H2 prospection in a volcanic Island, Réunion hotspot

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Résumé

Natural hydrogen (H) is increasingly considered regarded as a primary energy resource rather than a simple carrier(GF1) . Several generation processes mechanisms have been identified, including oxidation of iron-bearing minerals (e.g., olivine, iron oxides)oxidation, magmatic degassing, water radiolysis, and mechanoradical reactions. Intraplate basaltic islands such as La Réunion, which combine active volcanism and abundant mafic to ultramafic lithologies, represent promising potential but stillyet largely unexplored targets for natural hydrogen exploration.
Our soil gas survey, based oncomprising more than 700 soil gas analyses distributed across the entire island, highlights strongreveals pronounced H anomalies of up to 648 ppmv, together accompaniedwith by He anomalies reaching 27 ppmv. These anomalies are , spatially restricted confined to the N120◦ rift zone,directly above the intermediate magma chamber located at Moho depth (10–13 km). Outside this zone, anomalies remain limitedconcentrations remain modest (< 100 ppmv H2), with very low concentrations values measured at Piton de la Fournaise, consistent with a degassed shallow reservoir. The spatial correlation correspondence between surface anomalies and the deep underplating zone enriched in CO suggests a coupled magmatic–hydrothermal control on H release. These results identify the Mare à Boue depressionN120◦ rift zone as the primary exploration target forsource ofnatural hydrogenH2in an intraplate hotspot settingon La Réunion and highlight volcanichotspot islands as promising targets for natural hydrogen prospection.

Mots-Clés: hydrogène naturel, système, Réunion, système de drainage

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