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Review

K-bentonites: A review

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Abstract

Pyroclastic material in the form of altered volcanic ash or tephra has been reported and described from one or more stratigraphic units from the Proterozoic to the Tertiary. This altered tephra, variously called bentonite or K-bentonite or tonstein depending on the degree of alteration and chemical composition, is often linked to large explosive volcanic eruptions that have occurred repeatedly in the past. K-bentonite and bentonite layers are the key components of a larger group of altered tephras that are useful for stratigraphic correlation and for interpreting the geodynamic evolution of our planet. Bentonites generally form by diagenetic or hydrothermal alteration under the influence of fluids with high-Mg content and that leach alkali elements. Smectite composition is partly controlled by parent rock chemistry. Studies have shown that K-bentonites often display variations in layer charge and mixed-layer clay ratios and that these correlate with physical properties and diagenetic history. The following is a review of known K-bentonite and related occurrences of altered tephra throughout the timescale from Precambrian to Cenozoic.

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