

Recharge Estimation in the Surat Basin – Stage 3a Data Analysis

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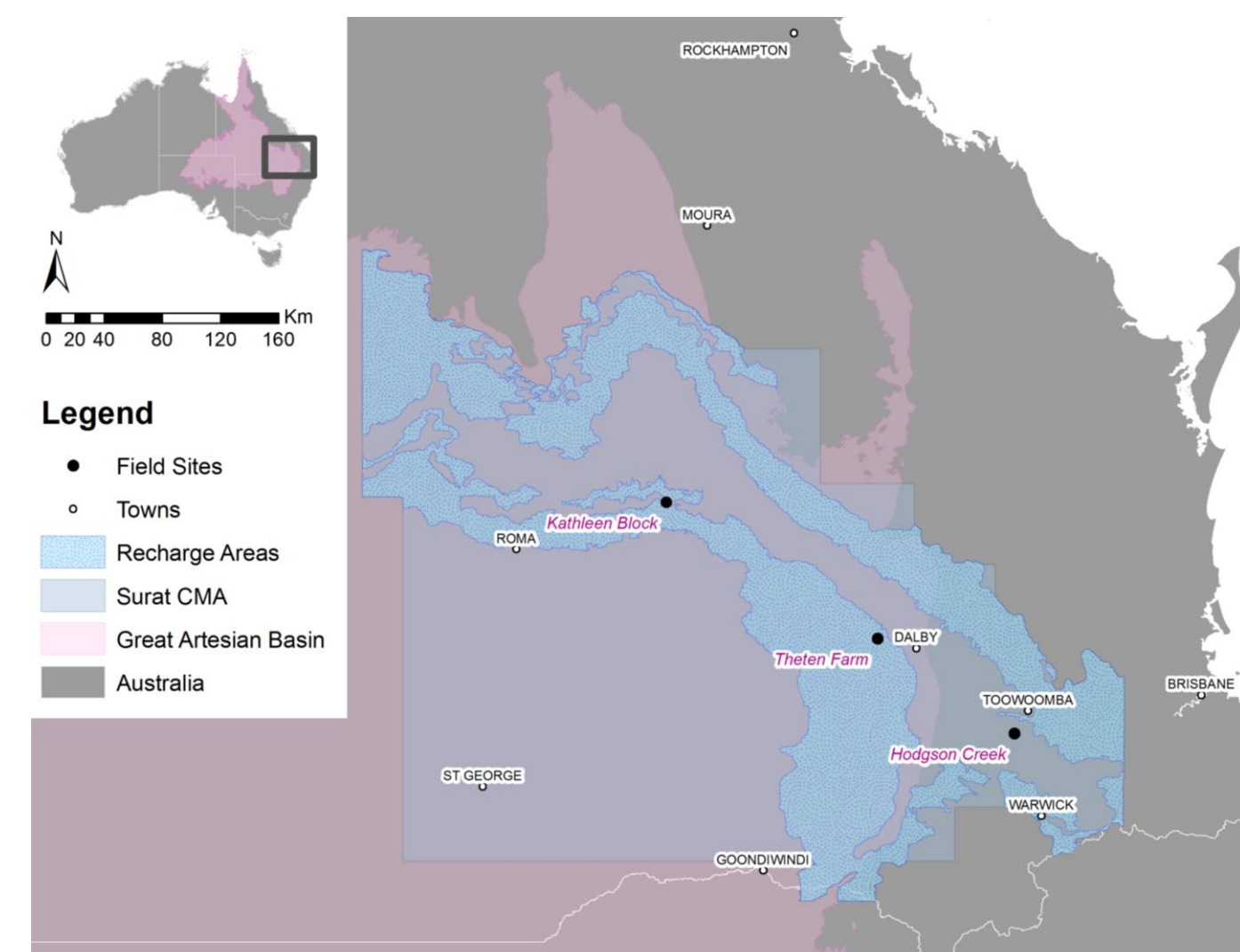
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BACKGROUND

- The Surat Basin makes up part of the larger Great Artesian Basin (GAB) and is a major water resource in the semi-arid interior of eastern Australia
- Groundwater resources are heavily utilised by regional agriculture (irrigation and stock), urban water supply, ecosystems and recent coal and coal seam gas developments

Project aims:

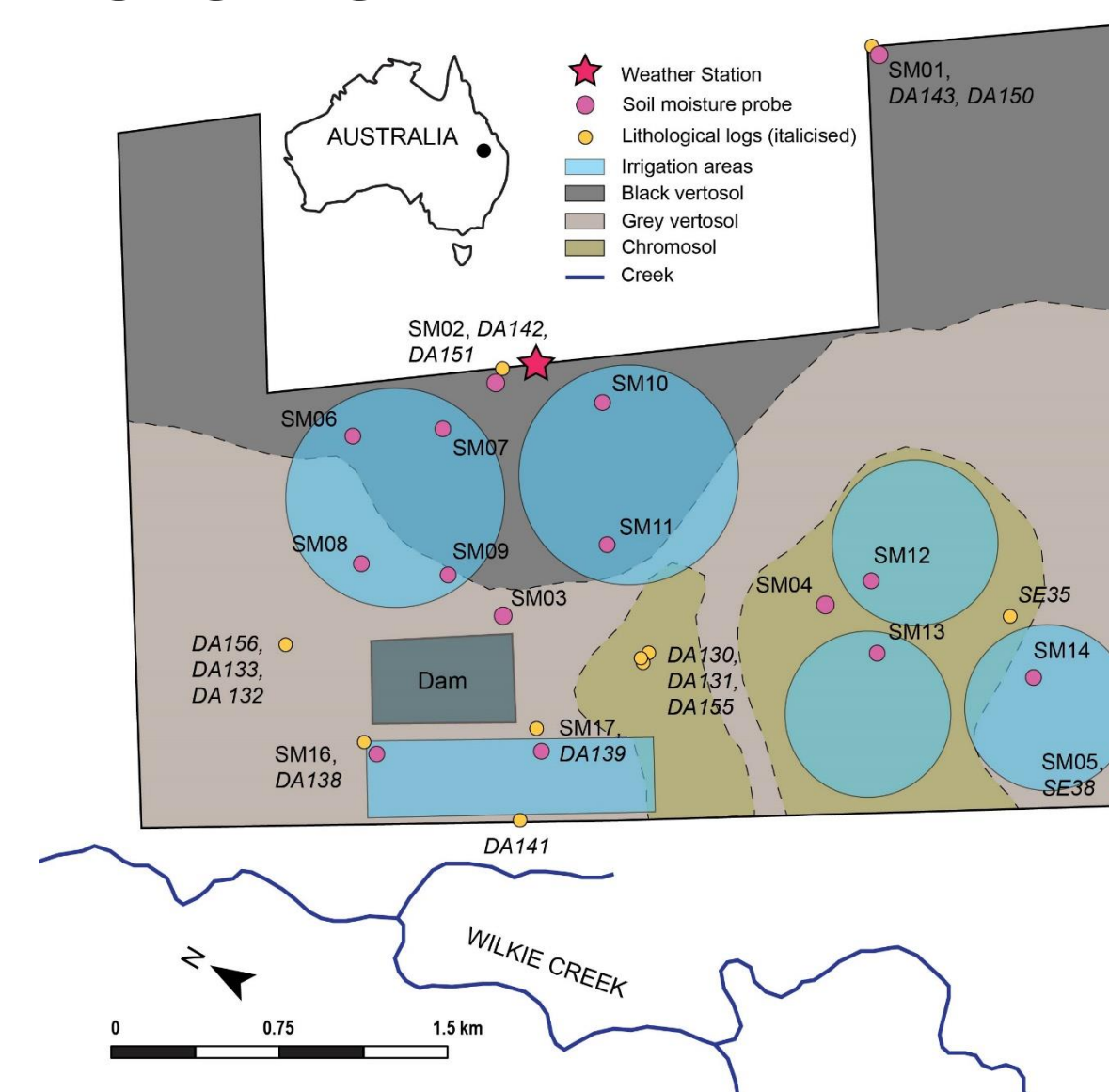
- Develop quantitative knowledge about groundwater recharge processes and pathways in the Surat Basin
- Focusing on the unsaturated zone and priority geological outcrops and subcrops: *Gubberamunda sandstone*, *Main Range Volcanics* and the *Condamine River Alluvium*
- Provide recommendations for recharge inputs to regional groundwater models: aid groundwater impact assessments and sustainable groundwater management
- Stage 1** (complete) – Preliminary recharge Estimates (1 - 12 months)
- Stage 2** (complete) – Field site establishment (13 – 22 months)
- Stage 3** – Multi-scale recharge estimation (23 – 42 months)



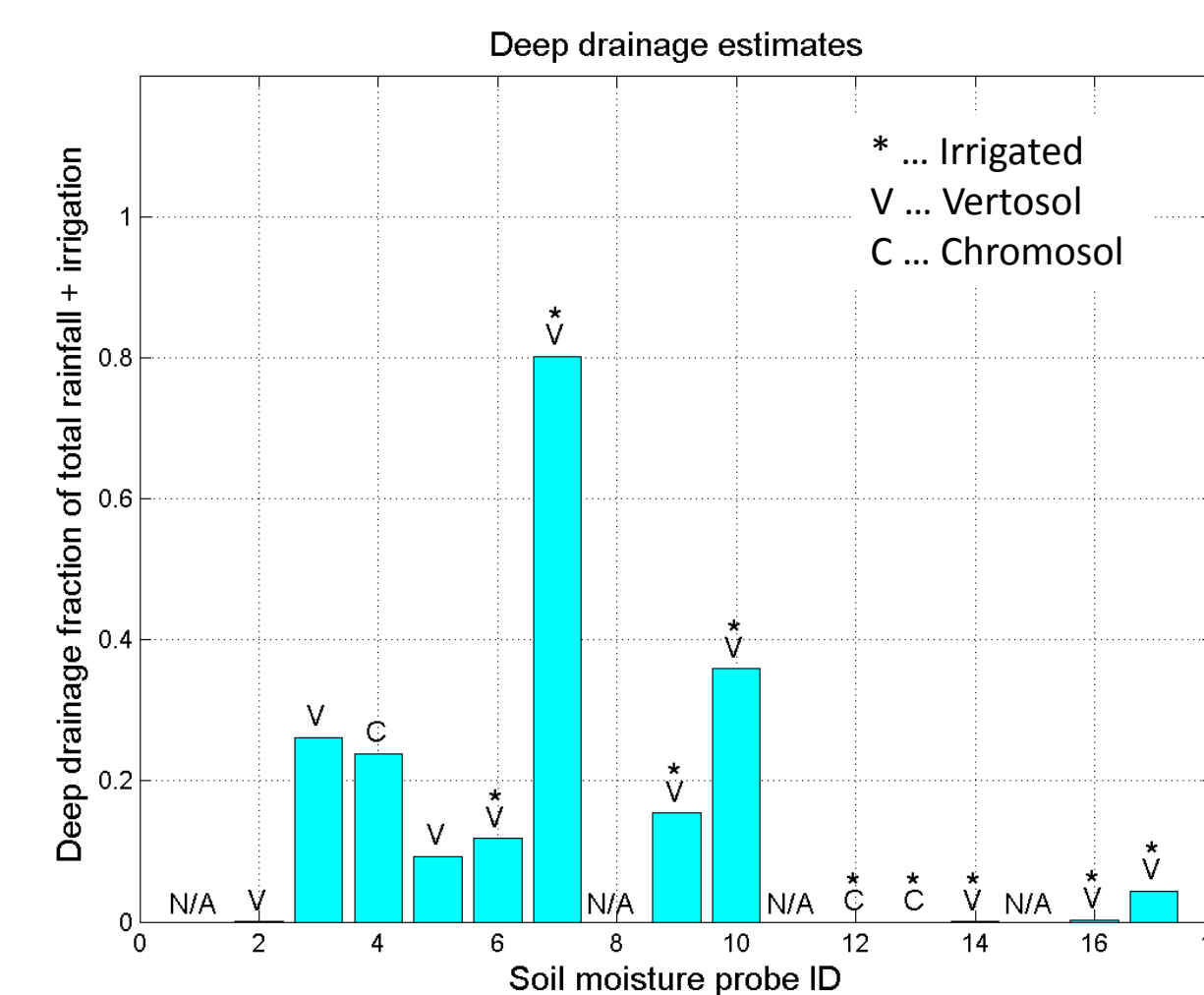
MONITORING at Theten Farm

DEEP DRAINAGE at Theten Farm

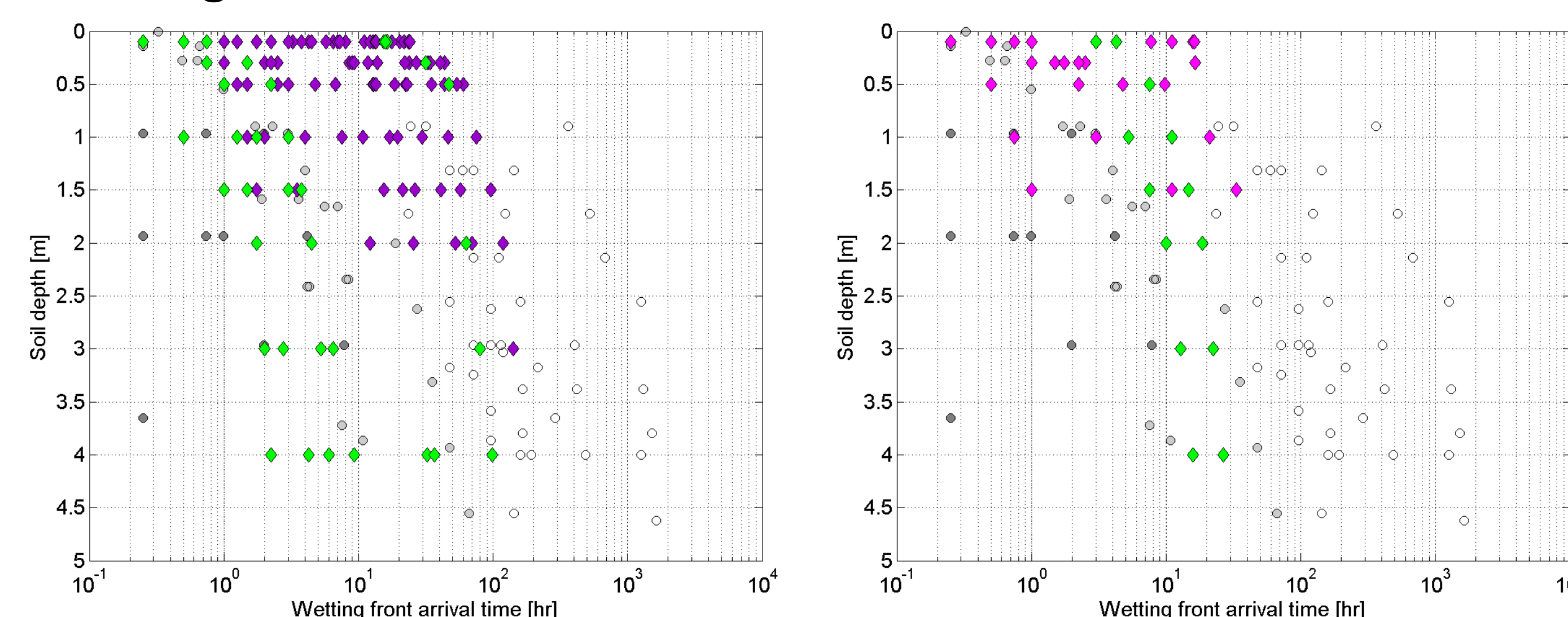
Overview



Deep drainage estimates



Wetting-front arrival times

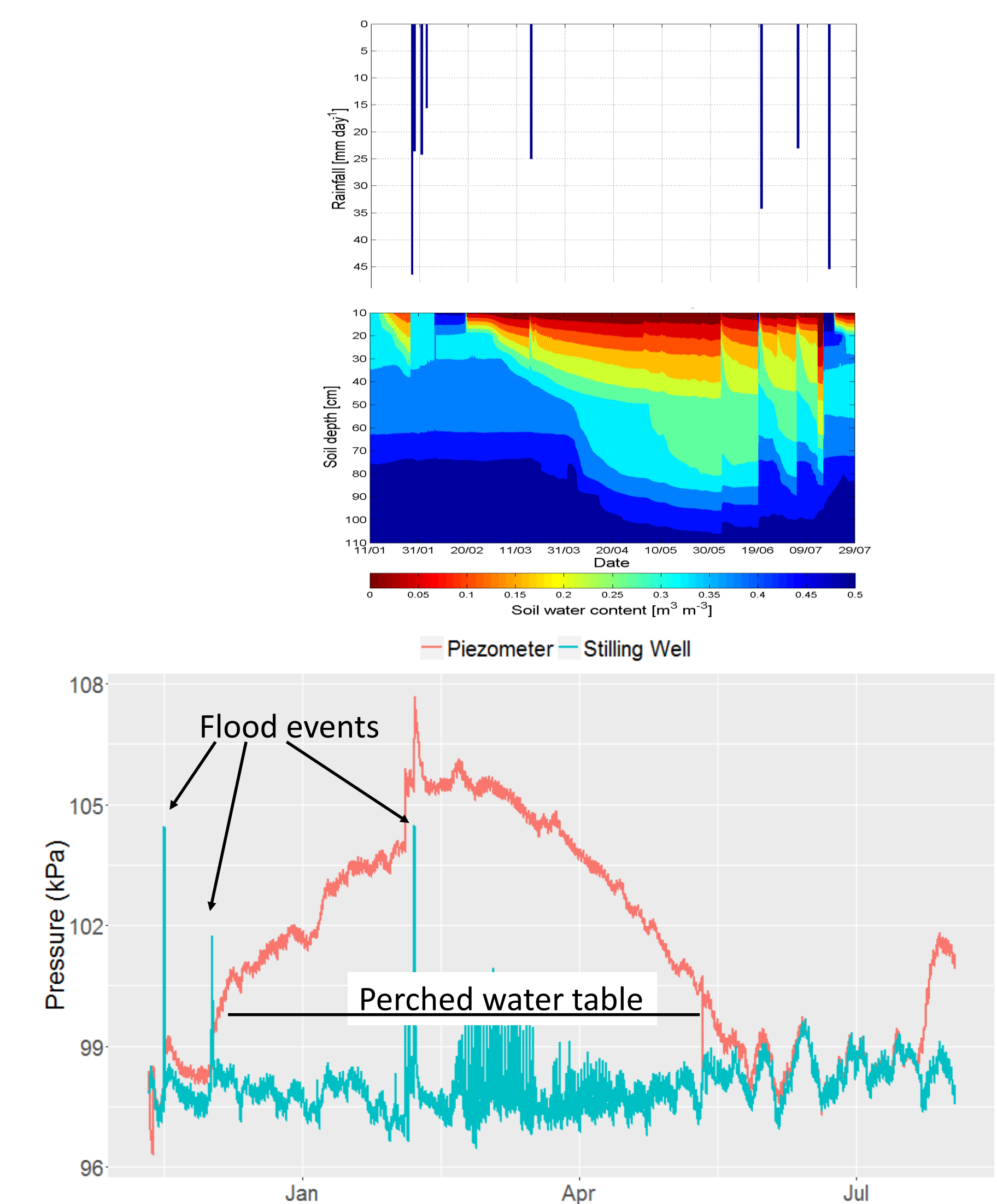


MONITORING at Kathleen Block

Nine Mile Gully flooding

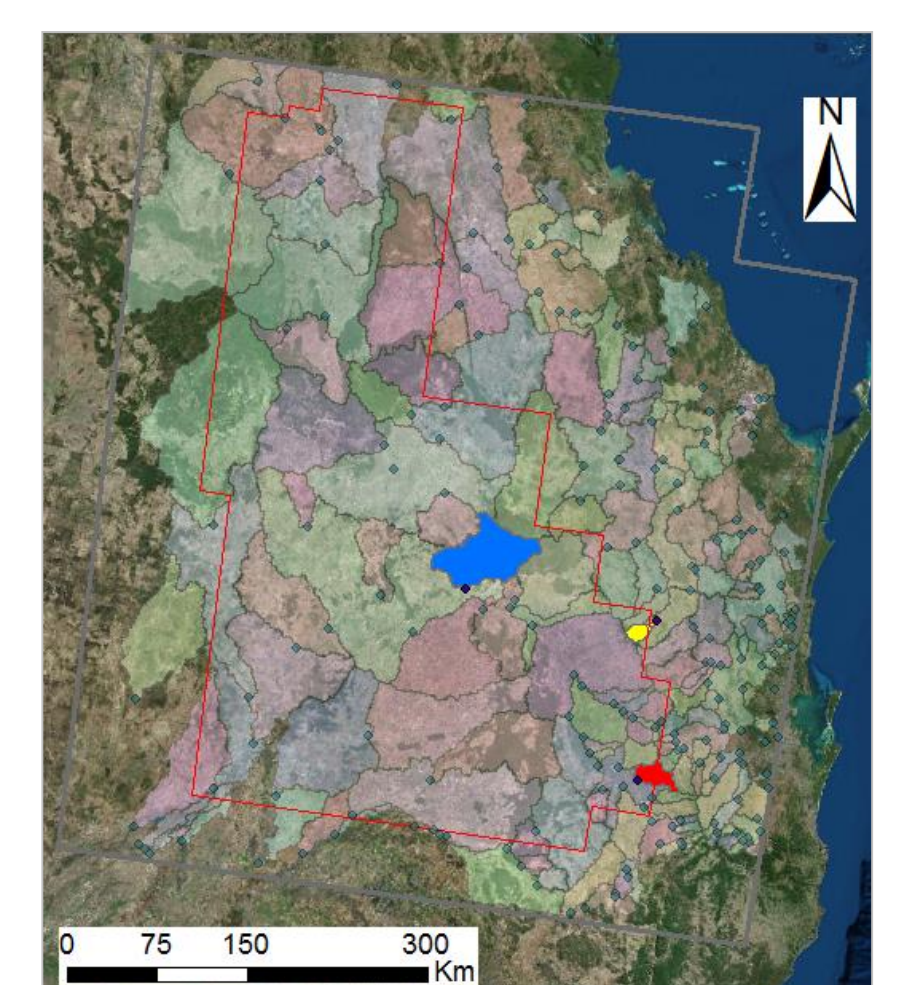


Sensor responses



REGIONAL RECHARGE

- Estimated annual recharge using a simple water balance approach:
$$\text{Recharge} = \text{Rainfall} - \text{AET} - \text{Runoff}$$
- Data sources:
 - AET and Rainfall: AWRA-L
 - Runoff: Qld WMIP
- Assessment carried out for each water year (March to February) from 2005 to 2015
- 3 gauged catchments selected from the BoM Hydrologic Reference Stations list (Fig. 7):
 - Barker Creek at Brooklands (yellow)
 - Dogwood Creek at Gilweir (blue)
 - Kings Creek at Aides Bridge (red)
- Variable results suggest the simple water balance is missing a key input



ACKNOWLEDGEMENTS

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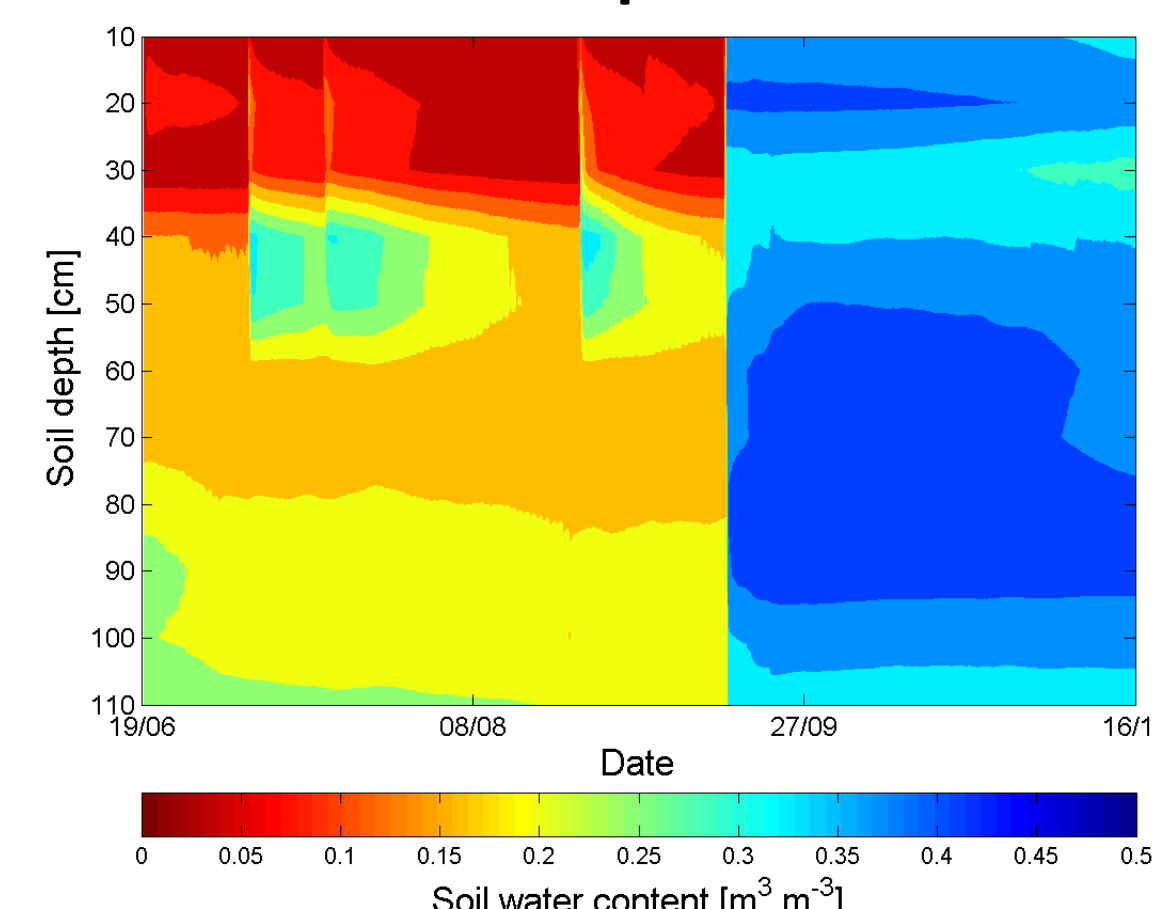
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Wilkie Creek flooding



Soil moisture response in creek bed



Water table change

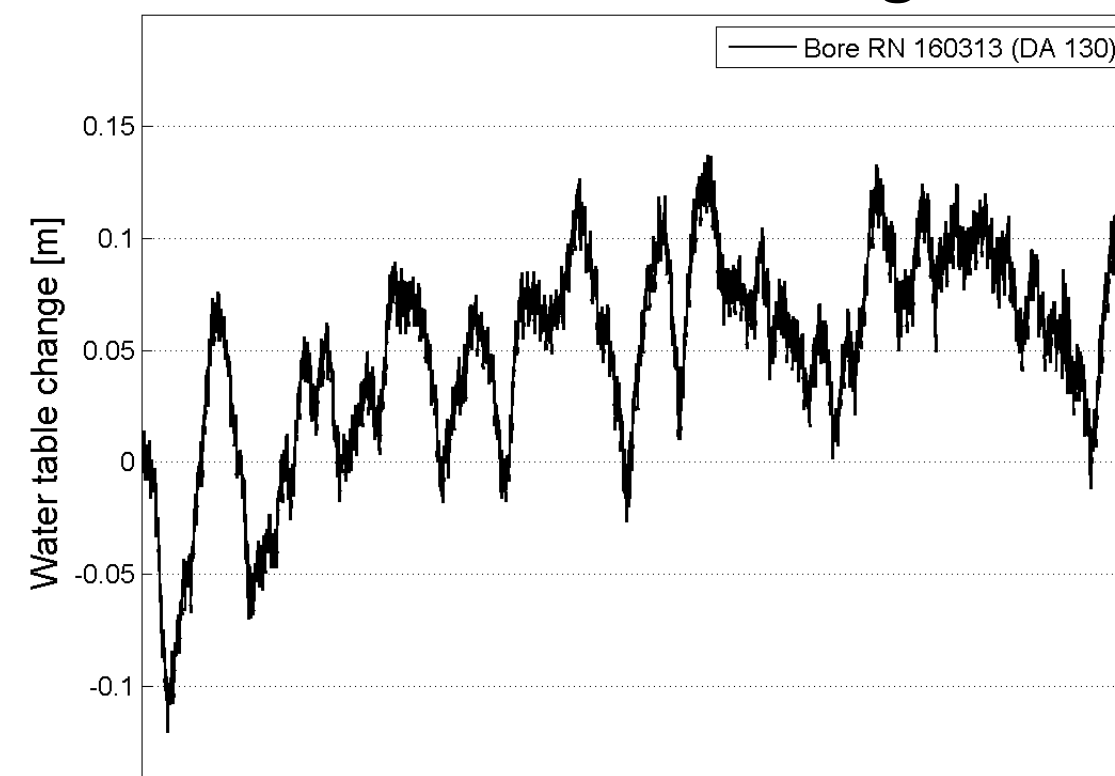


Fig. 2. Example of flood event in Wilkie Creek (left) and corresponding soil moisture response (upper right) and water table change at selected bore (lower right) (see Fig. 3 for locations).