

## Optical Coherence Tomography for vulnerability assessment of sandstone in-situ

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Sandstone is an important cultural heritage material, in both architectural and natural settings, such as neolithic rock art panels. The majority of deterioration effects in porous materials such as sandstone are influenced by the presence and movement of water through the material. The presence of water within the porous network of a material results in changes in the optical coherence tomography signal intensity that can be used to monitor the wetting front of water penetration of dry porous materials at various depths. The technique is able to detect wetting front velocities from  $1 \text{ cm s}^{-1}$  to  $10^{-6} \text{ cm s}^{-1}$ , covering the full range of hydraulic conductivities likely to occur in natural sandstones from pervious to impervious. The OCT has recently been taken to the field to measure the hydraulic conductivity of historic gravestones in various states of weathering, demonstrating the ease at which the technique can be used for in situ measurements. The technique has the potential to monitor changes due to weathering over time and to determine depth penetration of conservation treatments and the effect of water proofing treatments on building and cultural heritage materials in situ.

