

Joint analysis of Satellite and in-situ data observed in the eastern English Channel over the period 1998-2016

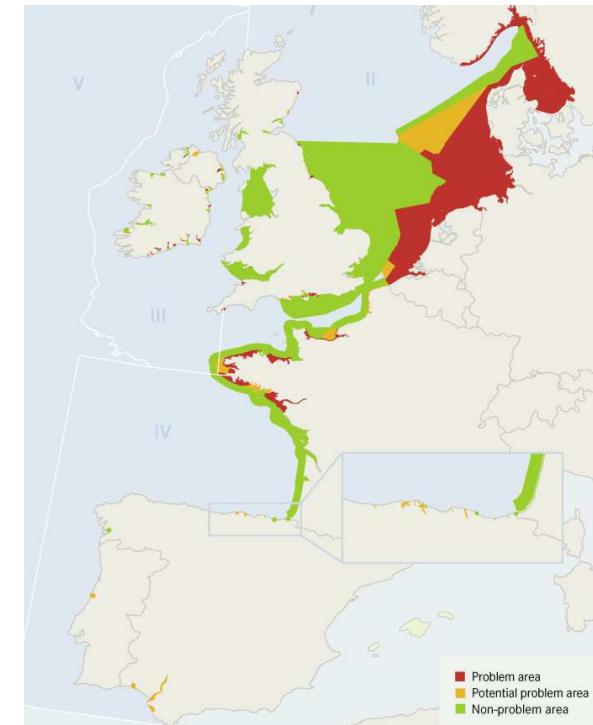
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Ifremer*

JMP EUNOSAT a Project making use of the CMEMS OC data

Joint Monitoring Programme of the Eutrophication of the North Sea with Satellite data

Project funded by EC/DG-ENV call:
Implementation of the second cycle of
the MSFD (September 26th 2016)

2-year project starting in February
2017 , Coordinated by Rijkswaterstaat
(NL), 13 international partners



Map of problem areas for eutrophication in OSPAR region (OSPAR Quality Status Report 2010)



Data used

- In-situ data :

SRN (Suivi Régional des Nutriments –AEAP/Iframer, within the REPHY datasets)
observations of Chl-a and SPM (Suspended Particulate Matte)

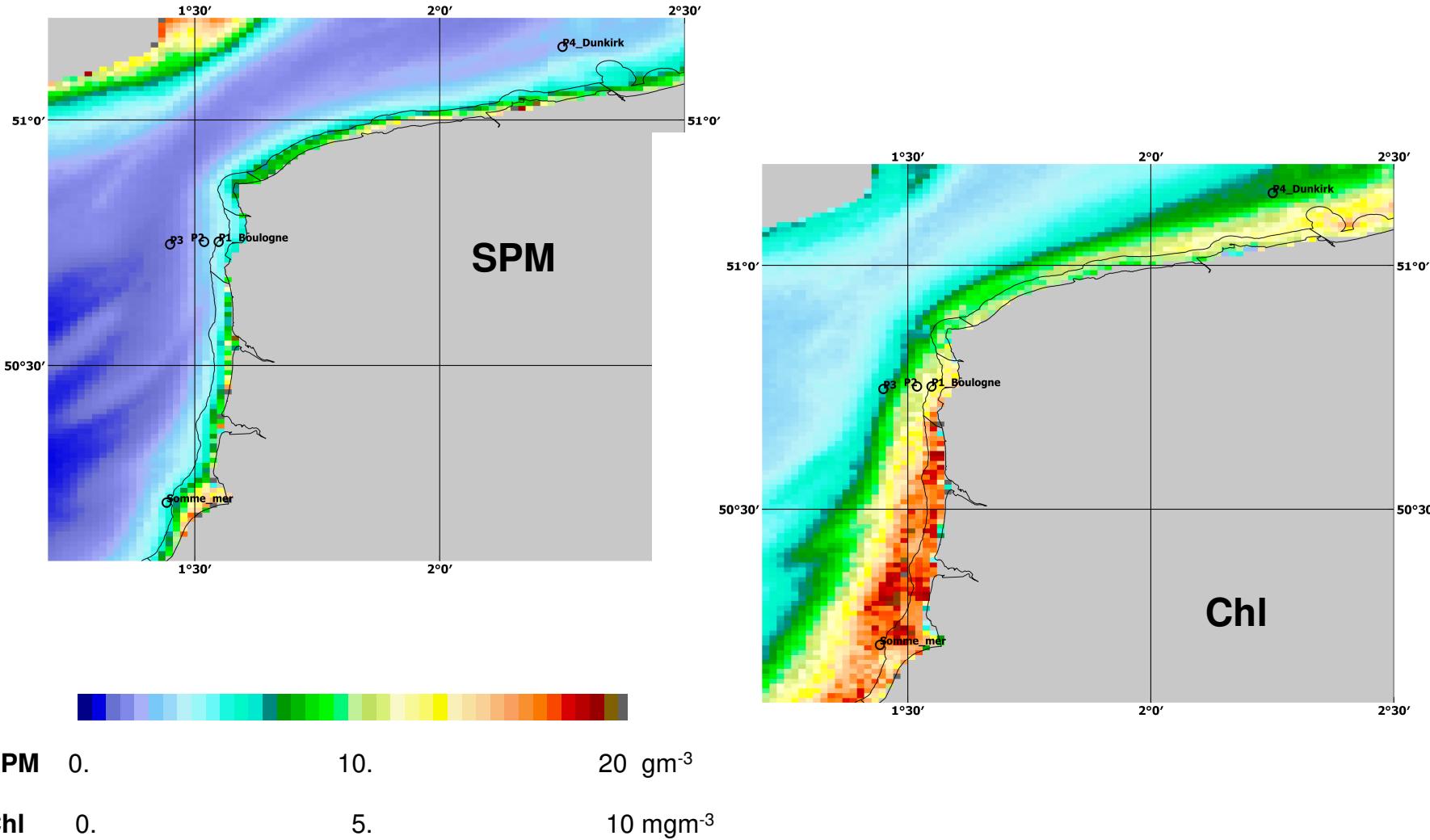
- Satellite data :

Daily interpolated multi-sensor products (L4) of Chl* and non-algal SPM* processed by OC5 (Tilstone et al., 2017; Jafar-Sidik et al., 2017)
(equivalent in coastal waters to the Chl L3 CMEMS OC5 CCI provided by PML but interpolated)

**Tilstone, G., Mallor-Hoya, S., Gohin, F., Belo Couto, A., Sa, C., Goela, P., Cristina, S., Airs, R., Icely, J., Zühlke, M., Groom, S., 2017. Which Ocean colour algorithm for MERIS in North West European waters? Remote Sens. Environ.. 189, 132-151. <http://dx.doi.org/10.1016/j.rse.2016.11.012>*

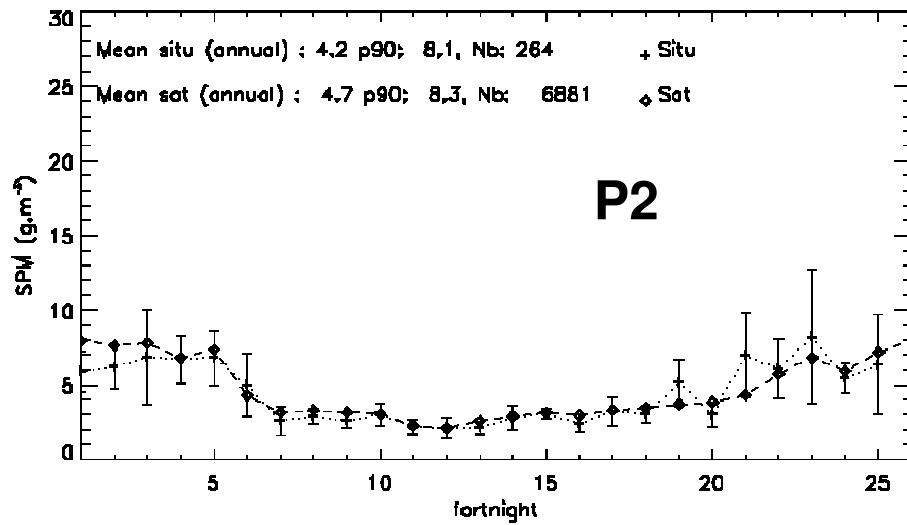
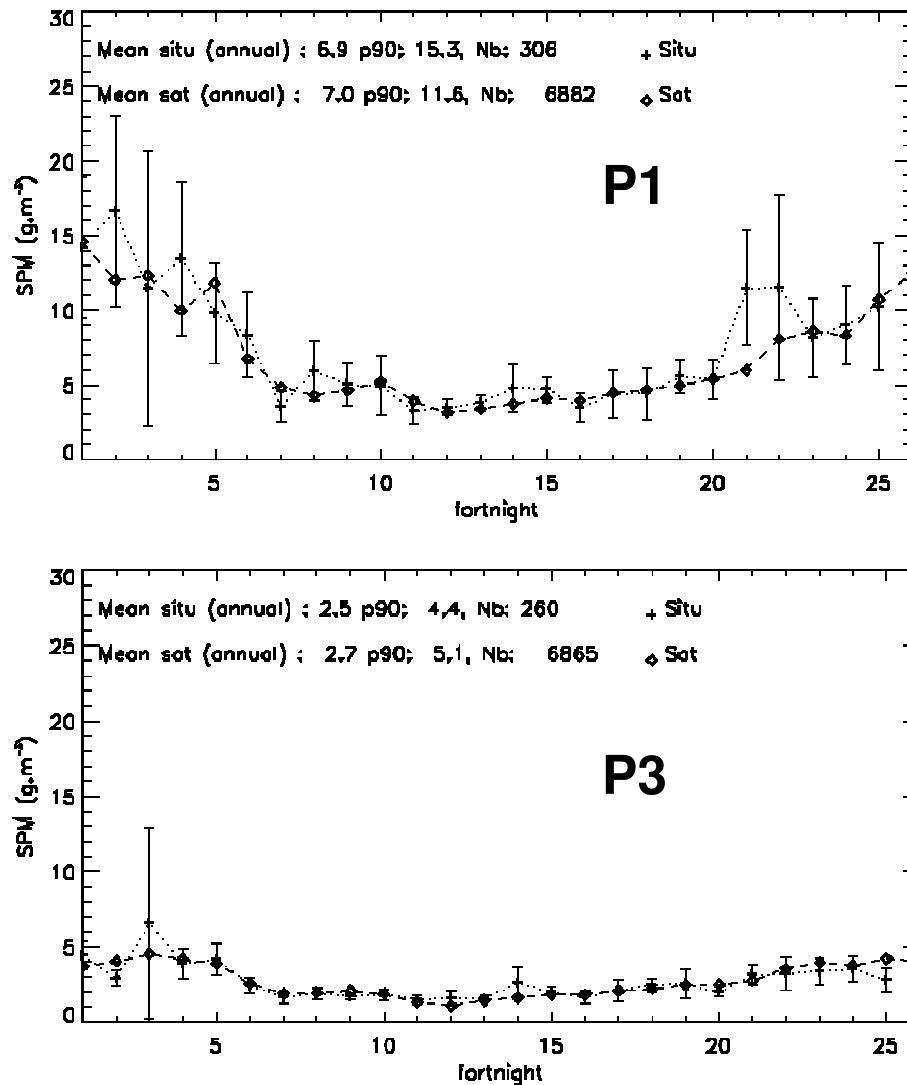
***Jafar-Sidik, M., Gohin, F., Bowers, D., Howarth, J., Hull, T., The relationship between Suspended Particulate Matter and Turbidity at a mooring station in a coastal environment: consequences for satellite-derived products, Oceanologia, 59, 3, 365-378, <https://doi.org/10.1016/j.oceano.2017.04.003>*

The in situ stations projected on the satellite means in Chl-a and SPM 1998-2003 (productive season WFD March to October)



Total SPM across the Boulogne transect

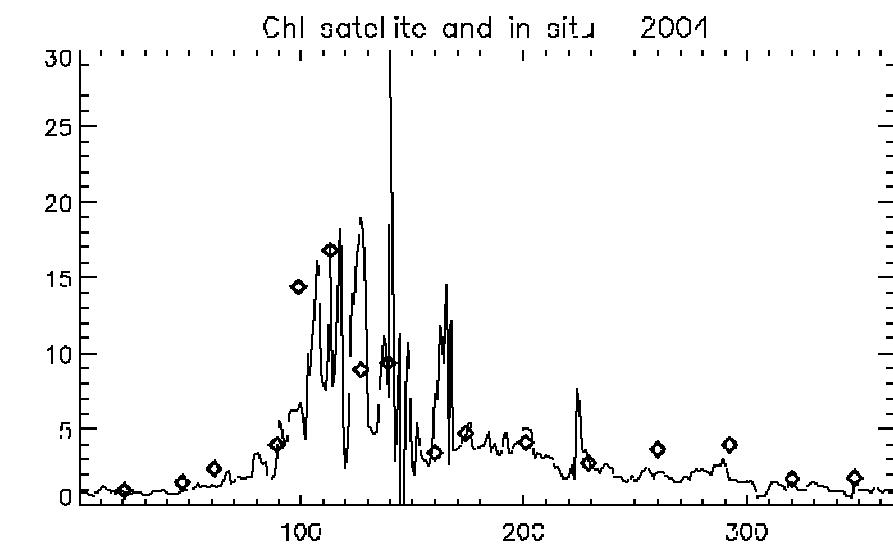
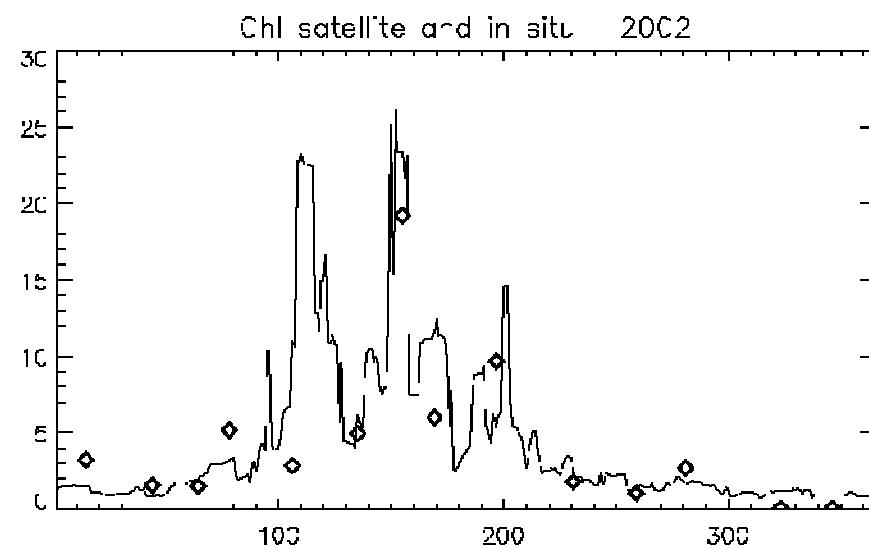
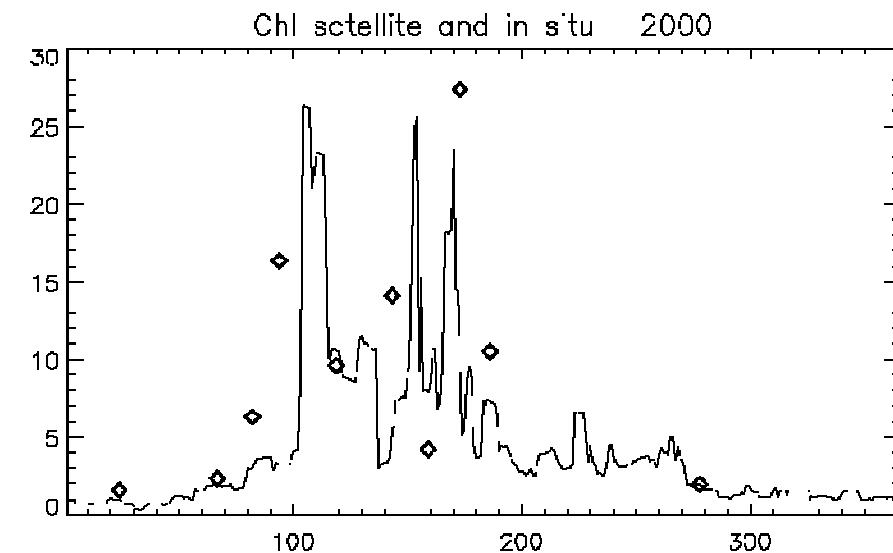
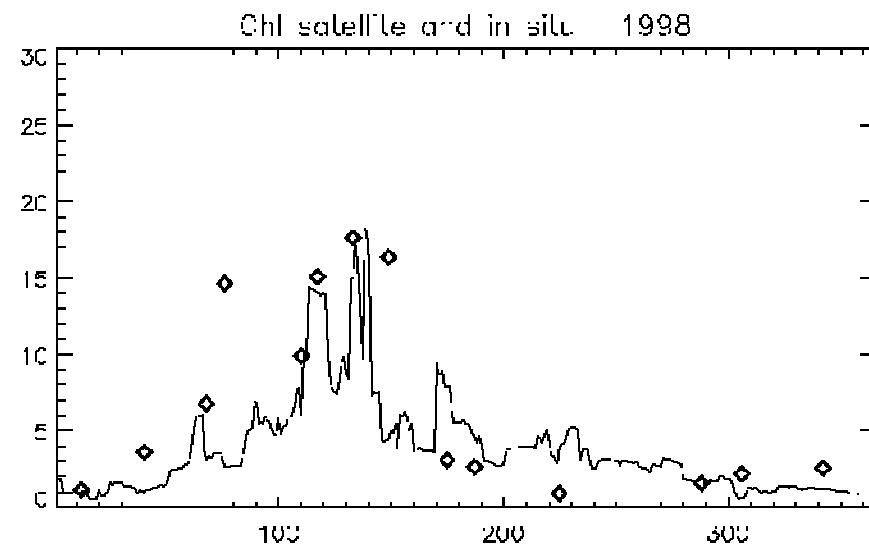
Mean cycles over the 1998-2016 period



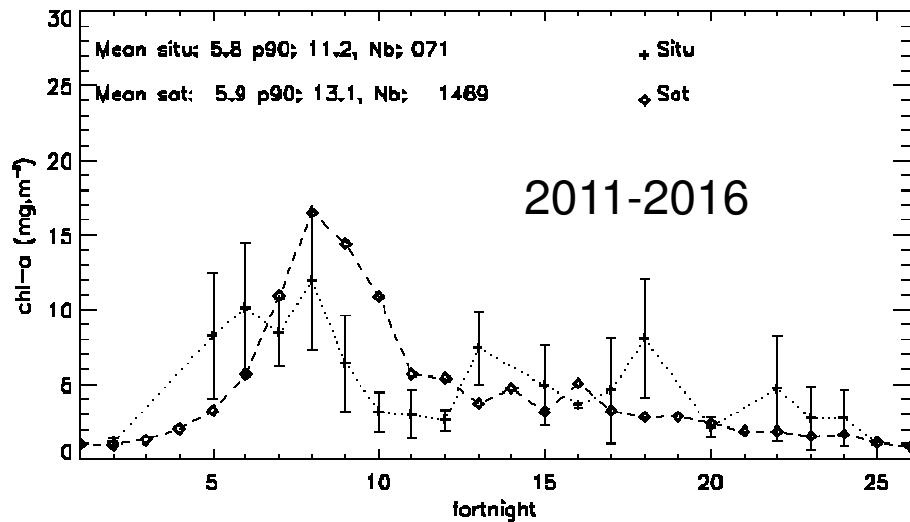
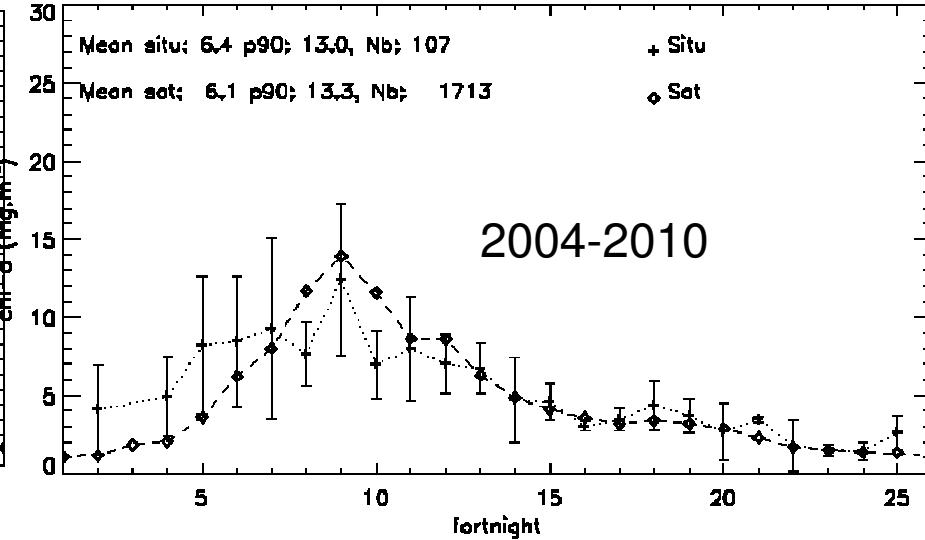
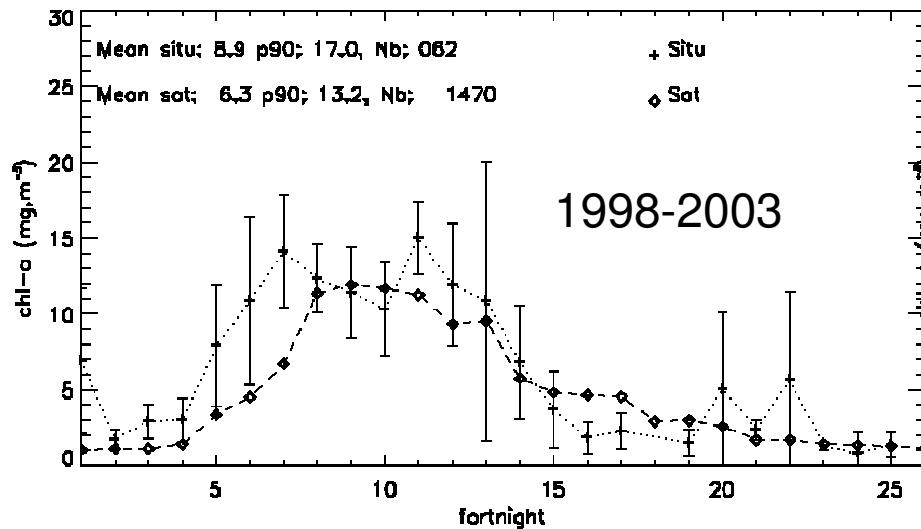
By 15 day periods

± 1.65 Standard error for the in-situ means

Some years of observations in Chl-a at Boulogne P2



Chl cycles by fortnight at Boulogne P1

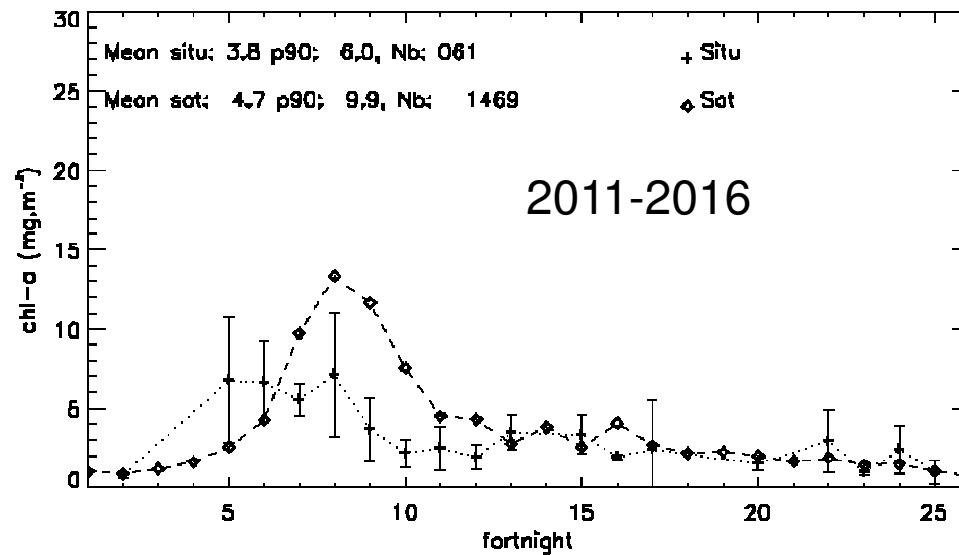
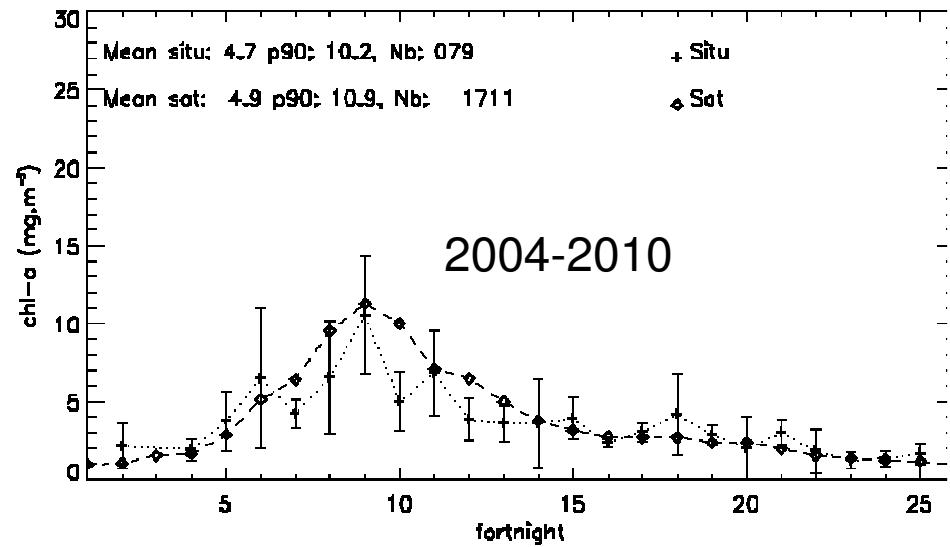
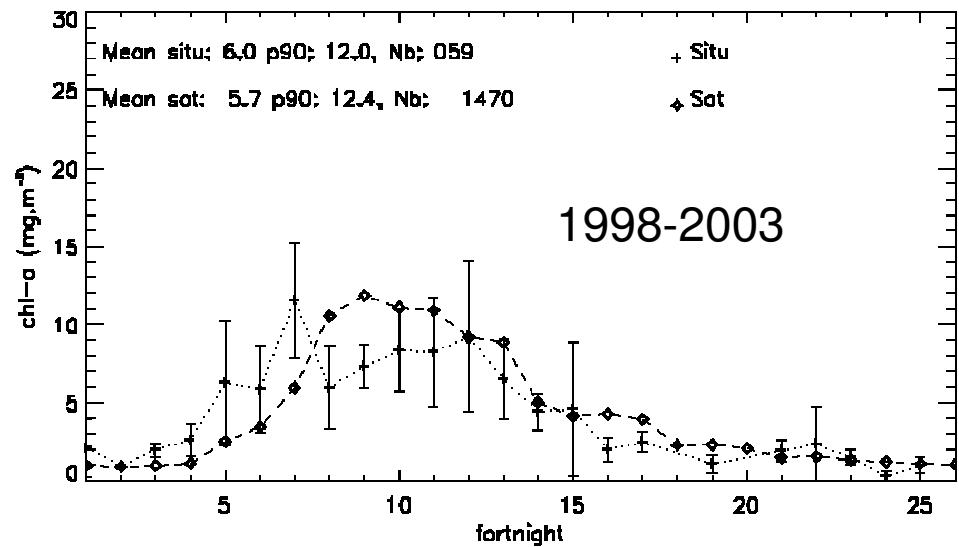


Decrease – much stronger in-situ

Better convergence of the shapes
of the seasonal cycle (peaks)
sat/situ with time but higher in situ
Chl in winter

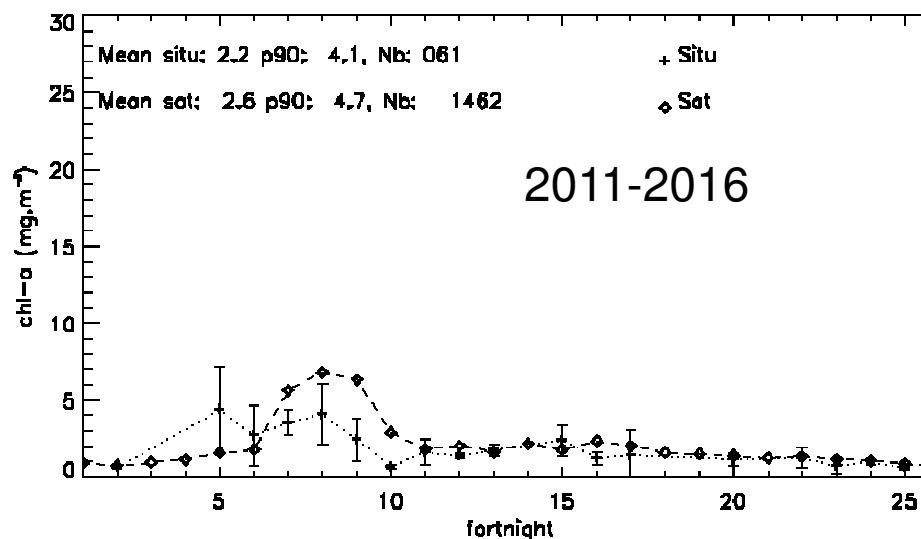
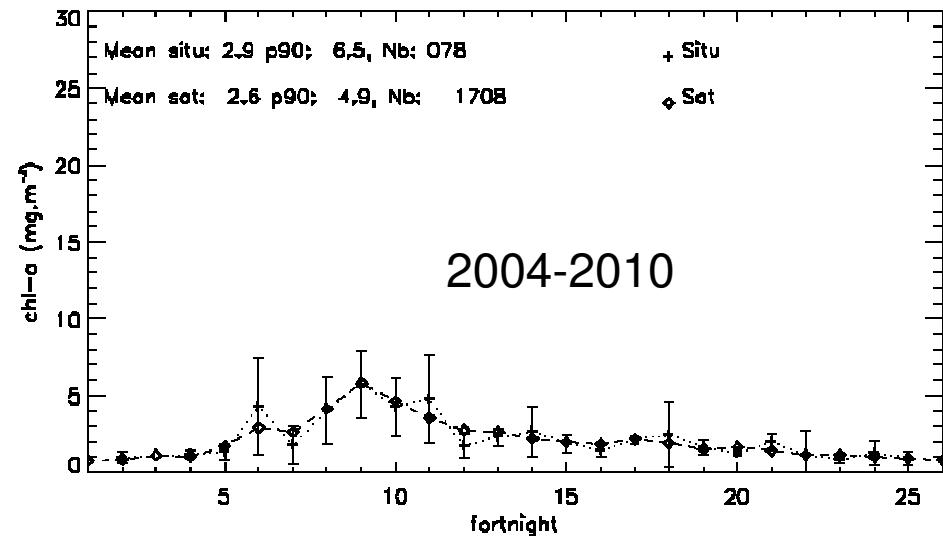
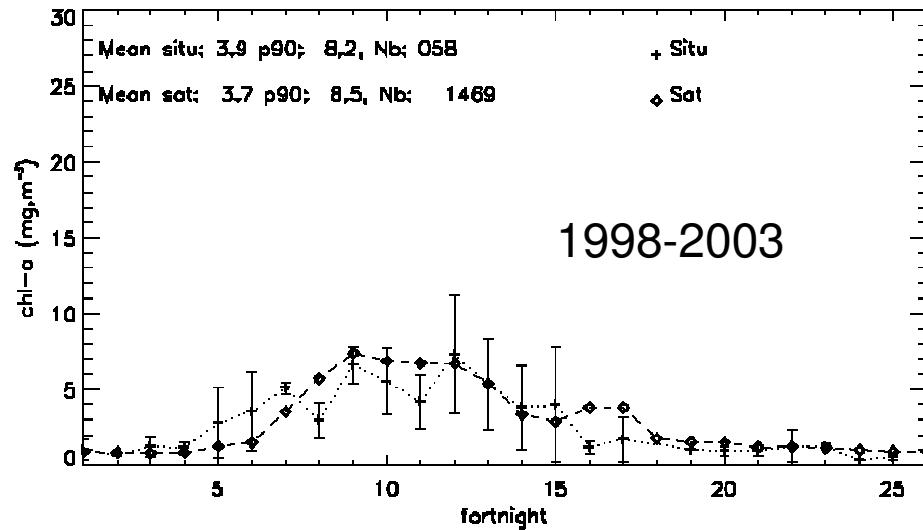
Peaks (second half of April) are
sharpening with time

Chl cycle by fortnight at Boulogne P2



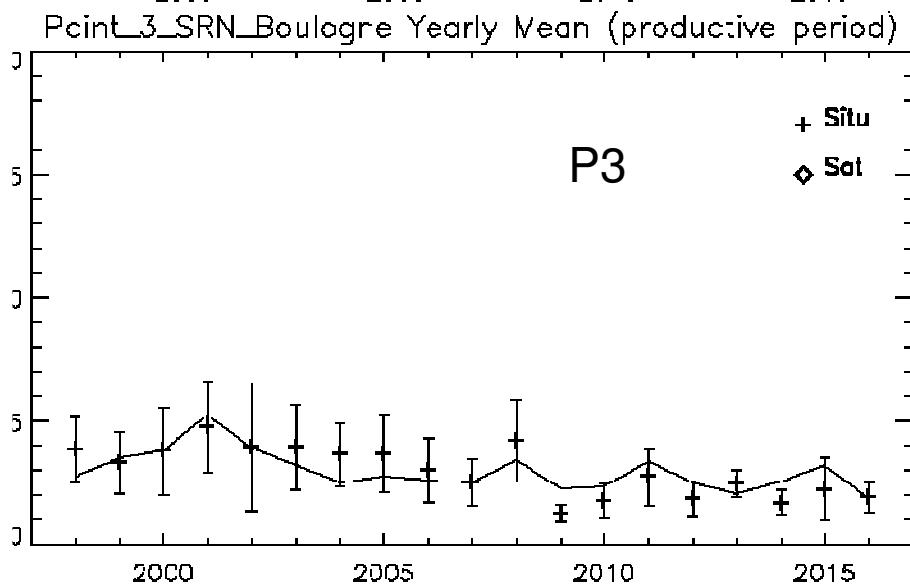
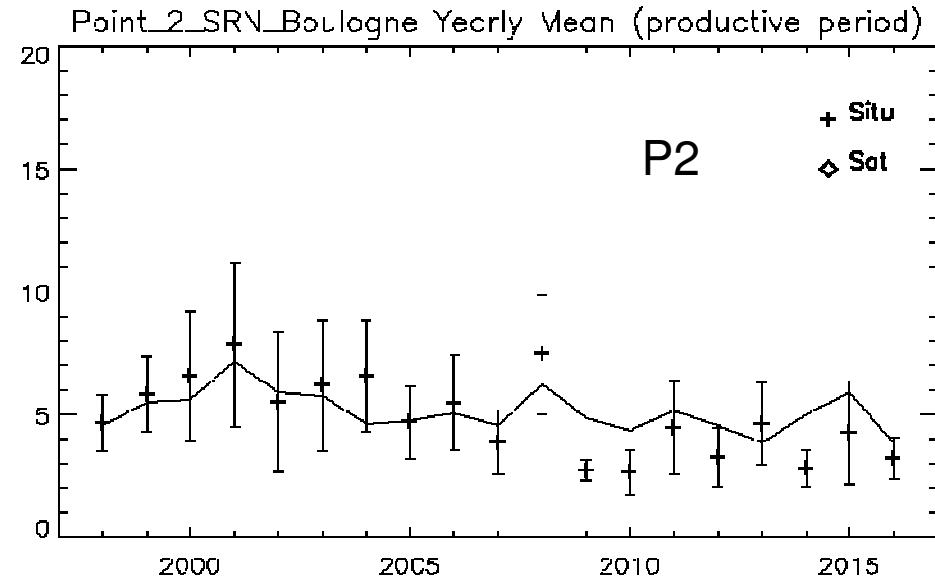
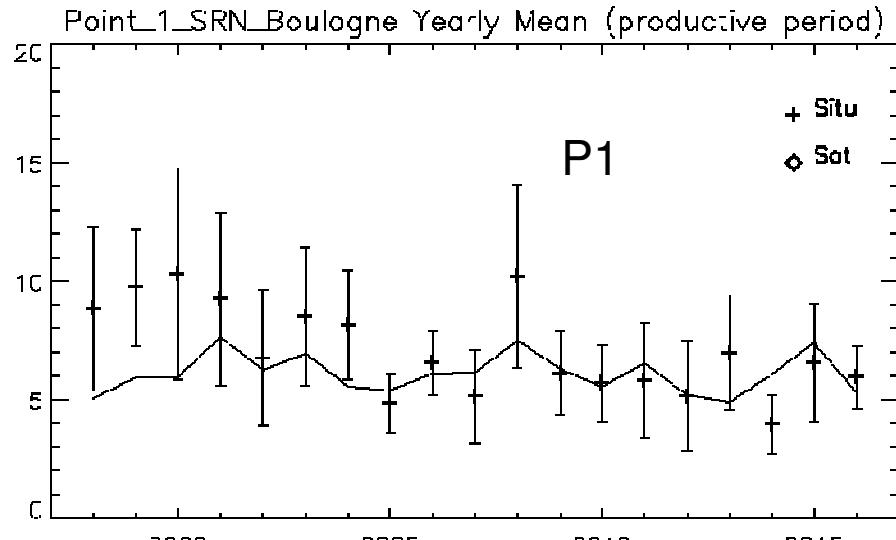
Evolution similar to that at Point 1

Chl cycle by fortnight at Boulogne P3



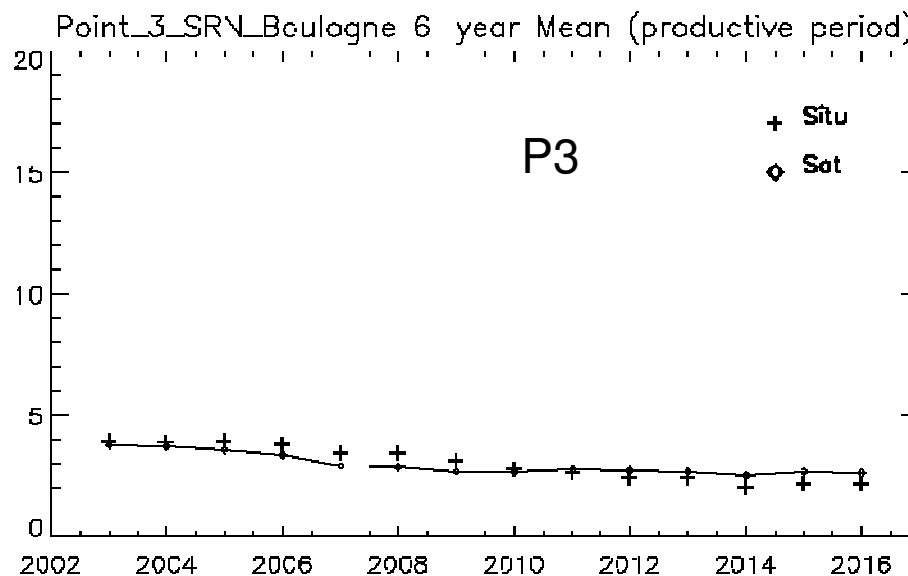
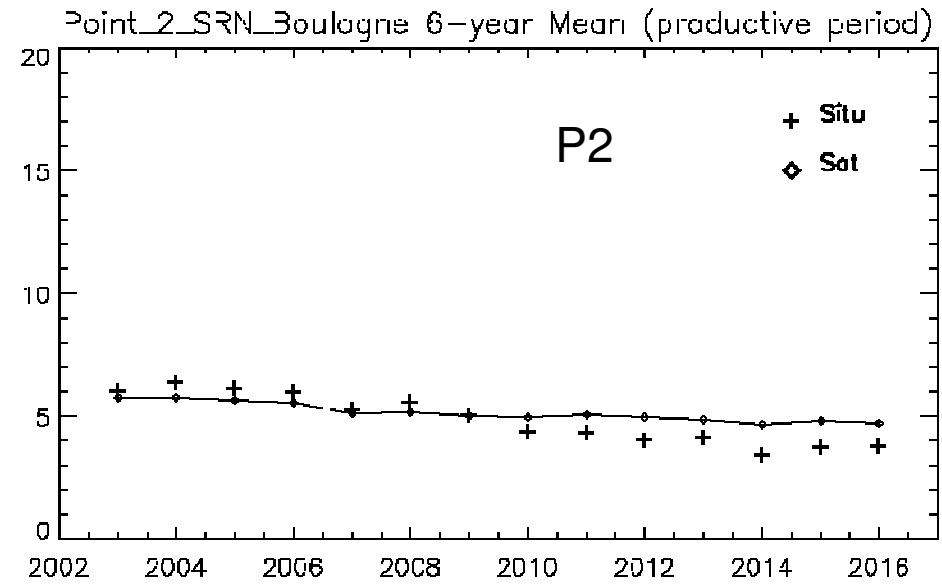
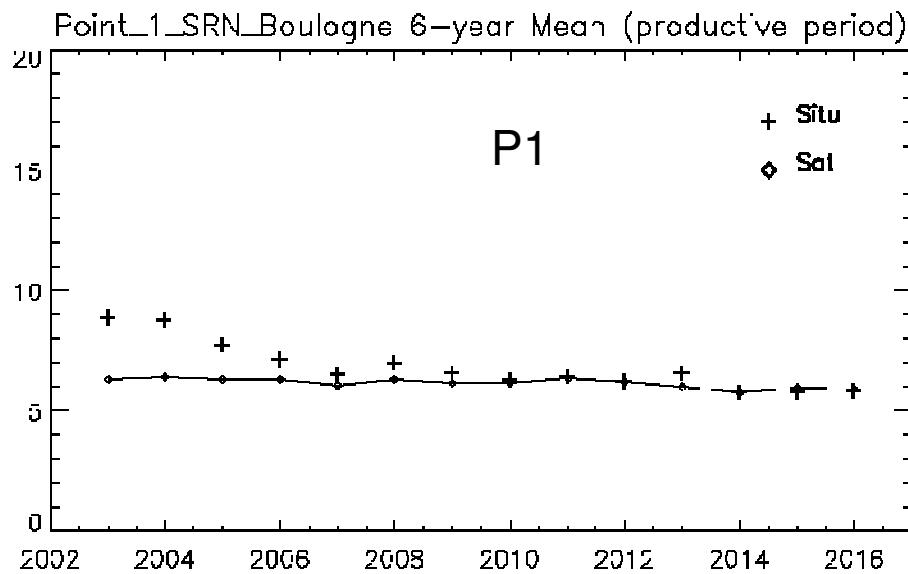
Decrease –stronger in-situ
excellent agreement between the datasets in 2004-2011

Evolution of the yearly average of Chl-a on the Boulogne transect



Chl units in mg m⁻³

Evolution of the 6-year moving average on the Boulogne transect

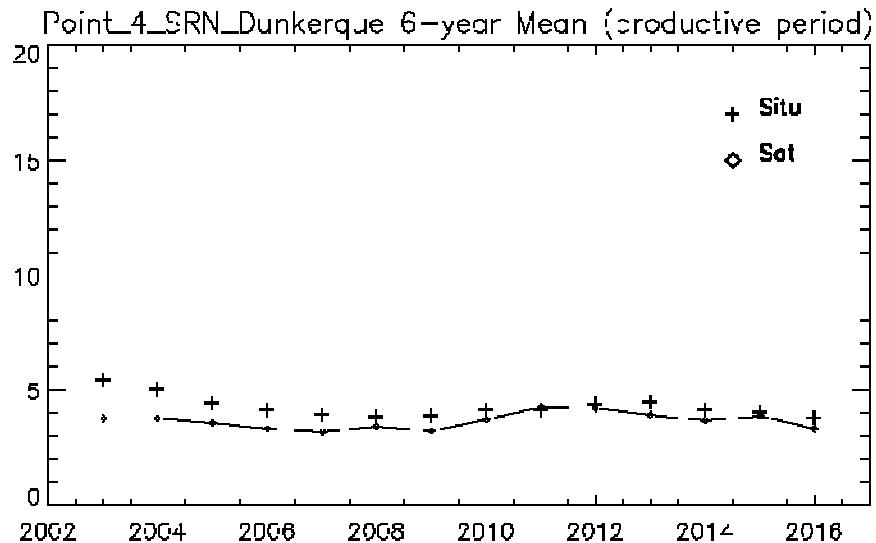


6 years is the time unit for the Water Framework Directive

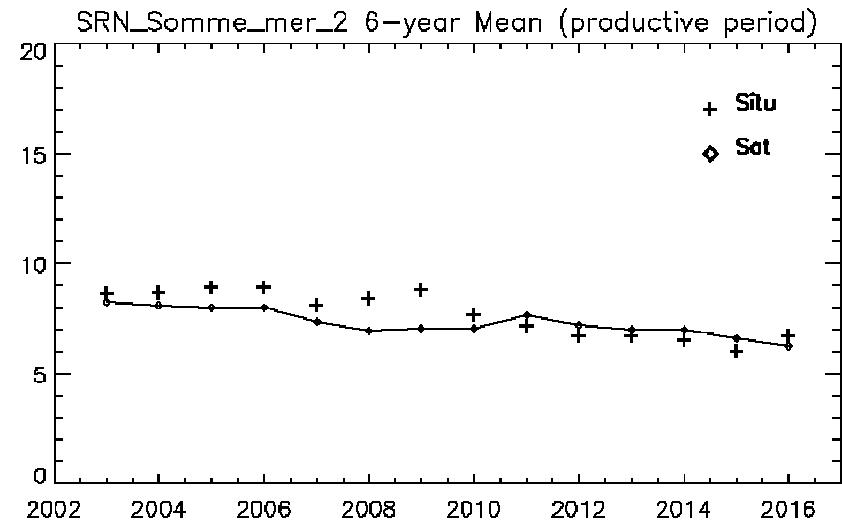
The decrease in satellite Chl is not significant at P1 but this point is coastal and the retrievals are of lower quality (Gohin et al., 2008)

Chl units in mg m⁻³

At Dunkirk and Somme mer

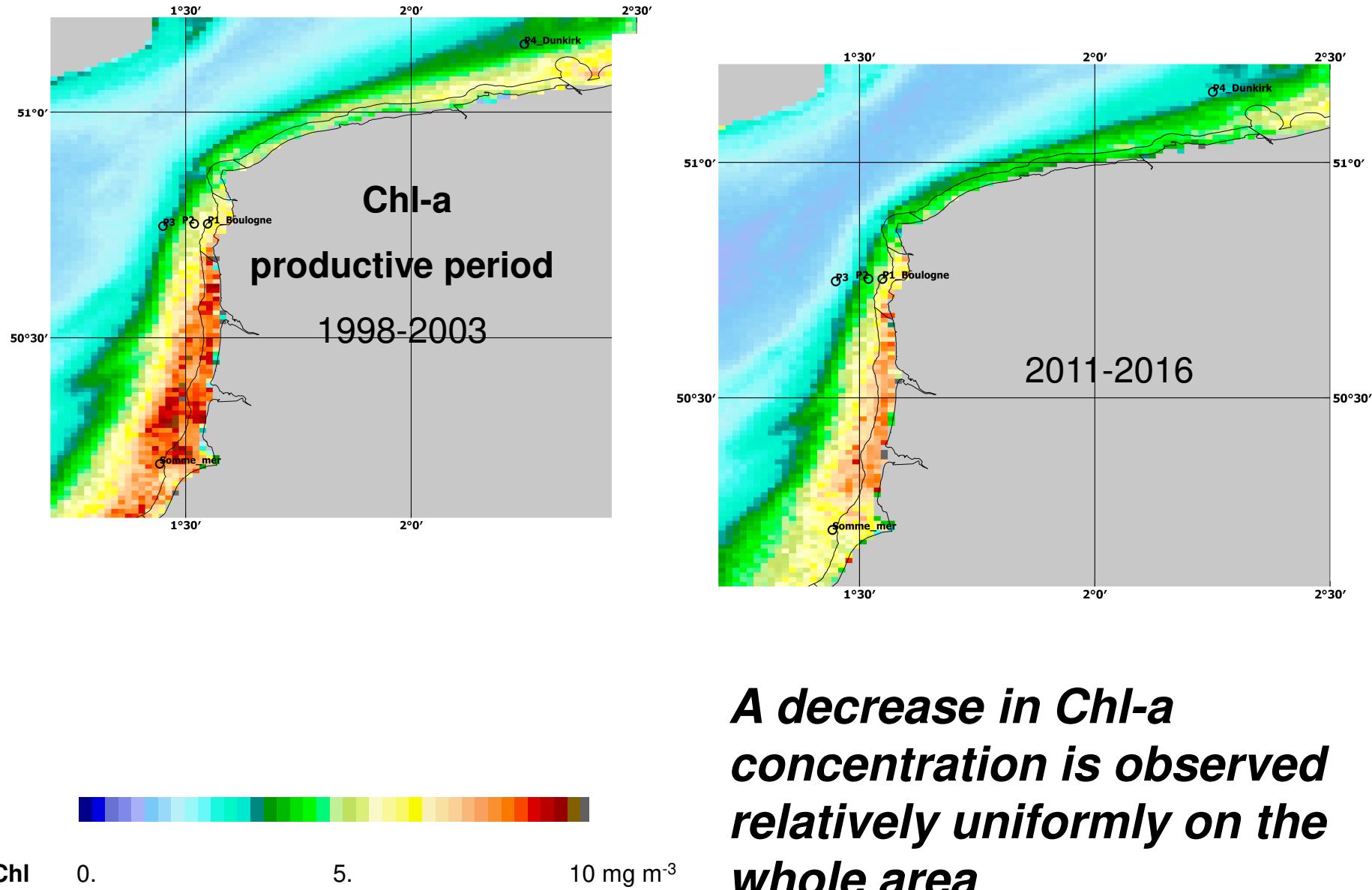


Dunkirk P4



Somme_Mer

The trend in Chl-a



A decrease in Chl-a concentration is observed relatively uniformly on the whole area

Commentaires sur la méthode

Les comparaisons des produits interpolés Chl sont en ligne avec les résultats connus par capteur (Gohin, Ocean Science, 2011)

Le RBINS dans EUNOSAT teste divers autres algorithmes classiques par match-up sur les données des partenaires, y compris celles de l'Ifremer.

Et le CMEMS (région European North-West Shelf)?

Le produit phare multicapteur CMEMS du PML (OC-CCI ESA) est en révision (LUT OC5 spécifique au produit imminente).

Le nouveau produit interpolé ACRI-ST est en cours de traitement. Ces deux produits sont compatibles avec notre méthode.

Commentaires sur les résultats

La baisse de la production primaire de la Mer du Nord doit être évaluée plus précisément mais est plausible (Capuzzo et al., Global Change Biology, 2017)

à vérifier dans EUNOSAT et sur les côtes atlantique et Manche

Cette baisse est accompagnée par endroit d'un resserrement du pic printanier, à expliquer et évaluer les conséquences (flore, débits des fleuves, ?)

Besoin d'observations in situ toujours plus fort. Les analyses conjointes, comme celle-ci, doivent permettre de mieux cerner les évolutions à long terme.

Merci de votre attention !