# Comparing Primary Production Models in the Canary Eastern Boundary Upwelling System

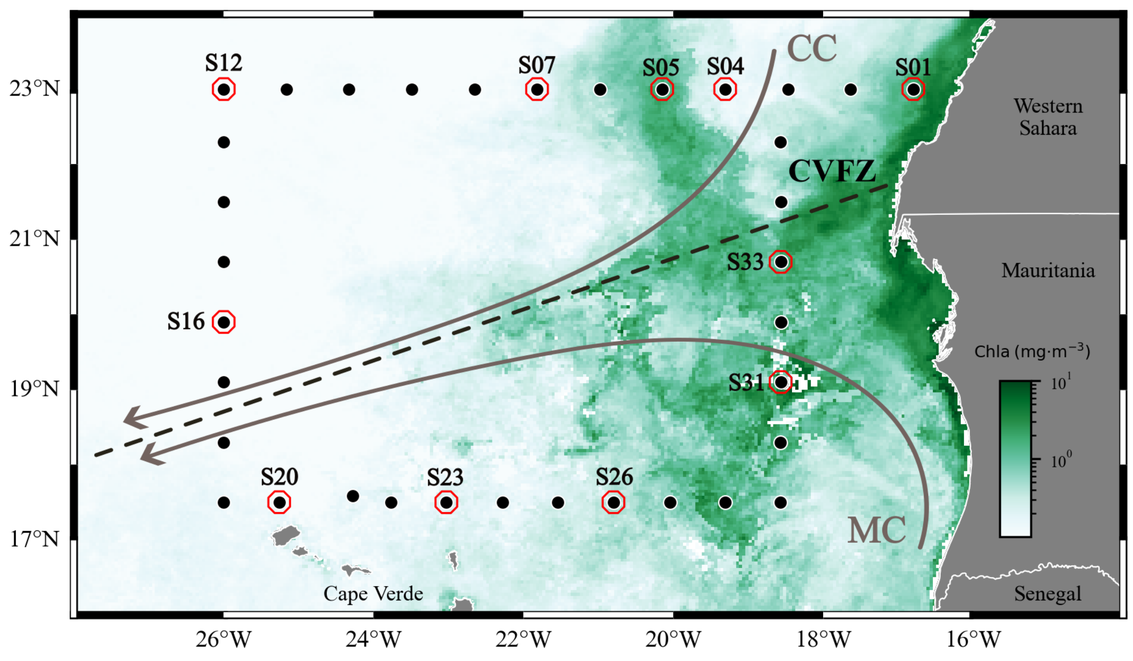
Nauzet Hernández-Hernández[1], Yeray Santana-Falcón[2], María F. Montero[1], Mar Benavides[3], Xosé A. Álvarez-Salgado[4], Antonio Delgado-Huertas[5], Steve Groom[6], Peter Land[6], & Javier Arístegui[1].

## Background:

- Eastern Boundary Upwelling Ecosystems (EBUE's) account for ~10% of ocean primary production (PP) supporting up to 20% of the global fish catch though they represent 3% of world ocean surface.
- The Canary Current EBUE (CanC-EBUE), unlike other EBUE, has been unabatedly warming, and decreasing (or at least not increasing) in wind intensity during the last 60 years. However, past trends in net primary production are uncertain, partly due to differences in the outputs of remote sensing models and the lack of *in situ* data to validate these models in the region.

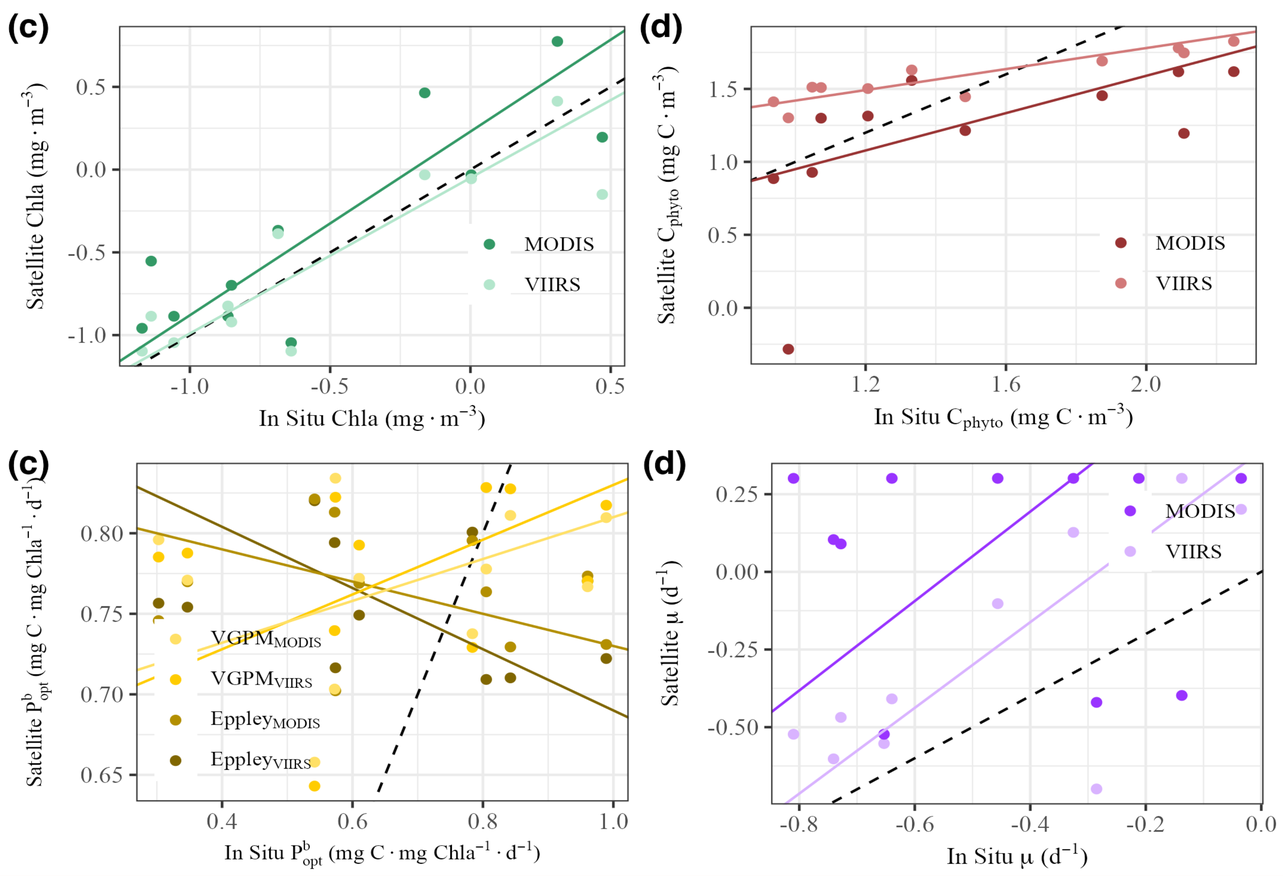
## Goal:

To test the performance of four widely used satellite-based PP models - the Vertically Generalized Production Model (VGPM) and its variant based on Eppley's description of the growth function (Eppley), the Carbon-based Production Model (CbPM), and the Carbon, Absorption and Fluorescence Euphotic-resolving model (CAFE)- comparing with 4 different *in situ* techniques

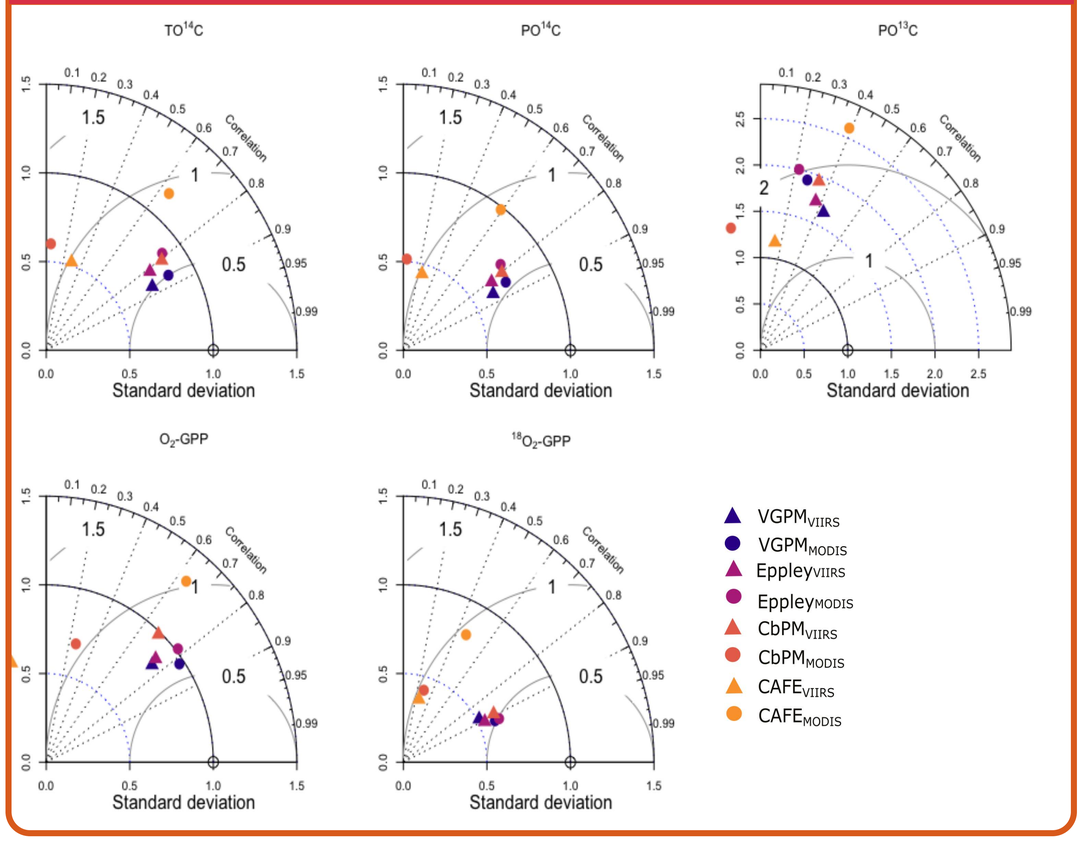



- Sampled stations are encircled in red
- $^{14}C$-uptake
- $^{13}C$-uptake
- $O_2$-production
- $^{18}O_2$-production

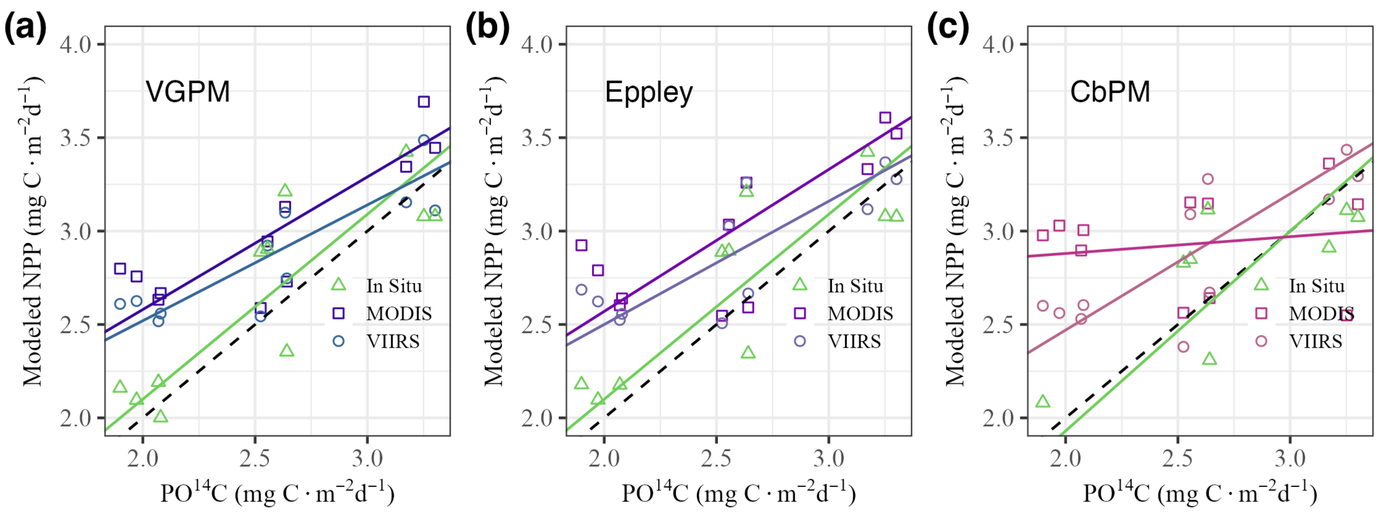
## Testing input data




## Comparing model performance




## Fueling models with *in situ* data




## Conclusions

- The Chl*a*-based models provide the more accurate NPP estimates yet these are among the first-described models in the literature.
- Our results indicate that the main weakness of the NPP models tested here is the lack of skill of the algorithms to accurately assess both $P^b_{opt}$ and μ.
- Our results highlight the potential of $^{18}O_2$ method, which presented the highest agreement with Chl*a* models, as standard for model validation.

## See what's going on in our Group

GOB OCEANOGRAFÍA BIOLÓGICA

## Fundings

FLUXES project (CTM2015-69392-C3)

PRIMUS project (ESA4000135025/21/I-NB)

Predoctoral Fellowship ACIISI (TESIS2015010036)

## PRIMUS project

esa

1 ULPGC IOCAG Instituto Universitario de Oceanografía y Cambio Global

2 cnrs

3 mio Institut Méditerranéen d'Océanologie

4 INSTITUTO DE INVESTIGACIONES MARINAS CSIC CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

5 IACT INSTITUTO ANDALUZ DE CIENCIAS DE LA TIERRA

6 PML Plymouth Marine Laboratory