DISTRIBUTION OF HYDROLOGICAL PARAMETERS, CARBONATE PROPERTIES AND NUTRIENTS IN THE ALGERIAN BASIN DURING SUMMER 2014: SOMBA-GE-2014 CRUISE

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Abstract
This work presents the main observations that have been collected during a 2014 summer cruise in the Algerian Basin SOMBA-GE-2014. We discuss the distributions of carbonate properties, oxygen, nutrients and chlorophyll along with those of hydrological parameters. Air-sea oxygen and CO2 fluxes, elemental ratios and anthropogenic carbon are calculated and compared to earlier observations for the same area.

Keywords: Open sea, Algerian Basin

The global warming and the increasing pressures of anthropogenic activities affect the marine ecosystems. In this context, it is requested to monitor the behavior of such ecosystems to better predict their fate. SOMBA-GE-2014 was conducted between 14 August and 10 September 2014 in the Algerian Basin on "Tethys II" oceanographic vessel (CNRS-INSU). The cruise was divided into 4 legs and included 70 hydrological stations, which cover the whole Algerian basin. A hydrological study, using ?-S diagram showed the typical water masses for this area: the AW (Atlantic Water) in surface layers, LIW (Levantine Intermediate Water) and WIW (Winter Intermediate water) in intermediate layers and WMDW (Western Mediterranean Deep Water) in deep layers with warmer and saltier waters between 2000m and the bottom (new WMDW). This new water mass is observed and described by many authors [1]. In surface waters, super-saturations for both CO2 and O2 are found. In summer, it has been shown earlier that Mediterranean surface waters were acting as a source of CO2 for the atmosphere, following the seasonal temperature increase. O2 super-saturations must be linked to the spring/summer production as the nutrients are found depleted in late summer. The deep chlorophyll maximum DCM shows a deepening from 40 m to 75 m along a west-east transect. It follows nutrient availability and eddy structures. Maximum chlorophyll concentrations reach 2 µg/l in the western part of the basin. In intermediate waters, the maxima of DIC, AOU, nutrients are found in the core of LIW. These are supposed to be the oldest water masses of the Algerian basin. The oxygen minimum (AOU~80µmol/kg) found generally between 200 and 800m, deepens eastward to reach 1500m near the Sicily strait. Below 2000m, relatively low AOU indicates newly formed deep waters. Below the photic zone, for depths higher than 150 m, we have found a N/P ratio of 15.5 (Figure 1). This result is in good agreement with earlier observations for the same area, [2]. In the photic zone, the signal is scattered and N/P ratio exhibits value around 21 confirming the phosphorus limitation of the primary production in that area, [3]. We have computed anthropogenic carbon estimates by using several methods. Not surprisingly, our results show that the Algerian basin is totally invaded by anthropogenic carbon. These estimates are compared to those obtained by using earlier data sets in the same region and the rate of surface acidification is discussed.

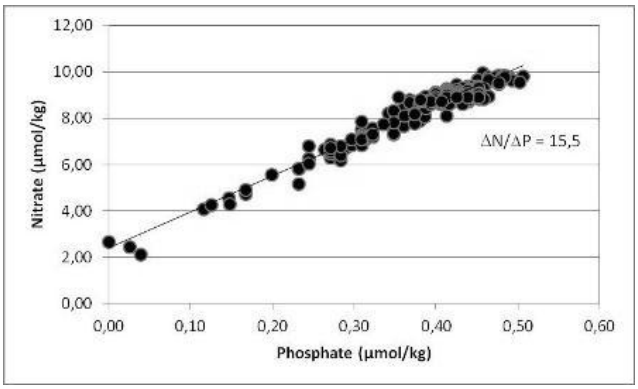

Fig. 1. Nitrate to phosphate ratio in the Algerian Basin for depths above 150 m during SOMBA-GE-2014 cruise

References

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