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The Pringle Falls polarity episode recorded in the Deschutes river area: a revisited study

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We have studied a total of 827 samples drilled from five widely spaced profiles sampled along the Deschutes River Oregon. The five profiles sampled recorded a high-resolution paleomagnetic record of the Pringle Falls magnetic polarity episode (ca. 218+/- 10 ka) and are characterized by diatomaceous lacustrine sediments. This sedimentary sequence was sampled as part of an extensive prehistoric fluvial and lacustrine complex that formed east of the Cascade Mountains during the last 1.0 Ma. The lake appears to have resulted from a late Pliocene/Pleistocene rise in the base level to the east of the sampling area near the western margin of the Basin and Range structural province and is related to the development of the extensive volcanism associated with the Newberry volcano. We have conducted paleomagnetic and rock magnetic studies in order to investigate the reproducibility of the paleomagnetic signal throughout the 5 km of the sampling of the five profiles. We conducted low-field vs. susceptibility analysis to determine the magnetic carriers of the sediments and we found that the main magnetic carrier is pure magnetite (Curie point 575C). The magnetic grain size indicated SD-MD magnetite. The demagnetization of the sediments was done by means of alternating field methods and the determination of the mean directions by principal component analyses. The level of detail of the paleo-signal of these five records is highly consistent since they are characterized by rapidly deposited sediments (greater than 10 cm/kyr) that provide detailed representation of field behavior during the excursion. The VGP paths are highly internally consistent and are defined by a clockwise loop traveling from high northern latitudes over the eastern part of North America and the North Atlantic to South America and then to high southern latitudes and that return to high northern latitudes through the Pacific and over Kamchatka. This last clockwise

looping is characteristic of other recently found excursions like the Iceland basin excursion (IBE, 188 ka). The published age of the Pringle falls excursion (ca. 218+/-10 ka) and the most recent radiometric ages (weighted mean 211 $\pm$ 11 ka, Singer et al., 2005) indicate that the dominance of such VGP paths (i.e. clockwise looping) of the Pringle Falls, the IBE, Jamaica and other excursion of the same age show that the excursional paleofield had a relatively simple geometric characteristic. A corollary of the latter option is that paleomagnetic polarity episodes of different ages may have similar transition polar paths, a conclusion implying that a common mechanism of the generation of the paleofield is involved.