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Geomorphological evolution and human settlement of the Sabaudia lake (Tyrrhenian sea, central Italy)

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This work shows the preliminary results of recent geomorphological and geo-archaeological researches carried out in the area of the Sabaudia lake (also known as Lake of Paola), within the Circeo National Park. This area has very important archaeological goods which includes remnants date back to the early Paleolithic (remains of Neanderthal man, Guattari cave-Mount Circeo) and the Roman Imperial Age. The Sabaudia lake, separated from the Tyrrhenian Sea by a dune ridge up to 27m high, shows an elongated shape parallel to the shoreline. To the east it is characterized by six narrow bays, called “arms” that correspond to valleys incised during the sea level lowering of the last glacial period. The dune ridge that created the wide lagoon system, was created after the sea level rise that reached its peak, according to several authors, after the Holocene climatic optimum (approximately 6000 years BP). Archaeological evidence of pre-Roman age are, however, very rare; therefore further studies are needed to include them in a context of geomorphological evolution before and after the formation of the lagoon. The archaeological remains of the Roman period in the area are of great value and testify an important phase of the urbanization of the lagoon. The Roman harbor and its entrance with parallel jetties (I century AD), located in the extreme southern portion of the lagoon, belongs to the category of Roman canalizations called “fossae”, artificially made for port and commercial purpose. The function of this works was to connect the Tyrrhenian Sea with the inner part of the lagoon where the villa of the Emperor Domitian (I century AD) and other relevant works, such as harbors, aqueducts and cisterns are still visible. Recent studies evidenced the presence of two paleosoils within the main dune, next to the entrance of the Roman harbor and both subjected to radiocarbon dating. The oldest paleosoil (calibrated age AD 900 to 1030), with a thickness ranging from 20 to 60cm is covered by approximately 4m of sand up to the top of the dune ridge. The location and the development of this paleosoil seem to indicate the presence of a dune lower than present, with a smooth profile and dipping toward the south near the harbor. In this context, the top of the dune during the Roman period was certainly placed at lower altitudes and, possibly, it was dip to the harbor with a minor slope. Most likely the Roman wall bordering the entrance of the harbor (Opus reticulatum), now completely covered by sand dune, had not functions of protection and kept behind large spaces. This assumption was also supported by geophysical surveys conducted with ground penetrating radar (GPR). The second palaeosoil, younger (calibrated age AD 1,040 to 1,100 and AD 1120 to 1260), has been observed approximately 2m above the previous one year and shows comparable thickness and slope. Studies from other authors and field surveys allowed to assume, always in Roman times, a higher extension (even if slight), of the lagoon. Considering the current elevation of the archaeological remains, it is likely to assume that the Villa of Domitian was closer to the shoreline of the lagoon itself.