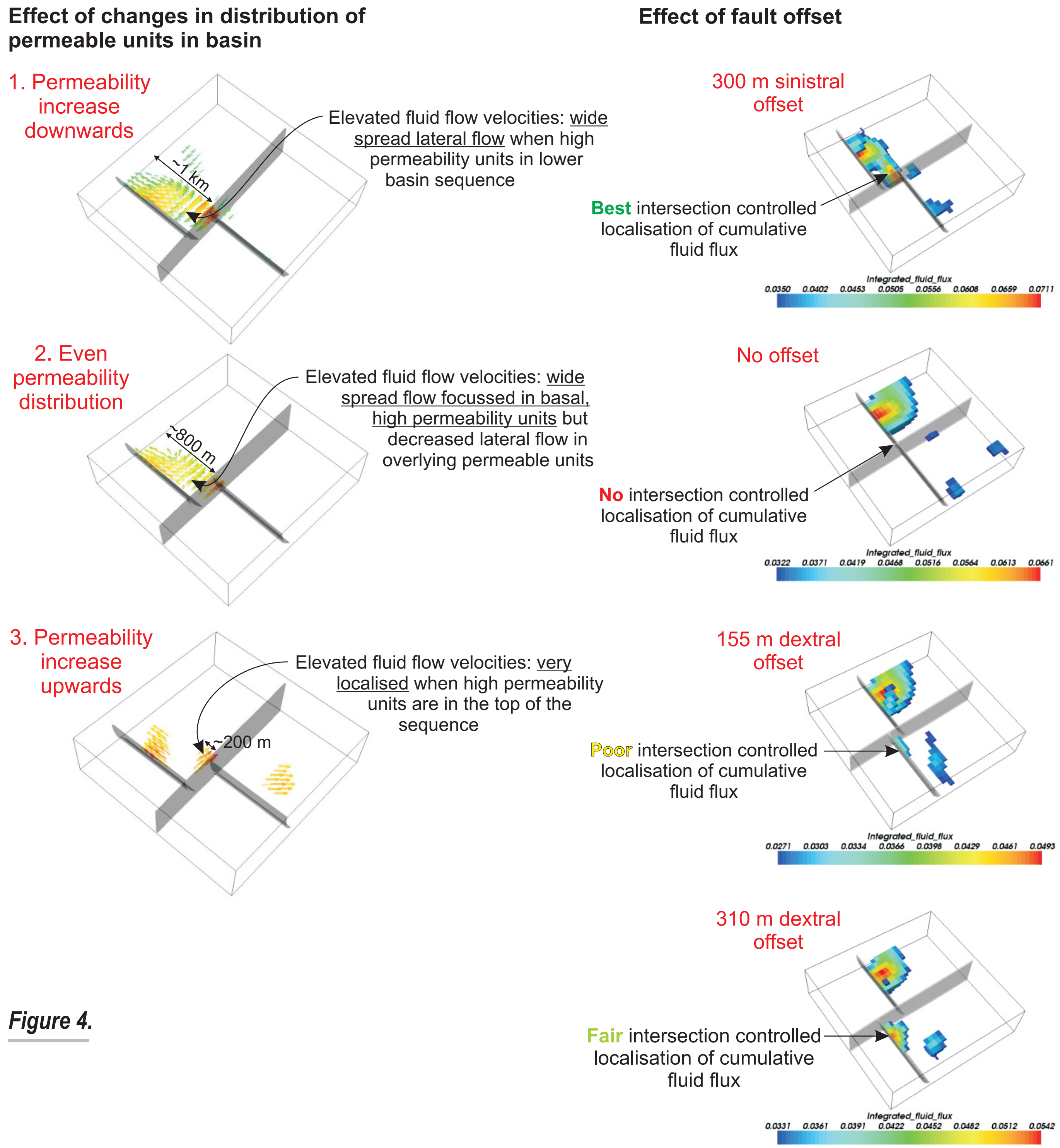

Figure 4.

The predictive targeting outcomes presented in this report result from numerical modeling/simulation of complex mechanical/fluid flow/chemical/thermal systems. The modeling process utilizes both empirical data and geological interpretations as a basis for model construction and some intrinsic assumptions are required by the process. Every effort has been made to simulate these processes as accurately as possible based on the available geological interpretation and data, however, it must be noted that changes to numerical inputs following further data acquisition or variations in geological interpretation may result in different modeling outcomes.

More information:

https://pmd-twiki.arrc.csiro.au/twiki/bin/view/PIRSA2MonaxIOCG/WebHome

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Punt Hill Deformation-Fluid-Flow modelling: Predictive Targeting Outcomes

P2008/946

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Predictive Targeting Outcomes: See figure 1

- Dilation and fluid flow will be localised in the south eastern (e.g. Ground Hog target) and north eastern corners of the offset basin produced by the inward-dipping, northwest-trending faults and the northeast-trending, sub-vertical transform faults.
- Larger strike slip offsets along the northeast-trending faults (300 m+) better localise fluid in the corners.
- Sinistral offset on the transform faults appears to better localise fluid, but may not be essential.
- Detailed examination of the fault intersection relationships shows that highest flow in the basin at the top of the sequence occurs on the northwest side of the intersection between the northwest and northeast-trending faults.
- Lateral flow in the permeable meta-sedimentary basin units is greater towards the base of the sequence and decreases towards the top below the GRV (suggesting that higher copper-gold anomalies underlying the GRV or toward the upper part of the sequence are a better indicator of proximity to a source pipe/primary conduit).

Aims and key questions addressed by the modelling

In this basin architecture, and in stress fields producing similar kinematics to those at Olympic Dam and elsewhere in the Gawler Craton.

- How will fluid flow be distributed? Are some fault intersections better than others? Which are they?
- How does the basin infill affect fluid flow? How does the fluid move out from the faults into the basin? And can we use this information to identify proximity to a source pipe?
- Is the amount of strike slip offset along the NE trending faults important?

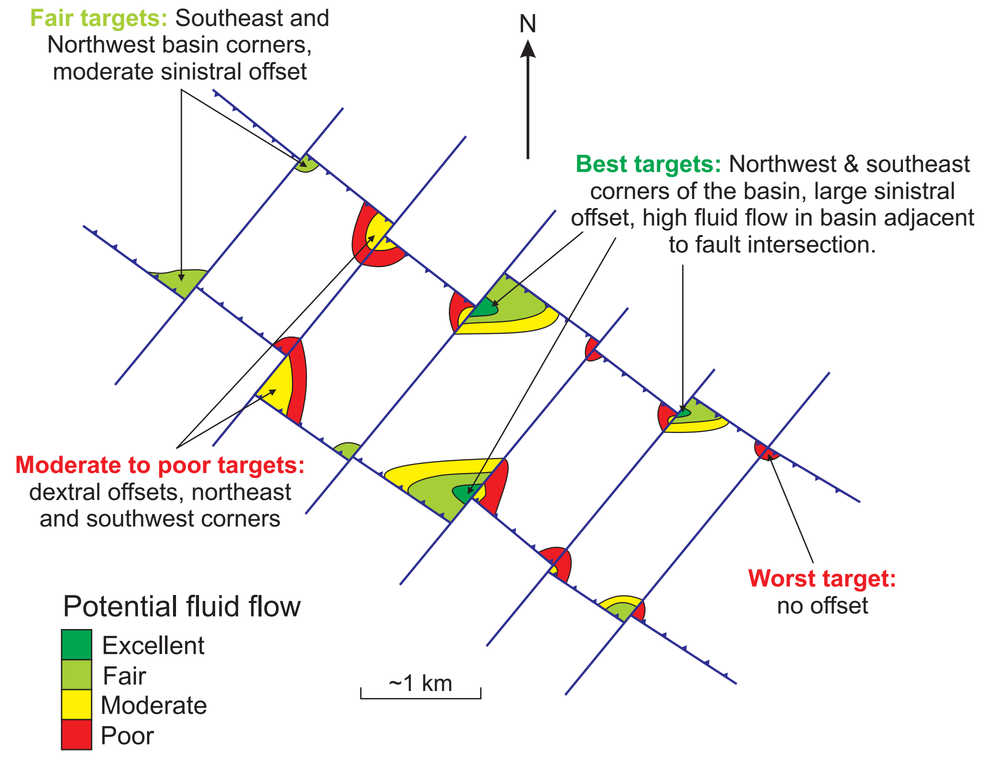


Figure 1

Model design and set-up

- Models are based around the geometry of a NW trending extensional basin, interpreted from geophysical data sets ('Wavelet-based multi-scale edge analysis' - i.e. Worms) and drill core. The basin consists of a series of NW trending extensional faults offset by a series of NE trending transform structures. The basin fill consists of near flat-lying, low-grade metasedimentary rocks while the basement rocks that bound the basin are represented by higher grade metamorphic rocks (denser and less permeable).
- 2 scales of models were used:

  Model 1: Consists of a 6 km wide segment of the basin, offset by NE trending transforms faults. This model is designed to test how the basin architecture influences fluid flow.

Model 2: Consists of a NW trending, NE dipping fault bounding the basin, offset by a NE trending fault (Representing a corner of the offset basin). In this model the basin infill is divided into psammitic and pelitic sub-units. Variables in this model include the distribution of permeable and less permeable units in the basin, sense and amount of displacement on the NE trending fault and fluid discharge.

- A wide range of stress fields have been tested, however, based upon structural relationships in similar age deposits in the Gawler Craton, the focus was placed on those that would produce dextral movement of the NW trending faults.

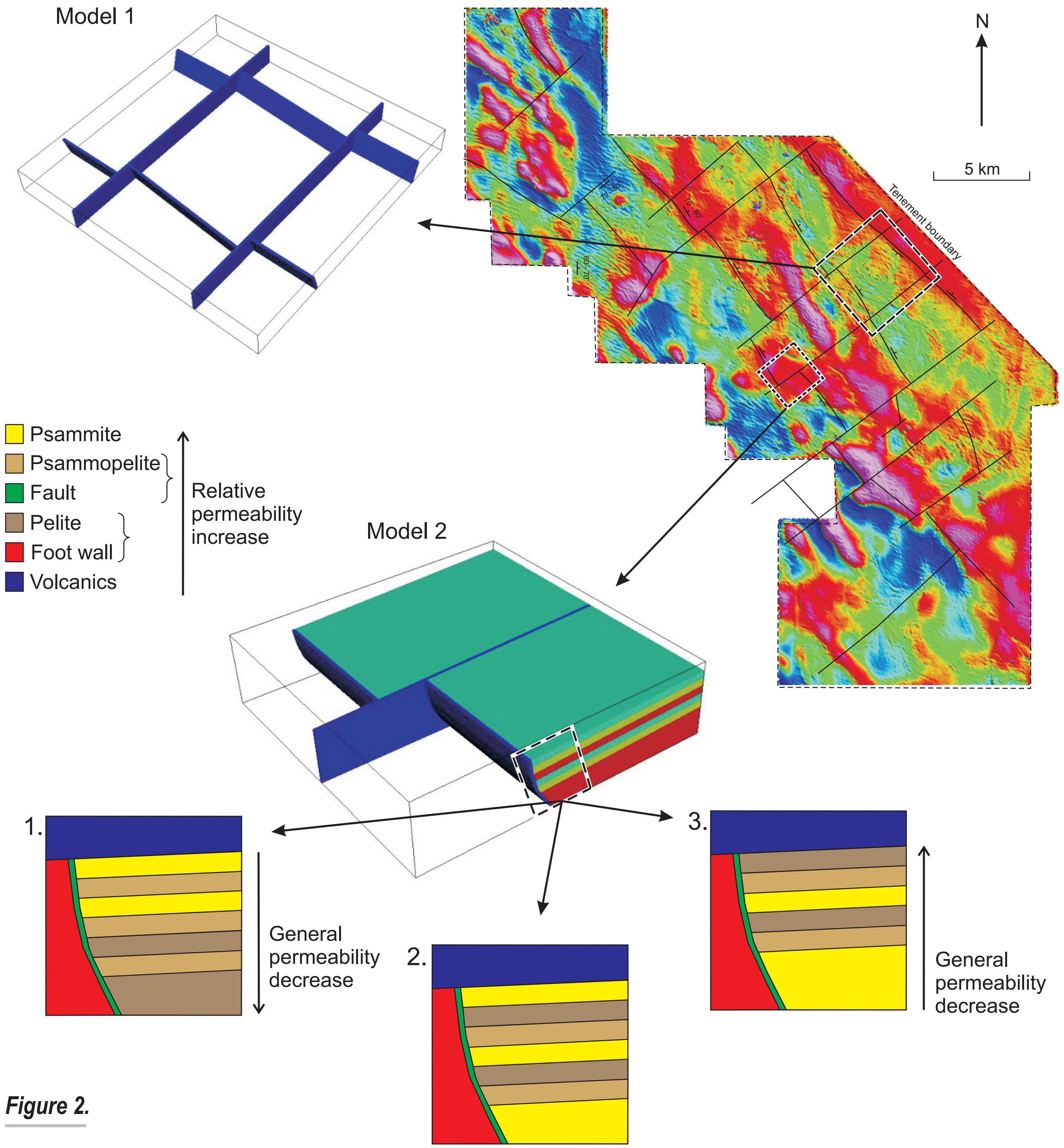


Figure 2.

Results

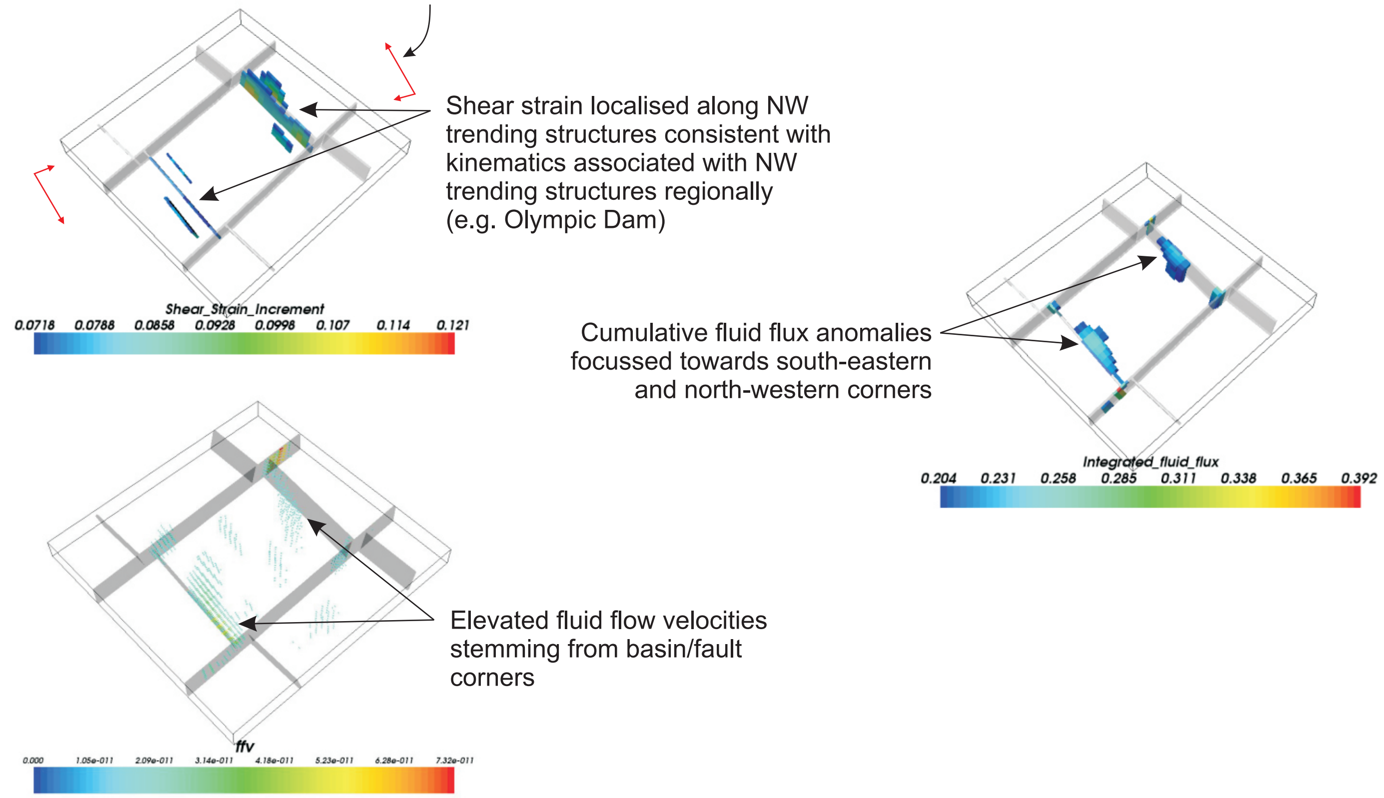
Model 1 (Figure 3)

- Stress fields required to produce dextral strike slip movement on the NW trending faults interpreted to bound a basin offset by NE trending strike slip faults, will also produce an asymmetric strain and fluid flow distribution in the basin.

Model 2 (Figure 4)

- Fluid flow into the basin metasediments adjacent to the faults is highly influenced by the distribution of high and low permeability units. Lateral distribution of mineralisation may be an indicator of proximity to a source pipe (fault intersection).
- Greater, and sinistral offset along the NE trending faults better localise fluid in the adjacent basin.

Sinistral transpression 3:1, 80° compression direction: Better potential for localising mineralisation.



Sinistral transpression 3:1, 120° compression direction: Less likely to localise mineralisation

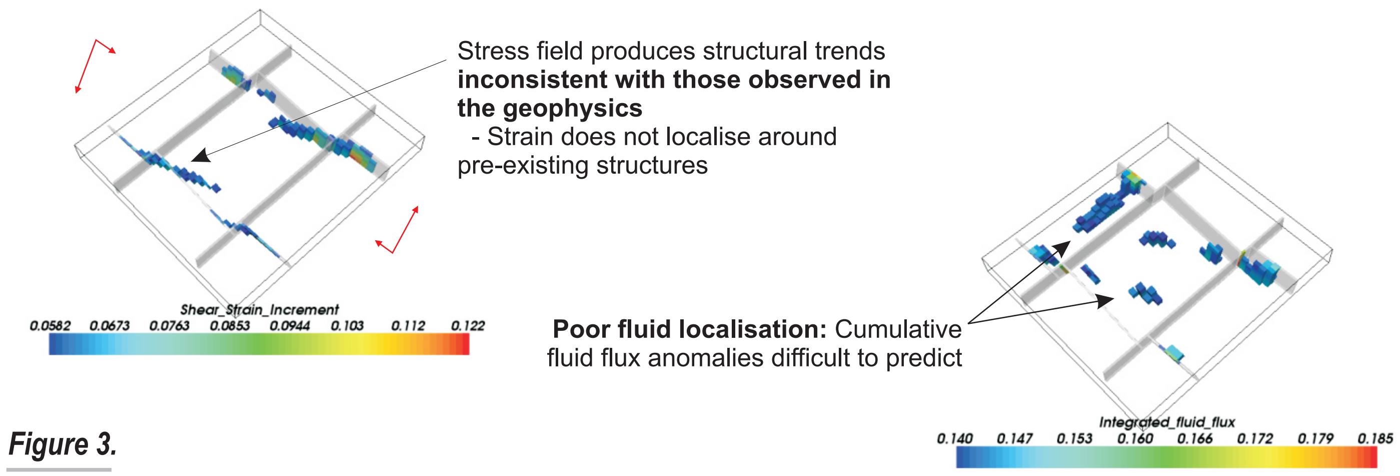


Figure 3.