

Comparison of Ordovician K-bentonites in Laurentia, Baltica, Avalonia, and western Gondwana: Stratigraphical, geochemical, and paleogeographic implications

¹CINGOLANI, C., ²BERGSTRÖM, S.M., ³HUFF, W.D. & ⁴KOLATA, D.R. ¹C.I.G.-Universidad Nacional de La Plata, 1900 La Plata, Argentina; ²Department of Geological Sciences, The Ohio State University, Columbus, OH 43210, USA; ³Department of Geology, University of Cincinnati, Cincinnati, OH 45221, USA; ⁴Illinois State Geological Surv., 615 E. Peabody Dr., Champaign, IL 61820, USA.

Ordovician (Ord.) volcanic ash beds (K-bentonites) are widespread geographically and stratigraphically in the continents bordering the Iapetus. Most of the more than 75 beds in Laurentia are in the upper Middle Ord. of eastern North America and only a few beds occur in the Lower and Upper Ord. The majority of the more than 170 K-bentonite beds in Baltica are likewise in the upper Middle Ord. Most of the more than 30 beds in Britain occur in the Middle and Upper Ord. but their stratigraphic distribution pattern is different from those in Baltica and Laurentia, suggesting a different source area. More than 180 ash beds have been recorded from the lower Middle Ord. of the Precordillera of Argentina. Their unique stratigraphic distribution suggests a separate source area. Microprobe analyses of primary mineral phases, including pristine melt inclusions in quartz, combined with whole rock trace element analyses, suggest the general tectonic setting of the source volcanoes as well as indicate the bulk composition of parental magmas. Melt inclusion data suggest that these beds represent vitric fallout ash from large-scale, felsic explosive volcanism associated with collision margin tectonism. There are general chemical similarities between samples from the various regions, especially between the Laurentian and European beds, but the Precordilleran ones contain some minerals unique to that region. All source magmas were derived by partial melting of continental crust during phases of closure of the Iapetus. K-bentonite evidence suggests that in terms of Iapetus paleogeography, there was a shorter distance between Laurentia and Baltica than between these regions and the Precordillera and Avalonia.