

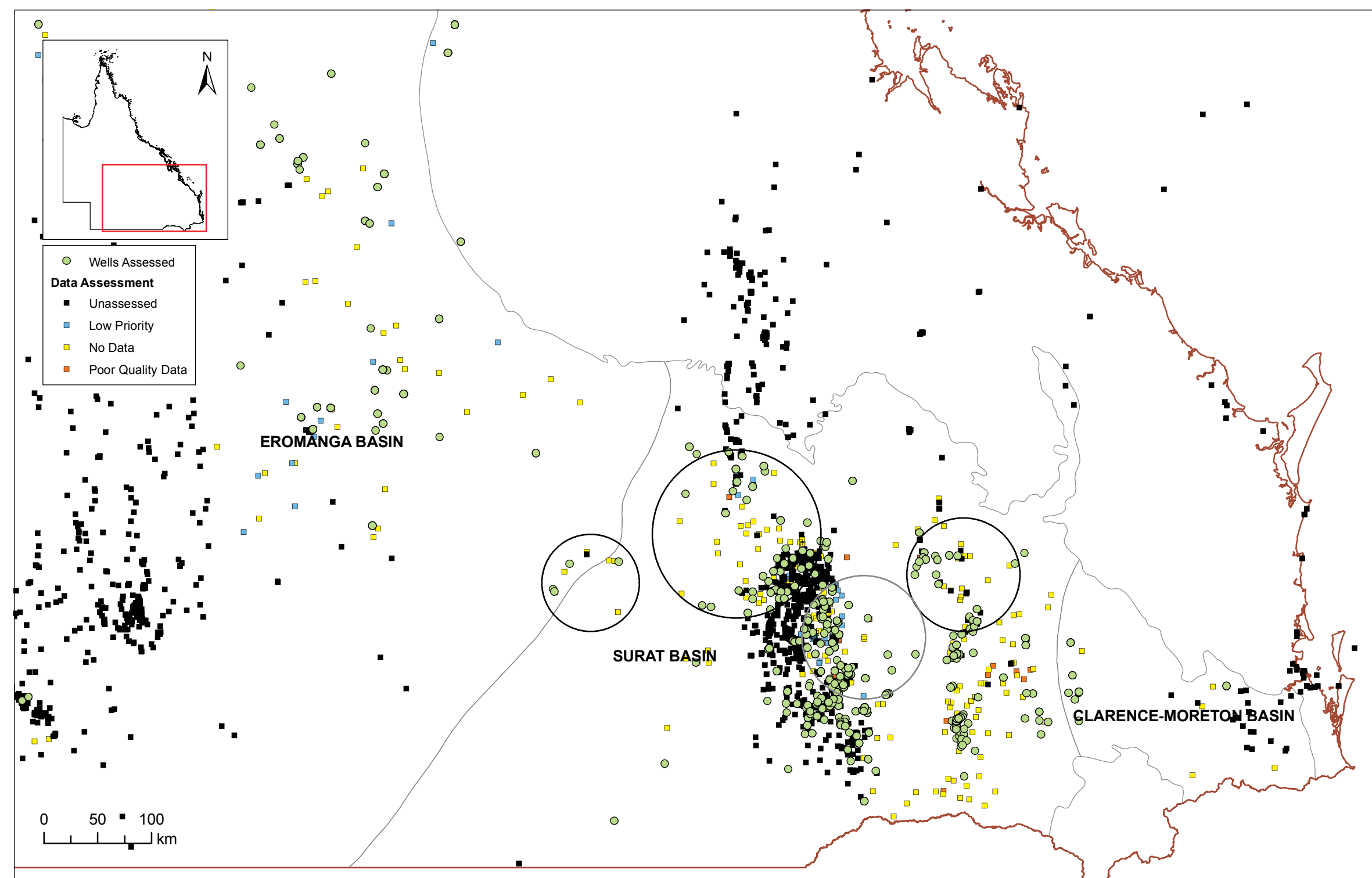
# Hydrodynamic modelling of Queensland sedimentary basins

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## Introduction

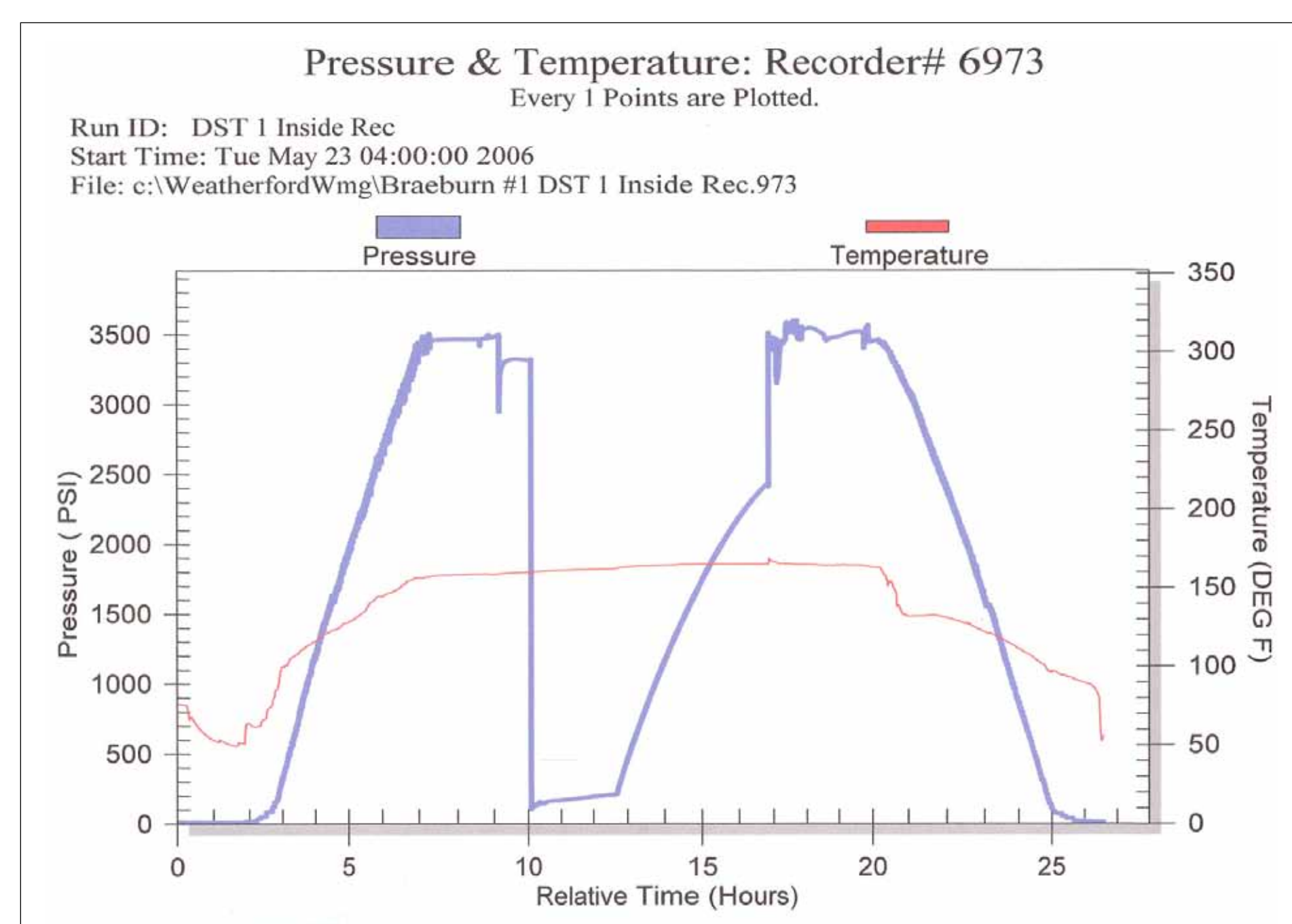
Reservoir pressures from drill stem tests, formation and wireline interval tests are extracted to increase understanding of flow regimes in potential carbon geostorage reservoirs. This work also endeavours to establish the vertical hydraulic relationships and the effectiveness of the regional aquitard/seal.

## 1. Well selection



Recent updates include all available pressure data from the Galilee Basin and the area surrounding the proposed CGI drilling sites in the central Surat Basin.

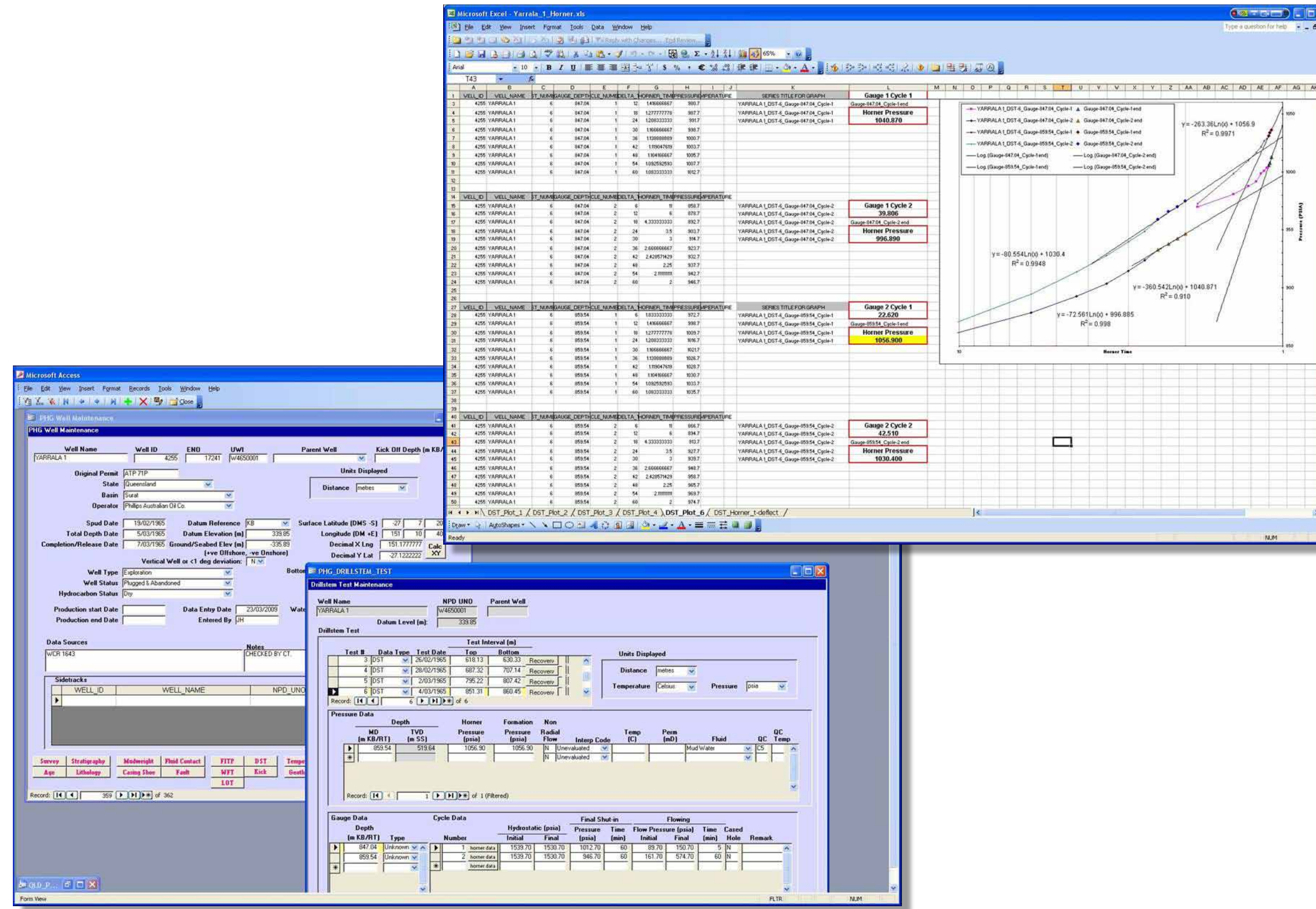
## 2. Data sources



Drill stem test (DST) data extracted from well completion reports are a major source for determining reservoir pressures. These figures show a typical two-cycle pressure time chart and a copy of the raw DST pressure data used for Horner pressure extrapolation.

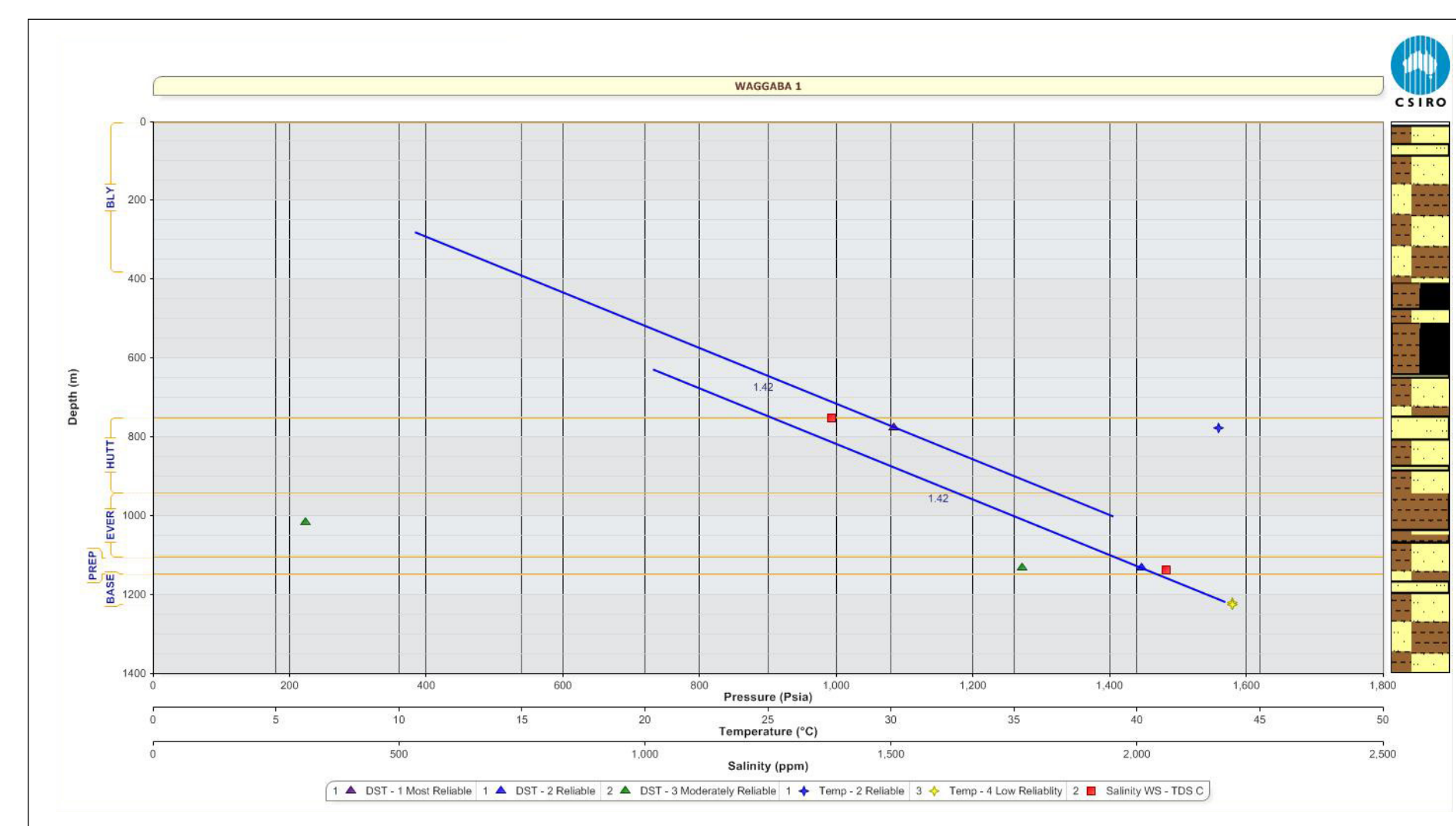
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### 3. Processing and Horner pressure extrapolation

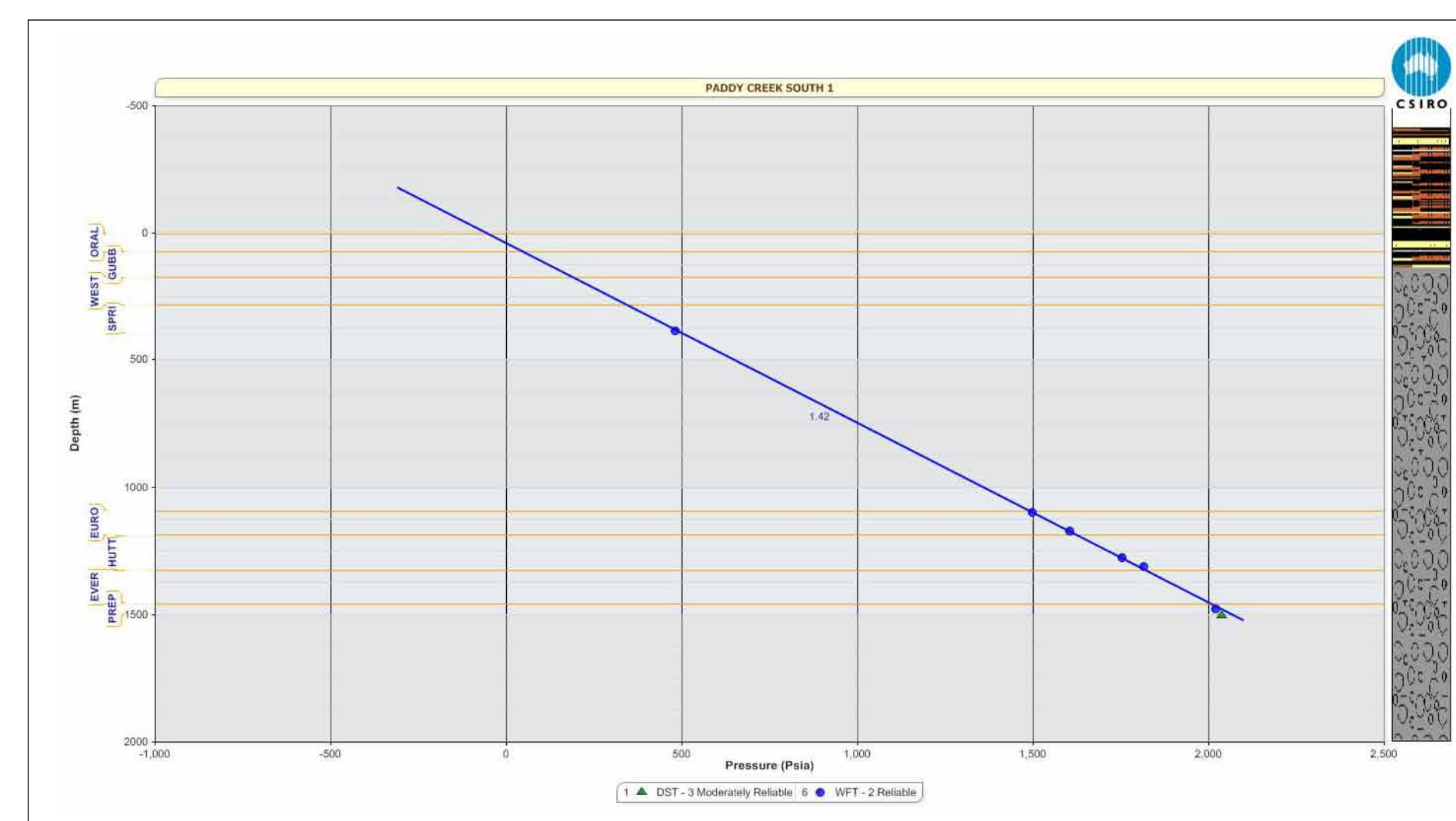


Using the CSIRO PressureQC™ database and quality control (QC) system. The methodology applies a standard set of criteria to each formation pressure test. Availability of raw data for the pressure test is considered to be one of the most important criteria. In tests where these data are not available, there is less confidence that the reported shut-in pressures represent the actual formation pressure. These tests are therefore, considered less reliable and are given a lower (QC) code. The above graph demonstrates the Horner pressure extrapolation based on the raw data.

#### 4. Evaluating hydrostatic gradients using the CSIRO Pressure Plot™ software

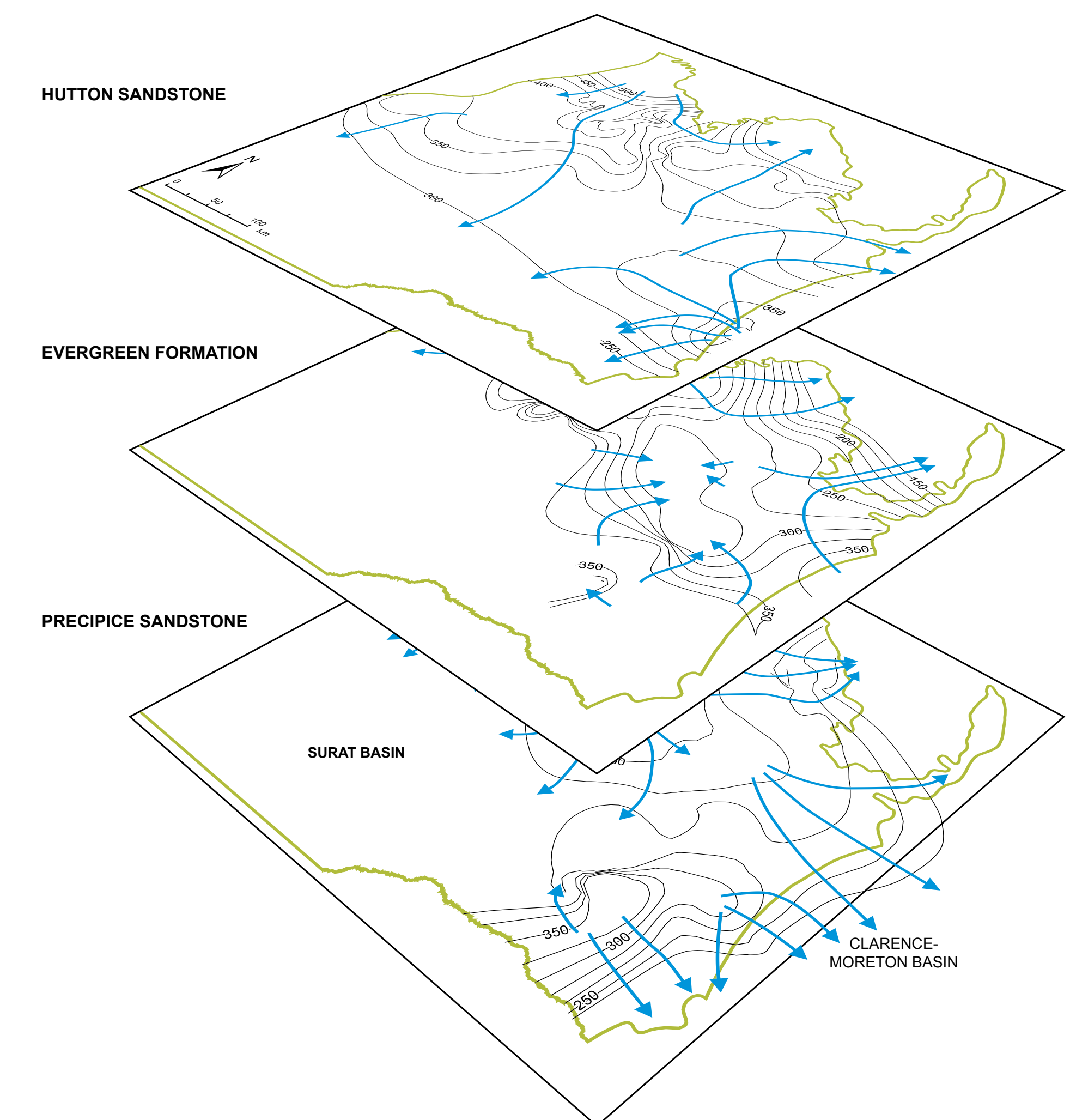


Possible effective seal between the two aquifers (Precipice Sandstone and Hutton Sandstone) separated by the Lower Evergreen Formation.



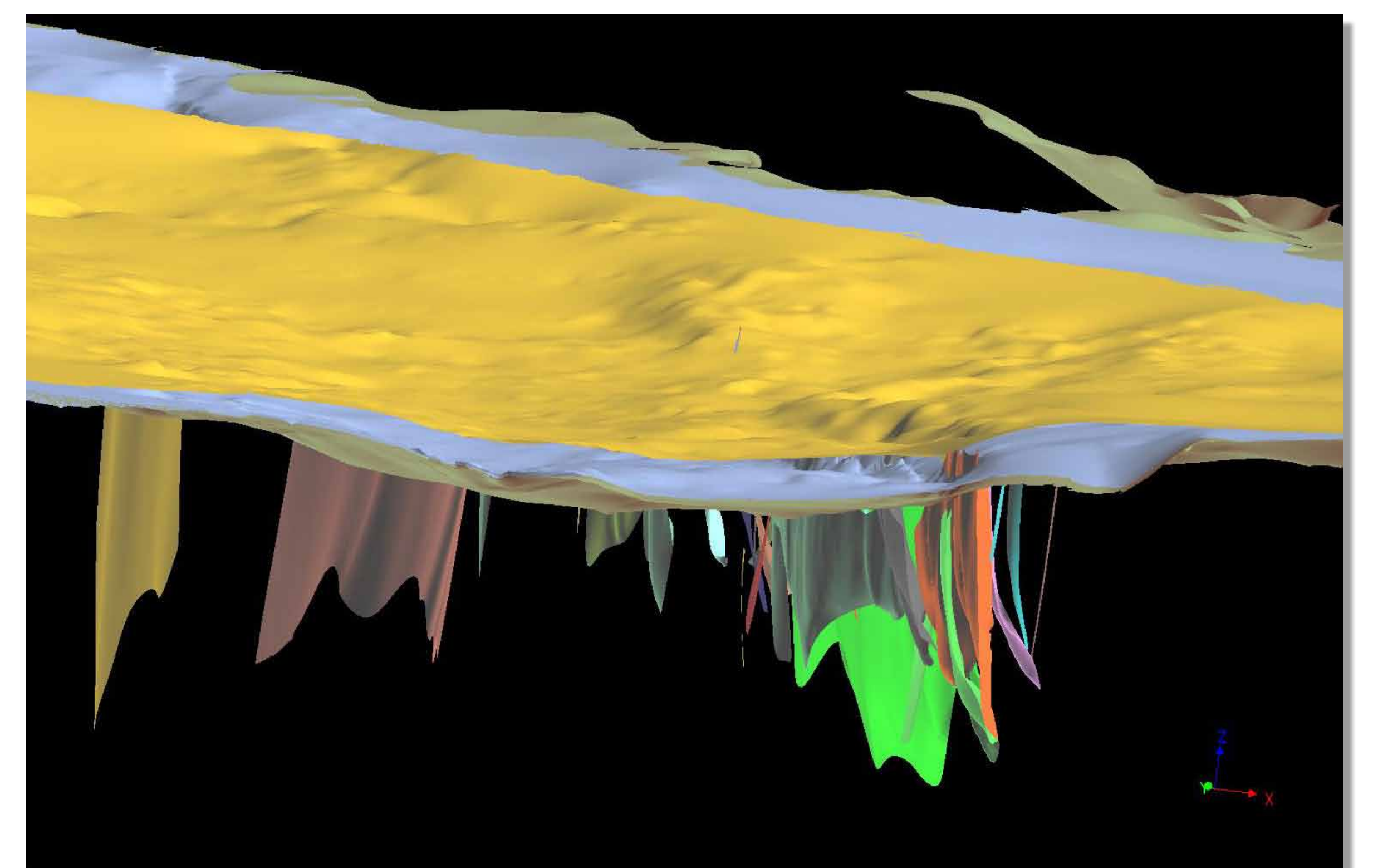
One single hydrostatic gradient between the Precipice Sandstone and the Hutton Sandstone separated by the Evergreen Formation suggests connectivity or vertical hydraulic communication between the aquifers of interest.

## 5. Flow paths within the Surat Basin



Current flow vectors as indicated by Hodgkinson et al. 2010 show flow direction for the Precipice Sandstone into the Clarence Moreton Basin while for the Hutton Sandstone, flow is in the opposite direction.

## 6. 3D modelling of the eastern Surat Basin



Modelling of the eastern Surat Basin with updated seismic horizon datasets from (Dixon et al. 2011) and modelled fault horizons from (McKillop et al. 2011). The displayed modelled surfaces represent the top of the Walloon Subgroup (dark yellow), base of the Hutton Sandstone (blue-grey) and the base of the Surat Basin (olive green). (Vertical scale exaggerated 10x for clarity)

## References

Dixon, O., McKillop, M. & Hodgkinson, J., 2011. Seismic horizon mapping in the Surat Basin – refinement of key stratigraphic surfaces as a foundation for subsurface fluid flow modelling. Queensland Geological Record, 2011/6.

Hodgkinson, J., Hortle (Henning), A. & McKillop, M., 2010. The application of hydrodynamic analysis in the assessment of regional aquifers for carbon geostorage: Preliminary results for the Surat Basin, Queensland. APPEA Conference, Brisbane CD of Proceedings.

McKillop, M., Dixon, O. & Hodgkinson, J., 2011. A new interpretation and model of the Moonie-Goondiwindi and Burunga-Leichhardt fault systems in Queensland. Geological Survey of Queensland Record, 2011/1.

