



## Sedimentology of the Paestum travertines, Salerno, Southern Italy

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The Paestum travertines, outcrop in the southern part of the Sele plain (Campania, southern Italy) and span in age from the late Pleistocene to the Recent. We have considered both the travertines resting under the ancient town of Paestum (founded by Sybaris Greeks in the VII century b.C.) and in its vicinities, as well as the travertine incrustations that post-date the VII century a.C. and partly cover the archaeological area. The textures and sedimentary features of the above rocks allow the environmental dynamics of the ancient as well as of the recent travertine deposits to be interpreted.

The age of the ancient travertines ranges from 30-40 ka to 70-75 ka, even though more recent times of deposition cannot be excluded. They are genetically related to the waters springing from the south-western margin of the Mesozoic-Tertiary carbonates of Monte Soprano and Monte Sottano. These waters flow also through the travertines and their neighbouring deposits, feeding other springs along the coast. The travertines, both *in situ* and forming the building blocks of the town walls, have been classified using the textural nomenclature of the primary incrustations. On this basis, different lithofacies have been recognized and grouped into 3 main lithofacies associations:

- 1) Microhermal and Stromatolitic Travertines associated with Grain Supported Phytoclastic Travertines (gentle to steep slope environments); this lithofacies association is largely represented in the foundation travertines as well as in the blocks used to build the walls and the monuments of the ancient town;
- 2) Phytohermal and Microhermal Travertines (rapid and waterfall environments); this lithofacies association is well exposed in the foundation travertines of Porta Marina (western side of the town) and in some wall blocks (e.g. nearby Porta Sirena, eastern side of the town);
- 3) Phytoclastic and Phytohermal Travertines (swamp and marsh environments); this lithofacies association is common in the blocks forming the town wall between Porta Sirena and Porta Giustizia (southern-eastern side of Paestum) and in the civil and sacred architecture.

The time-space relationships among the above lithofacies associations clearly emerge in the Porta Marina area both in the Greek walls of the ancient town (slope and swamp facies) and in the outcropping travertine substrate (slope and waterfall deposits).

Based on the above sedimentological results, it may be inferred that, like other ambient temperature travertine systems studied in southern Italy, the Paestum travertine growth developed over a gentle slope surface (in our case dipping to the west), laterally evolving into rapid and waterfall deposits. At the same time, the aggradational growth of the travertine system resulted in a flattened summit area with widespread swamp and marsh environments.

The ruins of Paestum, including the lower parts of sacred and civil buildings as well as town roads and walls, are even today largely covered by recent semi-coherent travertines (tufa), originating from waters that encrusted and then "fossilized" a large part of the town. Inside the town walls, these materials were pedogenized and nowadays are largely cultivated around and within the archeological area. A portion of these deposits was removed during the excavations of the beginning of last century, but traces of them may still be observed in different parts of the ancient town. Like the foundation travertines, the recent deposits are mainly made up of calcareous encrustations. Gastropods, ostracods and other organisms typical of terrestrial humid environments may be found in the phytoclastic textures. Usually, they are weakly cemented and at places incorporate different materials, including brick, wood and coal fragments. These sediments patchy cover the town within the wall

perimeter, for a few decimetres in the sacred areas, but reaching over 4 meters downhill and outside the walls: a process of “fossilization” that appears to have been particularly effective at Porta Marina, on the sea side of Paestum, where the door structures were almost completely buried by fan shaped calcareous deposits, precipitating from waters flowing from inside the town.