

## **Coralline algae abundance in the carbonate factory of the Nummulitic Limestone of the Alpine Foreland Basin**

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The Nummulitic Limestone is one of the formations which characterize the underfilled portion of the successions of the Alpine Foreland Basin. Together with the underlying infranummulitic formations (of fluvial, transitional or shallow marine origin) and the overlying marls, they testify the genesis and the environmental dynamics of the flexural basin before the arrival of the clastic material shed from the advancing orogenic wedge. The Nummulitic Limestone presents a deepening upward trend, with shallow-water facies located at the base of the succession close to the underlying substrate (either the infranummulitic formations or the Mesozoic substrate of the basin) changing upward into distal facies dominated by orthophragminids and planktonic foraminifera. This trend is related to the progressive deepening of the basin due to the increasing load of the orogenic wedge and culminates with the deposition of the marls which testify the final drowning of the carbonate platform. The deposition and the evolution of the Nummulitic Limestone is a diachronous event since it is controlled by Alpine tectonics; it starts approximately in the East and moves westward. Although significant differences occur among the Nummulitic Limestone successions of the different part of this large basin, the bulk of the limestone is generally represented by large accumulation of nummulitid tests. These facies generally present skeletal assemblages largely dominated by benthic foraminifera (mostly nummulitids) while other skeletal grains are rare (e.g. coralline algae). Coralline algae occur in the Nummulitic limestone, but they seem to be restricted to very shallow facies. Modern coralline algae are among the most tolerant carbonate producing organisms, they can thrive in both polar and tropical water, from the intertidal to the lower limit of the photic zone. Consequently, the lack of corallines from a skeletal assemblage otherwise dominated by organism typical of the photic zone, like large benthic foraminifera, is significant. In order to investigate the reason behind the distribution of coralline algae in the Nummulitic Limestone and gather paleoenvironmental information useful for the reconstruction of the basin, four different successions have been studied, the Annot, Argentera and Corsica successions from France and the Realdo succession from Italy. Coralline algae occur commonly only in the Realdo succession where they are associated with encrusting foraminifera. In the French successions coralline algae are extremely rare and only occur as small fragments of thin crusts. The only specimens still connected to their substrate grow over large nummulitid tests. The succession of Realdo is the thickest among those investigated and one of the thickest successions of Nummulitic Limestone in the whole basin suggesting specific geological (and consequently environmental) conditions in the area. Since, outside the Realdo succession, all the rare coralline crusts connected to their substrate occur over large tests of Nummulites, it is likely that substrate availability played an important role in the distribution of corallines.