The impact of benthos on marine substrates, biogeomorphology, and the Mediterranean "coralligène"

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An overview of the most common organism-sediment interactions and their implications for the carbonate systems is presented, with focus on the biologic mechanisms leading to geologically significant changes in the substrate traits.

Organisms affect the transport and exchange of organic and inorganic matter across the sediment-water interface. Bioturbation mixes sediments, and bioerosion weaken the submerged calcareous structures; they are associated to bioirrigation, affecting substrate porosity, physical resuspension, subsurface chemical profile, organic matter decomposition, carbonate particle breakdown, and slope stability.

The interaction between marine biota and geologic processes is very important to shoreline stability. Bioprotection from erosion is operated by organisms and biogenic structures growing on various substrates. Benthic organisms produce shells and skeletons and are capable of binding small particles, thus changing the mean grain size of the original sediment and its chemical composition. Consequently they affect the critical bed shear stress, the erodibility of soft substrates and the turbidity, and ultimately, the sediment diagenesis and fate. Carbonate producers are a key element of the global carbon budget, and their behavior is of paramount importance in the framework of the ongoing climate warming and ocean acidification.

Bioconstruction is the physical building of biological structures that produce permanent geomorphological modification of the seafloor, also after the death of the builders. Beside the well known tropical coral reefs, an example of widely distributed Mediterranean (temperate) biogenic framework is the "coralligène". Coralline red algae are one of its most important components. The role of corallines as ecosystem engineers, and the importance of "coralligène" in biogeomorphology and sediment production are discussed.