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Investigation of geotechnical parameters from CSEM mapping and monitoring data at the oases Kharga and Baris of Sahara desert, Egypt

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The site of investigation, oasis Kharga, is located at about 600 km south of Cairo, Egypt; Baris is about 90 km from Kharga also to south and towards more inside the desert. The work was aimed to investigate the rock mass stability at Baris and to estimate the water intake in the Oasis Kharga. A controlled source electromagnetic (CSEM) approach developed earlier by IGF UB RAS (Geophysical Federal Institute, Ural Branch of Russian Academy of Science) is applied to image the ranked deformation levels in the massive structure of the Baris. The wide profile system of observation has been used to monitor the three components of the alternating magnetic field along predefined measuring lines in the study area. Here we can show the first results that we shall continue during some cycles of monitoring. The second part of our work was linked with mapping the massif structure inside the oasis City, where only using our device we could construct the geoelectrical sections for 5 profiles and show the real structure of the water volume and its complicated structure up to 200 meters depth recording the values of real not apparent resistivity.
The analytical treatments provided good information about the structure of the rock massive and its rank of degradation, the lateral distribution of the geotechnical heterogeneity, and finally a conclusive outcome about foundation stability. We can conclude that the general dynamic state close to the destruction level within the investigation areas is getting worse over the time; this is reflected in the crack's densities and positions, also on the changes in the lateral distribution of geoelectrical heterogeneity as an indicator of the saturation of the surface rock in the study area with water [1,2].
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