Proton adsorption and *in situ* metal sequestration by diverse microbial mats from Yellowstone National Park, USA

S.V. LALONDE* AND K.O. KONHAUSER

Department of Earth and Atmospheric Sciences, University of Alberta, Edmonton, Alberta, T6G 2E3, Canada (*correspondence: stefan.lalonde@ualberta.ca)

The propensity for microbes to adsorb dissolved metals on their surfaces has been well documented for microbes cultured under laboratory conditions. However, whether or not natural microbial biomass is comparable in surface chemical reactivity to laboratory cultures has received little attention. To resolve this, we examined various microbial mats sampled from two hydrothermal systems of distinct composition, and evaluated the biomass in terms of surface functional group concentrations, proton stability constants, and acid-leachable metal contents. At the first site, natural cyanobacterial mats of various morphologies were sampled within close spatial proximity. As a whole, they displayed organic surface functional group concentrations that are on the same order of magnitude as values previously reported for laboratory cultures, and the concentrations of metals adsorbed by the mats *in situ* correlated with surface functional group concentrations. However, the metals most strongly concentrated by these mats possessed low metal-carbonate solubility products, and the concentrations of these metals also correlated with concentrations of mat-hosted bicarbonate.

At the second site, diverse microbial mats were similarly compared with highly-reactive HFO minerals that precipitated within the same spring system. For both microbial and mineral surfaces, surface functional group availability again largely correlated to the concentrations of metals adsorbed to these surfaces. Surprisingly, one microbial mat sample from this site was found to be relatively metal- and proton-unreactive.

Geochemical, isotopic and detrital zircon provenance of Mesozoic rocks, Oregon and Idaho, U.S.A.

T.A. LAMASKIN[1]*, J.D. VERVOORT[2] AND R.J. DORSEY[1]

[1]1272 University of Oregon, Eugene, OR 97405 (*correspondence: tlamaski@uoregon.edu)

[2]Wash. State Univ., Webster Physical Science Building, Room 1228, Pullman, WA 99164-6376

The Mesozoic evolution of accreted island arcs and subduction complexes in the Blue Mountain Province (BMP) of eastern Oregon and western Idaho has been explained with a wide variety of tectonic models. Common elements include the intra-oceanic origin for both the Wallowa and Olds Ferry arcs and accretion of the BMP to western Laurentia during Late Jurassic or Middle Cretaceous time.

In this study, we use geochemical, isotopic and detrital-zircon provenance of mudstone-sandstone turbidite couplets from the Blue Mountains to characterize the tectonic settings of sediment source areas and to constrain the timing of terrane accretion. Flat REE patterns, low incompatible element concentrations, positive ε_{Nd} values and a lack of Precambrian detrital-zircon grains indicates that during Middle to Late Triassic time, the Wallowa terrane was an intra-oceanic arc system. Conversely, steeper REE patterns, higher incompatible element concentrations, more negative ε_{Nd} values and ubiquitous Precambrian detrital-zircon grains indicate a continent-fringing setting for the Triassic Olds Ferry arc. Middle to Late Jurassic deep-marine shales overlying both the Wallowa and Olds Ferry arcs have steepened REE patterns, higher incompatible element concentrations, more negative ε_{Nd} values and Precambrian detrital-zircon grains, indicating that following Triassic amalgmation, the entire BMP region received sediment input from continental sources. These results suggest that BMP accretion likely initiated in the Middle Jurassic, earlier than is generally agreed upon.

Our results highlight the need for evaluation of both igneous and coeval sedimentary rocks to adequately characterize ancient tectonic settings. Previous trace-element and isotopic investigations of igneous rocks in the Blue Mountains have suggested an intra-oceanic setting for both the Wallowa and Olds Ferry arcs. Evaluation of contemporaneous sedimentary rocks enhances our understanding of the region and has important implications for Mesozoic tectonic models of western North America.