



Effect of environmental conditions on the decay of stone in archaeological site of Volubilis - Morocco

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Volubilis is the most excavated and the best preserved archaeological site of Morocco. Located about thirty kilometres north of Meknes, it was a Mauritanian capital founded in the 3rd century B.C., and became an important outpost of the Roman Empire. Volubilis monuments are constructed with five regional lithotypes of limestone. A grey massive limestone and beige-yellowish calcarenite limestone are the two most largely used on Volubilis site, representing respectively about 30% and 60 % of the total volume of building stones. Field observations showed that the calcarenite limestone is more decayed than the massive limestone and is mainly affected by scaling, alveolization and sanding.

This work aims to estimate the role of environmental conditions on the decay of the calcarenite stone through the effect of thermal stresses and freezing–thawing action. Air temperature data of Meknes station is analysed. Furthermore, mineralogical composition of the calcarenite limestone and its intrinsic properties required for stress calculation are determined.

The results of this study show that the calcarenite limestone is a quite soft carbonate stone, contains about 71 % of calcite, 18 % of quartz and others accessory minerals. Besides, there is no risk of damage due to freezing–thawing processes. Nonetheless, thermal stresses may have an important role in the decay of calcarenite stones of the Volubilis site.