

Results of stratigraphic drilling in the southern Thomson Orogen

David Purdy, Dominic Brown, DNRM
Ian Roach, Geoscience Australia

Digging Deeper 2017

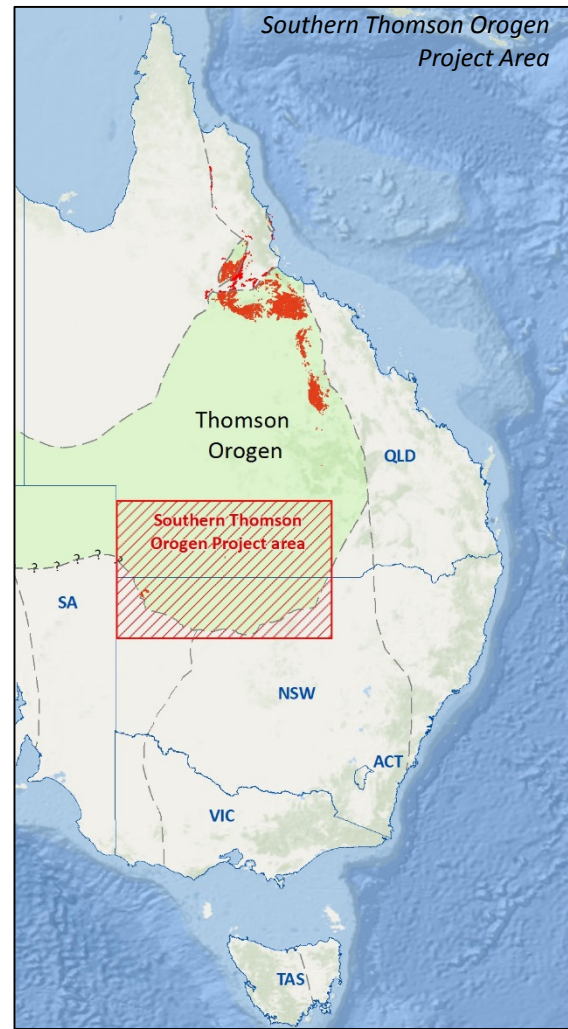
GEOLOGICAL SURVEY OF QUEENSLAND

Annual seminar



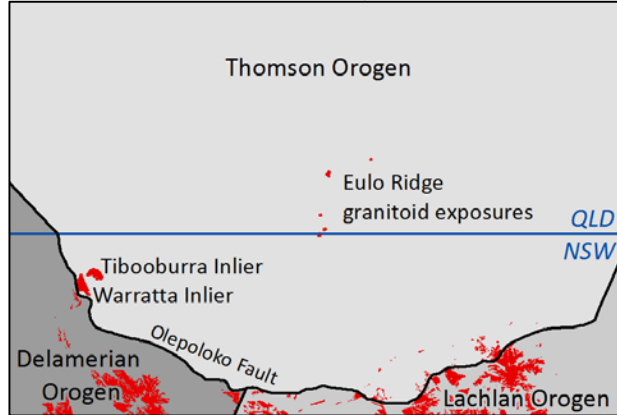
Southern Thomson Orogen

- Major collaborations with GA, GSNSW and universities
- New data – geochemistry, geochronology, geophysics
- New ideas emerging



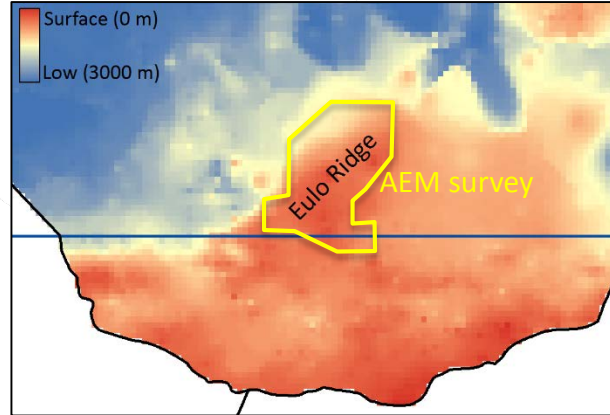
Southern Thomson Orogen

Outcrop

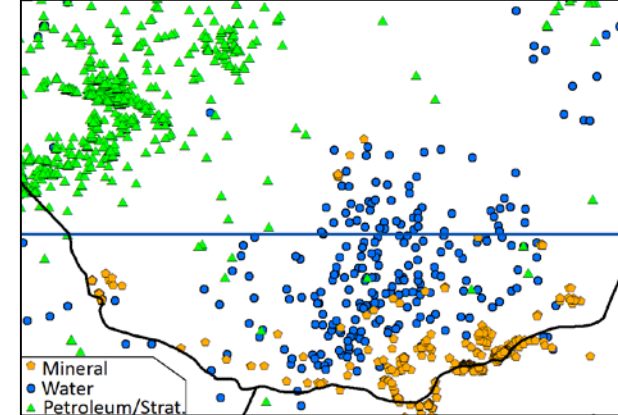


200km

Depth to basement

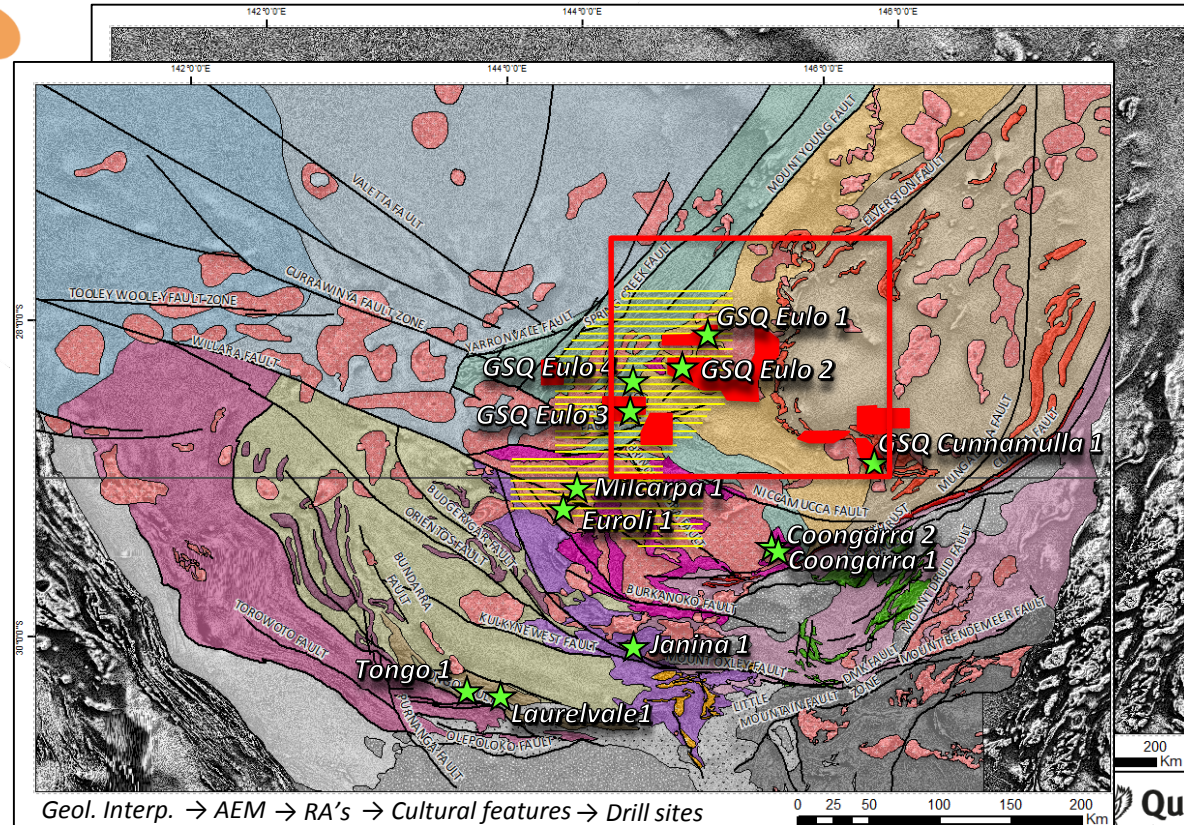


Drill holes

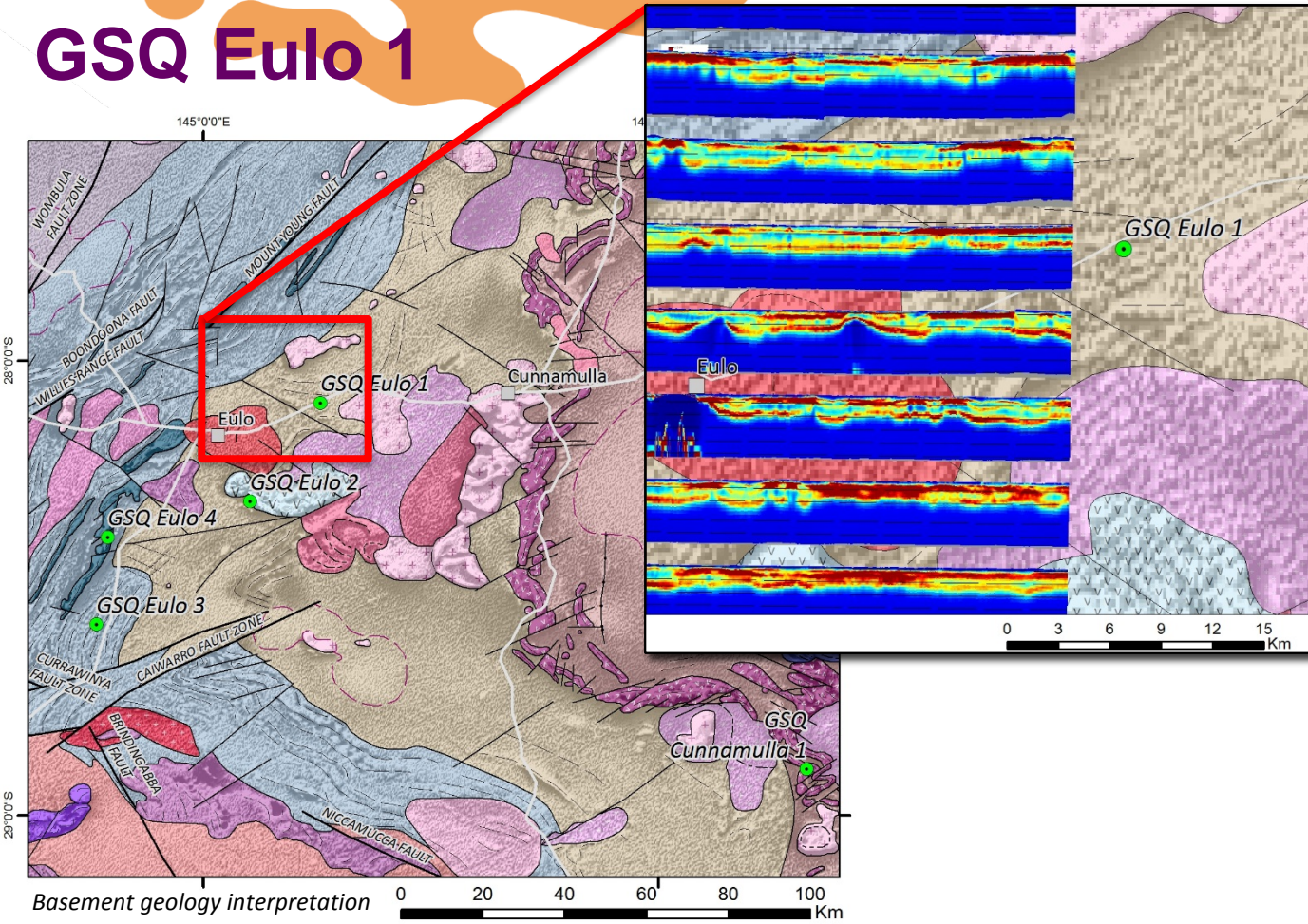


Drilling

- Understand geology and tectonic development
- Define depth to basement and where to explore
- What geophysical and drilling methods work
- Is there any economic potential?



GSQ Eulo 1



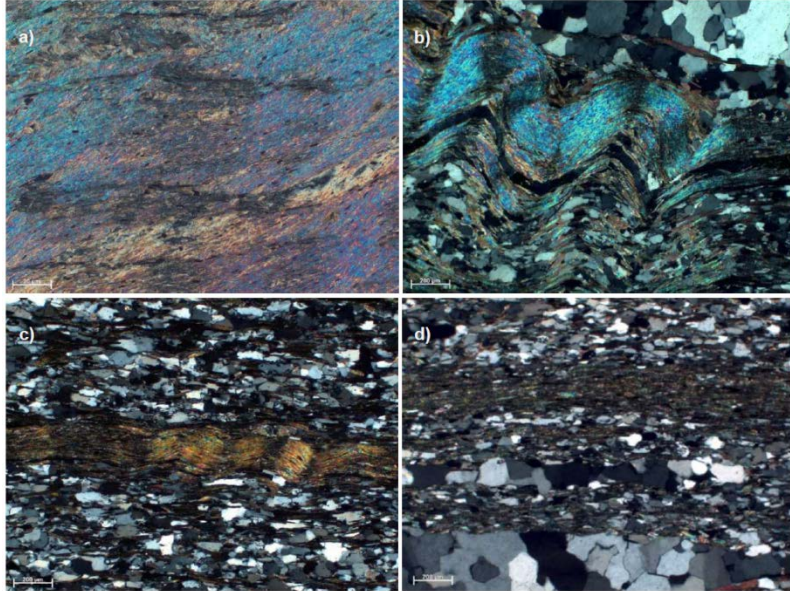
Method	Cover thickness estimate (m)
Refraction seismic	295 - 317
Audio-MT	245 - 299
Targeted mag. Inversion	195 - 431
Adjacent water bores	280
Regional AEM	>200
Drilling	299

Goodwin et al. in press

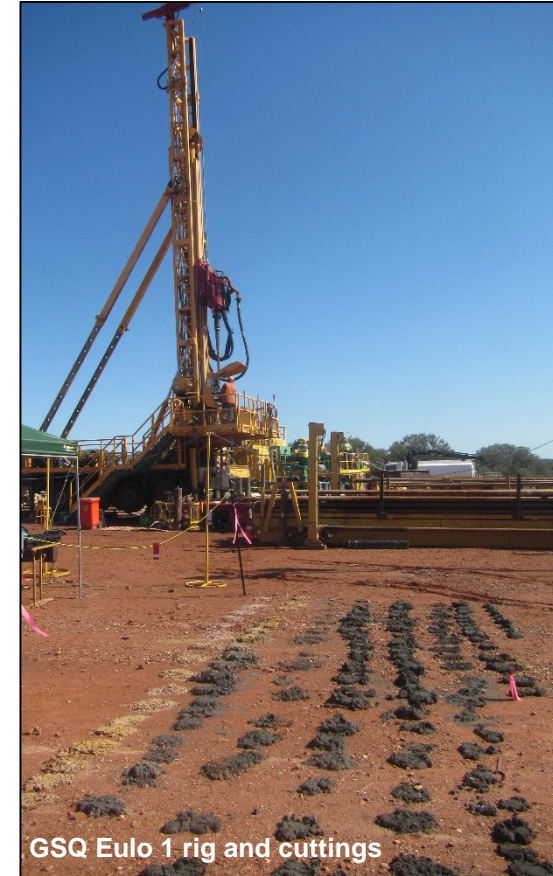


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- Basement at ~299m (Nebine metamorphics)
- Wedged, drilled on to 379.3m total length
- Greenschist facies metasediments
- Prelim. maximum depositional age ~460Ma

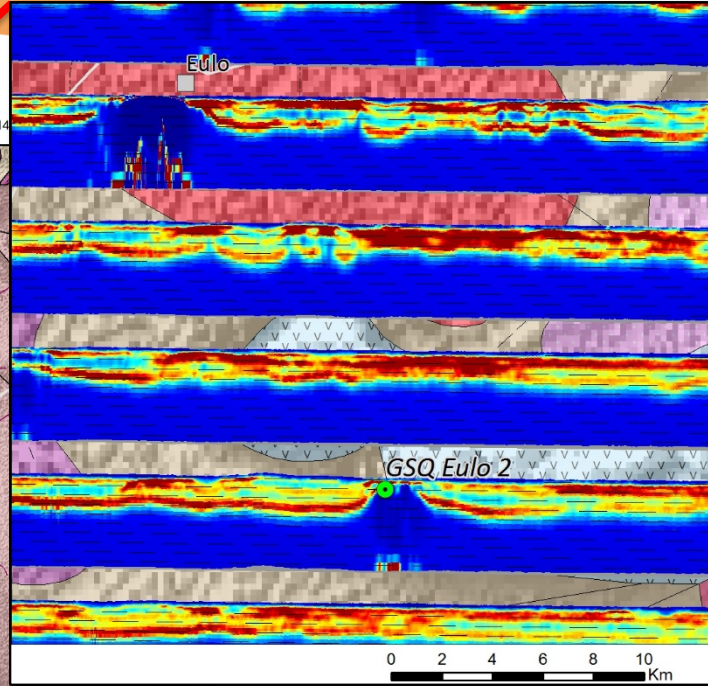
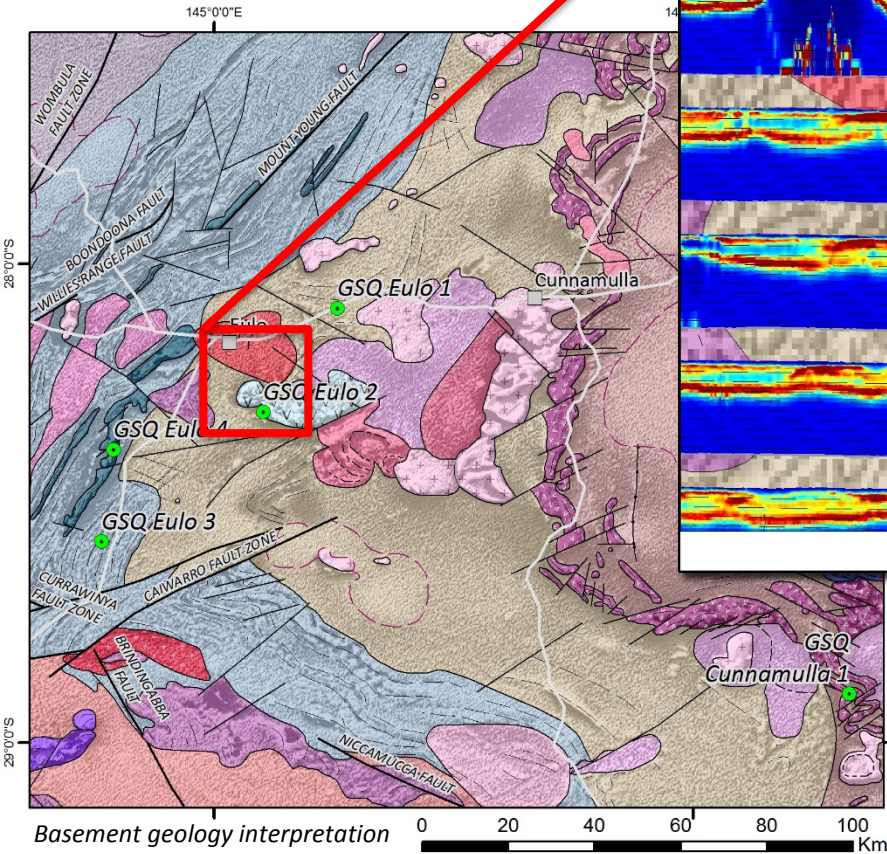


GSQ Eulo 1



GSQ Eulo 1 rig and cuttings

GSQ Eulo 2



Method	Cover thickness estimate (m)
Refraction seismic	49 – 55
Audio-MT	34 – 42
Targeted mag. Inversion	133 - 295
Adjacent water bores	>100
Regional AEM	50
Drilling	49

Goodwin et al. in press



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GSQ Eulo 2

- Basement at ~49m (Waihora Volcanics)
- Drilled on to 135.5m total depth
- Upper 20m - Volcaniclastic conglomerate
- Lower section – altered dacitic volcanics



67.1 – 69.6m



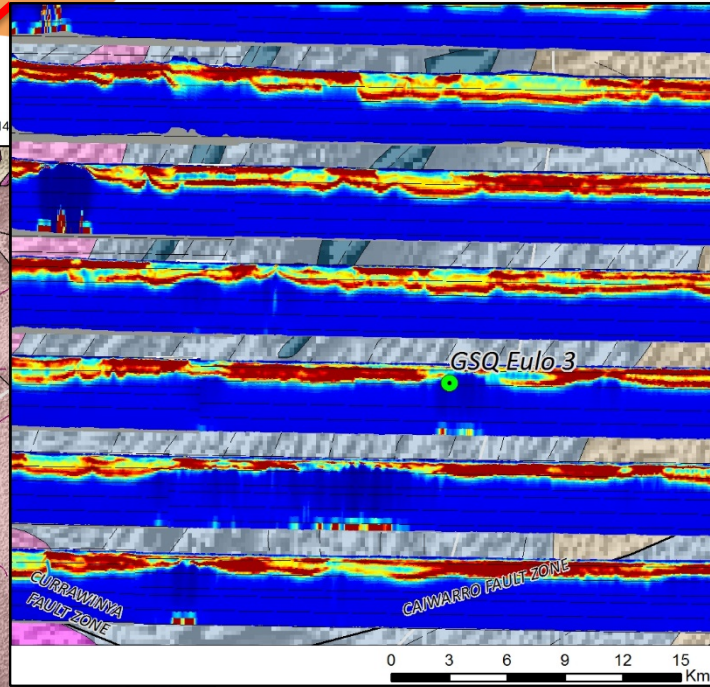
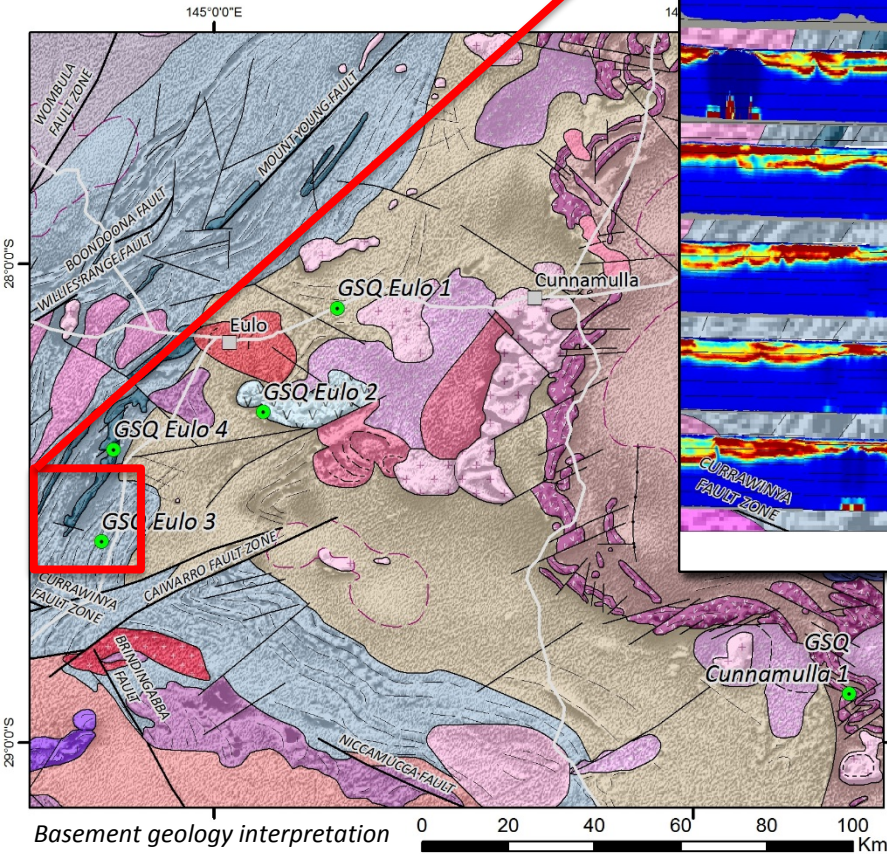
75.6 – 78.8m



101.6 – 105m



GSQ Eulo 3



Method	Cover thickness estimate (m)
Refraction seismic	-
Audio-MT	-
Targeted mag. Inversion	-
Adjacent water bores	<135
Regional AEM	75
Drilling	96

Goodwin et al. in press



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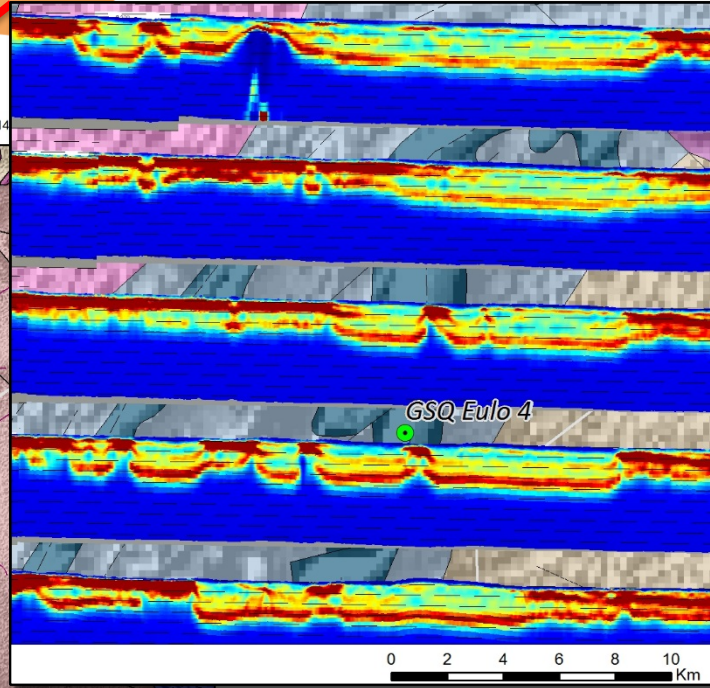
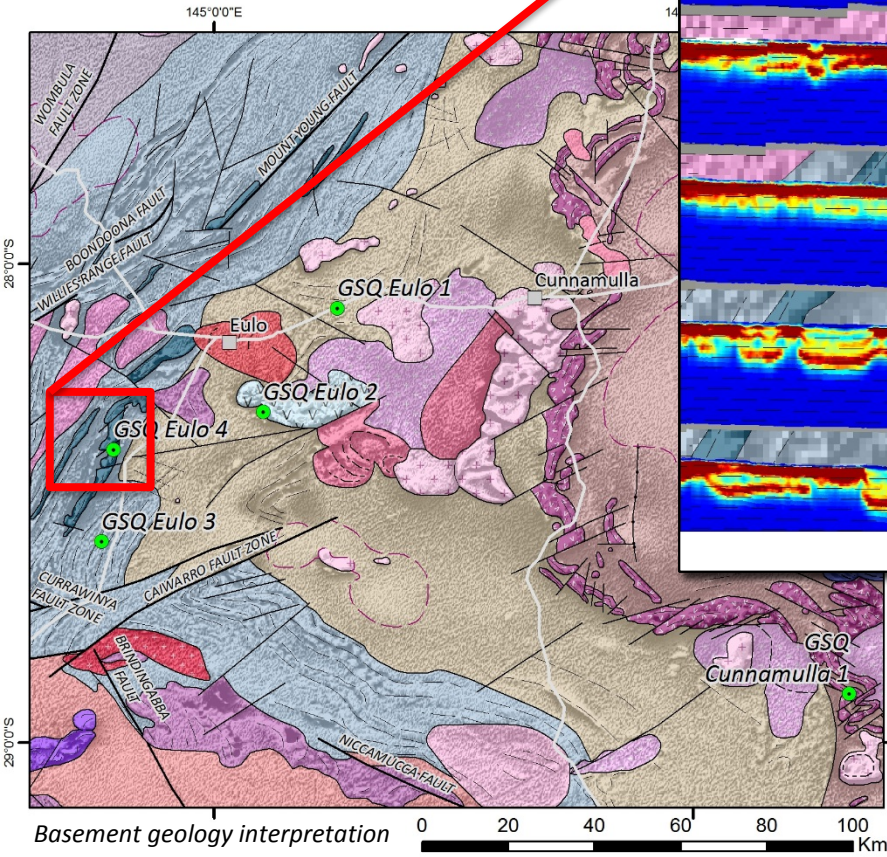
GSQ Eulo 3



- Basement at ~96m (Werewilka fm.)
- Drilled on to 171.9m total depth
- Thin bedded metasediments with abundant quartz veining, locally galena-bearing, abundant pyrite



GSQ Eulo 4



Method	Cover thickness estimate (m)
Refraction seismic	-
Audio-MT	-
Targeted mag. Inversion	-
Adjacent water bores	>240m
Regional AEM	>200m
Drilling	261

Goodwin et al. in press



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335.5 – 338.9m

325.4 – 329.1m

GSQ Eulo 4 drill site

GSQ Eulo 4



at ~261m (Werewilka fm.)

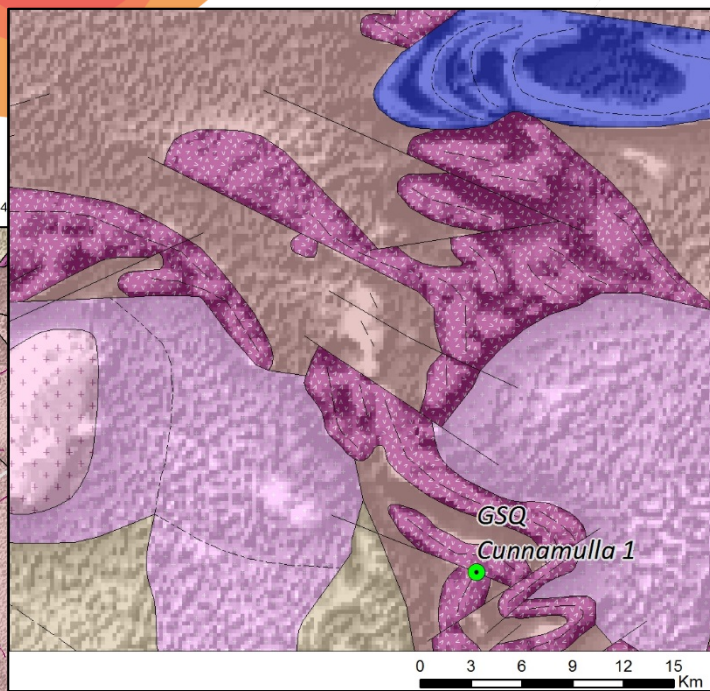
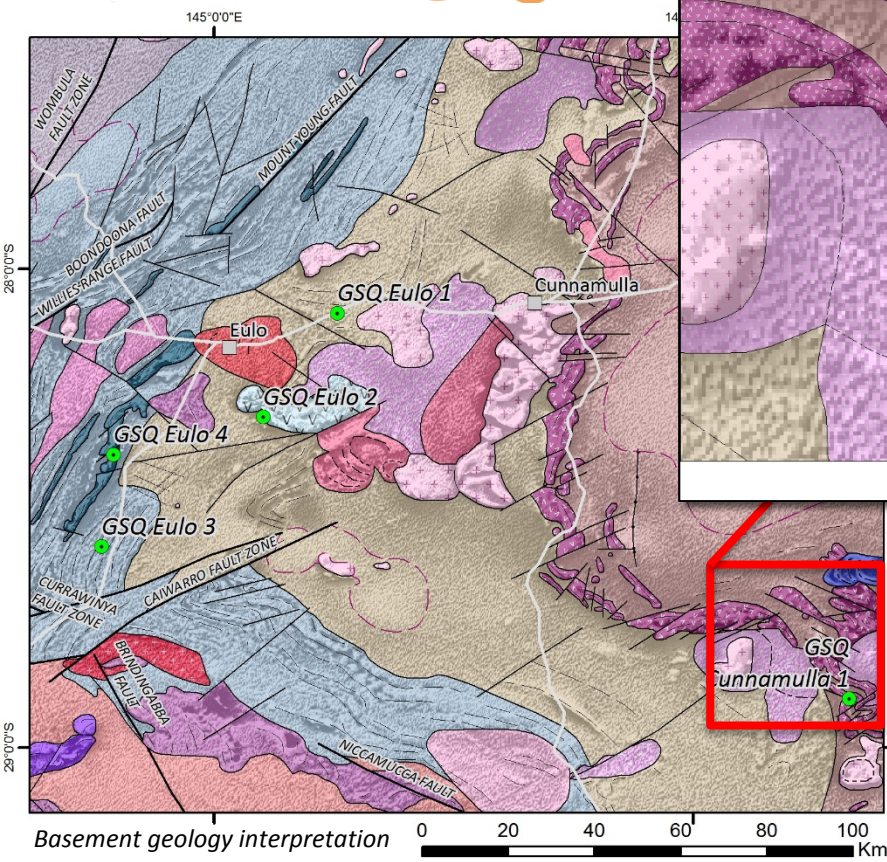
to 357.6m total depth

and metasediments in fault contact with
mafic intrusive rock with abundant
veining



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GSQ Cunnamulla 1



Drilling Deeper 2017

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Method	Cover thickness estimate (m)
Refraction seismic	241 - 256
Audio-MT	432 - 528
Targeted mag. Inversion	384 - 596
Adjacent water bores	450 - 550
Regional AEM	-
Drilling	502.2

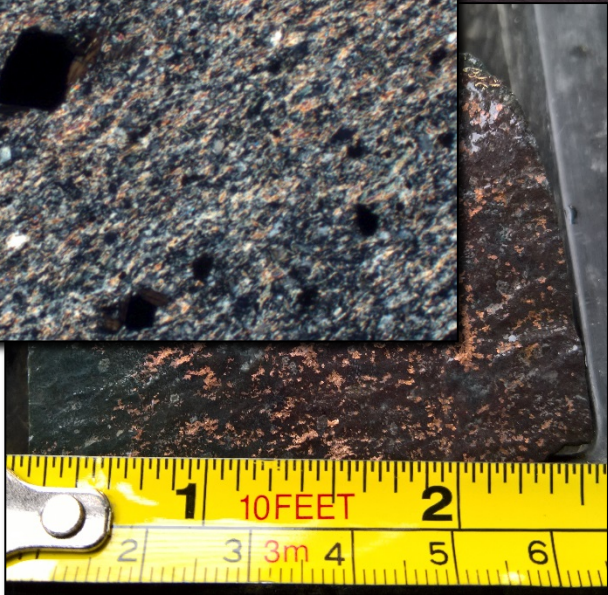
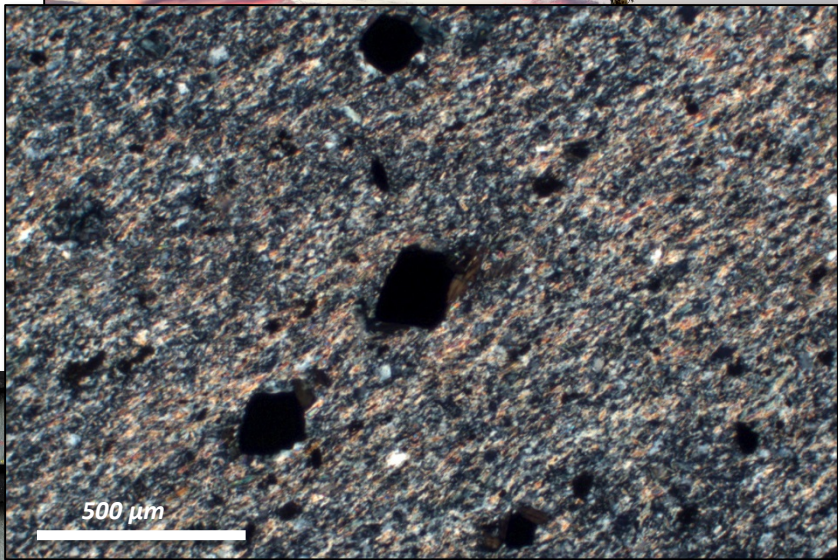
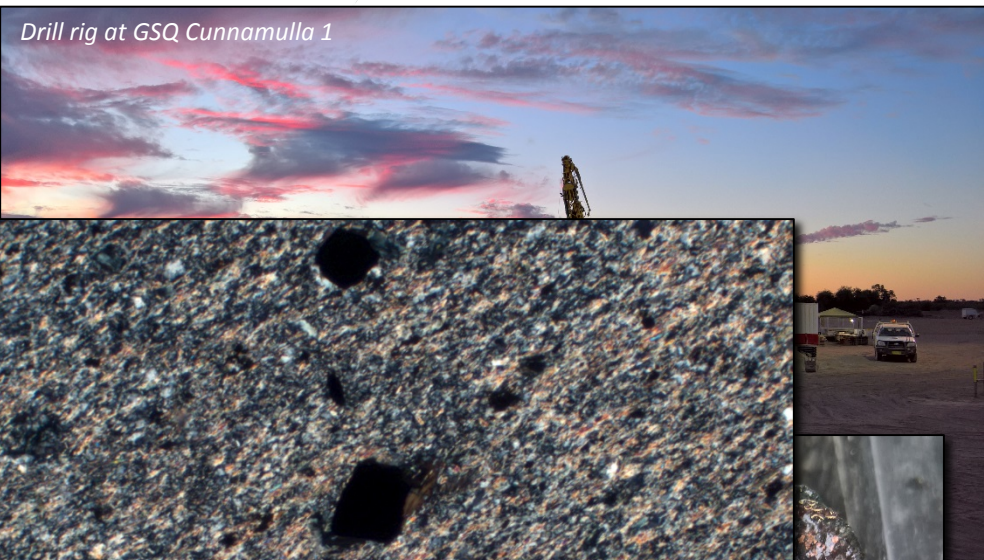
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GSQ Cunnamulla 1

- Basement at ~502m
- Drilled on to 632.4m total depth
- Foliated metasandstone and metasilstone with local magnetite-rich domains
- Deformed quartz veins and native copper along some foliation surfaces.



Summary – what have we proven?

- Regional AEM is useful for basement paleotopography
- Seismic refraction surveys confirm depth to basement over small areas
- Positive signs for economic potential
- Delivered successful drilling program in challenging terrane
- Stratigraphic drilling is a viable regional geology tool > logical follow-on from the \$M invested in regional geophysical surveys



Thank you

David Purdy

Senior Geoscientist

Geological Survey of Queensland

Department of Natural Resources and Mines

E: david.purdy@dnrm.qld.gov.au

Feedback:

geological_info@dnrm.qld.gov.au



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