Is it possible to extract information related to sea-state from an Argo float ?

Antoine Poteau, Hervé Claustre, F. d'Ortenzio, L Prieur

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Poteau[1,2] A., Claustre[1,2] H., D'Ortenzio[1,2] F., Prieur L.[1,2]
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

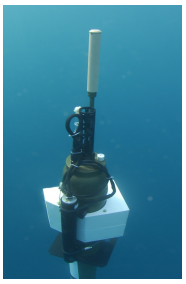
Thanks to the new generation of profiling floats and in particular to iridium telemetry, the acquisition frequency can be dramatically increased. We investigate here the possibility to extract information related to sea-state from the analysis of high-resolution measurements of the pressure data. We 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 Med Sea and concurrent seastate measurements by a weather buoy in the same area, we suggest that float behaviour can be an indicator of sea-state. In the context of remOcean and NOAS projects, we set up a high frequency mode (every 2 s) for the sub-surface layer and for more than fourty floats deployed in various open ocean areas, we present a preliminary analysis of the speed anomaly.

CTS4, NKE

Characteristics of the NKE CTS4 float in the upper layer:
- when the float passes 10 dbars, it does not activate its pump for a duration of 600 sec
- after 600 sec, the float starts to pump 360 sec to emerge

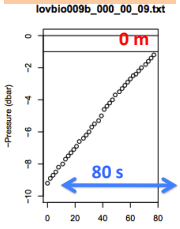
- under standard (calm) weather conditions, it takes 90-100 sec for the float to rise the surface from 10m.

- data acquisition from 1m to 0 m: mean value
- data acquisition from 10 to 1m : raw data @ 2 sec (0.5Hz)
- data acquisition from 350 to 10m : raw data @ 10 sec (0.1Hz)

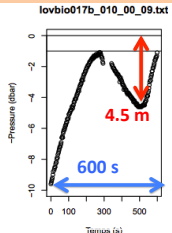


observation of float behavior :

Standard behavior

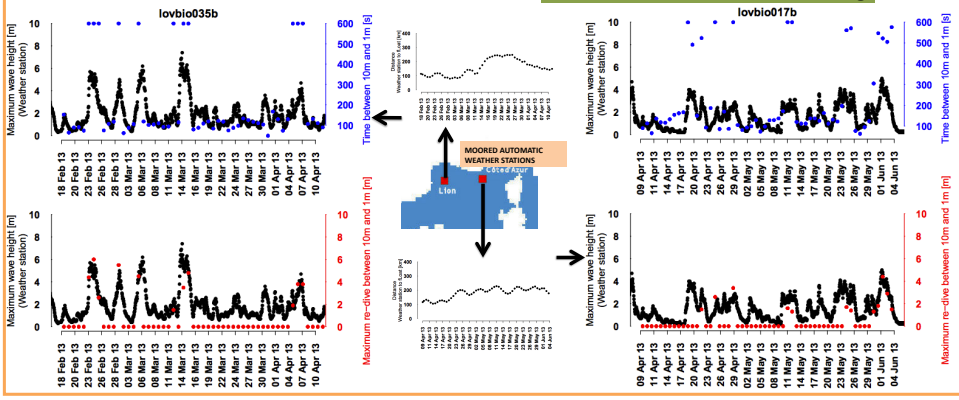


Non Standard behavior



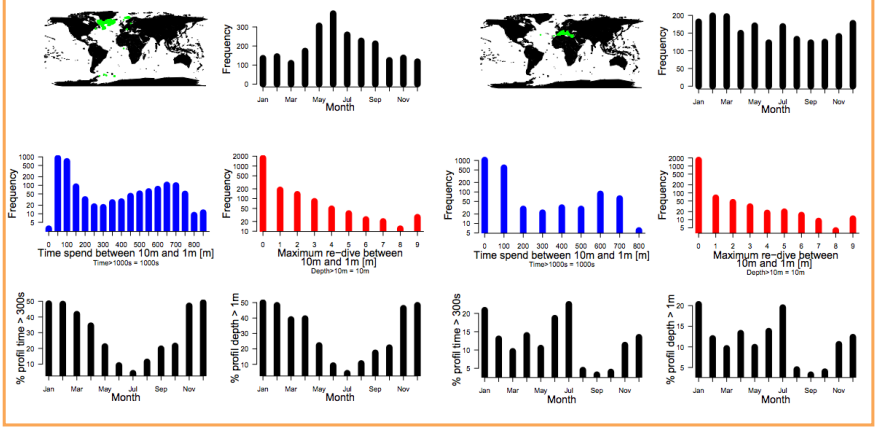
Characteristics of the NKE CTS4 float in Indicators of float behavior in the upper layer
In this poster we explore the idea that the float behavior is related to the sea state.

validation with weather mooring

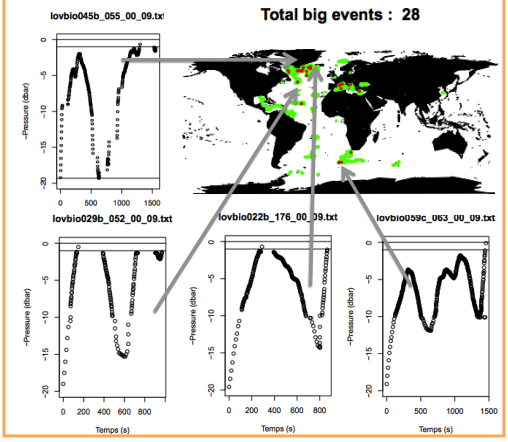


Time-serie of behavior indicators of two floats compared to meteorological buoy data in the North-Western Mediterranean Sea.
Even if the distance of the floats to the mooring are greater than 100 km, the comparison of both time series confirms that float behavior indicators can be used with a certain confidence to track sea-state. These indicators can thus be extracted from all the CTS4 floats we manage to date.

statistic & climagraphs



big events > 10m re-dive 0.4%



what next

We now envisage to extract similar float behavior indicators from standard Argo profiles and in particular the information related to big event..