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3D ERT monitoring of the reactivation of waste biodegradation with fresh leachate injection

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The aim of this study is to monitor (bio) physical processes occurring in a landfill. The experiment consists in injecting leachate towards a drain in unsaturated and not yet digested waste to reactivate (or activate) waste biodegradation. The target is the first 15 meters of the studied landfill subsurface. The visualization of the wet front arrival (short term effect) is crucial because we want to ensure that waste is entirely humidified to allow the reactivation of waste digestion. The second process is a long term effect consisting in the increase of the internal temperature of the landfill which is synonymous of the reactivation of biodegradation processes.
We use 3D time-lapse ERT on a monthly basis to capture the decrease of electrical resistivity related to the increasing temperature. We also collect ground truth data, including distributed temperatures in a borehole to validate results. For short term effects, we monitored the wet front arrival with three 2D ERT profiles composing the 3D image, during an entire day. Preliminary results, corroborated by ground truth data, show that leachate flow in anisotropic (more rapid horizontally than vertically). So far, waste was completely humidified and slight changes of temperature occurred.