

Microbial-derived pyrite as evidence of early diagenetic processes on a Late Holocene shoreface deposits (Sulcis Iglesiente, West Sardinia, Italy)

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Since Roman time, SW Sardinia was a mine district and its flourishing industrial activity lasted few decades ago. Mine activity in the district resulted in enhanced amount of sediments transported by rivers to the coast and, one of the major concern is elucidating the mineralogical background before and after industrial activity along the present-day coasts.

A 3-m long core was collected in the shoreface zone, at -13-m depth below sea level and ca. 500 m far from the coastal area located on the southern-western of Sardinia (west Mediterranean, Italy). A multidisciplinary approach was followed to study the core and two samples were collected for dating purpose. ¹⁴C analysis revealed a Late Holocene age comprises between 4320 ± 30 BP (base) and 1420 ± 30 years BP (close to the top). Preliminary sedimentological data show that the core is composed of medium-fine grained sand, with the presence of aligned pebbles and/or shells at the base of the strata. These strata can be interpreted as the results of major storms occurred in a shoreface setting. Pervasive early diagenetic processes and sub-oxic conditions are observed as well.

The preliminary geochemical results can be summarized as follows: 1) residual metal sulphides are not detected; 2) Zn and Pb carbonates can be found in samples collected close to the beaches, 3) barite and other minerals are often concentrated in the fine fraction (<63 microns). Moreover, the microscopic analysis reveals the presence of secondary pyrite that is interpreted to be of microbial origin. Thus the microbial activity most likely plays a fundamental tool in the pervasive early diagenesis of the studied core. Bacterial activity and its effect on biominerals processes and sedimentological features are actually under investigation.