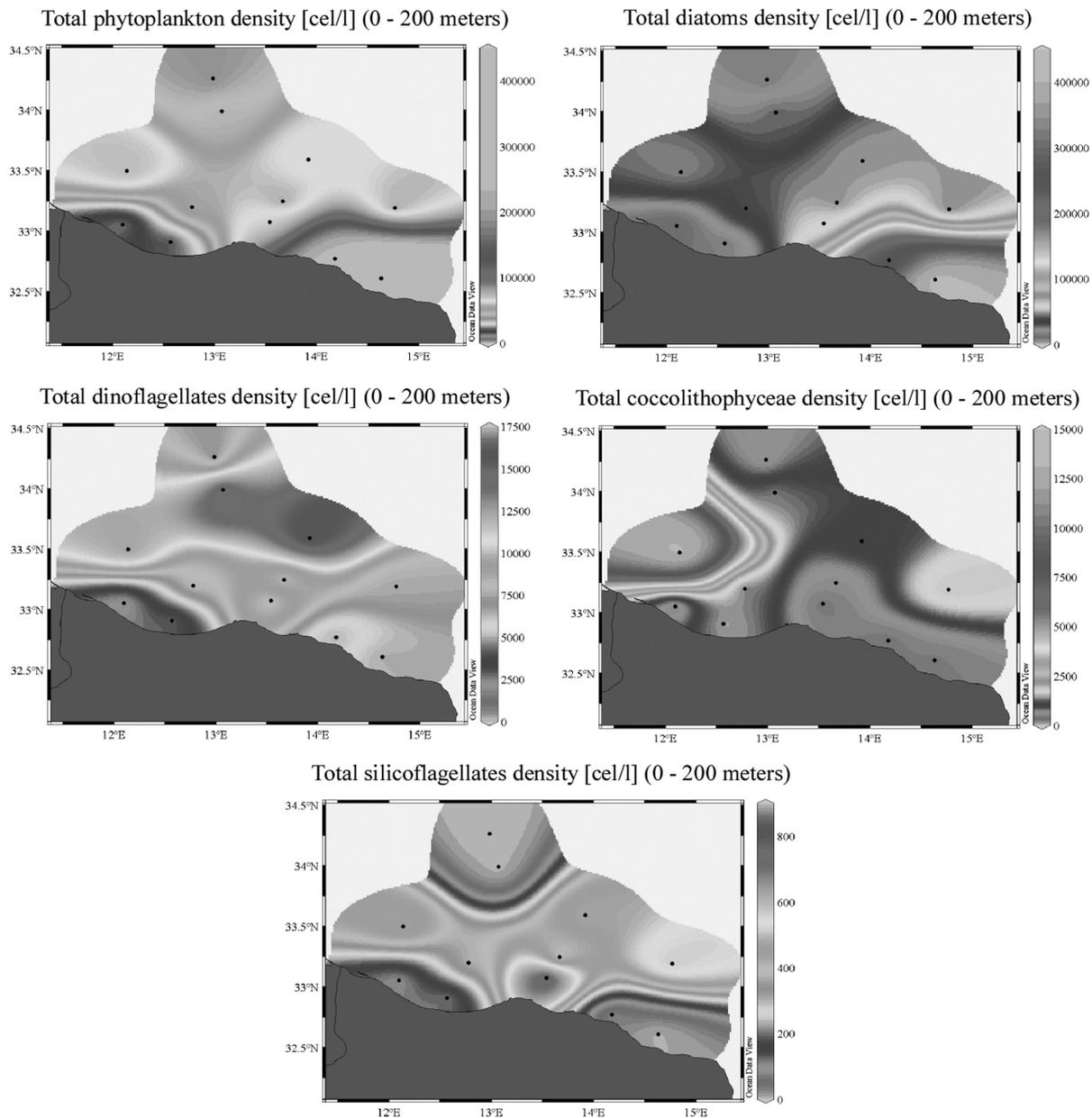


First data on oceanography, phytoplankton density and nutrient distribution of the western Libyan sea area (August, 2006)

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A multidisciplinary investigation was carried out in the sea area in front of the western Libyan coast during August, 2006. Hydrological data (CTD and ADCP), distribution of nutrients (NO_3 , NH_4 , PO_4), and phytoplankton and suspended matter (TSM, POC and PON) were collected during the MedSudMed-06 oceanographic survey, carried out in the framework of the FAO Regional Project MedSudMed (“Assessment and Monitoring of the Fishery Re-

sources and the Ecosystems in the Straits of Sicily” funded by the Italian Ministry of Agriculture Food and Forestry Policies (MiPAAF), that promotes the scientific cooperation for fisheries research among four countries of the central Mediterranean - www.faomedmed.org). The main aim of the survey was the study of the spatial distribution of the different life stages of small pelagic fish species in relation to environmental parameters of the area, and in



particular the correlations between chemical-physical and biological parameters. Seventy-four water samples were collected from different levels of the water column (5, 25, 50, 100, 150, 200, 500 m, bottom), in 14 stations. The interpretation of water-mass movements has been conducted using both the current measurements of the LADCP and the estimated geostrophic currents. The survey permitted to get evidence on the displacement along the coast of typical Mediterranean waters (AW, ISW and LIW) moving in opposite directions. The temperature profiles single out a well-developed thermocline at a mean depth of about 27 m, and a progressive decrease of temperature from about 28°C at the surface to 13.6°C near the bottom. The salinity profiles evidence the AW (Atlantic Water) signature with a minimum (Smin) at about 75 m. The successive increase reaches its maximum of salinity (Smax) at about 175 m (LIW core). Going deeper, both temperature and salinity appear almost constant near the bottom, evidencing a homogeneous bottom layer of about 50-70 m thickness.

Phytoplankton quantitative analyses point out that, in the summer period (August, 2006), the association is generally characterized by abundant diatoms and dinoflagellates, common to rare Coccolithophyceae and rare to very rare silicoflagellates. A very high concentration of phytoplankton in the first 100 m is localized in the easternmost part of the investigated area, near-shore. In this area, the dominant species is *Leptocilindrus danicus*. The dinoflagellate quantitative distribution shows high-density values (16 000 ~ 10 000 cell/l) in the first 25 m in the central-western zone. A lower concentration was found, near-shore, in the western and eastern part of the area. Diatoms exhibit very high-density values (400000 ~ 100000 cell/l) in the first 75 m in the easternmost part and a lesser density in the westernmost area, near-shore. In general, diatoms are the dominant phytoplankton compound in the western Libyan shelf. The coccolithophore quantitative distribution shows a gradual increase in the first 100 m of the western-central zone (14000 ~ 2000 cell/l), and a rapid decrease in the central and eastern part (2000 ~ 400 cell/l density). A low to middle degree of dissolution affects all calcareous phytoplankton species. The silicoflagellates, as expected, show very low values and are confined to the deeper eastern and central zones. The recognized assemblage is constituted only by *Dictyocha fibula* specimens that never reaches over 700 cell/l density.

Surface (0 - 25 m) concentrations of nitrate are elevated (~ 1.5 $\mu\text{M/l}$) in the transect in front of Tripoli, as well as in the Zauara-Tripoli coastal area (> 1.5 $\mu\text{M/l}$, 25-60 m). The vertical distribution of dissolved nitrate ($1.48 \pm 1.32 \mu\text{M/l}$) shows an increasing trend with depth (max. 6.08 $\mu\text{M/l}$ at 700 m). Nitrate and ammonia show, as expected, opposite trends, in agreement with the recycling of respective nitrogenous compounds. The max. value of ammonia (4.68 $\mu\text{M/l}$) was found at 5 m depth in the Zauara station. Values of reactive phosphate in the surface layer (5 m) are more elevated in the Zauara transect, as well as in the coastal station in front of Tripoli (~ 0.6 $\mu\text{M/l}$). The PO_4 vertical

distribution does not appear regular in several investigated stations ($\text{PO}_4 0.38 \pm 0.19 \mu\text{M/l}$). The phosphorous and ammonia increments recorded in the Zauara coastal area are probably due to urban discharges. On the other hand, the relatively high nitrate concentration in the coastal Tripoli area could be interpreted as a consequence of agriculture activities, possibly using nitrogen fertilizers. The incidence of Total Suspended Matter (TSM) was high in all considered samples, ranging between 7.60 and 19.65 mg/l. POC and PON are not elevated, but higher than those found in previous investigations in the Strait of Sicily. Higher POC values (>150 $\mu\text{gC/l}$) were registered in the euphotic layer (max. = 235.60 $\mu\text{gC/l}$) overall in the off-shore area, while in the near-shore they were generally lower. The C/N ratio values show a general condition of equilibrium between the trophic components (autotrophy, heterotrophy, detritus). In surface waters, a better efficiency level of the autotrophic compartment was found in the easternmost area, where C/N values ranged between 6 and 8. However, in the off-shore area in front of Tripoli, higher C/N ratio values suggest that the phytoplankton community is not very efficient (C/N > 9).