Geophysical Research Abstracts
Vol. 15, EGU2013-10923, 2013
EGU General Assembly 2013

In situ evaluation of stone protection treatments: a contribution to the knowledge and limits of a multi-years campaign performed by contact sponge test

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Since the last decades, chemical treatments have been widely used for surface conservation of stone artefacts. Many case studies with a sufficient time laps from their realization, are now available for a monitoring activity in order to evaluate the in situ performance of the conservation works carried out in the past. The knowledge of the behaviour of the conservation treatments in real conditions can also be helpful to correlate their real performance with the results of wide laboratory assessments. The monitoring activity is also an important tool for detection of the new conservation needs of the artefacts in view of planning the monument's maintenance.
In this work we focus the attention on the evaluation of stone protective treatments with reference to the water-repellency of the treated stone surface and its evolution over time, as a tool for the monitoring of the performance over time. As it is known, "in situ" verification of the effects of stone surface conservation measures with non-destructive methods is highly problematic. Among the limited number of available tests able to ensure, at the same time, no destructive impact and reliability, the sponge contact test was adopted for the measurement of the water absorption trough the stone surface. The measurements carried out in real condition on experimental walls and on some buildings made of Lecce stone (an highly porous calcarenite) before and after the application of conservation products showed significant results in order to evaluate the variation of the water absorption arising from the application of the chemical treatments. The method also revealed to be effective for the measurement of the progression of the water absorbed over time, when data are collected before and after the application of the treatments, and then with periodic time lapses. The significance of the measurements is ambiguous and the evaluation with respect to the current action of the treatments is more complex and problematic for those situations in which the data of reference before and after the intervention are lacking. This case is also illustrated in the work, with reference to some churches in the town of Lecce that underwent to nine years of monitoring activity starting some years after the conservation works. The study evidences the importance of the planning and the inclusion of the monitoring within the conservation activities since the first steps of the works, in order to make subsequent controls and checks effective for the evaluation of the durability and the performance of the interventions in the real conditions.