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Resistivity monitoring contribution to hydrogeological risk assessment in a reclaimed landfill in Thessaloniki (Greece)

G. Vargemezis^{(1)*}, P. Tsourlos⁽¹⁾, I. Fikos⁽¹⁾ and N. Kazakis⁽²⁾

⁽¹⁾ Department of Geophysics, Aristotle University of Thessaloniki, Thessaloniki, Greece

⁽²⁾ Department of Geology, Aristotle University of Thessaloniki, Thessaloniki, Greece

* varge@geo.auth.gr

Old non sanitary landfills can become a major source of pollution for surface water bodies and groundwater. Even if old landfills are subjected to reclamation, there are cases in which highly variable local hydrogeological conditions are a constant environmental threat which needs to be taken into account to avert environmental accidents and to improve the reclaimed landfill management. In the case of Derveni landfill (city of Thessaloniki) which was subjected to reclamation in 2006, leachate still outflows from the main waste body. Before operation, no bottom sealing liner was used to protect groundwater from leachate, and, even during reclamation no top liner was placed. Therefore, it is under question whether the outflowing leachate is a fluid produced by lateral groundwater flow contaminated by the waste disposal or by the infiltrated rainwater.

As part of a wider study, geoelectrical monitoring has been applied to investigate the hydrogeological conditions of the area involving: (a) SP and resistivity changes during pumping of two observation wells existing within the site, (b) resistivity changes over more than two years in four selected locations within the landfill.

Continuous recording during pumping allowed the cross examination with the water table variation and resulted in understanding the aquifer distribution and its relation with the waste body and leachate, while resistivity changes within the waste body have been interpreted along with the precipitation recorded in situ for more than a two years period.