



4D Fracture Distribution in the Cooper Basin

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Abstract

The Cooper basin is located in central Australia and is made from non-marine sedimentary rocks which were formed in the Late Carboniferous to Middle Triassic period. The basin was formed due to thermal subsidence, and it can be attributed to prior granite emplacement and uplift due to high heat flow.

4D Fracture Distribution is used to identify the effect of stress orientations caused by different tectonic events in the study area by interpreting fractures and faults from image log data. This study focuses on the section of Cooper Basin in South Australia where an intra-cratonic basin is located and, specifically, where it is entirely overlain by the Eromanga Basin and partially underlain by the Warburton Basin. Stress influences tectonic orogeny in this study area from the Warburton Basin stratigraphy (Pando formation) to the Eromanga Basin (Bulldog Shale) section.

The image log data provides information on fractures and faults which indicate that fractures and faults were created by different stress mechanisms through time. Firstly, these fractures are interpreted by stereonet and separated to different sets according to the different formations and stress regimes created. Secondly, these fracture and fault interpretations are related to tectonic events in the Cooper Basin. The tectonic events stress influences are shown in wells location map after data cooperation.

In conclusion, tectonic events can be seen which include (listed in order of age) Ross-Delamerian Orogeny, Alice Springs Orogeny, Kanimblan Orogeny, Sakmarian uplift, Hunter-Bowen Orogeny, Late Eocene Oligocene, Mid Miocene Orogeny and an unknown stress which indicate stress directions and time in the area studied. In some events, stress directions are not unitive because well location may lie near fault belts which could obstruct stress conduction.

Table of Contents

Acknowledgements.....	ii
1. Introduction	1
1.1 Project Background.....	1
1.2 Project Aim.....	1
1.3 Pervious Work: Basin stress evolution.....	2
1.4 Thesis Plan.....	6
2. Methodologies	6
2.1 Well location	6
2.2 Image log.....	6
2.2.1 Introduction to borehole imaging tool	6
2.2.2 Fracture Interpretation with image logging data	7
2.2.3 Well borehole breakout and DITF.....	8
2.2.4 Fault image log interpretation	9
2.3 Stereonet projection fracture analysis	10
2.4 Identify fractures with folded beddings.....	12
2.5 Wells image log data.....	13
2.6 Stratigraphy formation and lithology of well image log data	14
2.7 Fracture number value.....	14
2.8 Fracture colors in stereonet interpretation	14
3. Literature Review.....	15
3.1 The Stress Tensor.....	15
3.3 The Cooper Basin Structure Elements: Ridges and Trough	16
3.4 Geological Summary with Stratigraphy and Lithology.....	17
3.4.1 Warburton Basin Stratigraphy and Lithology: Early Ordovician	17
3.4.2 Cooper Basin Stratigraphy and Lithology: Early Permian	17
3.4.3 Cooper Basin Stratigraphy and Lithology: Late Permian	19
3.4.4 Eromanga Basin Stratigraphy and Lithology: Jurassic.....	20
3.4.5 Eromanga Basin Stratigraphy and Lithology: Early Cretaceous.....	21
3.5 Horizontal stress orientation	22
3.6 Drilling induced tensile fractures.....	22
3.7 Borehole Breakout	22

3.8 The relationship between natural fractures density with lithology and depth.....	23
4. Results.....	24
4.1 Fracture sets diversification with depth	24
4.2 Fractures and faults sets for each formation.....	24
4.2.1 Pando Formation	24
4.2.2 Patchawarra Formation	25
4.2.3 Murteree Shale	27
4.2.4 Epsilon Formation	28
4.2.5 Roseneath Shale.....	28
4.2.6 Daralingie Formation	29
4.2.7 Toolachee Formation	30
4.2.8 Nappamerri Group.....	31
4.2.9 Poolowanna Formation.....	32
4.2.10 Birkhead Formation	32
4.2.11 Westbourne Formation.....	32
4.2.12 Namur Sandstone	33
4.2.13 Cadna-owie Formation	34
4.2.14 Bulldog Shale.....	34
4.3 Fault interpretation.....	35
4.3.1 Bulldog Shale Formation	35
4.3.2 Cadna-owie Formation.....	35
4.3.3 Patchawarra Formation	37
4.4.4 Pando Formation	37
4.4 Core observation.....	39
4.4.1 Biala_6 Murta Formation (1197.80m- 1215.60m).....	39
4.4.2 Biala_7 Murta Formation (1201.50m- 1218.80m).....	40
4.4.3 Dullingari_47 Murta Formation (1478.80m- 1497.10m)	42
4.4.4 Narcoonowie_4 Murta Formation (1321.60m- 1339.80m).....	43
5. Discussion.....	44
5.1 Ross-Delamerian Orogeny	44
5.2 Unknown Stress 1	44
5.3 Sakmarian uplift	45
5.4 Hunter-Bowen Orogeny.....	46
5.5 Late Eocene Oilgocene.....	49

5.6 Mid Miocene Orogeny	50
5.7 Nowadays in situ stress field fracture.....	51
5.8 Unknown Stress 2 influenced fractures.....	51
6. Conclusion.....	52
References	54