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# Capillary migration of anions in porous rocks: Laboratory simulations and implications for weathering in sandstones.

**A. Micallef** (1), H.A. Viles (1), A.S. Goudie (1) and C. Sancho (2)

(1) Oxford University Centre for the Environment, University of Oxford, UK.

(2) Dept. Ciencias de la Tierra (Geomorfologia), Universidad de Zaragoza, Zaragoza, Spain. (Contact E-mail: amicall@noc.soton.ac.uk)

Understanding salt weathering requires clarification of the patterns of salt migration and alterations in pore structure. Field observations of salt concentrations in weathered sandstone in Ebro Basin (Huesca Province, NE Spain) are used to develop realistic laboratory simulations of anion uptake and porosity changes. Large rock blocks ($15\times15\times15$ cm$^3$) cut from sandstone quarried near the field site have been subjected to two different drying regimes and two different concentrations of mixed NaCl and $CaSO_4$ solutions. Our results show different responses for Cl and $SO_4$. Cl migrates more rapidly and deposits mainly at the surface in efflorescences or as peaks inside the cube. The migration of $SO_4$ is enhanced by the presence of Cl, and its deposition inside the rock profile is more homogenous. The distribution of Cl tends to be more affected by changes in solution concentration and drying rates. Both anions are deposited in coarse pores first, with pore filling by salts containing $SO_4$ being dominant. The distribution of anions inside the rock is used to infer salt concentrations in order to understand the spatial distribution of effective crystallization pressures. The results are used to interpret what happens in cavernous weathering features at the study area.