

## **Smectite and zeolite formation from the pyroclastic deposits of the Aksitero Formation, Philippines**

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The smectites and zeolites dominantly comprising the tuffaceous siltstone and sandstones of the Aksitero formation have been found to form from the interaction of hyperalkaline ground water (pH10-11). These deposits are in proximity to the main hyperalkaline spring emanation called the Manleluag Hot Springs of Mangatarem Town, Pangasinan, Philippines. Geochemical reaction modelling (i.e. Geochemist's Workbench) suggests that zeolites are formed from the reaction of the smectites with the hyperalkaline groundwater. A very good evidence for this was also found during trenching conducted on the site, basalt rocks directly underlying the Aksitero Formation show reaction pathways in the form of mixed zeolite and smectite veins. This study highlights a natural analogue site in the Philippines for the bentonite – hyperalkaline pore water interaction that is foreseen to occur in underground nuclear waste disposal.