



EXAMINATION OF THE WEATHERING SUSCEPTIBILITY OF THE BUILDING STONES OF DEMETER SANCTUARY IN ELEUSIS: 1: ORIGIN, PETROGRAPHY AND PHYSICAL, MECHANICAL AND MICROSTRUCTURAL PROPERTIES

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ABSTRACT: The Demeter Sanctuary in Eleusis, in the greater Athens area in Greece, constructed between the late Helladic and the classic (Periclean) period demonstrates a variety of building stones characteristic of the different lithological formations which comprise the complicated geological structure of Attica. In the present work analysis and classification of lithotypes is taking place by employing mineralogical-petrographic studies, physical, mechanical and microstructural analysis of the porous system of the various lithotypes, in order to assess and evaluate their susceptibility to weathering in the intense marine and polluted atmosphere of Eleusis. Grey micritic limestone, yellow limestone, grey biomicritic limestone, yellow brown limestone and yellow-brown fossiliferous dolomite with origin from the subpelagian unit of Eleusis area and white (Pentelic) and white-grey marble from the autochthonous Attico-Cycladic crystalline complex have been identified. The building stones present in general low porosity, mainly of interparticle type as well as good physical and mechanical properties matching their textural and structural characteristics, the marble group attaining the highest apparent density and the lowest water absorption, in comparison with the limestone group. The wave velocity, depending on the homogeneity of the stone mass, appears to be higher for the relevant low porous and fine grained limestone, that present no microstructural networks, while on the contrary the most porous limestone presents lower values. Different values of physical and mechanical properties measured for the same rock type indicate its alteration due to anisotropy and/or weathering. The texture of the building stones matches the structure of the pore spaces demonstrating the preferential routes for weathering.

COMPENDIO: Il santuario di Demetra in Eleusi, in Grecia, nella Regione di Atene, costruito tra il periodo Tardo-Elladico e quello Classico (di Pericle), mostra una grande diversità di pietre da costruzione, caratteristiche delle diverse formazioni litologiche della complicata struttura dell'Attica. In questo lavoro è stata eseguita l'analisi e la classificazione dei litotipi, impiegando studi mineralogico-petrografici ed analisi fisiche, meccaniche e microstruturali dei sistemi porosi dei diversi litotipi, allo scopo di mettere in evidenza e valutare la loro suscettibilità all'azione del tempo meteorologico, nell'aria marina fortemente inquinata di Eleusi.

Valori differenti delle proprietà fisiche e meccaniche misurati per lo stesso tipo di roccia ne mettono in evidenza l'alterazione dovuta all'anisotropia e/o all'azione del tempo. La tessitura delle pietre da costruzione si accorda con la struttura degli spazi, dimostrando così i percorsi preferenziali dell'azione del tempo.