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Changes with depth in the Black Sea benthic redox-environment with regard to oxygen availability for deep-sea fauna

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Recent detections of deep-water communities of both planktonic and benthic fauna in the Black Sea *(Sergeeva, Gulin, 2007)* bring up a question about oxygen supply, limitations for their respiration within the subanaerobic environmental conditions and toxic H_2S presence.

One of opportunities for deep penetration and residence of life-forms in the Black Sea can be effect of spatial instability of oxic/anoxic interface in the water column *(Luth et al., 1998; Gulin, Stokozov, 2005)*. Above all, it should be the most important for benthic organisms. Earlier, near the NW Black Sea shelf we have detected tsunami-like but oft-recurring vertical fluctuations of interface between O_2- and H_2S-zones in the depths range 130-165 m, i.e. up to 35 meters in height. The fluctuations can cover a horizontal distance from 150 m up to 1.1 km at the sea floor. Thus, a belt-like zone of high variability of oxic/anoxic conditions exists in the near-bottom layer, located over the shelf-break. As the main result, in the near-bottom waters it can exert influence on O_2/H_2S, Mn^{+4}/Mn^{+2}, NO_3/NH_4 ratios with biogeochemical and ecological consequences.

At the same time, aeration of the Black Sea deep-water column below permanent pycnocline can be controlled also by some another natural factors. Our investigations have shown that, besides other, a possible way it can be absorption of dissolved O_2 (and nitrates adsorption too) in the suboxic-zone by the fresh suspended inorganic substance - particles of Mn^{+4} and their co-precipitation, gravity-accelerated migration

through the oxic/anoxic interface *(Lazorenko, Gulin, 1990; Gulin, Gulin,1992)*.

During the cruise of German RV Meteor 72/5 (May-June 2007), as a part of general objectives it was study of sea floor redox-environment in the central, northwestern and eastern parts of the Black Sea. Samples of sediments and water were collected from the uppermost 'fluffy-layer' and from the upper 0-5-cm seabed sediments.

Results of Eh/S^{-2} measurements revealed that above-mentioned spatial instability of oxic/anoxic interface in the shelf/slope area was observed again. It has occurred due to the rising of H_2S upper level along the seabed slope to the shallower zone. And it is necessary to note that this time it was found for another region - near the Kerch Strait. The chemocline rise effect was observed in a range of depths from 163 m at the 270-m-station up to 149 m (149-m-station), i.å 14 meters upwards.

On the whole, the main fluctuations both Eh- and S^{-2} potentials were shown at the depths down to 450 meters. Also, a somewhat higher variability of redox-parametres was observed in the deepest part of the Black Sea - at the depths 2000-2200 m. Last case shows penetration of Mediterranean waters through the Bosporus Strait to the maximal depths of the Black Sea H_2S-zone. And it's the most important fact that these water masses are enriched by dissolved oxygen.

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