Seasonal variations of trace elements in the water column of the Ligurian Sea, Western Mediterranean

L.-E. HEIMBÜRGER[1], J.-F., CHIFFOLEAU[2], A. DUFOUR[3], C. MIGON[3], L. COPPOLA[3], D. AUGER[2] AND D. COSSA[1]

[1]LBCM/Ifremer, BP 330, F.83507 La Seyne sur mer, France
[2]LBCM/Ifremer, BP 21105, F.44311 Nantes, France
[3]LOV/CNRS, La Darse, BP 8, F.06238 Villefranche sur mer Cedex, France

In oceanic waters, some trace elements (TE) are known to be involved in the Redfield model of organic matter synthesis and regeneration, while the biogeochemical cycling of others is more governed by inorganic sorption processes. The observation of the seasonal variations of TE vertical profiles in relation to pigment and nutrient distributions are informative of the relative importance and amplitudes of these processes. We present here the vertical distributions of Ag, Cd, Co, Cu, and Ni in a 2200m-deep water column of the Ligurian Sea (Western Mediterranean) monthly sampled between July 2007 and February 2008 in relation with PO_4^{3-} concentrations. This oligotrophic region is characterized by a long stratification period during which surface waters are nutrient depleted. Cu (0.9 - 2.7 nM) and Ni (3.4 - 5.5 nM) depicted typical nutrient like profiles, Co (31-133 pM) exhibits surface maxima, while Cd (0.08-0.20 nM) and Ag (2.8 - 13.5 pM) were too low to show significant vertical trends. Co and Cu present higher concentrations within the surface waters (0-50m) during winter months. The relationships between TE and nutrients are discussed.

Eroding Australia: Slowly

A.M. HEIMSATH[1]*, J CHAPPELL[2], G.R. HANCOCK[3], D. FINK[4] AND K. FIFIELD[5]

[1]School of Earth and Space Exploration, Arizona State Univ., Tempe, AZ 85287, USA (*correspondence: arjun.heimsath@asu.edu)
[2]Research School of Earth Sciences, Australian National Univ., Canberra, Australia
[3]School of Environmental and Life Sciences, Univ. of Newcastle, Callaghan, NSW, Australia
[3]AMS ANTARES, IER, ANSTO, Menai, Australia
[3]Research School of Physical Sciences and Engineering, Australian National Univ., Canberra, Australia

We use *in situ* produced ^{10}Be and ^{26}Al to quantify erosion rates across a wide variety of field settings in Australia. Here we present the full suite of data from our diverse studies to provide an overview of how Austalia is eroding, as well as showing how robust this methodology is. Field sites range from several soil-mantled landscapes spanning the passive margin escarpment of southeastern Australia, to rocky, bedrock dominated landscapes in the Flinders Ranges and the Central Australia Outback. Also, in the far north, we examine an undisturbed catchment in the rugged topography of Arnhem Land: Tin Camp Creek.

We sample detrital sands draining the landscape in a nested fashion at each of our field sites: from small to large catchments. We also sample across the slopes to quantify point-specific rates of soil production and bedrock erosion. Soil production rates and mechanisms across the escarpment have been presented in previous publications and will be used here to compare with a new, 'humped' soil prodction function from the Arnhem Land field site. In the rocky landscapes of the Flinders Ranges and MacDonnell Ranges, we sample the blocky slopes as well as catchment sands to constrain a block failure model for slope retreat. Point specific rates are also compared with detrital rates for Kings Canyon and the Todd River drainage to examine the potential for long-term landscape equilibrium. To conclude we show the first, unequivocal example of a regolith mantled landscape eroding in dynamic equilibrium from the western MacDonnell Range.

Rates span an order of magnitude, from about 4 to 40 m/Ma across the escarpment in southeastern Australia. The 'humped' soil production function peaks at just over 20 m/Ma under about 30 cm of soil and decreases to less than 5 m/Ma under 70 cm of soil. Rates in the Outback are extremely slow, from less than 1 in places to the distince evidence for equilbrium in the Western MacDonnells, at about 7 m/Ma. These results raise many provocative questions and suggest new directions for quantifying how landscapes evolve.