

# **Carbon Sequestration by Hyperalkaline Springs in Palawan, Philippines: Geochemical Constraints and Implications**

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High pH springs produced by reaction of groundwater with buried ultramafic rocks were documented in Narra, Palawan, Philippines. These waters are Ca-OH waters, and their pH ranges from 9.5-11.2, Eh (ORP) from -414 to -60mV, and temperature from 37-45 degrees C. Ion compositions are dominated by Ca, Na, K, and Cl, with low concentrations of silica, Mg and carbonate. The Cl and Na contents vary widely with other known hyperalkaline springs, probably due to the proximity of the Narra samples with the sea. Aside from studies as a natural analogue for geological disposal of nuclear waste, these springs also capture Carbon Dioxide from the atmosphere and have deposited millions of tonnes of travertine calcite within a few thousand years. Ironically, Palawan has serious electric power shortages and efforts to build small coal-fired power plants (<30 MW) have been met with strong objections from anti-global warming NGOs regarding CO<sub>2</sub> emissions. The amount of sequestered CO<sub>2</sub> by these springs are several orders of magnitude greater than maximum emissions of the proposed coal plants, causing debates on balancing cheap power and global warming concerns.