Enhanced chemical weathering during early Triassic in response to the collapse of terrestrial ecosystem after the end-Permian mass extinction

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The vegetation recovery after the end-Permian mass extinction was delayed by > 5 m.y. until middle Triassic. It is demonstrated that the collapse of terrestrial vegetation enhanced physical weathering during early-middle Triassic, whereas its impact on chemical weathering intensity has not been investigated. Here, we investigate the variations of chemical weathering intensity and biogenic Si flux from lower to middle Triassic pelagic siliceous sequence of the equatorial Panthalassa in Japan, whose cyclostratigraphy is well established [1, 2]. Our results suggested that the chemical weathering intensity and the biogenic Si flux during early Triassic were extremely high relative to middle Triassic and decreased during middle Triassic. Also, the calculated biogenic Si budget on pelagic Panthalassa during early and middle Triassic was several times larger than total Si budget of global ocean today [3], suggesting that pelagic siliceous sequence at equatorial Panthalassa was the major sink of oceanic Si. Hence, the changes in biogenic Si flux on pelagic Panthalassa could reflect changes in global chemical weathering intensity in time scales larger than the residence time of Si in the ocean (> 10 kyr [3]). Therefore, the increase and following decrease in chemical weathering intensity during early to middle Triassic would have been related to the collapse of terrestrial vegetation and its recovery during early Triassic.

[1] Ikeda *et al*., (2010), *Earth Planet. Sci. Lett*., **297**, 369-378. [2] Sakuma *et al*., in review *Island Arc* [3] DeMaster *et al*., (2002), *Deep-Sea Research,* **49**, 3155–3167

Trace metal concentrations and Pb isotopes of sediments from Barkley Sound, British Columbia

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Port Alberni is home to several industries (e.g., pulp and paper mills), responsible for releasing significant amounts of heavy metals (e.g., As, Cd, Pb and Hg) into Alberni Inlet every year [1]. Alberni Inlet may carry this metal effluent into Barkley Sound, located on the west coast of Vancouver Island, British Columbia (BC), home to economically important oyster farms. Alberni Inlet supplies freshwater to Barkley Sound and the headwaters are proximal to Port Alberni. Emissions associated with recreational boating in Barkley Sound and traffic in the lower mainland and on Vancouver Island are other potential sources of Pb pollution. We determined As, Cd and Pb metal concentrations and Pb isotopic compositions in sediment samples from Barkley Sound, collected from transects along Imperial Eagle Channel, Trevor Channel, and from Junction Passage, to assess metal contamination associated with local industries and trace the source of Pb pollution.

Metal concentrations for sediments from Barkley Sound range from 6.20 to 10.8 ppm for As, from 0.36 to 0.56 ppm for Cd, and from 4.91 to 17.5 ppm for Pb. The highest concentrations of As and Cd were observed in sediments from Junction Passage, directly downstream from Alberni outlet. In general, a decrease in Pb, As and Cd in the sediment was observed along NW-SE transects, i.e. towards the open ocean. Sediment $^{206}Pb/^{207}Pb$ ratios increase with increasing distance from Port Alberni, suggesting increasing natural contributions. The $^{206}Pb/^{207}Pb$ ratios (1.1783 to 1.1909) were primarily within the high end of the range reported for BC road dust [2], with the exception of that of sediment from the most distal site in Trevor Channel, with an isotopic composition closer to that of North Pacific sediments [3]. Our study shows that metal concentrations in Barkley Sound sediments are controlled in large part by anthropogenic activities and industrial inputs to Alberni Inlet.

[1] Environment Canada (2009) National Pollutant Release Inventory Facility (NPRI) [2] Preciado *et al*. (2007) *Water Air Soil Poll* **184**, 127-139. [3] Carpent *et al* (2010) *Gold. Conf. Absr*. 144