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

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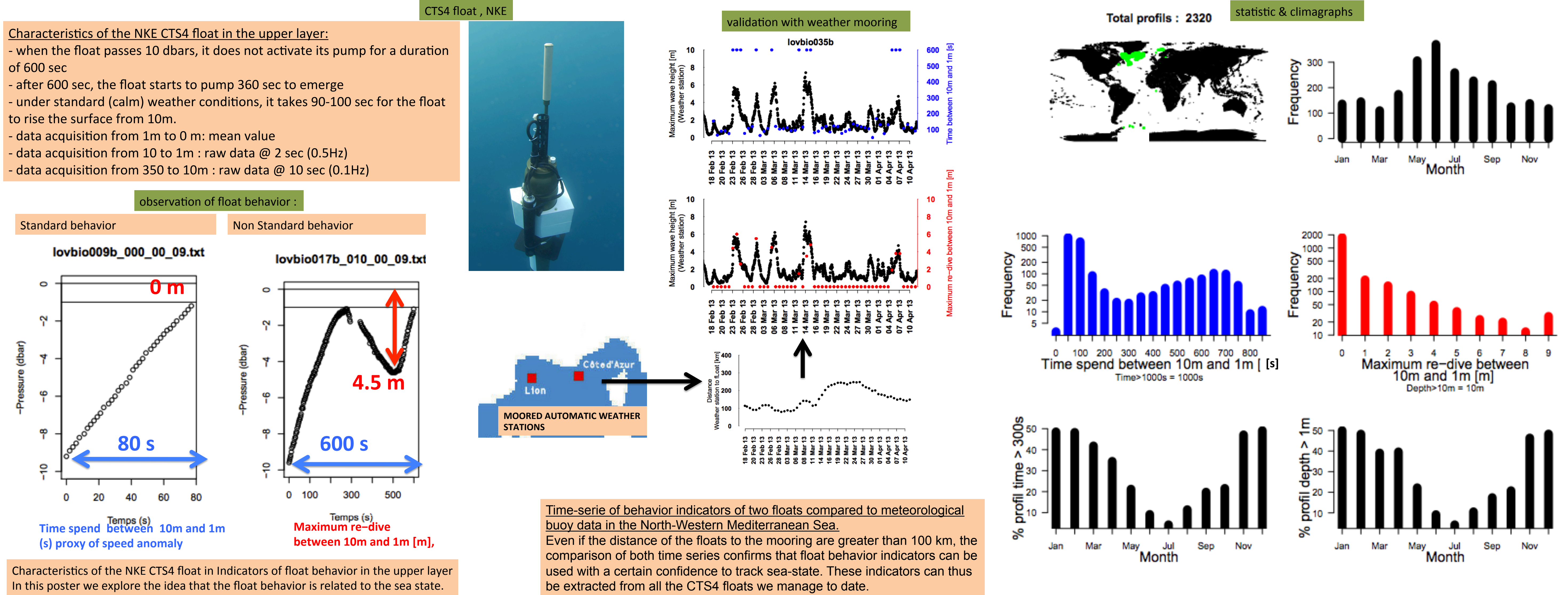
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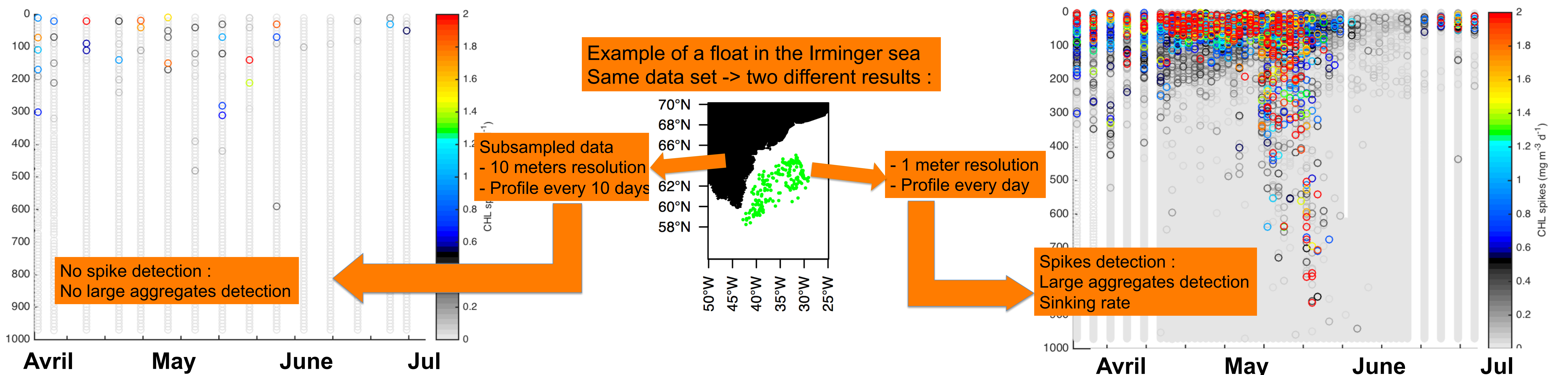


Together with temperature and salinity measurements, Bio-Argo profiling floats now measure a significant range of biogeochemical (e.g. O₂, NO₃) and bio-optical variables (Chla, backscattering coefficient and radiometry). To transmit the very large amount of data acquired by this **new generation of floats**, 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.

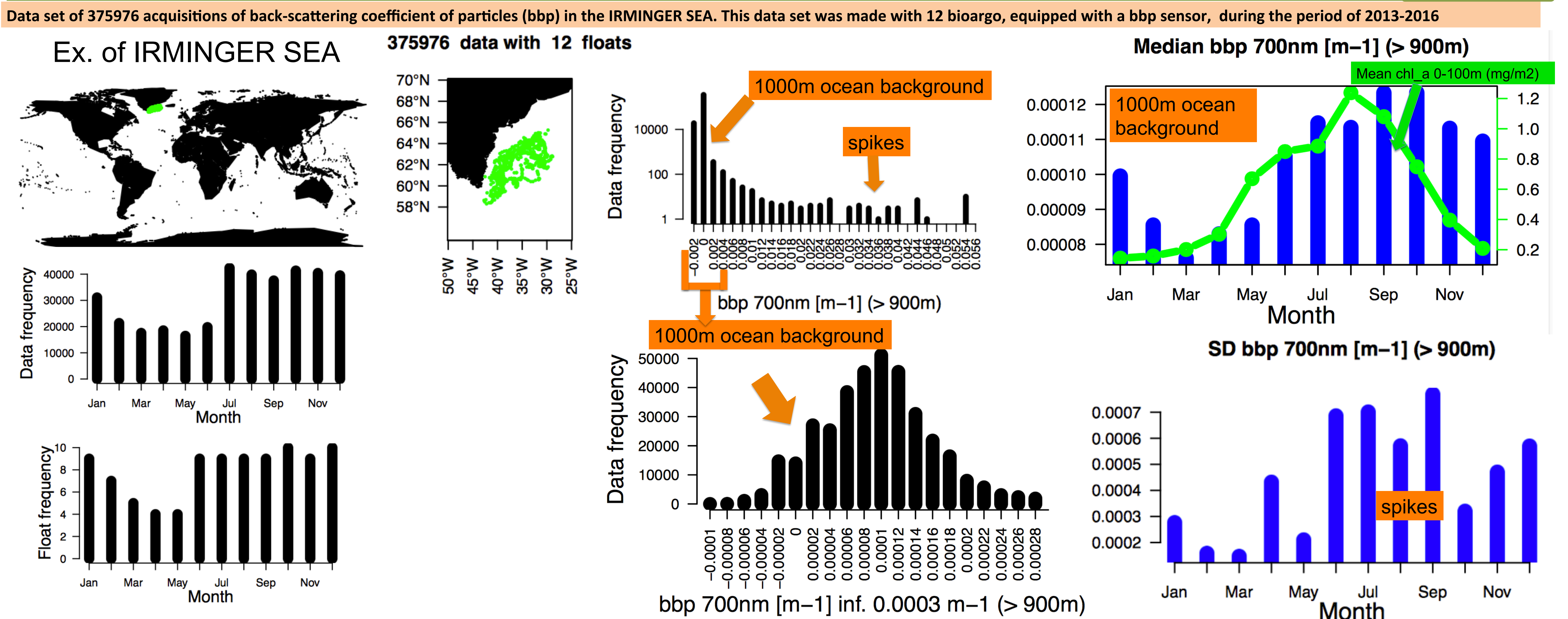
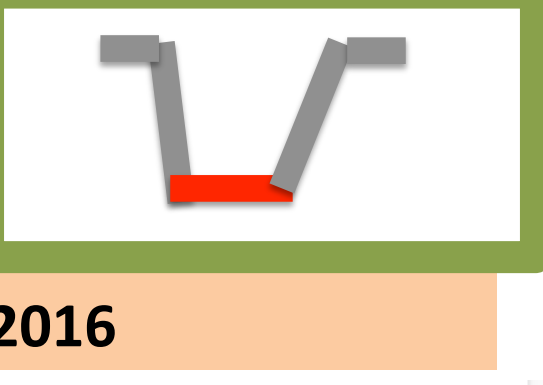
(1) **High resolution measurements** of pressure, temperature and salinity (every 2 s) when the float is finishing its ascent (without any pump action) in the **upper 10 m** layer are analyzed with respect to sea state. We particularly focus on the study of the speed anomaly as compared to a nominal 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 Chla) 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.)