

Hydrogeophysical inversion techniques for seawater intrusion models

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ABSTRACT

High-resolution geophysical data is commonly used for the development of seawater intrusion models. Typically, geophysical data is processed and inverted separately, after which seawater intrusion models are provided with hydrostratigraphy and salinity distributions that are inferred from the inverted geophysical images. Increased use of airborne geophysical surveys and advancements in inversion algorithms developed for both groundwater and geophysical methods provide the opportunity to extract information in a more intuitive fashion, in which geophysical and hydrogeological models are used in a single inversion framework. The main advantage of such framework is the definition of a hydrogeological interpretation of a geophysical dataset that can be tested in an inverse modelling exercise which would otherwise be absent. In this presentation two examples are given of hydrogeophysical inversion strategies, including a joint and coupled inversion. In the joint inversion study, parameters of a groundwater model are simultaneously estimated with those pertaining to an electromagnetic sounding. A second study is presented in which parameters of a seawater intrusion model are estimated by fitting observed geophysical signals. This presentation concludes with a summary of how hydrogeological inversion strategies can be applied to use seawater intrusion models and geophysical models in a more integrated way.

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