



## **How confined is my aquifer? Tidal analysis of water level data to characterise confinement**

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One of the largest challenges for groundwater management is reliable modelling of semi-confined and confined aquifer systems with variable degrees of vertical connectivity. There is often a lack of sufficient hydraulic and hydromechanical data for each strata in a complex aquifer system to enable robust and reliable numerical modelling. Currently, data are often spatially and temporally sparse due to the extensive labour and setup costs of aquifer pump test techniques, and whether aquifers are semi-confined or confined is poorly quantified. The analysis of Earth and atmospheric tides in standard monitoring bores (pressure gauged) offers significant utility to provide a preferential alternative to long term pump tests in confined aquifers. These novel techniques also enable unprecedented monitoring of changes of the degree of confinement of aquifers and variations in hydromechanical properties over time. We provide a synthesis of the current understanding and utilization of Earth and atmospheric tidal analysis of groundwater level data for characterization of subsurface systems. We also highlight uncertainties in techniques that are being developed, to encourage discussion and further research.