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On the Subsurface Chlorophyll Maximum layer in the Black Sea Romanian shelf waters

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By analyzing data recorded in 38 sampling stations (bottom depths between 16 and 200 m) covering the entire Romanian shelf, from the Danube's mouths to the southern part of the coast, the authors study Subsurface Chlorophyll Maximum (SCM) from May 2009 to April 2011.
Chlorophyll a (Chla), seawater temperature, salinity, sigma T, dissolved oxygen, ph, beam attenuation, were measured over the water column depth with the CTD probe and averaged over 1-db intervals (about 1 m depth). Nutrients and phytoplankton qualitative and quantitative parameters were recorded from different depths according to water masses stratification (inscribed in the research protocol of the cruise).
In late winter/early spring, due to strong mixing processes of water masses, SCM was not observed in the Black Sea shelf waters. In spring (May), the Danube's increased discharges, characteristic to that period, strongly affected the vertical distribution of Chla, particularly in the area of the Danube's direct influence, where Chla reached maximum in the surface layer (19.76 – 30.39 μg.l-1). In the deeper sampling stations, a relatively weak SCM (Chla within 0.77 – 1.21 μg.l-1) was observed, mainly at the lower limit of the euphotic zone (between 30 and 40 m depths). Here, the position and magnitude of SCM seemed to be controlled mainly by the light conditions; the seasonal thermocline was not well contoured yet.
In the warm season, once the stratification becomes stronger, the magnitude of SCM increased (Chla varies between 1.45 – 2.12 μg.l-1). The SCM was well pronounced below the upper boundary of thermocline, at depths between 20 and 25 m, where the dissolved oxygen concentrations have also reached the highest values (>10 mg.l-1 O_2), thus suggesting strong photosynthetic processes, where both nutrient and light conditions are favorable. A particular situation was found in July 2010, when abnormally high discharges from the Danube led to a well pronounced SCM (3.23 – 6.87 μg.l-1 Chla) above thermocline (within 8 – 12 m depths) in the shallow waters, the nutrients being not limitative factors.

Keywords
Chlorophyll a, Subsurface Chlorophyll Maximum layer, the Black Sea, the Danube