



HAL
open science

High-resolu-on Bio-Argo and Argo Measurements to Reveal Specific Oceanic Processes.

Antoine Poteau, H. Claustre, F. d'Ortenzio, L. Prieur, E. Boss

► **To cite this version:**

Antoine Poteau, H. Claustre, F. d'Ortenzio, L. Prieur, E. Boss. High-resolu-on Bio-Argo and Argo Measurements to Reveal Specific Oceanic Processes.. Ocean Sciences Meeting, Feb 2016, New Orleans (Louisiana), United States. hal-04550114

HAL Id: hal-04550114

<https://hal.sorbonne-universite.fr/hal-04550114>

Submitted on 17 Apr 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

High-resolution Bio-Argo and Argo Measurements to Reveal Specific Oceanic Processes.

Poteau^{1,2} A., Claustre^{1,2} H., Briggs^{1,2} N., D'Ortenzio^{1,2} F., Schmechtig C., Prieur L.^{1,2}, Boss E.⁴

1 - Sorbonne Universités, UPMC Univ Paris 06, UMR 7093, LOV, Observatoire océanologique, F-06230, Villefranche/mer, France

2 - CNRS, UMR 7093, LOV, Observatoire océanologique, F-06230, Villefranche/mer, France

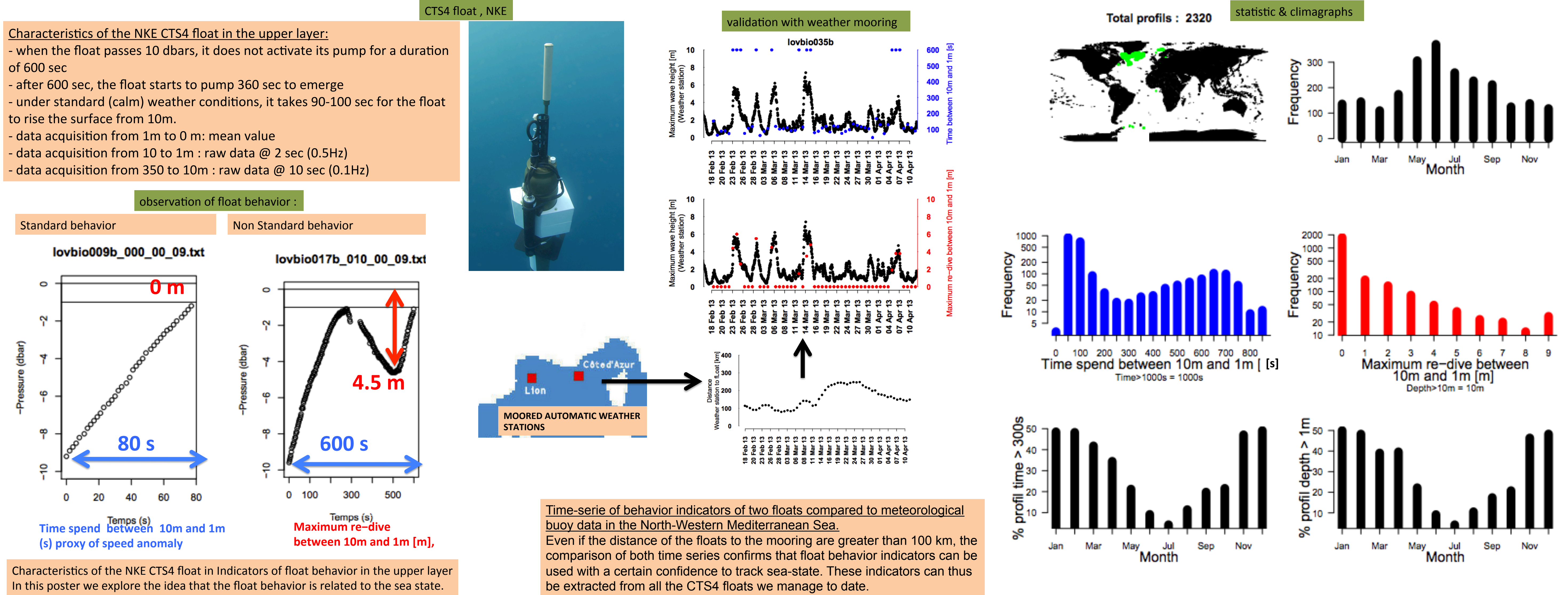
3 - OSU Ecce Terra, UMS 3455, CNRS and Université Pierre et Marie Curie, Paris 6, 4 place Jussieu 75252

4 - University of Maine Orono, ME United States

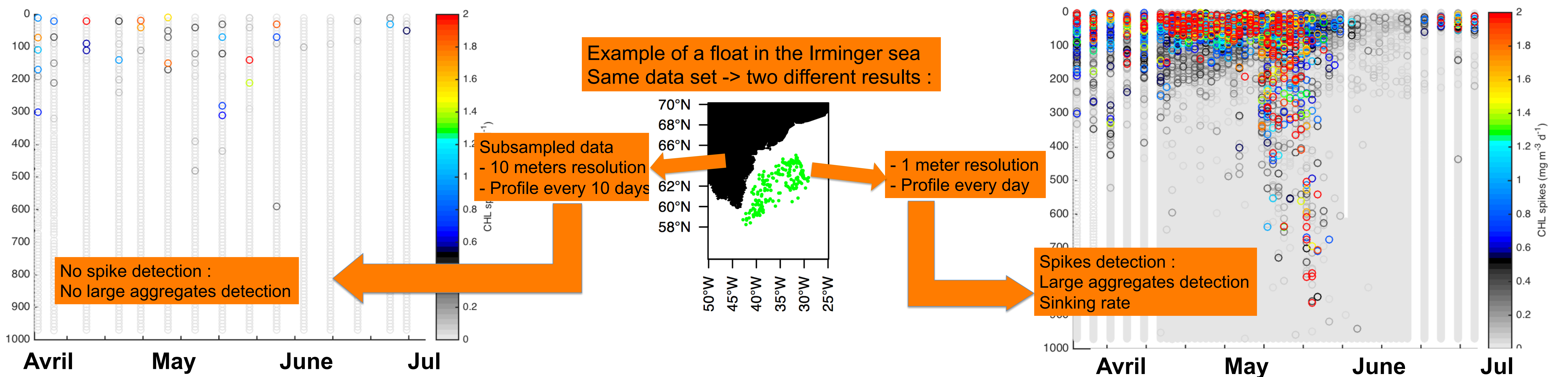


Together with temperature and salinity measurements, Bio-Argo profiling floats now measure a significant range of biogeochemical (e.g. O₂, NO₃) and bio-optical variables (Chl_a, backscattering coefficient and radiometry). To transmit the very large amount of data acquired by this **new generation of floats**, it was required to substitute the Argos telemetry (Argo program) with iridium telemetry. The obvious consequence is not only a much **greater flexibility** on data transmission but also on data acquisition thanks to the two-way communication allowed by iridium. Our group has now deployed and managed over 100 Bio-Argo floats of this type. In particular we have set up high-resolution mode of acquisition for certain periods of time or for dedicated portions of the water column. Here we illustrate with three examples the potential of conducting high-resolution measurement to identify and explore certain oceanic processes.

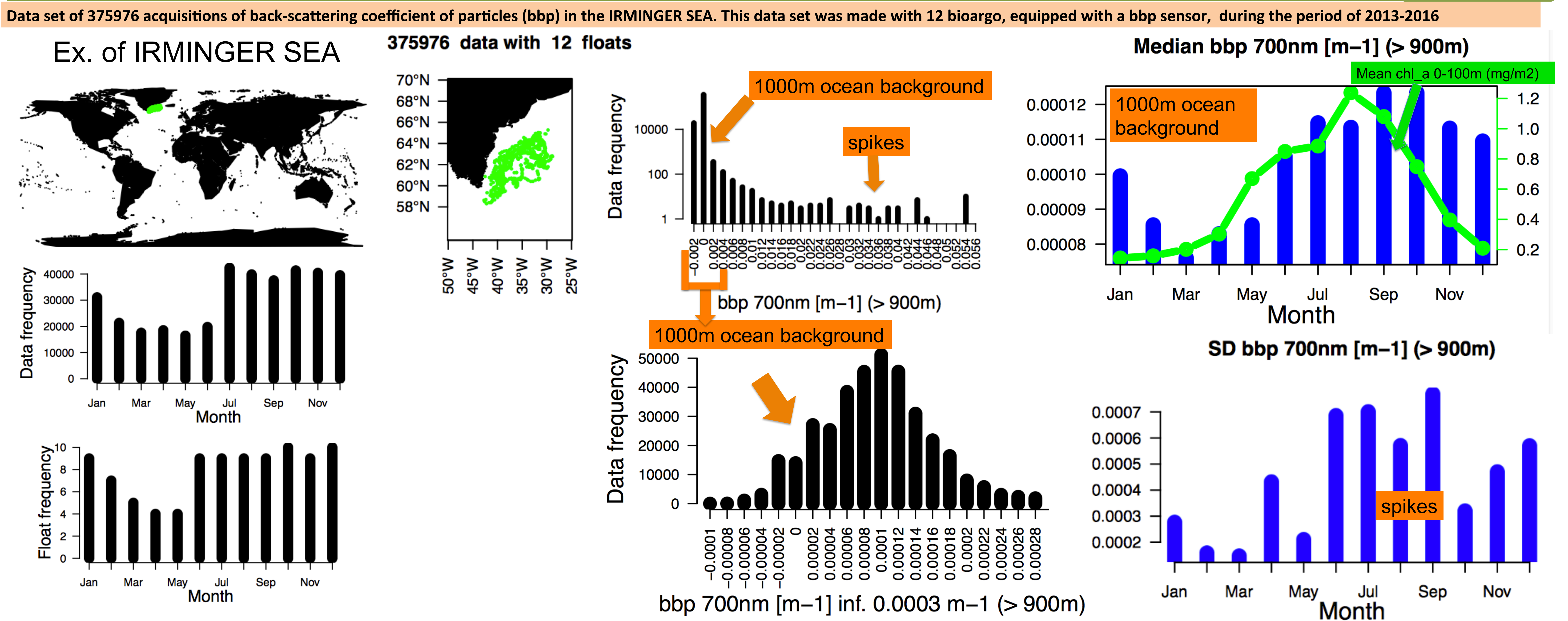
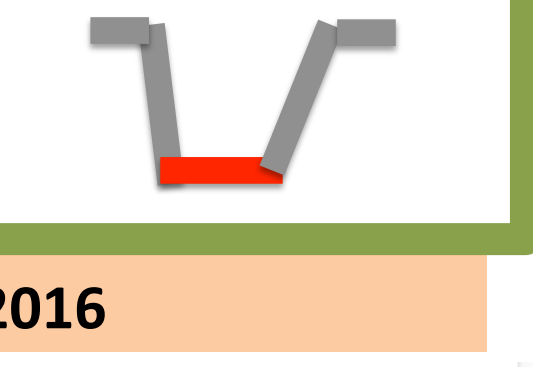
(1) **High resolution measurements** of pressure, temperature and salinity (every 2 s) when the float is finishing its ascent (without any pump action) in the **upper 10 m** layer are analyzed with respect to sea state. We particularly focus on the study of the speed anomaly as compared to a nominal speed expected for a calm sea state. By comparison between speed anomaly of a float in the Mediterranean Sea and concurrent sea state measurements by a weather buoy in the same area, we suggest that float behaviour can be an indicator of sea state.



(2) Each year, in response to springtime phytoplankton blooms, the resolution of bio-optical variables (backscattering and Chl_a) in the **top 1000 m** was **increased to at least 1m** (every 10 s) for all floats in the North Atlantic and Southern Ocean. This resolution allowed accurate estimation of the concentration of large phytoplankton aggregates and revealed systematic differences in bulk aggregate sinking rate between ocean basins.



(3) Finally we continuously record all the variables at a **10 min resolution during the float drift at 1000m**. This allows us to characterize some events at this depth that can be related to bottom currents, high mixing or massive export of aggregates.



Median values of bbp at 1000m are consistent with mass measurement of Brewer and al., 1976. (The distribution of particulate matter in the Atlantic Ocean. Earth and Planetary Science Letters 32, 393-402.)