
Asymmetric Zonation of a Thick Ordovician K-Bentonite Bed at Kinnekulle, Sweden

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Abstract: The clay fraction of a ~2-m-thick K-bentonite at Kinnekulle in southwestern Sweden has been studied by X-ray powder diffraction, chemical analyses, and cation-exchange capacity determinations. Previous investigations of the upper half of this bed (B-bed) have shown the clay mineral to be illite/smectite (I/S), containing about 50% illite layers at the center of the bed and 65% illite layers at the upper contact. New data on six samples from the lower part of the bed show no zonation, the I/S containing about 50% illite layers in all samples. The bentonite occurs in limestones and shales overlying a 40-m-thick limestone bed and is overlain by limestones, marls, and shales (~90 m), which in turn are overlain by a 40-m-thick diabase. The limestones are silicified in contact with the bentonite, particularly beneath the B-bed. The increased K content towards the upper contact may therefore have resulted from diffusion of K-bearing solutions from overlying shales, a process that was impeded in the lower part of the bed, probably by the silicification.

Key Words: Bentonite • Diagenesis • Illite/smectite • Potassium • Shale • X-ray powder diffraction

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