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Rhodalgal/bryomol assemblages in temperate type carbonate, channelised depositional systems: the Early Miocene of the Sarcidano area (Sardinia, Italy)

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During Aquitanian-Burdigalian times, temperate-type carbonate-siliciclastic successions were deposited in basins located on the grabens and half–grabens along the Oligo-Miocene Sardinia Rift Basin (Sardinia, Italy). In one of these basins, the Isili Basin, rhodalgal/bryomol limestone was deposited in a temperate-type carbonate depositional system in which a shallow carbonate factory, a marginal tributary belt and a main channel were identified. The Isili Limestone is herein described in terms of biogenic components and taphonomic characterization. In order to understand the palaeoecological settings and the related palaeoceanographic controls, the coralline algal assemblages have been differentiated according to coralline growth-forms, rhodolith shapes, rhodolith inner structures, and taxonomic composition.

The results obtained provide fundamental support to the palaeoenvironmental reconstruction coupling palaeobiological analyses (i.e. rhodolith characteristics, bryozoan growth-forms, taphonomic features) to previous physical (sedimentological and geometrical) observations and allow a more detailed reconstruction of the complex relationships between the different sectors of the sedimentary system: the carbonate factory, the smaller erosive tributary channels and the deeper main channel.

The shallow-water production areas pertaining to the carbonate factory of the Isili sedimentary system were characterised by maerl deposits. In the deeper sectors of the production area crustose coralline algal pavements and rhodolith pavements developed. The comparative analysis of rhodolith shape (sphericity), growth-forms, and inner structure distinguishes rhodolith beds allowing us to differentiate between different rhodolith pavements in which *in situ* and/or reworked rhodoliths accumulated. Spheroidal rhodoliths with massive inner structure constituted rhodolith pavements in the marginal-to-distal production area in which a tractive current regime was active. Sub-discoidal rhodoliths with loosely-packed laminar thallial structure are characteristic of the crustose coralline algal pavements in the deep marginal production sectors where in place bryozoan assemblages have been found. Different sectors of the production areas contributed to feed the Isili main Channel, through erosive tributary conduits. We cannot exclude a partial growth *in situ* of skeletal donor assemblages in these tributary channels.

Mixed rhodolith assemblages fed by the marginal rhodolith pavements and crustose coralline pavement can be discerned in the filling sequences of the main channel. Only very limited contribution from autochthonous assemblages have been recognized.