

## **Taphofacies and trace fossils in the Calcarei Grigi, Pliensbachian, Trento platform (Northern Italy).**

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The Trento carbonate Platform of the Southern Alps, Northern Italy, represents a paleogeographic unit of the Lower Jurassic continental margin of Tethys, studied since last century due to abundance of large bivalves of the Lithotis facies and land floras (Calcarei Grigi Formation). A tidal sequence of the Pliensbachian, 70 meters thick, have been studied by means taphonomy and trace fossil analysis. The sequence is constituted by largely bioturbated limestones and marls bearing very abundant skeletal beds, 1 to 45 cm thick, made of brachiopods, large bivalves, turriculate gastropods, echinoderms, encrusting algae, solitary coral remains and large benthic foraminifers.

Taphonomic characters of about 450 skeletal layers have been analysed (database). Taphonomy reveals a narrow relationship among physical events and biological ones. Taphocharacters (5 taphonomic categories and 29 subcategories) and taphofacies suggest a strong vertical redistribution of grains caused by burrowing. In the muddy subtidal environment at the base of a cycle biogenic activity was largely developed, destroying original physical structures (storm wave base ripples and combined-flow ripples). Predators, scavengers, bioadaptors, burrow-lining infauna, chewers, fecal peloid producers, active crustacean domicinia and so on reveal a strong biogenic activity. Branched burrow systems of crustacean decapods without special wall lining (Thalassinoides) or with knobby wall lining (Ophiomorpha) are tiered and show straight tunnels, meander mazes, irregular boxworks, shafts, tunnels, turning chambers, apertures and conical mounds. Encrusting and boring are also largely developed. Subtidal biogenic activities, therefore, induced diagenesis and nodularity of the substrate more frequently than the physical ones.

In the upper part of a cycle (upper subtidal-intertidal), conversely, fragmentation, shelter porosity, grouping, stacking, winnowing of mud, abrasion, re-orientation and disarticulation are largely represented, suggesting high-energy regime induced by physical agents.

Taphonomic recurrences have been quantified in the taphosequence and taphocycle has been interpreted in comparison to sequence stratigraphy. Biofabric and taphonomic signatures record, therefore, different histories and they represent a useful tool in palaeoenvironmental analysis of ancient carbonate platform environments so largely developed in the Jurassic time.