

## Organic Carbon Fluxes in a Stressed Groundwater System

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Dissolved Organic Carbon (DOC) flux in groundwater is poorly understood: influenced by recharge, extraction and surface processes. We measured variations in DOC content during a series of high intensity extraction and recovery events in the surrounding aquifer and extracted groundwater. Groundwater was extracted from a fractured basalt/metasediment aquifer overlain by residual soils and flanked by a Quaternary alluvial channel. Groundwater systems included the fractured rock system interconnected with the alluvial aquifer through a leaky aquitard and a perched aquifer held at the soil bedrock interface.

Prior to and throughout the test, groundwater samples were collected from wells within the fractured rock, alluvial aquifer and soil bedrock interface and analysed for DOC. Initial DOC concentrations in the upper aquifer were ~2 mg/L, following pumping concentrations increased 36 mg/L (ave) peaking at 72 mg/L. In the lower aquifer initial TOC concentrations were ~1.6 mg/L, during pumping levels increased to 3.98 mg/L (ave) peaking at 14.32 mg/L.

Results indicate the fractured rock aquifers ability to recharge was exceeded during intense pumping periods and a larger component of water was drawn from the upper aquifer. This increased the volume of water being drawn through the soil profile and increased DOC content in abstracted groundwater. Hydrological setting, well construction and pumping regime are likely to affect the concentration of DOC within abstracted groundwater. Further attention to abstracted groundwater as a component in terrestrial DOC fluxes is warranted.