



Hydrology and nitrogen dynamics along a semi-arid hillslope-riparian gradient

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Hydrology and nitrogen dynamics were examined along a hillslope-riparian gradient of a third order semi-arid stream near Margaret River in South-Western Australia. Two transects of piezometers and wells were installed perpendicular to the stream channel. Six wells instrumented with water level loggers were used to monitor perched aquifer dynamics. Water level data illustrate the responsiveness of the perched aquifer to the highly seasonal climate with significant water table fluctuations in response to rainfall events in the midslope and riparian zones. Site hydrology also responded to variations in the depth to the confining clay layer, which was mapped using GPR.

Monthly water samples collected from piezometers and wells were analysed for nitrate, ammonium and dissolved organic carbon. The data reveal spatial and temporal variation of inorganic nitrogen species and dissolved organic carbon across the hillslope-riparian gradient. Data also show that some sites along the hillslope-riparian gradient of the two transects are acting as nitrate sources while others are dominated by nitrate removal. One transect featured a constant source of nitrate in the upper hillslope which decreased rapidly along the hillslope-riparian gradient. The second transect exhibited a decline in nitrate concentrations corresponding with perched water table formation, however near stream wells displayed high concentrations during late winter and spring sampling.