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Corrigendum

# Corrigendum to "Serpentinite fluids and slab-melting in the Aleutian arc: Evidence from molybdenum isotopes and boron systematics" [Earth and Planetary Science Letters, Volume 603, 2023, 1-12/117970]

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After publication of our paper Rojas-Kolomiets et al. (2023), we discovered that Aleutian lavas powdered in the University of South Carolina between 2004 and 2009 were contaminated with Mo. The issue was discovered in June-July 2023 when we re-powdered a subset of samples twice by grinding them in agate containers in a planetary ball mill and in tungsten carbide containers in a benchtop ring mill. Analyses of both sets of new rock powders showed significantly lower Mo concentrations than data from Rojas-Kolomiets et al. (2023). We subsequently re-powdered and re-analyzed all samples that were originally prepared at the University of South Carolina following the methods outlined in the paper. This included all samples from Rojas-Kolomiets et al. (2023) except those from the Korovin, Seguam and Yunaska locations. Despite this issue, most of our conclusions (particularly the presence of serpentinite-derived fluids in Aleutian lavas near the Amlia Fracture Zone) remain unchanged, and only one ought to be slightly modified (see details below).

We expected the contamination to be from the grinding containers used to prepare the powders but the agate containers we used from 2004 to 2009 were the same containers we used in 2023 and the results are the same for replicate samples powdered in tungsten carbide. Thus, the source of the contamination is unknown. We speculate that it may be related to the renovation of the lab space that was completed in 2004. No other analyzed element shows the discrepancy that we find for Mo (Table S1, Fig. S1). Review of published data for the affected samples shows no sign of contamination for sensitive elements such as Pb which have depleted isotopic compositions that are well aligned with data from prior studies and are inconsistent with any plausible environmental contaminant (e.g., Fig. 13 in Yogodzinski et al., 2015).

The new Mo isotope and Mo concentration data are reported in Table S1, and shown in updated figures (Fig. 2, Fig. 3, Fig. 4, Fig. 5, and Fig. 7). Based on the re-analyses, the Mo concentrations of the western Aleutian samples are lower than reported in the original article (with no difference between the tungsten carbide and agate mills). We find no systematic variability between the new and previous Mo concentration or Mo-isotope data (except one Okmok sample, UM-10, with newly acquired heavier Mo isotope compositions, Table S1). As such, most of our interpretations and conclusions remain unchanged, specifically:

1. Lack of Mo isotope fractionation with fractional crystallization (Fig. 2A).
2. Along-arc variability of Mo isotopes showing heavy Mo isotopes only in Korovin, Seguam and Yunaska near the Amlia Fracture Zone (Fig. 4C).
3. A serpentinite-derived fluid source with heavy Mo isotopes and high B/Ce ratios, likely related to the subduction of the Amlia Fracture Zone, remains the most likely explanation for the relatively heavy Mo isotope values in Korovin, Seguam and Yunaska (Figs. 2C, 4C and 7C).
4. MORB-like Mo isotopes in the western Aleutian lavas remain consistent with a Mo flux from the subducted Pacific MORB (Fig. 4C).
5. Mo incompatible behavior in Little Sitkin lavas: This discussion point remains unchanged given that, despite the lower Mo concentrations, Little Sitkin lavas show increasing Mo concentrations with decreasing Mg# (Fig. 2B).
6. The role of amphibole fractionation in the Mo systematics: Although new data shows that Little Sitkin lavas have lower Mo/Ce ratios than originally published, Mo/Ce vs. B/Ce plot patterns (Fig. 2C) show that amphibole fractionation is consistent with the new Little Sitkin data.

Only one discussion/conclusion point ought to be slightly modified:

1. Based on the elevated Mo/Ce and MORB-like Mo isotopes of western Aleutian lavas, we originally speculated that rutile, albeit present as

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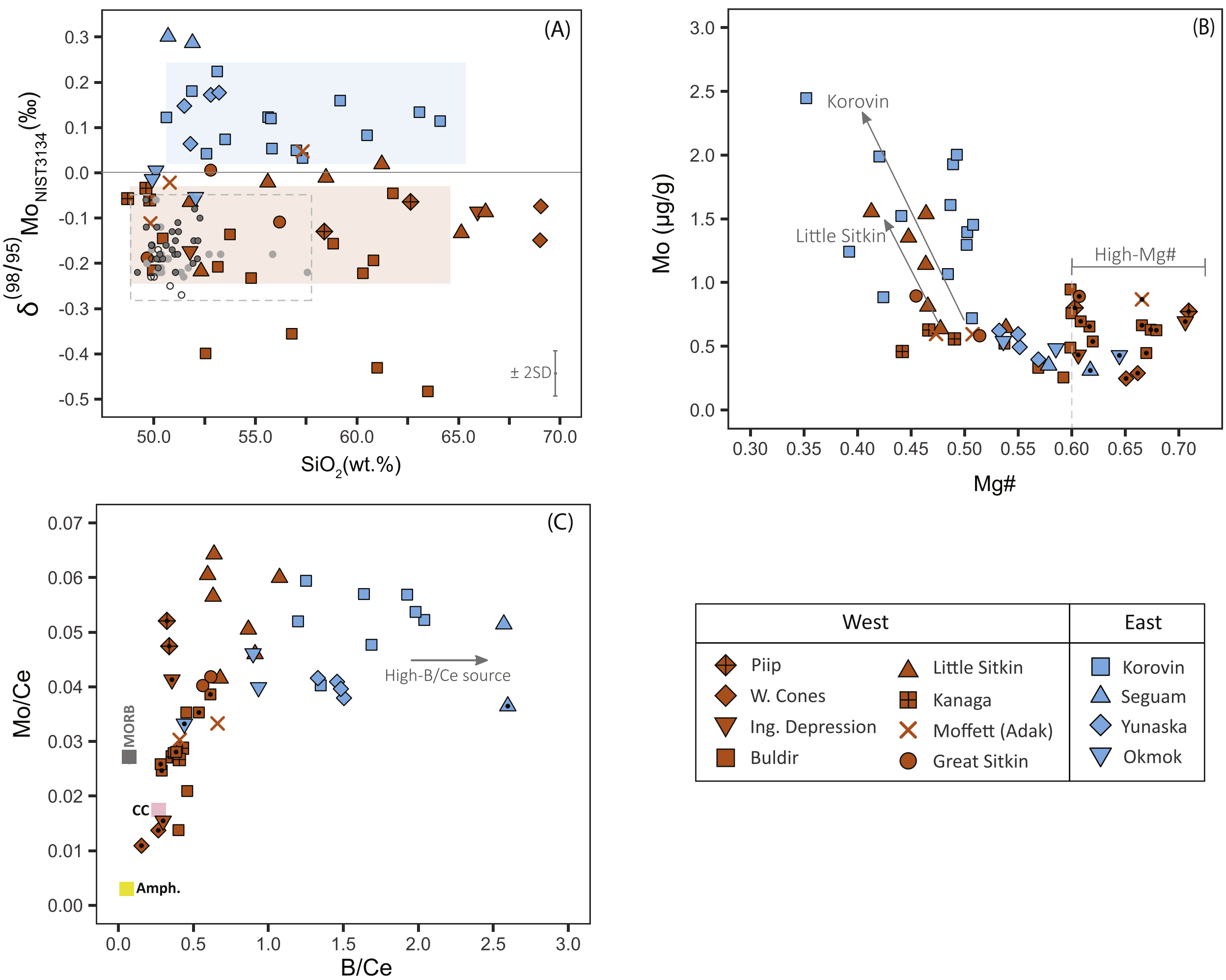


**Fig. 2. Mo isotope systematics and B concentration for Aleutian arc lavas. (A)** $\delta^{98/95}$Mo vs. SiO2 (wt.%). Shaded rectangles represent the general distribution of Korovin and Buldir lavas. Gray dashed rectangle shows the general distribution of MORB estimates (excluding the two high $\delta^{98/95}$Mo MORB samples) (Bezard et al., 2016, dark gray circles), (Chen et al., 2022, light gray circles), (Hin et al., 2022, hollow gray circles). **(B)** Mo concentrations vs. Mg#. High-Mg# dacites correspond to westernmost samples with Mg# >0.6. Gray arrow shows the general tendency of Korovin and Little Sitkin plot patterns. **(C)** Mo/Ce vs. B/Ce. Gray and pink squares represent average MORB and Continental Crust (CC), respectively. MORB B concentrations from Marschall et al. (2017) and Ce from Gale et al. (2013). Mo isotope data for CC from Liang et al. (2017) and Voegelin et al. (2014). Mo and Ce concentrations from Rudnick and Gao (2003). Aleutian Ce and $SiO_2$ data from Singer et al. (2007); Arndt (2011); Yogodzinski et al. (2010, 2015). Data points with black circles represent primitive samples (Mg#>0.6). Gray bar represents analytical uncertainty (±2SD) of ±0.05.

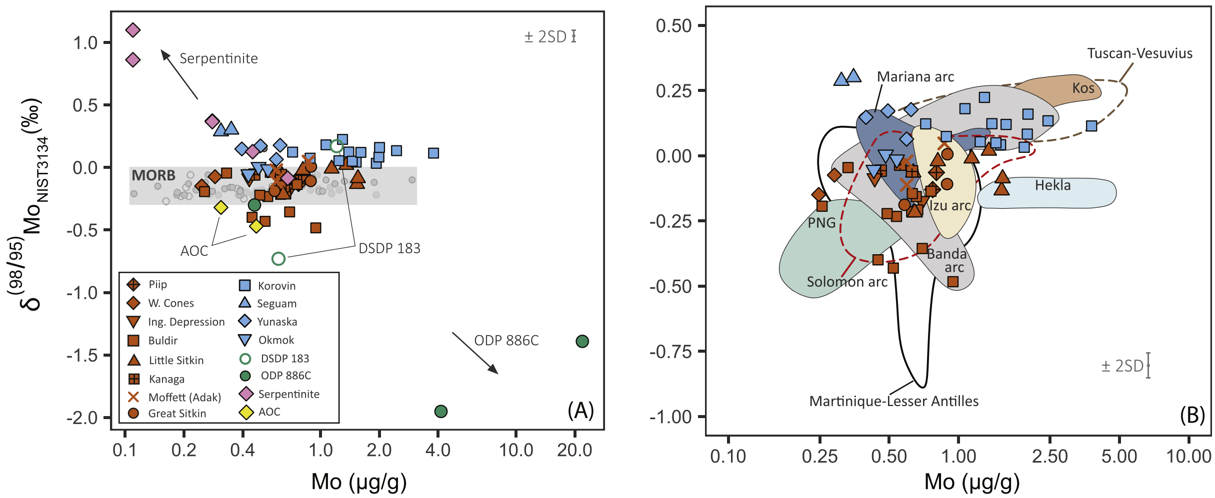


**Fig. 3. Mo isotopes vs. Mo concentrations for Aleutian lavas and volcanic rocks globally. (A)** $\delta^{98/95}$Mo vs. Mo concentrations for Aleutian lavas (see legend in the lower left corner), Pacific sediments (hollow green circles for DSDP 183 and filled green circles from ODP 886C), serpentinized peridotites (magenta diamonds) and AOC (yellow diamonds). Light gray bray represents general distribution of MORB data (Bezard et al., 2016; Chen et al., 2022; Hin et al., 2022). **(B)** $\delta^{98/95}$Mo vs. Mo concentrations for Aleutian lavas, Hekla (Yang et al., 2015), Mariana arc (Freymuth et al., 2015), Banda arc (Wille et al., 2018), Kos (Voegelin et al., 2014), Tuscan-Vesuvius (Casalini et al., 2019), Solomon and PNG (König et al., 2016), Lesser Antilles (Freymuth et al., 2016), Martinique (Gaschnig et al., 2017) and Izu arc (Villalobos-Orchard et al., 2020). Gray bar represents analytical uncertainty (±2SD) of ±0.05.

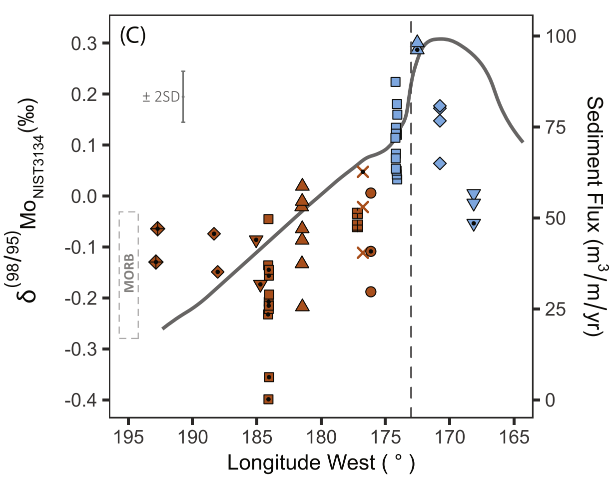


**Fig. 4C. Along-arc variance on Mo isotope signatures of Aleutian lavas.** Bold gray line represents sediment flux ($m^3$/m/yr) estimates from Kelemen et al. (2003). Dashed gray line shows the location of the Amlia Fracture Zone (AFZ) in the Aleutian arc. Dashed gray rectangle represents the general $\delta^{98/95}$Mo distribution for MORB (Bezard et al., 2016; Chen et al., 2022; Hin et al., 2022). Gray bar represents analytical uncertainty (±2SD) of ±0.05. Data points with black circles represent primitive samples (Mg#>0.6).

a residual phase, does not retain Mo. However, new data show that Western Cones and selected Buldir lavas with a stronger slab-melting signature and marked heavy-rare-earth-element depletions (La/Y > 0.78), display Mo depletions (Mo/Ce < 0.02) comparable to Ta-Nb (Fig. 5A), as opposed to the Mo enrichments observed in the original paper. This suggests that rutile may play a role in retaining Mo in lavas with a stronger slab-melting component. However, given their light and MORB-like Mo isotopes, retention of Mo in rutile does not lead to Mo isotope fractionation in Aleutian lavas.

We sincerely apologize for any inconvenience caused and we would like to advise future studies on Mo analyses to exercise caution during sample powdering and preparation.

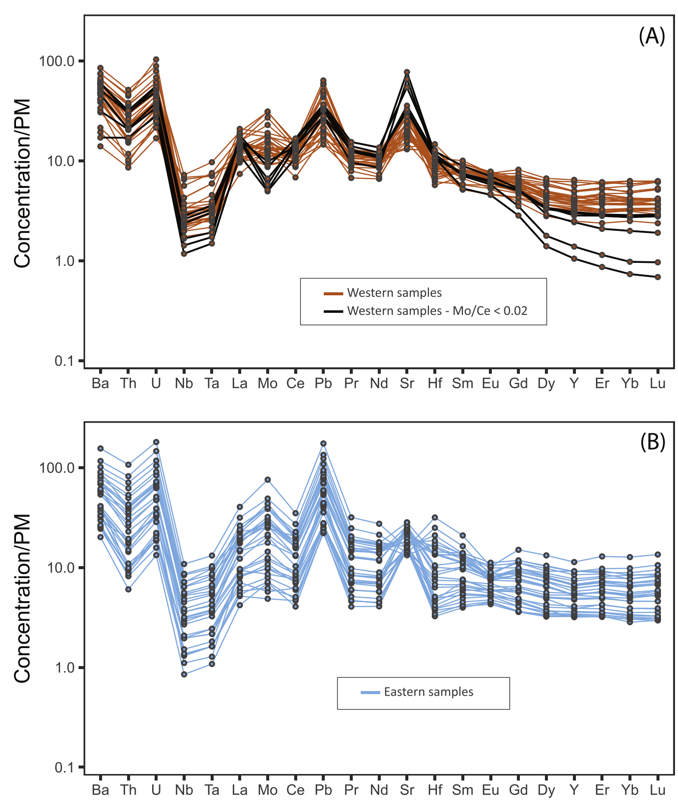


**Fig. 5. Trace element concentrations relative to Primitive Mantle. (A).** Orange lines represent western Aleutian lavas. Black lines represent western samples with Mo depletions (Mo/Ce < 0.02) and heavy-rare-earth-element depletions (La/Y > 0.78). **(B).** Light blue lines represent eastern lavas. Aleutian data from Yogodzinski et al. (2010, 2015) and Arndt (2011). Primitive mantle values from McDonough and Sun (1995).

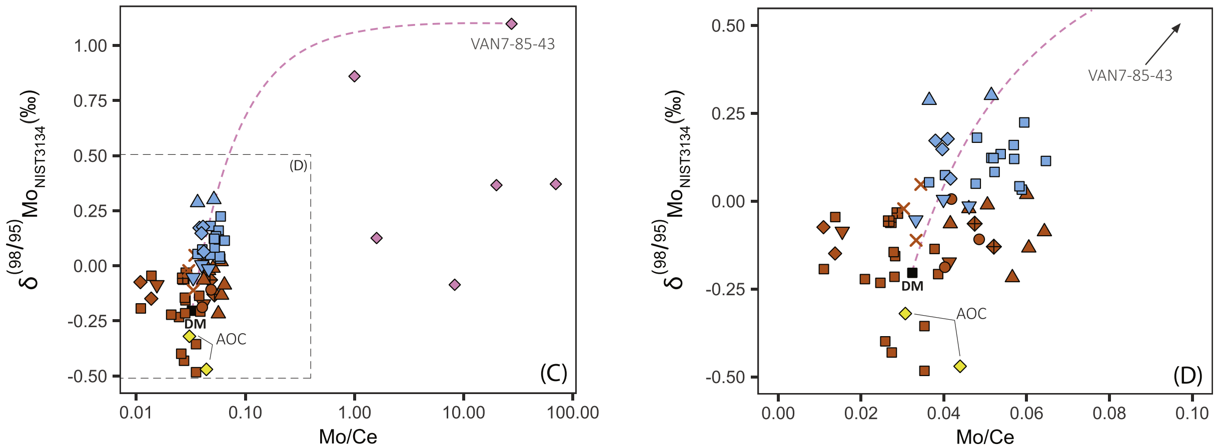


**Fig. 7C. D. Mo isotopes vs. Mo/Ce ratios for Aleutian lavas, serpentinized peridotites and AOC. (C)** $\delta^{98/95}$Mo vs. Mo/Ce ratios for Aleutian lavas, serpentinized peridotites (magenta diamonds) and AOC (yellow diamonds). Dashed rectangle represents the bounds of Fig. 7D. **(D)** Inset in Fig. 7C. Magenta dashed lines in (B), (C) and (D) represent mixing calculations between bulk serpentinized peridotite (VAN-85-43) and DM. Horizontal axes of Fig. 7C in logarithmic scale.

## Declaration of Competing Interest

None.

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.epsl.2023.118474.

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