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Mapping peat layer using integrated surface geoelectrical techniques at eastern part of Nile Delta, Egypt.

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The shallow subsurface of the Nile Delta, Egypt is inhabited with peat layer of maximum thickness about 3.5 meters and depth varying from 5 to 15.5 meter. The hazardous properties of peat layer, which affects the infra structures, can be categorized as the great capacity for tacking up and holding water, high shrinkage on drying, high permeability, low shear strength and high compressibility. Consequently, from the engineering point of view, peat is often unstable for supporting any kind of structure and considered as the worst kind of foundation materials that may encounter in the substrata. In this study, the area of southern Mansoura city, Nile Delta was surveyed using shallow geoelectrical tools aiming to delineate the peat extensions in order to assist engineers for future planning of the infra structures. The survey includes a self-potential (SP), induced polarization (IP) and time domain electromagnetic (TDEM) techniques. The results showed that the peat layer is associated with relatively higher chargeability than the surrounding sediments. The depth to peat layer that is inferred from the SP, IP and TDEM profiles is coinciding with the borehole data. The thickness of the peat layer inferred from the TDEM results is highly correlated with the borehole data. However, the thicknesses of this high chargeability zone in IP-sections are poorly depicted. That may be due to the screening effect of IP response to current flow through deeper parts. The average values of depth and thickness were calculated along each profile to construct isopach and depth to peat layer maps in the study area. The integration of these maps and the available borehole data give detailed informa-

tion about the distribution of peat layer rather one data alone. This can assist engineers when choosing the suitable sites for engineering constructions. Accordingly, we recommend applying a similar survey at the new proposed dwelling zones in Nile Delta area, prior any planning for constructions, to give detailed information about the subsurface distribution of peat.