

Mapping remanent magnetizations at regional scales

Clive Foss 12 October 2017

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Outline

- Remanently magnetized magnetic anomaly sources
- Case study remanence expression in magnetic field data in the Tellus SW survey, southwest England
- Australian remanent anomaly database
- Conclusions

Anomaly Source Magnetization Directions



Tellus SW TMI



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Total gradient of TMI contours on Bouguer Gravity



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Total gradient of TMI contours over Geology



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TMI maps

Induced anomaly









Area 3



Area 3 example model sections



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Area 3 measured and computed TMI



Area 5b



Area 5b example model sections



Area 5b measured and computed TMI



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Total gradient of TMI contours (red) with palaeomagnetic sample sites (blue)



Creer, K.M., 1966, Palaeomagnetic studies on basic dykes and sills from S.W. England, Geophys, J. R. astr. Soc., 11, 415-422

Resultant Magnetizations from TMI Inversions and Remanent Magnetizations from Palaeomagnetism



Filled symbols +ve inclination

Open symbols -ve inclination

00

OT

80

90

100

110

120

130

Total gradient contours with selected mine sites



Lead mines

Copper mines

I would like to thank Mike Gill, recorder of the Northern Mine Research Society <u>http://http//www.nmrs.org.uk/</u> for supply of the Devon and Cornwall mine location database.

TMI Image of Australia



Data courtesy of Geoscience Australia

Australian Crustal Elements Map





Australian Lithology Classification



Data courtesy of Geoscience Australia

Remanent Anomalies Database Structure



Australian Remanent Anomalies Database



https://confluence.csiro.au/display/cmfr/Home

Database Interrogation



Anomaly Database Download



Database entries require only that an anomaly is located and attributed to a survey

Anomalies can be attributed with magnetization direction by analytic methods or inversion

Inversion models can be made available for download (in zip files – allowing versatile formats)



Automated Regional Source Mapping



Conclusions

• Mapping distribution of magnetizations can assist geological mapping and mineral exploration

• Magnetization mapping can be conducted at continental (and global) scales

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Thank you

CSIRO Mineral Resources Clive Foss Senior Research Geoscientist

e clive.foss@csiro.auw www.csiro.au/loremt +61 2 9490 8713

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