

4.1.P05

Early diagenesis and benthic fluxes in Manfredonia Gulf (Southern Adriatic sea)

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The Gulf of Manfredonia is situated in the western part of Southern Adriatic Sea. This shallow gulf is considered a complex area, presently not well studied (as opposed to the Northern Adriatic Sea), where anthropogenic pressure plays an important role for pollution phenomena and alteration of the marine ecosystem.

The aim of this study was to investigate early diagenesis processes that produce benthic fluxes affecting the chemistry of water column. Two oceanographic cruises were carried out in late summer 2002 and in late winter 2003 to evaluate the seasonal variations of early diagenetic processes. Sediment cores were collected in two sites (inside and in the offshore boundary of the gulf) in which high sedimentation processes occur. Parameters on the solid fraction and pore waters profiles of TCO_2 , NH_3 , NO_3 , PO_4^{3-} , SO_4^{2-} , alkalinity, Fe, Mn, Ca and Mg were determined in each site. Benthic fluxes were measured using two benthic chambers in each site.

The ^{234}Th profiles show a more intense bioturbation in the firsts centimetre of sediment in the inner station and the sedimentation rate, calculated by $^{210}\text{Pb}_{\text{ex}}$ and ^{137}Cs profiles, ranging from $0.40 \text{ gcm}^{-2} \text{ y}^{-1}$ in the inner shelf to $0.49 \text{ gcm}^{-2} \text{ y}^{-1}$ in the outer gulf. In winter, pore water profiles suggest oxic and anoxic degradation of reactive organic matter less intense and occurring in a thinner layer close to the sediment-water interface in both site. Reactive organic matter degradation products also show an intense irrigation in the firsts centimetres of sediments in both stations. During the summer, the pore water profiles reflect remineralization processes limited to a very thin layer close to the sediment water interface in both stations but higher in the shallowest site. Measured benthic fluxes will be compared with the fluxes obtained by pore water modelization to investigate sediment-water interface processes.

4.1.P06

Ikaite geochemistry and formation of submarine tufas in Greenland

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Ikaite ($\text{CaCO}_3 \cdot 6\text{H}_2\text{O}$) is a monoclinic colourless hexahydrate of calcium carbonate first described from Ikka Fjord in SW Greenland [1]. Here the mineral precipitates from mixing of seawater and fresh water rich in sodium bicarbonate seeping from submarine springs on the fjord bottom. Low temperature in the fjord and high phosphate concentration in the spring water favours formation of ikaite over calcite and aragonite.

Owing to the lower density of the fresh water, columns of ikaite develop over springs on the fjord bed. The columns grow as the spring water rises buoyantly through the seawater and growth continues until a thermocline is reached. The process leads to remarkable column forms which in some cases may reach heights of up to 18 meters.

The water feeding the springs originates as isotopically light precipitation falling on the surrounding plateau's. This water soaks down into joints and through the rocks of the Grønnedal-Ika alkaline igneous complex. During the passage through the complex the groundwater is enriched in carbonate and phosphate ions necessary for ikaite formation.

Ikaite is unstable at temperatures above 6°C and columnar structures disintegrate to calcite, monohydrocalcite and water if not kept frozen.

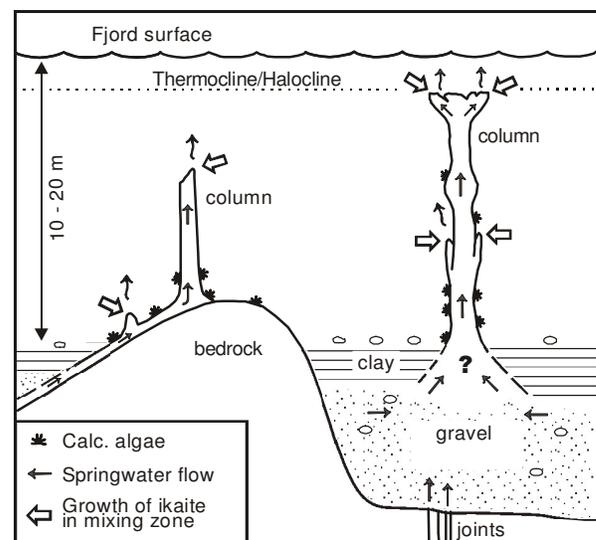


Figure shows model for ikaite formation in Ikka Fjord.

References

[1] Pauly, H. (1963) *Arctic* **16**, 263-264.