

Exploring natural hydrogen in the Philippines

DR. KARMINA A. AQUINO, DR. SC. ETHZ¹, CANDY MARIEL JUEGO¹, YZANX GRANO MALIGAT TAGLE¹, AMERICUS PEREZ¹, ALEXANDRIA M. TANCIONGCO¹, RICO NEIL QUIERREZ¹, JAMES ANDREW LEONG², EMMANUEL A. CODILLO³ AND STEFANO M. BERNASCONI⁴

¹Department of Science and Technology - Philippine Nuclear Research Institute

²LDEO, Columbia University

³Carnegie Institution for Science

⁴ETH Zürich

Presenting Author: kaaquino@pnri.dost.gov.ph

Hydrogen is regarded as the fuel of the future and countries all over the world, including the Philippines, are racing to harness its potential for power generation. However, most of the current hydrogen production is not carbon-free and requires a lot of electricity to produce. Hydrogen may form naturally by serpentinization, a process that involves the interaction between water and olivine and/or pyroxene-rich rocks. This form of hydrogen may be stored in geological settings for millions of years and is recently recognized as a potentially large and unutilized reservoir that may provide the energy needed for a green economy for generations. Given the abundance of ultramafic rocks, serpentinization is likely to be ongoing in several sites in the Philippines. However, the amount of hydrogen produced, as well as the outgassing rates remain unquantified. Here we present our efforts in exploring natural hydrogen in three sites in the Zambales Ophiolite where previously occurring hydrogen seeps or springs have been reported. We integrate constraints from field geology, gas flux measurements, and volatile geochemistry to evaluate the potential of natural hydrogen in order to better understand the formation, occurrence, size, and production rates of hydrogen in the Zambales Ophiolite.