Behavior of calcium isotopes during slab subduction

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We report Ca isotopic compositions of greenschists, eclogites, UHP marbles and sedimentary carbonates from the Dabie-Sulu orogen to shed light on the behavior of Ca isotopes during slab subduction. Most eclogites enclosed by silicate rocks and UHP marbles yield comparable $\delta^{44/42}$Ca values with a mean of 0.36 ± 0.06‰ (2SD, N = 14/16), typical of terrestrial basalts (0.41 ± 0.12‰, 2SD) [1]. No correlation with H_2O^+, indicates $\delta^{44/42}$Ca values of eclogites seem have not been significantly affected by dehydration during subduction. Greenschists have slightly higher $\delta^{44/42}$Ca values (0.35‰ to 0.47‰) that correlate with CIA and CaO, reflecting the effect of weathering/alteration prior to or during greenschist facies metamorphism. UHP marbles have lower $\delta^{44/42}$Ca values (0.16‰ to 0.46‰) compared to sedimentary carbonates (0.31‰ to 0.47‰). $\delta^{44/42}$Ca values of marbles are positively correlated with MgO/CaO and negatively correlated with δ^{26}Mg, which can not be explained by protolith inheritance, isotopic exchange or diffusion. Considering the higher solubility of calcite than dolomite and magnesite at high pressure [2], the variation of marbles may be caused by selective dissolution of calcite. In summary, prograde metamorphism dehydration would not fractionate Ca isotopic compositions of silicates but would decrease $\delta^{44/42}$Ca of the carbonates.

[1] He *et al*. (2017) *GGR*. [2] Pan *et al*. (2013) *PNAS* **110 (17)**, 6646-6650.