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Peloids of present-day salt lakes: geological and man-caused controls on their composition

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The Crimean peninsula, as well as the Dead Sea area, belong to the most unique recreational places on the planet, but their balneological resources have not been thoroughly assessed. The purpose of this work is to examine and summarize mineralogical and geochemical characteristics of bottom sediments of salt ponds for the analysis of geological and anthropogenic aspects of peloid formation.

Particle size, the mineral, and chemical compositions of oozy muds from Crimean salt lakes and the Dead Sea are presented. Muds can be characterized based on the composition of their salts as carbonate, sulphate or chloride types. Fe-V-Mn-Pb-Y-Mn association in the mud of lakes in the south part of the Kerch Peninsula originates from the weathered iron ores, which supply sedimentary material to the lake basin. Elevated concentrations of Rb, Cu, Zn, Mo, Ni, U in the mud of the Dead Sea are most likely due to the deep metalliferous calcium-chloride brines supplying the Dead Sea. In general, muds of Crimean lakes are characterized by a higher content of sulfur than those of the Dead Sea. Size distributions of oozy mud are controlled by the distance from the shore, beach sediments particle size distributions, protection of mud by the overlying layer of brine, position in the section, influence of anthropogenic factors. Brines from the Dead Sea and those from Crimean lakes are chemically distinct, reflecting their different sources. Brines of Crimean lakes can be distinguished from Dead Sea brines by their high arsenic content, reflecting regional geological and hydrogeological conditions.

Anthropogenic factors control partly granulometric, salt and micro-element compositions of peloids. Thus, a complete lack of halite in the composition of the mud of Lake Kuchuk-Adzhigol is connected most likely to an intensive man-made desalination of lake at the expense of waste and drainage water. The coarsest muds were sampled in Lake Saky. The hydrochemical regime of the lake may have been changed by its prolonged human use and man-made changing of its shape, causing precipitation of small crystals of gypsum. Ferrous sediments of the Cimmerian stage are widespread in the vicinity of lakes Koyash, Marfovka, Erofeevka, Tobechnik, Achi, Kirkoyash. These deposits were exploited through open pit mining until recently (the iron ore mine Kamish-Burun), what could amplify the higher display of the Fe-Ti-Cr-K-V-Pb-Y-Mn-As-Co association in the muds. Cimmerian deposits are absent in basin areas of lakes Chokrak, Saky, Sasyk, Oyburysky.

