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Climate change and its influence on shrinkage–swelling clays susceptibility in a semi-arid zone: a case study of Souk Ahras municipality, NE-Algeria

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ABSTRACT

Dry summers and irregular rainfall have been affecting our daily life in the last decades. These climatic changes influence the susceptibility of shrinking and swelling phenomenon of clay and marl formations. Clay soils are found in many areas in north Algeria, but they are more common in the sub-arid highlands belt. By combining intrinsic factors that influence shrink–swell behavior as well as the climatic data, a susceptibility map has been established for Souk Ahras municipality. This map shows sensitive areas, which are going to become the future extension territories, toward shrink and swell phenomenon. The adopted methodology begins with the establishment of a synoptic map of clay and marl formations. This procedure allowed the identification of 17 argillaceous formations. Then, they were subjected to a hierarchy in terms of their susceptibility to the phenomenon. The classification was established by a combination of lithological, mineralogical, and geotechnical criteria. The use of GIS technology has permitted the combination of several predisposing and trigging factors such as the annual average rainfall, the evapotranspiration, the land use, and the orography. The result of the adopted approach was a shrink–swell susceptibility map, which can be used as a regulatory tool in land use and planning procedures.

Keywords: Shrinkage–swelling; Susceptibility; Clay; Souk Ahras municipality; Climate changes; GIS

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