In situ investigation of the impact of cyclic thermal variations impact on the mechanical properties of sandy soil.

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The incorporation of heat exchangers into geostructures leads to changes in the temperature of the adjacent soil, which may affect its hydro-mechanical properties. In this study, mini-pressuremeter tests were carried out in the vicinity of three experimental energy piles of 12 meters length and 0.52-meter diameter installed in saturated sandy soil. Tests were carried out in three locations and in two different depths (namely 3 and 4 meters in depth) before and after cyclic variations of their temperature. The pressuremeter parameters are the pressuremeter modulus EM, the limit pressure PL and the creep-pressure Pf. These parameters characterize the properties of the soils; some measurements were done close to the energy piles (1.25 meters from the center of the pile) using a mini-pressuremeter cell (380 mm in height and 28 mm in diameter). The comparison of the results before and after the four warming-cooling cycles (8°C to 19°C) showed a thin thickening of the material at 3 meters depth. These results are coherent with in-lab measurements and with the results of the pile loading tests carried out later on the same site.