

THE BACTERIA-MEDIATED PRECIPITATION OF AUTHIGENIC CARBONATES IN GAS SATURATED SEDIMENTS

Belenkaya I. Yu. Moscow State University, Moscow, Russia

During several cruises of the TTR programme a number of mud volcanoes and hydrocarbon vent sites have been investigated in the N-E part of the Black Sea, on the area of the plateau Voring, and on the Moroccan margin, in water depth ranging from about 730 m to 2000 m. Recently formed authigenic carbonate crusts, nodules and concretions are found to be frequently associated with the fluid escaping from the vents. Mineralogical, isotopic and chemical investigations were performed using optical microscope and SEM with an on-line Link EDS system, XRD analysis, and mass-spectrometry. Also, the pore water chemical composition was determined. Mineralogical study revealed Mg calcite, calcite, aragonite, and dolomite to be common authigenic carbonate minerals in the samples. Aragonite forms individual crystals, "fuzzy-dumbbells" (Folk, 1993), and rod-shaped aggregates. Framboidal pyrite and gypsum in the form of rose-like aggregates and hexagonal crystals were observed when carbonates were treated with the HCl. The morphology of the aragonite, calcite and Mg calcite that appear in connection with the biofilm suggests a genesis linked with bacterial growth. The bacteria are seen in SEM apparently, because they lie on the surface of the crystals or are attached to them by strands, or sheets of polysaccharide mucus often congregate together. Carbon isotopic values of the carbonate studied range from $-27,00$ per mil to $-53,40$ per mil PDB. It was concluded that oxidation of methane through the bacteria activity is a main force for the precipitation of studied authigenic carbonates.