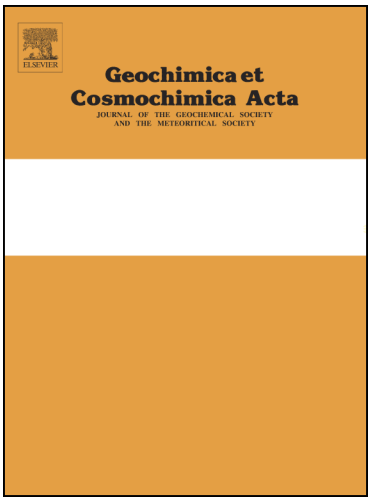

Molybdenum, Vanadium, and Uranium Weathering in Small Mountainous Rivers and Rivers Draining High-Standing Islands

Christopher B. Gardner, Anne E. Carey, W. Berry Lyons, Steven T. Goldsmith, Brandon C. McAdams, Annette Trierweiler

PII: S0016-7037(17)30567-7
DOI: http://dx.doi.org/10.1016/j.gca.2017.09.012
Reference: GCA 10459

To appear in: *Geochimica et Cosmochimica Acta*

Received Date: 7 December 2016
Revised Date: 12 August 2017
Accepted Date: 2 September 2017

Please cite this article as: Gardner, C.B., Carey, A.E., Berry Lyons, W., Goldsmith, S.T., McAdams, B.C., Trierweiler, A., Molybdenum, Vanadium, and Uranium Weathering in Small Mountainous Rivers and Rivers Draining High-Standing Islands, *Geochimica et Cosmochimica Acta* (2017), doi: http://dx.doi.org/10.1016/j.gca.2017.09.012

Molybdenum, Vanadium, and Uranium Weathering in Small Mountainous Rivers and Rivers Draining High-Standing Islands

Christopher B. Gardner [a,b,*], Anne E. Carey [a,b], W. Berry Lyons [a,b], Steven T. Goldsmith [a,b,1], Brandon C. McAdams [a], and Annette Trierweiler [a,2]

[a] *School of Earth Sciences, The Ohio State University, Columbus, OH 43210-1398, United States*

[b] *Byrd Polar and Climate Research Center, The Ohio State University, Columbus, OH 43210-1002, United States*

[*] Corresponding author at: School of Earth Sciences, The Ohio State University, 275 Mendenhall Laboratory, 125 South Oval Mall, Columbus, OH 43210-1398, United States. *Email Address*: Gardner.177@osu (C.B. Gardner)

[1] Current address: Department of Geography and the Environment, Villanova University, Villanova, Pennsylvania 19085, United States

[2] Current address: Department of Biological Sciences, University of Notre Dame, 100 Galvin Life Science Center, Notre Dame, IN 46556, United States.

Abstract

Rivers draining high standing islands (HSIs) and small mountainous rivers (SMRs) are known to have extremely high sediment fluxes, and can also have high chemical weathering yields, which makes them potentially important contributors to the global riverine elemental flux to the ocean. This work reports on the riverine concentrations, ocean flux, and weathering yields of Molybdenum (Mo), Vanadium (V), and Uranium (U) in a large number of small but geochemically important rivers using 338 river samples from ten lithologically-diverse regions. These redox-sensitive elements are used extensively to infer paleo-redox conditions in the ocean, and Mo and V are also important rock-derived micronutrients used by microorganisms in nitrogen fixation. Unlike in large river systems, in which dissolved Mo has been attributed predominately to pyrite dissolution, Mo concentrations in these rivers did not correlate with sulfate concentrations. V was found to correlate strongly with Si in terrains dominated by silicate rocks, but this trend was not observed in primarily sedimentary regions. Many rivers exhibited much higher V/Si ratios than