Poster Presentations

P01

3D time-lapse ERT monitoring on a small Municipal Solid Waste Landfill cell

Audebert Marine[1], Clément Rémi[1], Grossin-Debattista Julien[1], Moreau Sylvain[1]

[1]*National Research Institute of Science and Technology for Environment and Agriculture (IRSTEA), Hydrosystems and Bioprocesses Research Unit, 1 rue Pierre Gilles de Gennes CS 10030 92761 Antony Cedex, France*
(marine.audebert@irstea.fr), (remi.clement@irstea.fr), (j.grossin-debattista@irstea.fr), (sylvain.moreau@irstea.fr)

Leachate recirculation is a key process in the operation of Municipal Solid Waste Landfills (MSWL) managed as bioreactors. To observe distribution and diffusion of the water content and to evaluate the performance of leachate pipe injection, in situ methods are required. Electrical Resistivity Tomography (ERT) is usually proposed since the last ten years. However, MSWL are lined by geomembranes, which are perfect electrical insulators, to collect leachate and biogas. These boundaries constituting a high resistivity contrast with the waste body can impact ERT measurements in modifying electrical current circulation and produce resistivity artifacts. In most previous in situ studies, geomembranes were neglected in the inversion process and supposed located far enough from the electrode line. However, the geomembrane location can change the boundary conditions of the inversion models, which have classically infinite boundary conditions. This study is divided into two steps. First, we demonstrate on a small MSWL cell that a standard inversion considering infinite boundary conditions produces many artifacts into the interpreted resistivity models. To improve these results, we propose an advanced inversion solution which consists in introducing the complex geometry and geomembrane location into the inversion tools. Second, these advanced inversion solution are validated on a field data set gathered on a small MSWL cell during a 3D time-lapse ERT monitoring where boundaries have to be taken into account.