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Hyperalkaline Springs, Serpentinized Ultramafics, Bentonite Reaction, Exotic Life Forms and Natural Carbon Sequestration: Preliminary Studies from the Philippines

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We have examined a number of hyperalkaline (pH 9-12) springs situated in ophiolites in various locations in the Philippines (Pangasinan, Zambales, Palawan). These clearly result from interactions of groundwater with mafic minerals, but differences in major- and trace-element compositions suggest complex reactions that need further study. Such springs are associated with massive tufa-like carbonate deposits that precipitate as a result of uptake of carbon dioxide from the atmosphere, thus providing a significant locus of natural carbon sequestration (cf. calculations of 5 Gtonnes of CO_2 sequestration in similar systems in the UAE). In addition, the interactions of these waters with proximal bentonite deposits provide a natural analogue for projected reactions within the engineered barriers in geological nuclear waste repositories. Lastly, initial studies on life forms inhabiting these springs suggest land-based analogues of the “extreme” environments previously investigated in hyperalkaline submarine ocean ridges.