Geophysical Research Abstracts
Vol. 14, EGU2012-5264, 2012
EGU General Assembly 2012

Durability of the Indian Kandla Grey sandstone under Western European climatic conditions.

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An increasing amount of imported natural building stones are being used in Western Europe, often as a replacement of more traditional, local building stones. Unlike for these traditional stones, which have been used under the prevailing climatic conditions in Western Europe, the durability of these imported stones is largely unknown. Therefore, it is essential to study their behaviour under these climatic conditions in order to predict their weathering resistance. Thus, the chemical and structural properties of these new building materials need to be determined and their behaviour under changing environmental conditions needs to be studied. When these materials are being used in Western Europe, they have to resist to significant mechanical stresses due to the imbibition of de-icing salt solutions. These de-icing salts are very frequently used during winter in Western Europe, while temperature fluctuates between freezing and thaw conditions. In this research, focus has been laid on the multi-disciplinary characterization of the compact Kandla Grey layered sandstone. This stone is recently frequently imported from India to Belgium. Besides traditional techniques, (according to European Standards for natural stone testing) highly advanced research techniques such as neutron and X-ray imaging (at synchrotron and in laboratory) and μ-XRF were used to characterize and monitor the changes under different external conditions such as freezing, thawing and salt crystallization. The results of this study demonstrate that the structural properties of the laminations inside Kandla Grey have an influence on the resistance of the stone to frost and salt weathering. Based on these results, it can be concluded that Kandla Grey can be vulnerable to these types of weathering under the current climatic conditions in Western Europe.