

## Accepted Manuscript

Weathering and transport of chromium and nickel from serpentinite in the Coast Range ophiolite to the Sacramento Valley, California, USA

Jean M. Morrison, Martin B. Goldhaber, Christopher T. Mills, George N. Breit, Robert L. Hooper, JoAnn M. Holloway, Sharon F. Diehl, James F. Ranville

PII: S0883-2927(15)00140-7

DOI: <http://dx.doi.org/10.1016/j.apgeochem.2015.05.018>

Reference: AG 3495

To appear in: *Applied Geochemistry*



Please cite this article as: Morrison, J.M., Goldhaber, M.B., Mills, C.T., Breit, G.N., Hooper, R.L., Holloway, J.M., Diehl, S.F., Ranville, J.F., Weathering and transport of chromium and nickel from serpentinite in the Coast Range ophiolite to the Sacramento Valley, California, USA, *Applied Geochemistry* (2015), doi: <http://dx.doi.org/10.1016/j.apgeochem.2015.05.018>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## Weathering and transport of chromium and nickel from serpentinite in the Coast Range ophiolite to the Sacramento Valley, California, USA

Jean M. Morrison<sup>1\*</sup>, Martin B. Goldhaber<sup>1</sup>, Christopher T. Mills<sup>1</sup>, George N. Breit<sup>1</sup>, Robert L. Hooper<sup>2</sup>, JoAnn M. Holloway<sup>1</sup>, Sharon F. Diehl<sup>1</sup> and James F. Ranville<sup>3</sup>

<sup>1</sup> U.S. Geological Survey, MS 964D, Denver Federal Center, Denver, CO 80225, United States

<sup>2</sup> University of Wisconsin-Eau Claire, Geology, Phillips 157, Eau Claire, WI 54702, United States

<sup>3</sup> Colorado School of Mines, Golden, CO 80401, United States

\*Corresponding author: jmorrison@usgs.gov (J. Morrison)

## Weathering and transport of chromium and nickel from serpentinite in the Coast Range ophiolite to the Sacramento Valley, California, USA

Jean M. Morrison<sup>1\*</sup>, Martin B. Goldhaber<sup>1</sup>, Christopher T. Mills<sup>1</sup>, George N. Breit<sup>1</sup>, Robert L. Hooper<sup>2</sup>, JoAnn M. Holloway<sup>1</sup>, Sharon F. Diehl<sup>1</sup> and James F. Ranville<sup>3</sup>

<sup>1</sup> U.S. Geological Survey, MS 964D, Denver Federal Center, Denver, CO 80225, United States

<sup>2</sup> University of Wisconsin-Eau Claire, Geology, Phillips 157, Eau Claire, WI 54702, United States

<sup>3</sup> Colorado School of Mines, Golden, CO 80401, United States

\*Corresponding author: jmorrison@usgs.gov (J. Morrison)

### ABSTRACT

A soil geochemical study in northern California was done to investigate the role that weathering and transport play in the regional distribution and mobility of geogenic Cr and Ni, which are both potentially toxic and carcinogenic. These elements are enriched in ultramafic rocks (primarily serpentinite) and the soils derived from them (1700 to 10,000 mg Cr per kg soil and 1300 to 3900 mg Ni per kg soil) in the Coast Range ophiolite. Chromium and Ni have been transported eastward from the Coast Range into the western Sacramento Valley and as a result, valley soil is enriched in Cr (80 to 1420 mg kg<sup>-1</sup>) and Ni (65 to 224 mg kg<sup>-1</sup>) compared to median values of U.S. soils of 50 and 15 mg kg<sup>-1</sup>, respectively. Nickel in ultramafic source rocks and soils is present in serpentine minerals (lizardite, antigorite, and chrysotile) and is more easily weathered compared to Cr, which primarily resides in highly refractory chromite ([Mg,Fe<sup>2+</sup>][Cr<sup>3+</sup>,Al,Fe<sup>3+</sup>]<sub>2</sub>O<sub>4</sub>). Although the majority of Cr and Ni in soils

Download English Version:

<https://daneshyari.com/en/article/6335006>

Download Persian Version:

<https://daneshyari.com/article/6335006>

[Daneshyari.com](https://daneshyari.com)