Inter-laboratory calibration of Zn isotopic compositions for organic and inorganic reference materials

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Significant inaccuracy in MC-ICP-MS measurements of Zn isotopic composition may be caused by inorganic and organic resin-derived components added to samples during column chemistry or/and to incomplete separation of the analyte from the sample matrix [1]. In addition, previous studies [1, 2] have shown that mass bias corrections, using sample-standard bracketing and external normalization, fail to accurately correct for these matrix effects.

The present work aims to calibrate several organic and inorganic reference materials to assess the accuracy of Zn isotopic measurements. Analyses of a broad compositional range of USGS rock reference materials, including the basalts BCR-2 and BHVO-2 and the gabbro HRM-27, and organic reference materials, including the lichen BCR-482, the rye grass BCR-281, the San Joaquin soil SRM 2709, the light sandy soil BCR-142 and the lobster hepatopancreas TORT-2, have been systematically performed on two Nu Plasma MC-ICP-MS (Nu 015 at ULB and Nu 021 at PCIGR).

Two anion exchange chromatography procedures have been compared for Zn isolation using 0.2 mL or 2 mL of AG 1-X8 resin. Elemental concentrations were determined by ICP-MS for each digested sample and Zn eluate cut to monitor both Zn recovery and the presence of potential matrix interferences. Zn isotopic ratios have been corrected both by external normalization using Cu and by sample-standard bracketing with IRMM 3702 and Lyon JMC Zn standard solutions. The lightest and heaviest δ^{66}Zn values (±2SD; relative to Lyon JMC) of the study are exhibited by the lichen BCR-482 (+0.09±0.06‰) and the lobster hepatopancreas TORT-2 (+0.49±0.07‰), respectively.

[1] Shiel, A.E., Barling, J., Orians, K.J. & Weis, D. (2009). *Analytica Chimica Acta* 633, 29–37. [2] Petit J.C.J., Taillez, A. & Mattielli, N. (2013). *GGR*. DOI: 10.1111/j.1751-908x.2012.00187.x.

Across-arc geochemical variations in Central America subduction zone: evidences from Honduras basalts

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The across-arc geochemical data on the subduction zone of Central America are relatively scarce in Honduras where the active volcanic front does not occur inland but few km offshore the Pacific Ocean coast. In order to fill this gap we selected quaternary basalts from a arc to back-arc transect, enclosing (i) El Tigre, a stratovolcano in the Gulf of Fonseca, (ii) Yojoa Lake and Sula Graben back-arc volcanism, and (iii) Utila, a quaternary volcanic island near the strike-slip boundary between the North-American and Caribbean plates, about 200 km behind the front.

We found systematic variations in trace elements and isotopic compositions of basalts across this Honduras transect. Lavas from El Tigre are calc-alkaline with a significant LIL enrichment and Nb depletion, a strong slab signature and incompatible element contents similar to those in the main front of the adjacent volcanoes from El Salvador and Nicaragua (e.g. Ba/La up to 80). The back-arc quaternary volcanism of Yojoa Lake, Sula Graben and Utila is Na-alkaline, with a wide range of composition at Yojoa (basalts, hawaiites, mugearites, benmoreites, trachytes) and a more restricted, mafic composition at Sula and Utila (basalts and hawaiites). The back-arc basalts have similar major-trace element compositions to OIBs, such as relative enrichment in Nb and Ta, depletion in Pb and no pronounced peaks of fluid–mobile incompatible elements (Ba/La < 20).

The Sr and Nd isotopic data show a clear systematic variation passing from arc to back-arc, with El Tigre lavas characherized by higher $^{87}Sr/^{86}Sr$ (≈0.7038), and lower $^{143}Nd/^{144}Nd$ (≈0.51301), Utila basalts having typical values of a Depleted Mantle unaffected by any subduction imprint (≈0.7028 and 0.51310, respectively), whereas Sula and Yojoa have intermediate values.

$^{208}Pb/^{204}Pb$ and $^{206}Pb/^{204}Pb$ isotope ratios of El Tigre are very similar to arc volcanoes of El Salvador and Nicaragua (38.2 and 18.5, respectively), whereas back-arc samples have higher $^{206}Pb/^{204}Pb$ (18.6-18.7 for Sula and Yojoa, 18.7 for Utila island).

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