



Environment-man relationships in historical times: the balance between urban development and natural forces at Leptis Magna (Libya)

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Since ancient times, socio-economic strategies of some civilizations have led to undertake severe environmental modifications, so drastic as to require natural risk management. Societies responded to extreme natural disasters according to their socio-economic state: in some cases a society was resilient to perturbations and in others a society was so vulnerable to perturbations that it was unable to cope. Historical natural disasters left permanent marks on the cultural development of entire regions. These are recognized not only in the study of civilizations, urbanization, migrations etc., but also in the geology and geomorphology of an area.

The sensitivity or vulnerability of landscapes and ecosystems to human activities were critical issues even during the Roman Empire. We analyze the relationships between human modification of the environment and natural events in the Roman city of Leptis Magna (UNESCO world heritage site), western Libya, located at the outlet of a major dry-land stream that served as a natural harbor. This magnificent town reached its maximum expansion during the Empire of Septimius Severus (193-211 A.D.) and started to decline during the late IV century. Historical and archaeological sources suggest that the harbor basin was abandoned due to its complete infill, possibly related to: i) violent flooding following the collapse of the local dam along the Wadi Lebda because of the large 365 A.D. earthquake (Crete, Greece); ii) lack of dam maintenance due to the decline of the settlement induced by severe damage after the 365 A.D. earthquake, or other local seismic sources; iii) immediate deposition caused by the tsunami wave of the 365 A.D. earthquake; iv) bad orientation and geometry of the harbor with respect to the local marine currents that were bringing debris inside.

We present geological data, supported by geomorphological analysis and radiocarbon dating, with the aim to: 1) verify the hypotheses concerning the harbor abandonment; 2) reconstruct the main events of the close human-environment interaction; 3) check the cause-effect relationship between natural disasters and the settlement decline; 4) integrate the archaeological knowledge at Leptis Magna by independent chronological constraints.