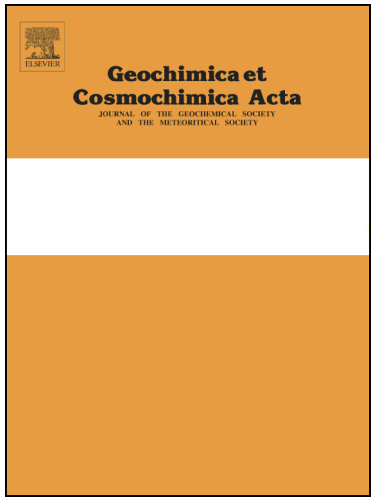

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A Global Ge Isotope Budget

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Abstract

We present measurements of Ge isotope composition and ancillary data for samples of river water, low- and high-temperature hydrothermal fluids, and seawater. The dissolved ^{74}Ge composition of analyzed rivers ranges from 2.0 to 5.6 % , which is significantly heavier than previously determined values for silicate rocks (^{74}Ge 0.4 - 0.7 % , Escoube et al., GGR, 36(2), 2011) from which dissolved Ge is primarily derived. An observed negative correlation between riverine Ge Si and ^{74}Ge signatures suggests that the primary ^{74}Ge fractionation mechanism during rock weathering is the preferential incorporation of light isotopes into secondary weathering products. High temperature (150 C) hydrothermal fluids analyzed in this study have ^{74}Ge of 0.7 - 1.6 % , most likely fractionated during fluid equilibration with quartz in the reaction zone. Low temperature (25 - 63 C) hydrothermal fluids are heavier (^{74}Ge between 2.9 and 4.1 %) and most likely fractionated during Ge precipitation with hydrothermal clays. Seawater from the open ocean has a ^{74}Ge value of 3.2 0.4 % , and is indistinguishable among the di erent ocean basins at the current level of precision. This value should