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Preliminary paleomagnetic results for the Century Zn–Pb–Ag deposit, Australia

K. Kawasaki [a,*], D.T.A. Symons [a], T. Dawborn [b,1]

[a] Department of Earth and Environmental Sciences, University of Windsor, Windsor, ON, N9B3P4, Canada
[b] Zinifex Limited, Melbourne, Victoria 3006, Australia

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ABSTRACT

Paleomagnetic results are reported for the world-class Century Zn–Pb–Ag SEDEX deposit in northwestern Queensland, Australia. The stratiform mineralization occurs in fine parallel lamellae in ~1595 Ma black shales and siltstones of the upper Lawn Hill Formation in the upper part of the Proterozoic McNamara Group. Galena from the deposit has given a Pb/Pb model age of ~1575 Ma. Paleomagnetic analysis of 333 specimens from ore zones (15 sites), hanging wall sandstones or siltstones (4 sites), and footwall siltstones (5 sites) using mostly thermal and then alternating field step demagnetization, isolates a stable characteristic remanent magnetization (ChRM) for the ore sites. Scattered ChRM directions only are observed in the hanging wall and footwall sites, probably due to the presence of excessive amounts of siderite. A paleomagnetic fold test using the ChRM directions of the ore sites is positive, showing that the ore ChRM predates the D_2 deformation stage of the poorly dated ~1575 to ~1500 Ma Isan orogeny. D_2 is an east–west compression event that includes folding of main-stage mineralization, and so the fold test shows that the mineralization retains a primary magnetization. The mean ChRM directions of the ore sites after an optimal 80% bedding correction yields an Mesoproterozoic paleopole at ~1550 Ma on the northern Australia apparent polar wander path. This result not only constrains the timing of the mineralization, but also provides an upper age limit for the D_2 deformation stage of the Isan orogeny in the Lawn Hill region.

* Corresponding author. Tel.: +1 519 253 3000x2171; fax: +1 519 973 7081.
E-mail address: kawasak@uwindsor.ca (K. Kawasaki).
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