**PYROPLANKTON – Living Planet Fellowship – J.Llort**

*Impacts of pyrogenic aerosols on phytoplankton ecosystems*

**Scientific goal**
Evaluate the influence of wildfires aerosols on marine primary production and carbon export

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**Internal collaborators:** R. Bernardello, P. Ortega, M. Gonçalves, E. Bergas-Massó, C.Pérez Garcia-Pando, S.Basart

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**Funding:** ESA Living Planet Fellowship (70%), BSC (30%)  
**Budget:** EUR ~120,000

**Started:** October 2021  
**Duration:** 24 months
Motivation

Marine net primary production (NPP) is nutrient-limited in large areas of the open ocean. Far from continents, nutrients supplied by aerosols are essential for NPP. Modelling efforts and recent observations suggest that burning biomass aerosols (BBa) are a key to explaining ocean fertilisation by aerosols due to their high content of soluble Fe.

Can we observe and characterise these impacts?
PYROPLANKTON strategy

In PYROPLANKTON will build mechanistical understanding of the BBa impact on marine primary production by means of satellite and groundbreaking mesocosm experiments.

Remote observations

Lab experiments

Improved ocean BGC models

Click on the infographics to know more about each task
The large-scale impact of aerosols on marine carbon export is still unknown. Strong observational efforts are needed to quantify all the mechanisms involved.

Priorities for satellite-based research (1-5ys)
- Remote estimate of the Biological Carbon Pump
- Remote estimates of phytoplankton community composition, DOC, DIC and PIC

5-10 years
- Measuring aerosol deposition over the oceans
- Observations of aerosols chemical composition and transformation in the atmosphere
Additional slides
PYROPLANKTON workpackages
Remote observations

CAMS Reanalysis

OCC-CI Chl-a

Ocean Chl sensitivity to BBa

Attribution of Chl anomalies to aerosol deposition

Collaborators:
R. Bernardello, P. Ortega, S. Basart, C. Garcia Perez-Pando (BSC)
W. Tang (Princeton), M. Ardyna (CNRS)
D. Hamilton (Cornell Univ)
PYROPLANKTON workpackages
Lab experiments

Collaborators:
C. Guieu, M. Bressac, F. Gazeau (LOV-SU, IMEV)
C. Santin (IMIB-CSIC, Swansea Univ)

Courtesy of C. Guieu and F. Gazeau
PYROPLANKTON workpackages
Improved ocean BGC models

Nuts from pyrogenic aerosols

Collaborators:
F. Doblas-Reyes, R. Bernardello, P. Ortega, M. Gonçalves, E. Bergas-Massó, C. Garcia Perez-Pando (BSC)
D.Hamilton (Cornell Univ)