Influence of salinity and moisture content in electrical resistivity tomography readings in geomaterials used in construction

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Wetness and salts are among the main agents hindering the performance of any porous building material. There are a number of techniques based on electrical properties for the detection of these agents in buildings, such as portable moisture meters and electric resistivity tomography (ERT). These methods are used to locate wet areas based on the lower electrical resistivity wet materials have in relation to dry ones. However, as both moisture and salts contribute to low resistivity readings, the ERT readings may have a degree of uncertainty. This research aims to study the contribution of salinity and moisture content on the readings of ERT by testing laminated gypsum boards in the laboratory with solutions with different compositions (i.e. sodium chloride, magnesium sulphate and a mixture of both) and concentrations of salts. An industrial product, such as the laminated gypsum board, was chosen to minimize the effects that heterogeneities in composition and physical properties could have in the ERT readings and facilitate the interpretation of the wetness/salt content difference. Gypsum board was soaked with a fixed amount of the chosen solutions and several ERT transects were performed with a GeoTom device (Geolog2000) while drying. Results show the influence salinity of solutions have in drying process, and how the salt content remaining within the pores of geomaterials impact on ERT results.