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Elevated hydrogen outgassing in a seep in the Zambales Ophiolite, Philippines

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Geologic hydrogen (H_2), produced naturally by geochemical processes on earth, is increasingly recognized as a new, low-carbon, energy resource. Unlike other naturally occurring gases, hydrogen produces only water when burned. Compared to hydrogen produced today via splitting of water using renewable energy or from fossil fuels, geologic hydrogen is freely available and does not require expensive or energy intensive technology to be produced. We present field-based hydrogen flux measurements from natural seeps and springs emanating from ultramafic rocks in the Zambales ophiolite, Philippines, where hydrogen is produced from water-rock interactions. Here, an exceptional surface outgassing of more than 800 tons/year was measured, representing the highest flow and highest flux of hydrogen per unit area measured in ophiolites to-date. This outgassing is significant and may supplement the power demand of the town hosting the seep. This highlights the potential of geologic hydrogen to provide access to energy especially in rural areas, where these ophiolites are often located in the Philippines. Recently, the Philippines opened a technical and legal framework for the exploration, development, and production of native H_2, signifying that the country sees the potential of geologic H_2 for future power generation. The Zambales seep could be just one of many undiscovered but potentially significant seeps associated with many other ophiolites in the Philippines.