on growth of the fold and thrust belt in the Central Flinders.

However, very few studies have focused on the control exerted by pre-Adelaidean basement structures in the deposition of evaporitic beds and their influence in the latter inversion of the basin.

Here, we use published geological maps, analysis of satellite imagery and aerial photograph, field work, interpretation of seismic refraction profiles and interpretation and modelling of potential field data in order to better determine the architecture at depth and better constrain the tectonic evolution of the basin.

Our study raises new evidence of the strong link between the location of evaporitic diapir and the development of normal faults affecting the basement during the basin formation. These normal faults were subsequently reactivated during the Delamerian Orogeny, and still remain the main structures controlling the present-day deformation of the Flinders.

Paleoproterozoic terrane boundaries in the unexposed Northern Gawler Craton, Marla Region: new insights from a geophysical perspective

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The geometry at depth of the unexposed basement of the northern Gawler Craton is poorly constrained yet its crustal architecture is of primary importance for models of continental growth during the amalgamation of Proterozoic Australia. Unfortunately, with less than 1% of basement exposed, the northern Gawler Craton is almost completely covered by Neoproterozoic and younger sedimentary rocks which have so far inhibited our understanding of the tectonic evolution of this area.

Here, we focus on the basement architecture in the Marla region of the northernmost Gawler Craton. We use geophysical techniques and apply a top-down approach to penetrate the cover and determine the structure of the unexposed basement rocks.

We use superficial geology, borehole data and seismic reflection profiles to determine the structure of overlying cover sequences and to constrain the role of basement structures in later intra-cratonic orogenies. We measured the petrophysical properties of samples, representing the whole sedimentary cover as well as the basement, along selected drillcores in the area of study. These data were used to remove the effect of the cover from gravity and magnetic data, therefore highlighting basement structures. The architecture of the basement is then determined by combining Euler deconvolution along with forward and inverse modelling techniques.

Our analysis shows that a broad magnetic anomaly observed over the Ammaroodinna Ridge is primarily due to shoaling of the basement rather than a change in its petrophysical properties, while the Middle Bore Fault represents a major Paleoproterozoic terrane boundary that juxtaposes high density mafic rocks against metasediments.

The basement structures revealed for the first time by our modelling approach enabled us to constrain the geological processes responsible for the growth and evolution of the northern terranes of the Gawler Craton and their role in the amalgamation of Australia during the Proterozoic.

P-T-X Conditions of Fluids in the Sunrise Dam Gold Deposit, Western Australia: Implications for the Interplay between Deformation and Fluids in Orogenic Gold Systems

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The formation of orogenic gold deposits is generally described as a complex interplay between deformation, permeability, rock strength and hydrothermal fluid pressure. Despite it being widely known that orogenic gold deposits form from low salinity, carbon dioxide-bearing fluids, the importance of this fluid composition in the context of the physical processes of deformation and fluid behaviour is commonly overlooked. In this study we combined fluid inclusion research with structural and numerical modeling in order to link these processes in the world class (10 MOz.) Late Archean Sunrise Dam gold deposit.

The Sunrise Dam gold deposit is hosted within a complex structural environment. Several major moderately dipping NW shear zones formed during D_1 and host significant orebodies, however, the bulk of mineralization formed during D3 and D4. D3 is characterized by thrusting and sinistral shearing particularly in steeply dipping mineralized structures. D4 formed dextral faults producing steeply dipping stockwork vein systems.

Numerical models suggest that high pore

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fluid pressures are a pre-requisite for significant deformation at Sunrise Dam. Early low salinity CO_2-H_2O fluid inclusions record high fluid pressures (300 MPa at 350°C) whereas later CO_2-rich fluid inclusions record much lower pressures (130MPa at 350°C). Reconstruction of P-T-X conditions suggest that the CO_2-H_2O fluid was initially trapped in the one phase field but may have undergone phase separation due to exhumation at lithostatic pore fluid pressures. The resulting phase changes may have initiated failure through possible volume expansion of fluid and changing physical wetting characteristics. The subsequent failure induced decompression may have resulted in the production of significant volumes of CO_2-rich fluids that coincided with the main period of gold deposition.

The auto-regressive model (ARM) approach to denoisING moroccan resistivity data phosphate "disturbances" map

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Several methods are currently used to optimize edges and contours of geophysical data maps. A resistivity map was expected to allow the electrical resistivity signal to be imaged in 2D in Moroccan resistivity survey in the mining domain. Anomalous zones of phosphate deposit "disturbances" correspond to resistivity anomalies. We propose a new method for white noise reduction of Moroccan phosphate disturbances map of resistivity data based on the auto-regressive model (ARM) approach. The effectiveness of our approach for successfully detecting and reducing white noise has been used much success in the analysis of stationary geophysical data. The ARM method is an efficient tool in the interpretation of geophysical potential field data particulary suitable in denoising, filtering and analyzing resistivity data singularities. The ARM filtering approach applied to modeling surface phosphate "disturbances" was found to be consistently useful.

Key words : resistivity, Schlumberger, phosphate, auto-regressive, model, filtering, Morocco.

Dryland salinity and geodiversity on the Southern Tablelands of NSW: the use of the EM technique for mapping and management?

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Dryland salinity is a major concern on the Southern Tablelands of NSW (STNSW). Considerable research, remediation and mitigation has been undertaken on the topic, with the Electromagnetic Induction technique (EM) being promoted as a preferred tool for planning and undertaking such activities.

The present research includes an investigation of the applicability of the EM technique to map and/or monitor dryland salinity outbreaks in upland landscapes, specifically the EM38 and EM31 Geonics hand held instruments, which are also widely used mounted on motor bikes. Research sites were restricted to relatively undisturbed areas on the STNSW, containing box/gum grassy woodlands, to reduce the compounding and confounding effects of intensive management practices. Lithology was restricted to two types within the Lachlan Fold Belt, Ordovician deep marine sediments and Silurian felsic volcanic deposits and associated marine sediments. EM measurements were taken along transects at 10 sites during autumn and spring of 2005. A number of other biotic and abiotic measurements were also taken, including soil EC, pH and evaporation indicators.

Results indicate that as the EM measurements increase with depth (i.e. EM38 to EM31), EC and other related salinity measurements show less of a relationship with the EM readings. The EM readings for both instruments frequently showed large variation over small distances, often within a few metres. The EM measurements increased from autumn to spring following considerable rainfall and are generally higher on the Silurian lithology. Soil EC measurements indicate that the high salt concentrations are generally at the surface, and concentrations vary considerably spatially and temporally. As EM readings are a function of multiple factors, including soil moisture, clays and ferrous minerals content and salt, which are all heterogeneous spatially and temporally, ground truthing is necessary, and at the same time as the EM surveys are performed. This is often impractical, laborious and expensive.

We therefore suggest that mapping, monitoring and management should be focused on surveys of soil surface factors, such as evidence of evaporation, organic matter content and degradation effects due to intensive stock grazing.