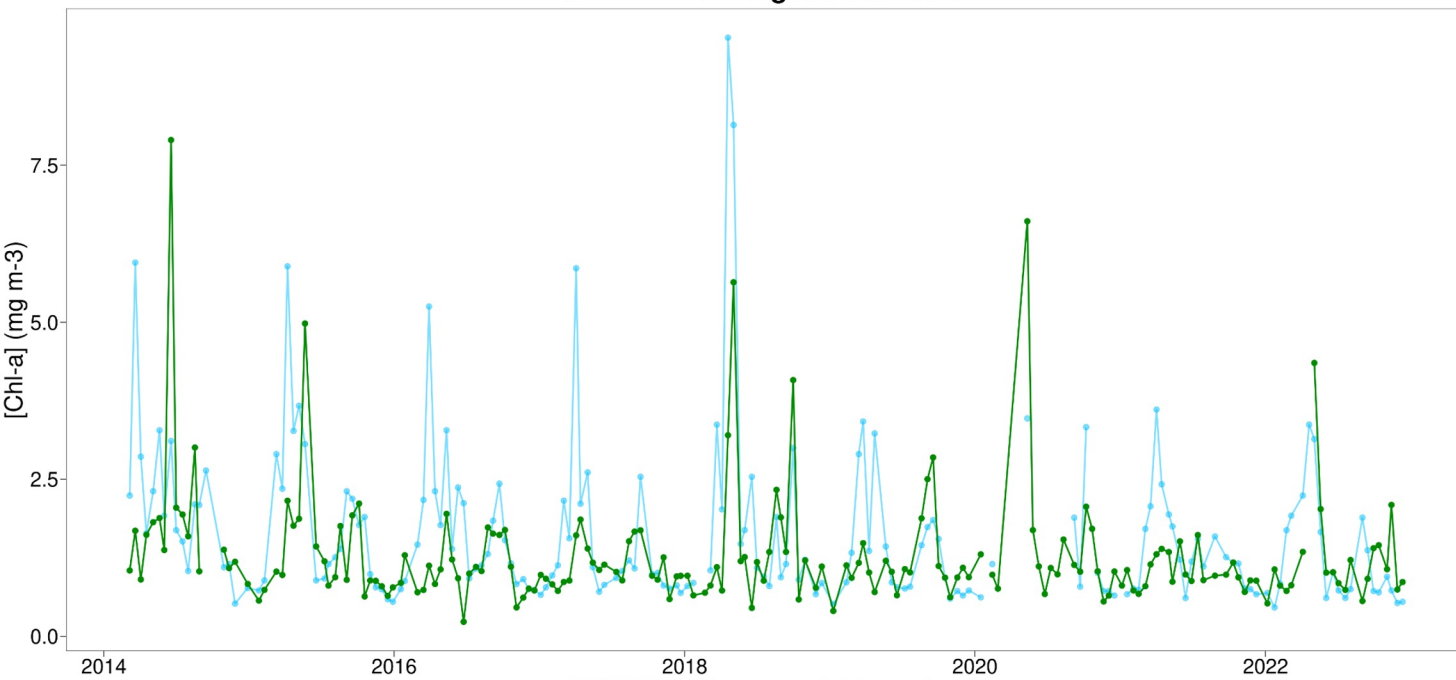




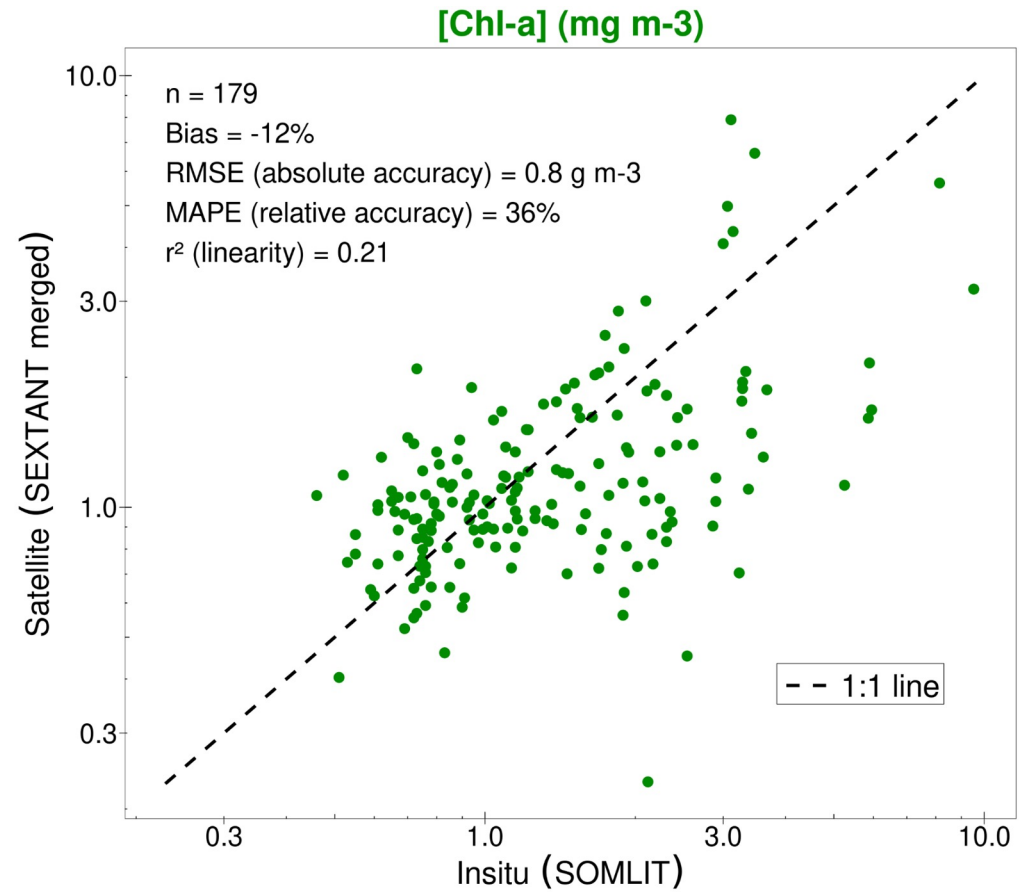
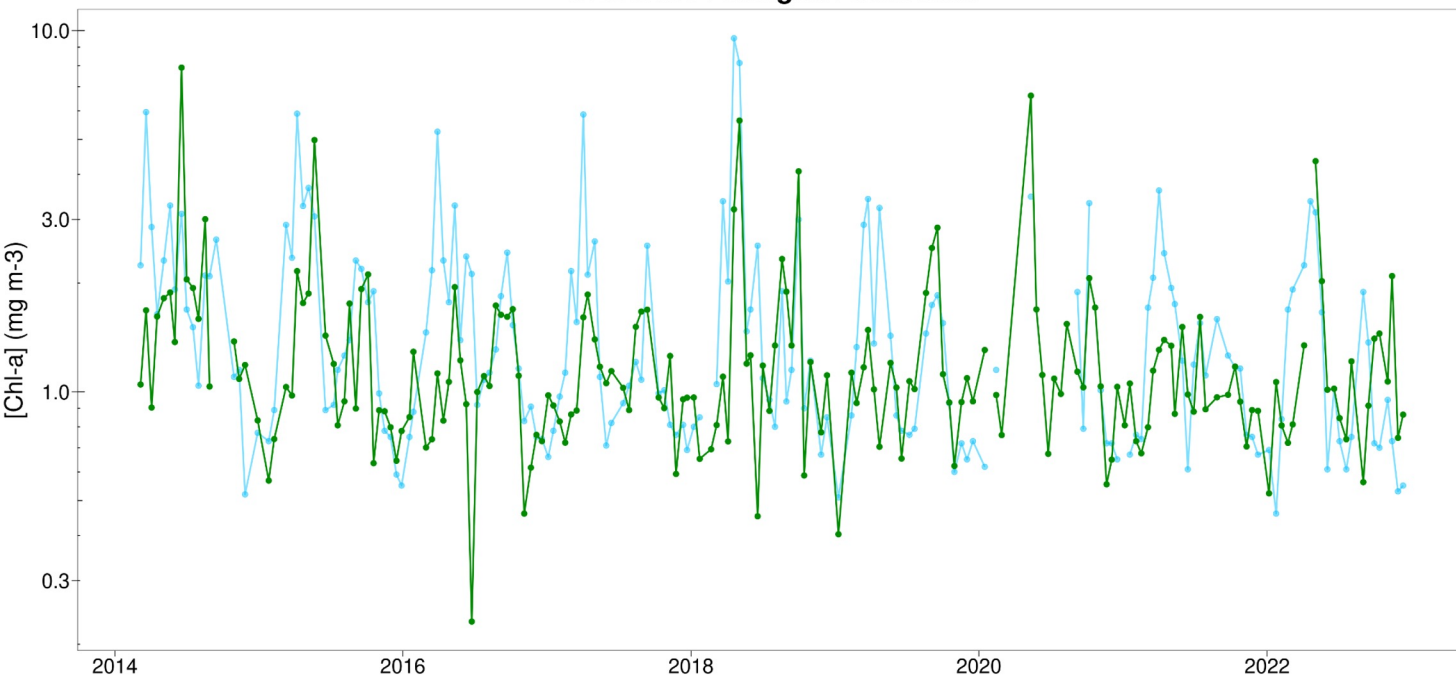
Station Cézembre



SEXTANT / merged / Standard

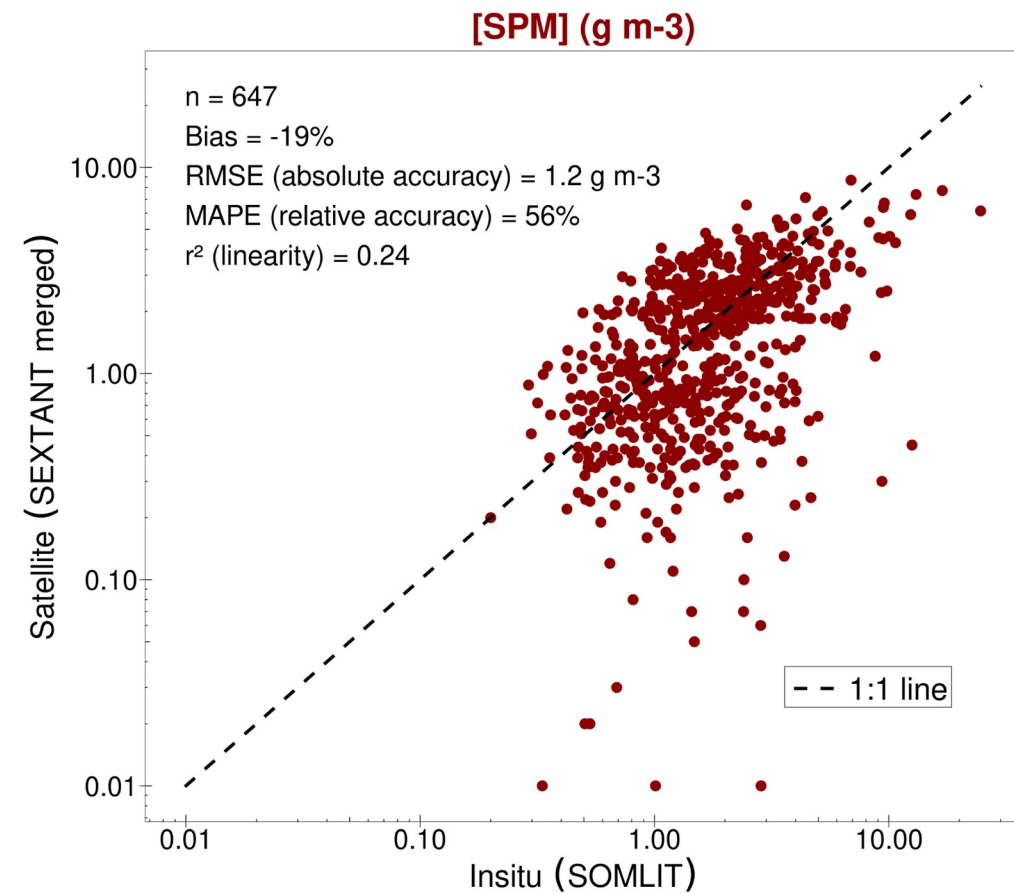
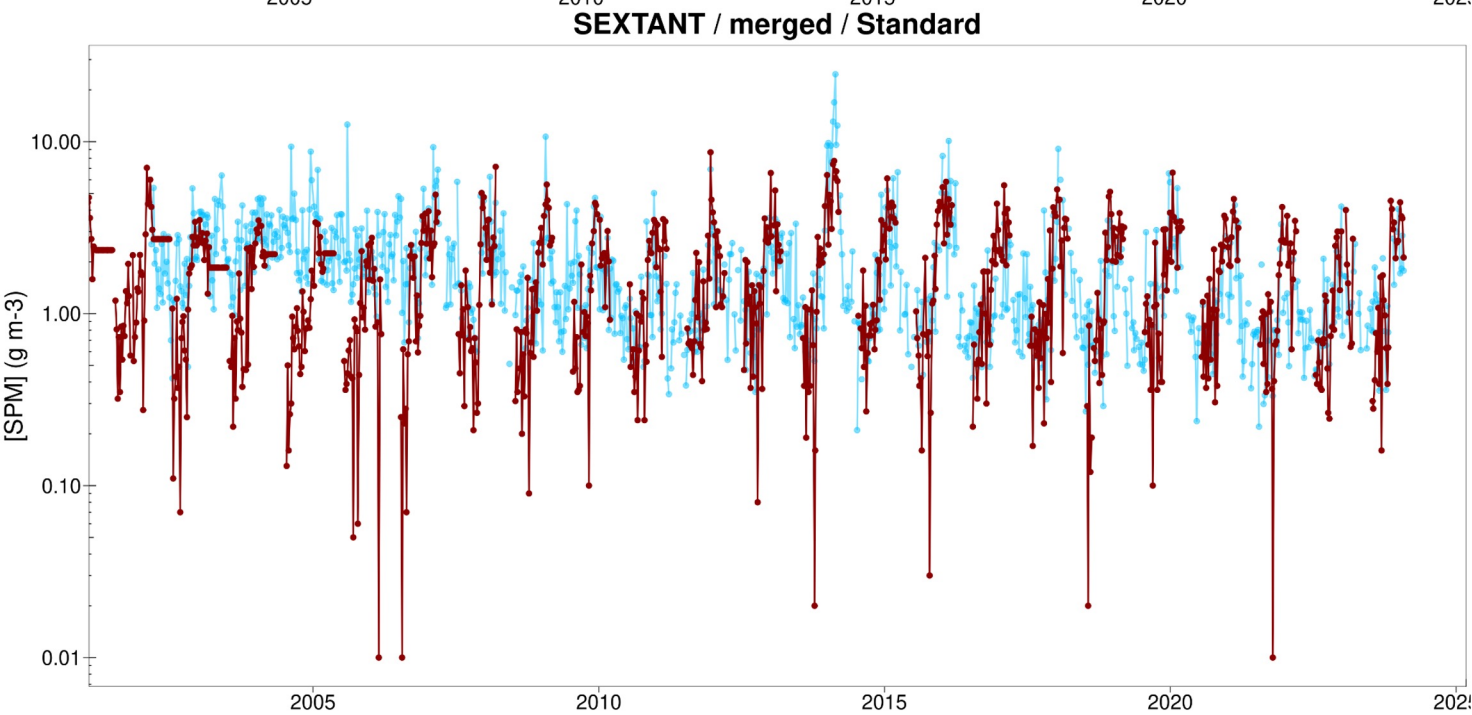
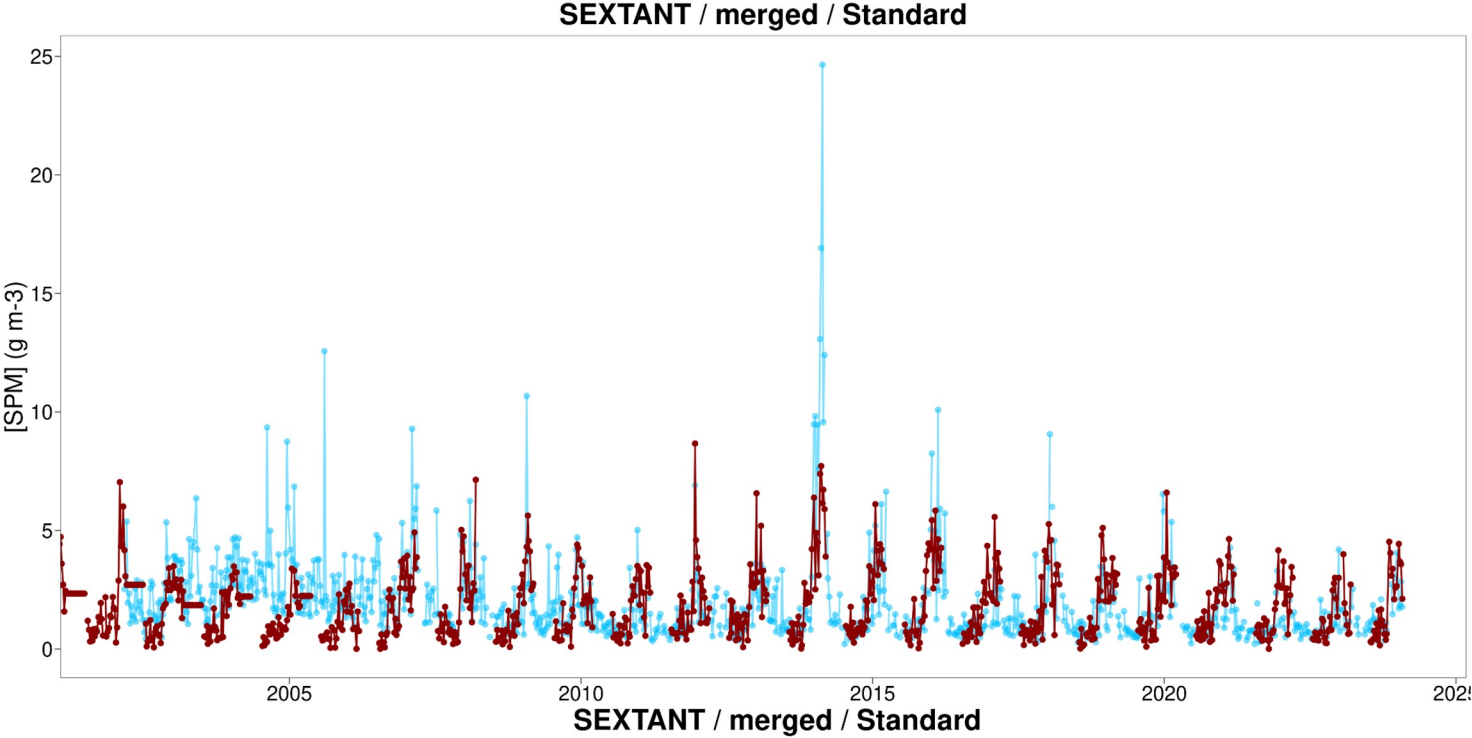


SEXTANT / merged / Standard

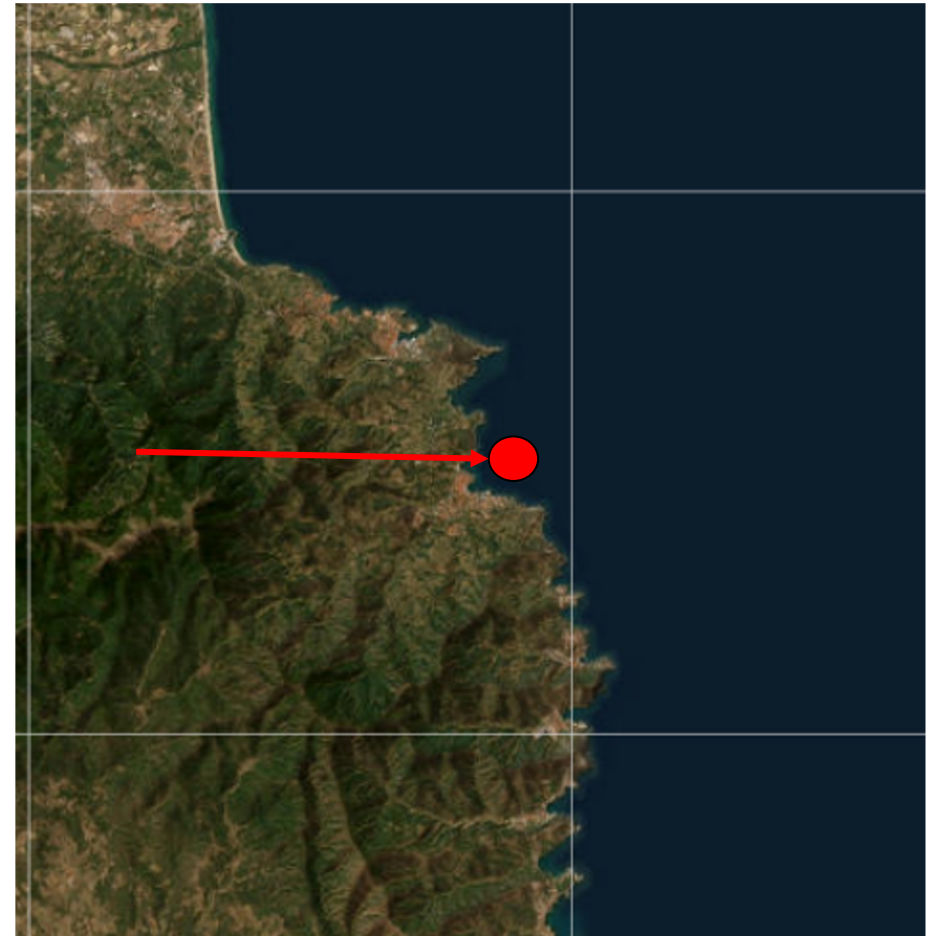
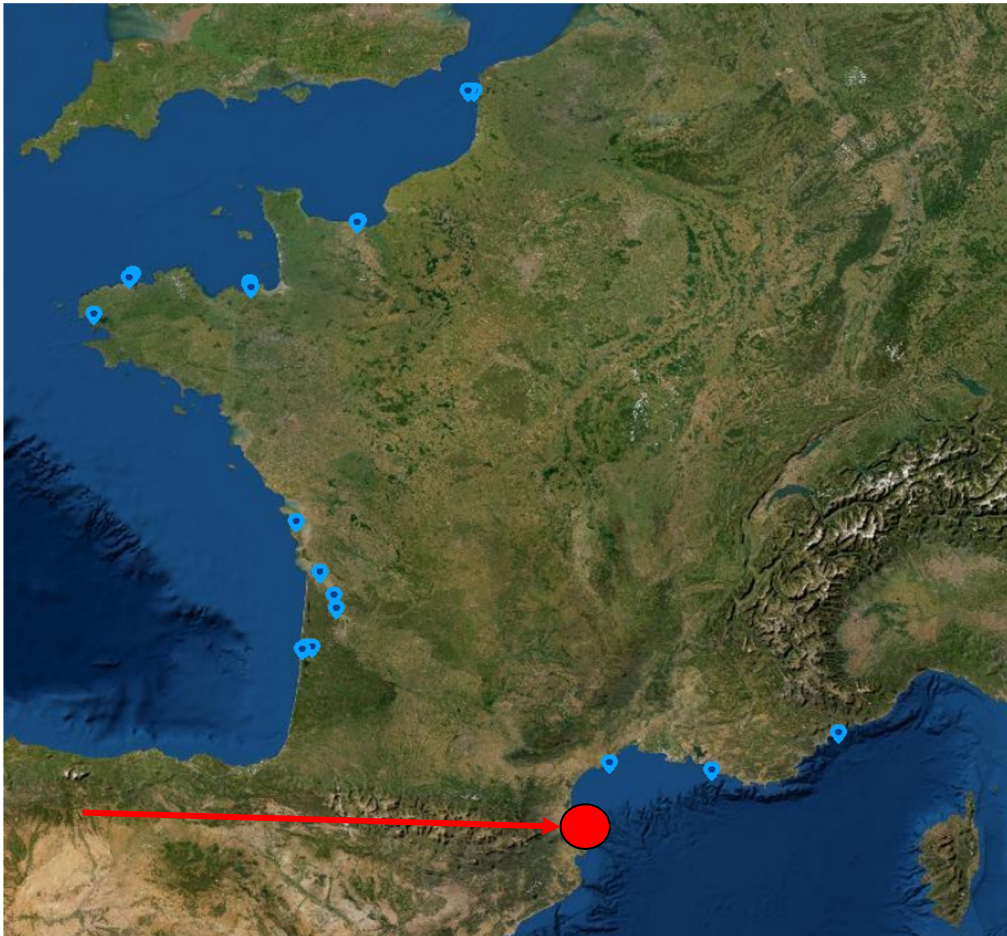


Station Portzic

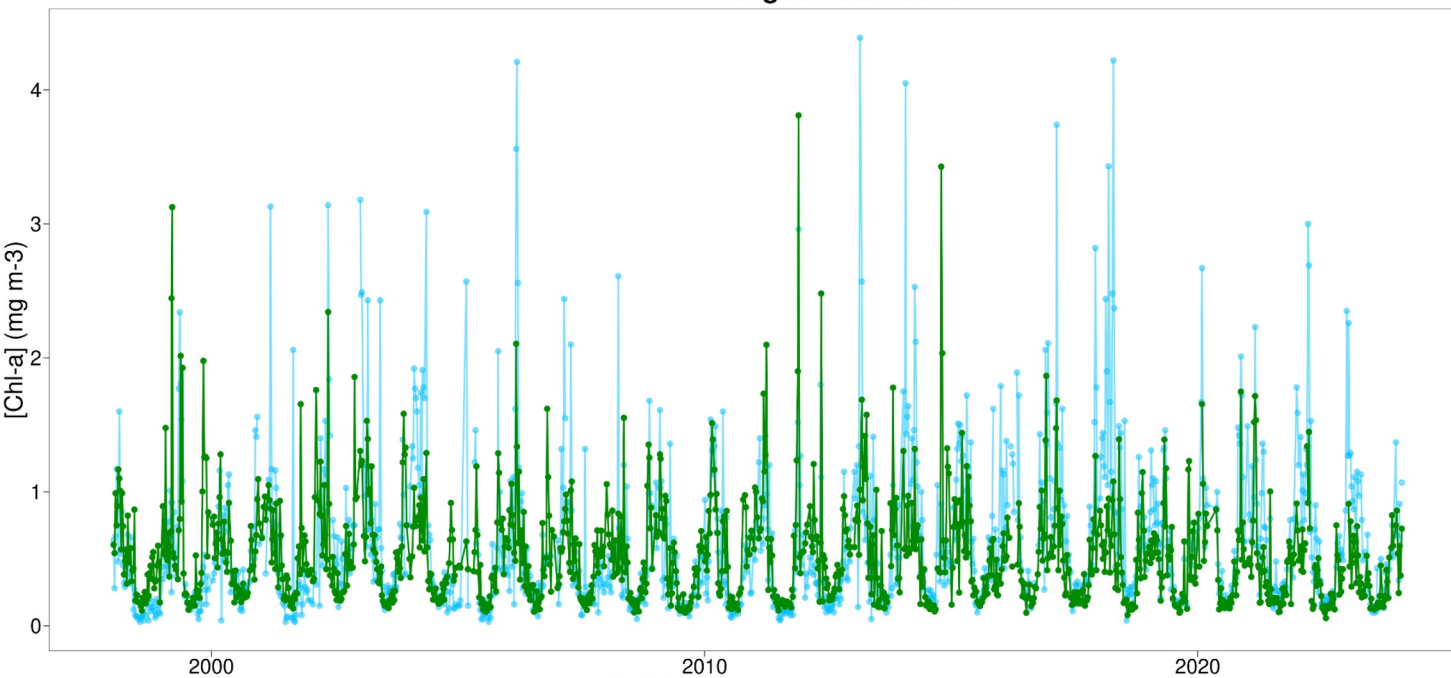




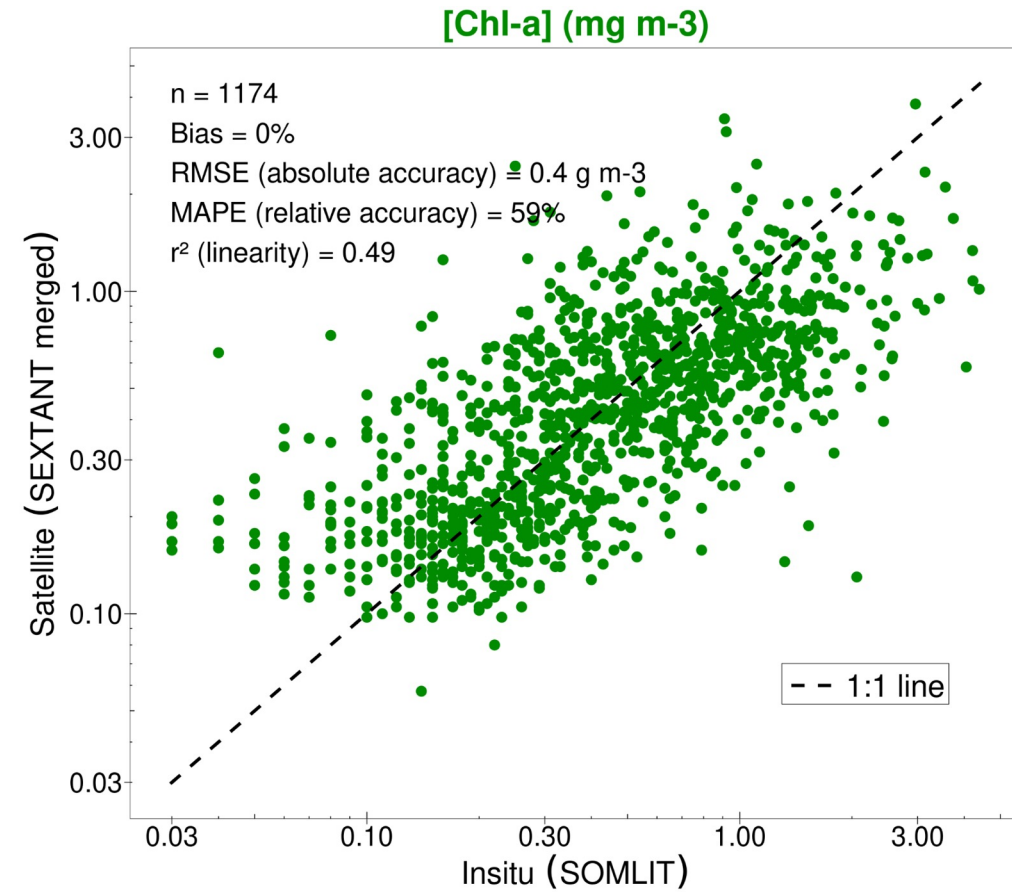
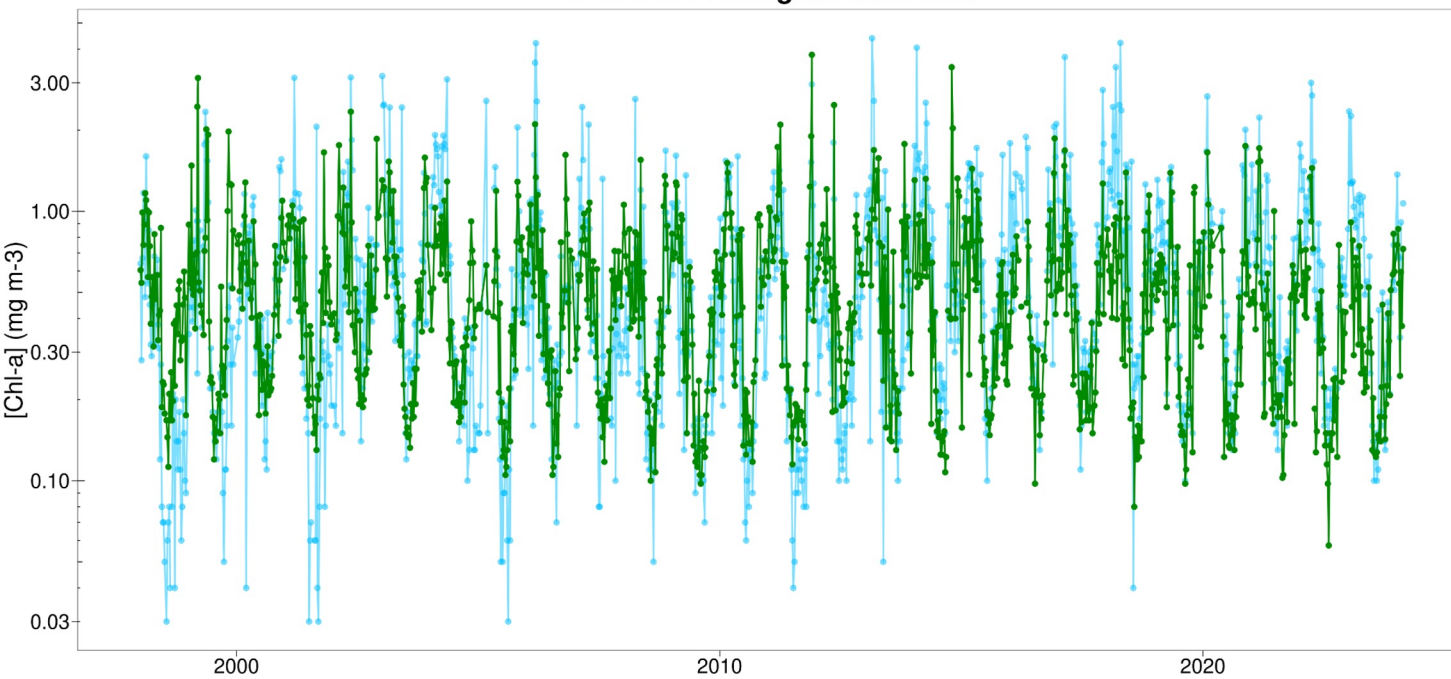
Station Sola



SEXTANT / merged / Standard

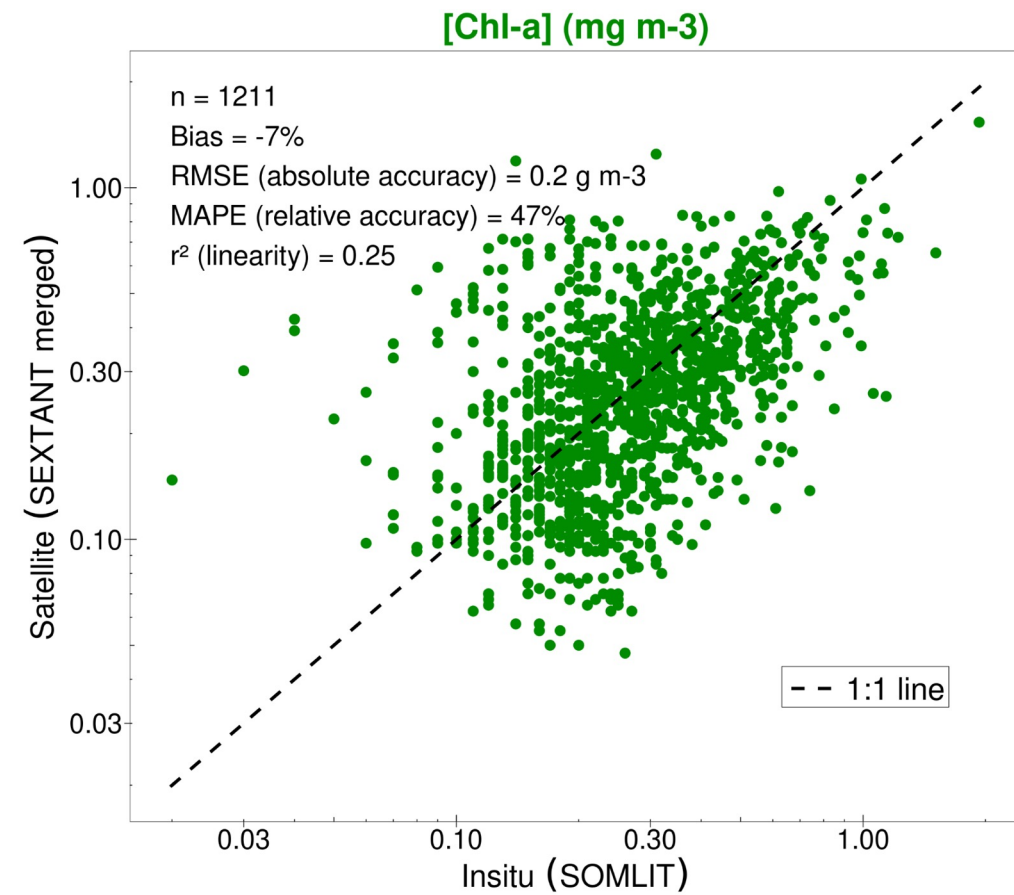
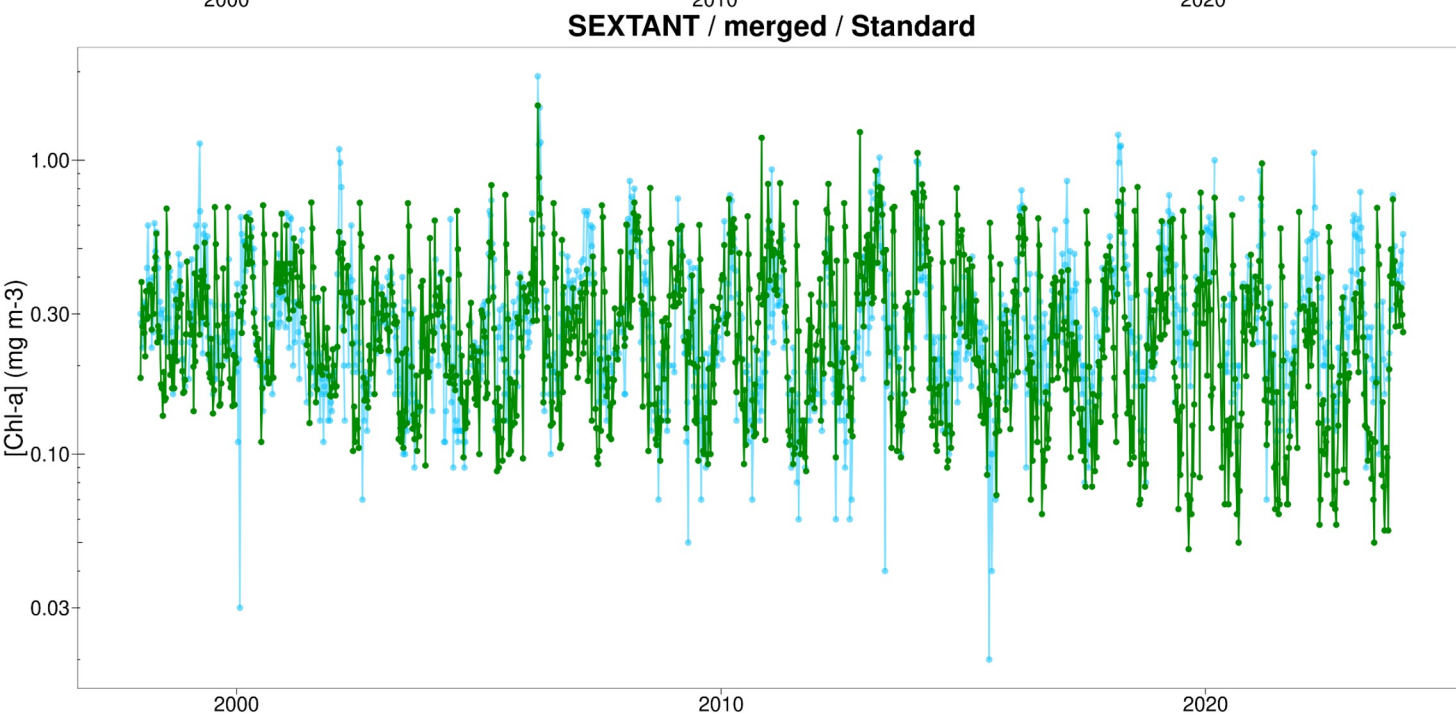
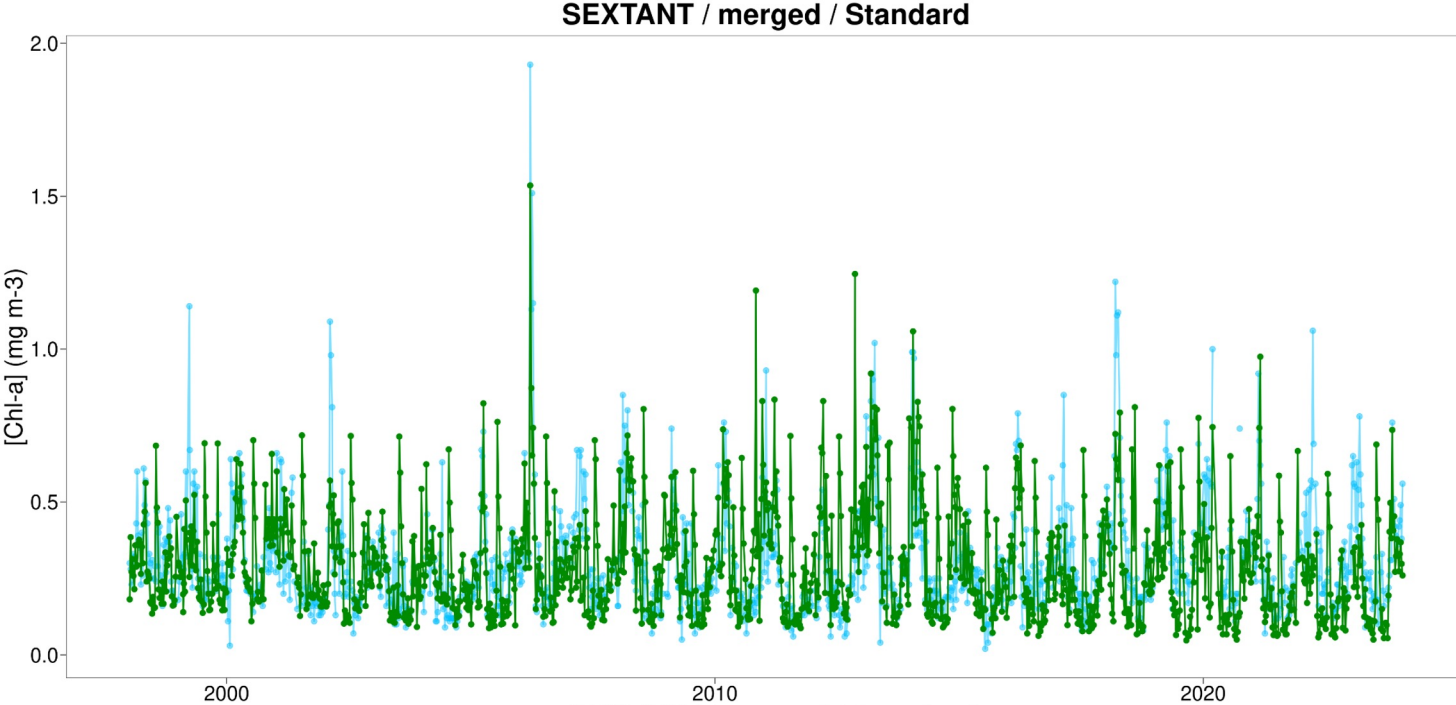


SEXTANT / merged / Standard



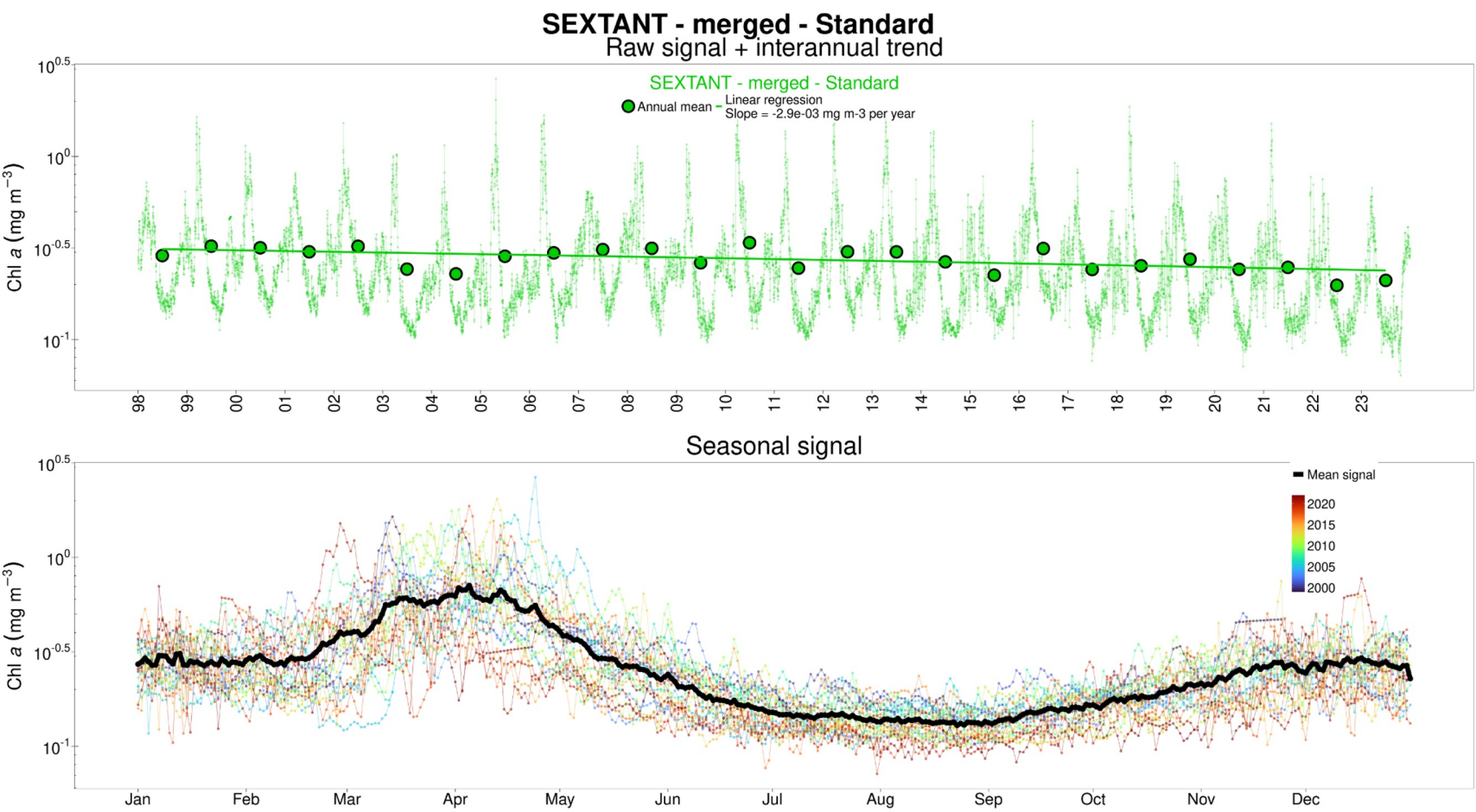
Station Point B





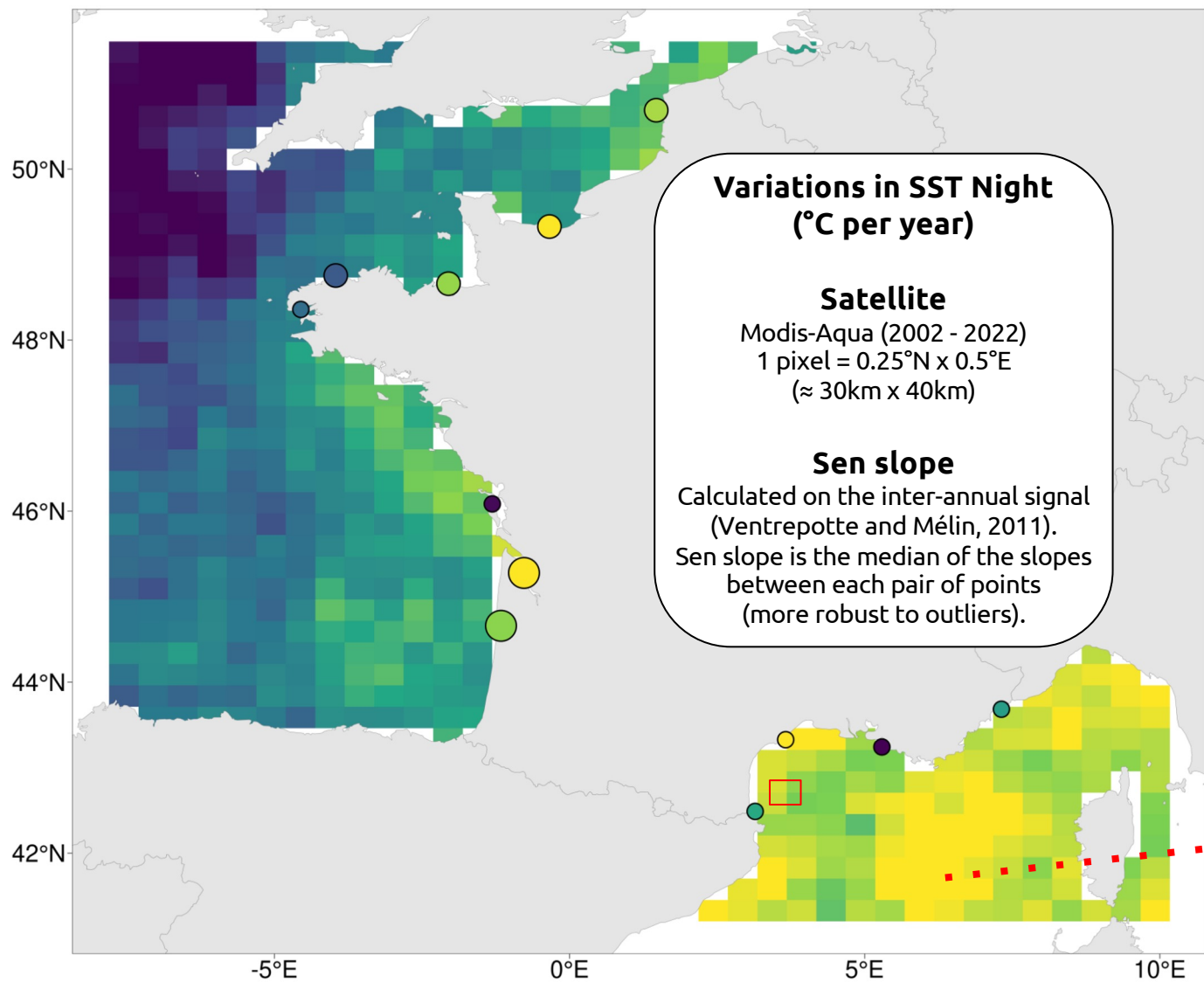
2) Les variations temporelles sont-elles comparables entre les produits ?

Exemple : Evolution (25 ans) de la Chla dans le Golfe du Lion

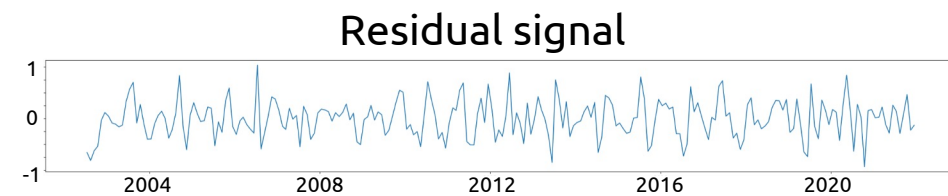
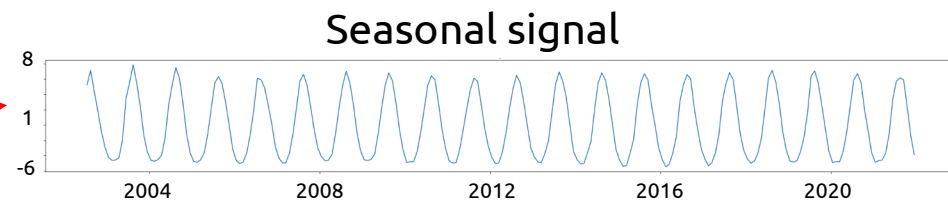
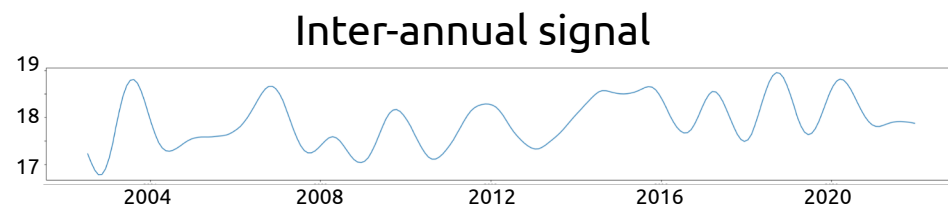
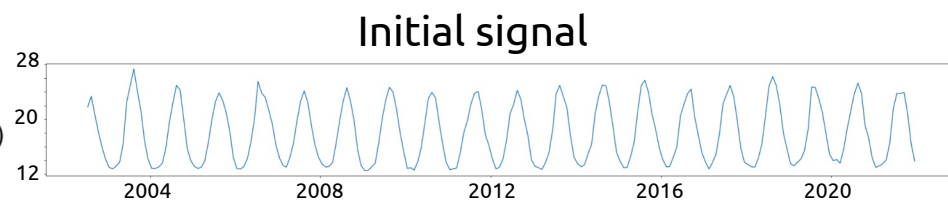


Variabilité totale
&
Tendance interannuelle
calculée sur les moyennes annuelles.
(i.e. les gros points)

Variabilité saisonnière

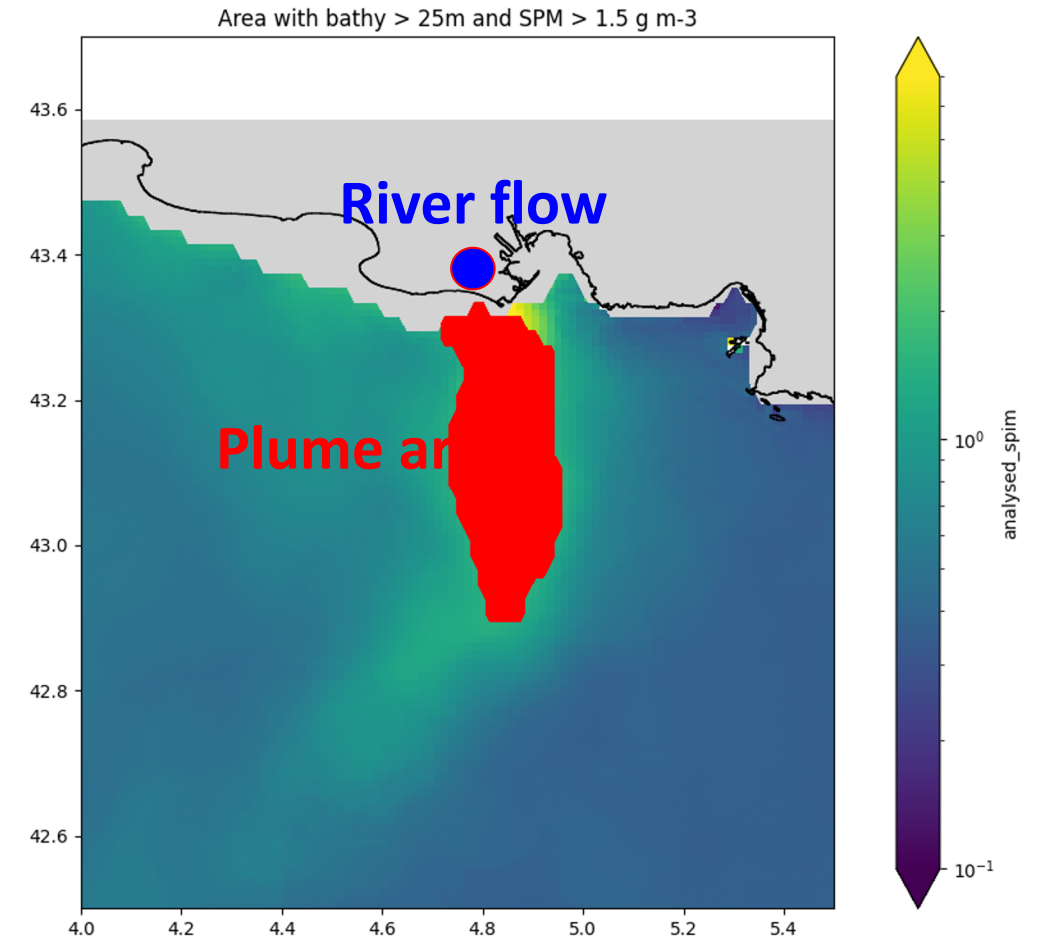
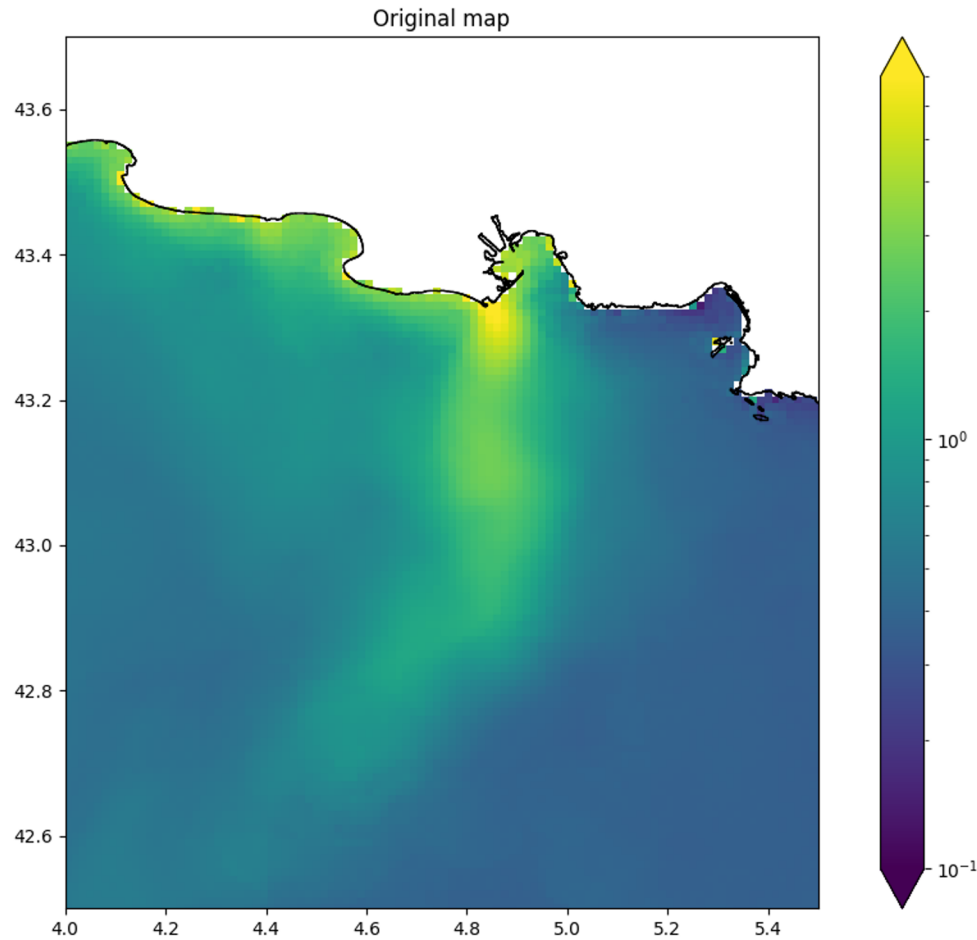


- 1 station
- 2 stations
- 3 stations



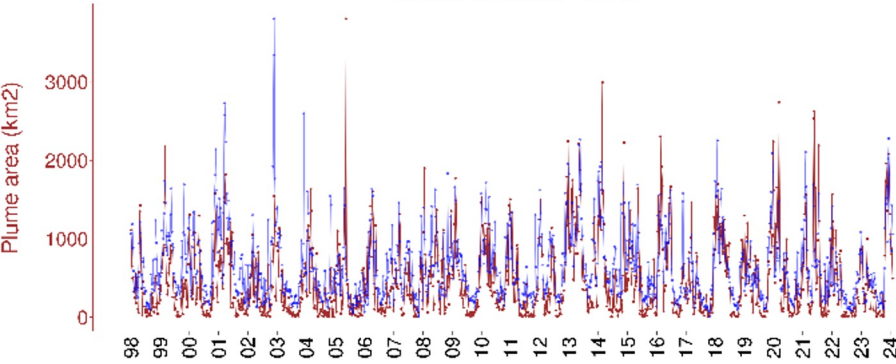
Détection et évolution spatio-temporelle des panaches fluviaux : ex. Grand Rhône

Plume detection (Averaged_over_07_02)

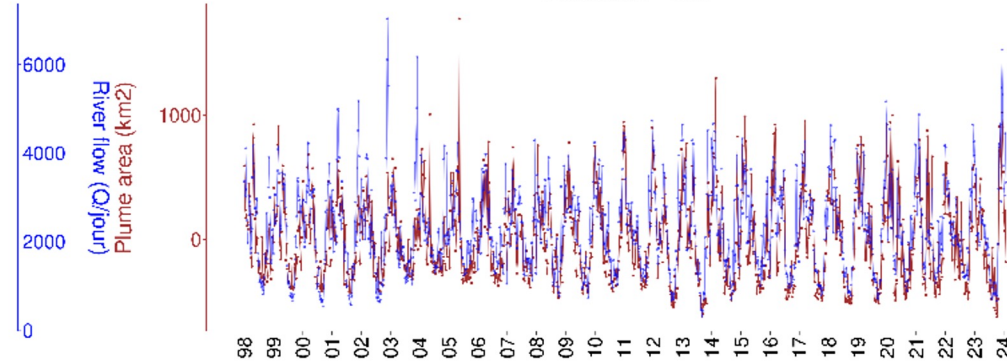


Grand Rhône

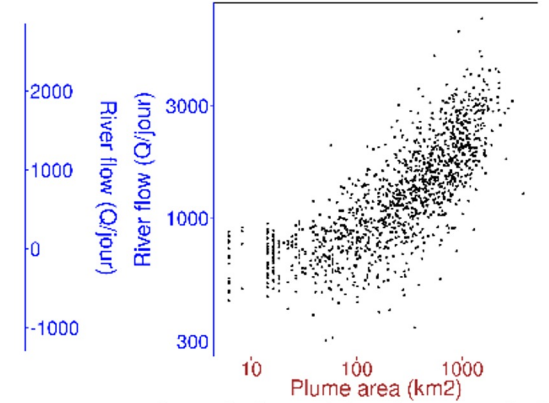
Raw signal
Variation Coefficient = 101%



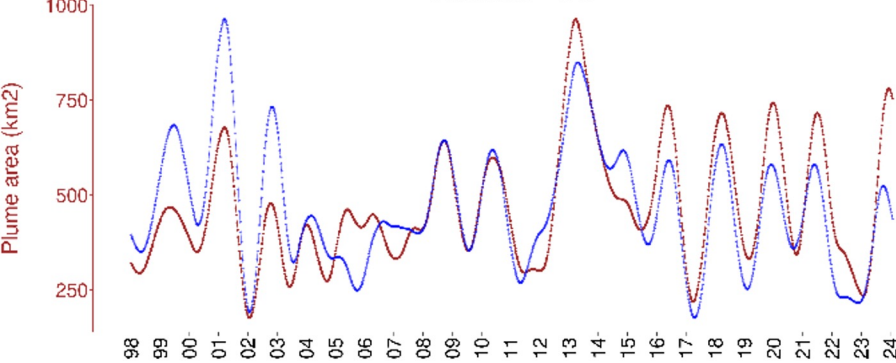
Seasonal signal
Contribution = 62%



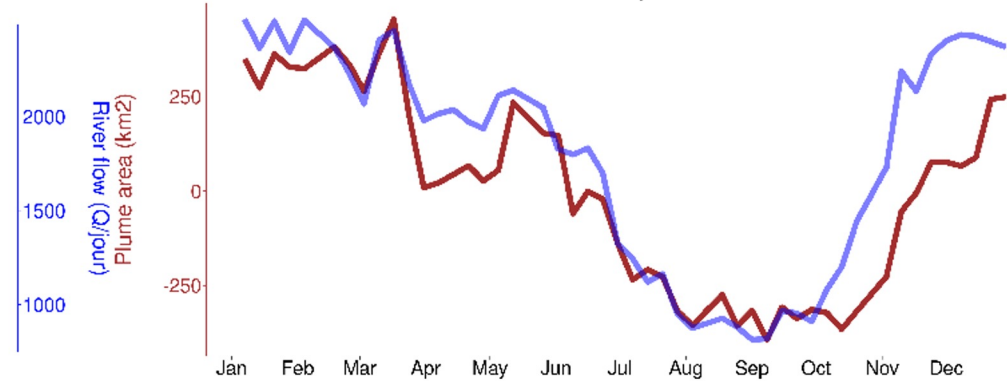
Correlation of the Raw signal



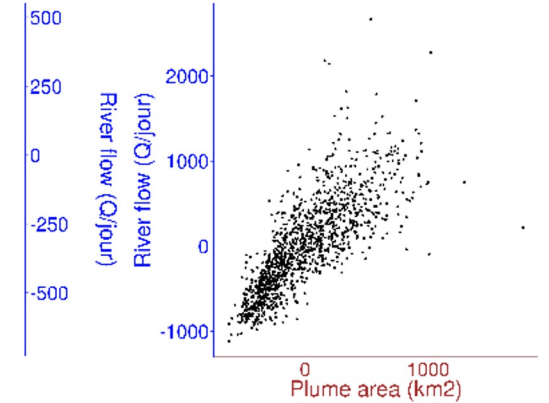
Interannual signal
Contribution = 13%



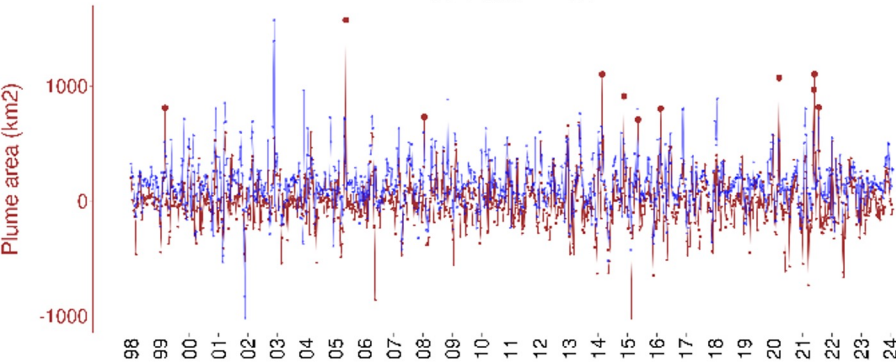
Seasonal patterns



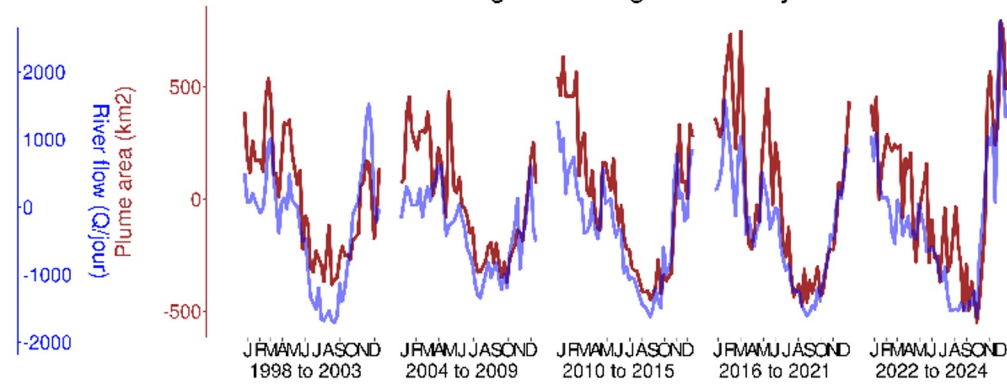
Correlation of the Seasonal signal



Residual signal
Contribution = 25%



Seasonal signal averaged over 6-years bins



Conclusions & Perspectives

- 25 d'observations concomitantes satellitaires et in situ (SOMLIT)
- Optimisation pour chaque site du protocole de matchup satellite vs in situ
- Distribution de produits satellitaires validés sur l'ensemble des eaux côtières françaises
- Reconstitution de l'évolution récente (25 ans) des eaux côtières françaises : calibration des modèles
- Rôles des forçages environnementaux et anthropiques
- Simulation de l'évolution (100 ans) des eaux côtières française suivant différents scénarios