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The behaviour of zirconium and hafnium during water-rock interaction

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1 THE BEHAVIOUR OF ZIRCONIUM AND HAFNIUM DURING WATER-ROCK
2 INTERACTION

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16 **Abstract**

17 Zr and Hf are two elements with same ionic charge and similar ionic size at a given
18 coordination number. Despite the Zr/Hf ratio is quite constant in meteorites and lithospheric
19 rocks, in natural waters can be either higher or lower compared to values of interacting
20 minerals and rocks. Here, we reanalyze very recent published and present new data on
21 continental and brine waters indicating that the Zr and Hf behavior is dependent on the
22 properties of the authigenic phases formed during the water-rock interaction process. Our
23 results show that water pH in the range between 1 and 9 and water ionic strength in the range
24 between 0.001 and 4 mol kg⁻¹ are responsible for the change of the Zr/Hf ratio. However,
25 analyzing the colloidal fraction comprising Fe-oxyhydroxides, carbonate and clay minerals
26 (occasionally gypsum and halite), obtained by ultrafiltration at the dimension between 10 kDa

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