Cd isotopic composition in the aerosols of the South China Sea

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Our previous study observed relatively heavy Cd isotopic composition (+8 to +9 ε) in seawater and sinking particles collected in the mixed layer of the northern South China Sea (NSCS) [1] [2]. In this study, we have collected aerosols in a cruise over NSCS in January 2011 and the aerosols at Dongsha atoll (DS) in summer and winter 2007, an islet in the NSCS. The overall isotopic composition over NSCS and at DS range from +1 to +18 ε, which is distinctly heavier than the composition in anthropogenic aerosols collected on land reported previously [3] [4]. The composition at DS in the winter time was as heavy as the composition observed in the seawater and sinking particles, ranging from +8 to +9 ε. In the summer season, the composition at DS elevated to +18 ε, indicating that the aerosols to the NSCS through southern monsoon possess even heavier isotopic composition than winter. As our previous study shows that aeolian Cd flux in winter was about one order of magnitude higher than the flux in summer, the comparable isotopic composition among aerosols, seawater and sinking particles validate our previous hypothesis that aerosol is the major source of heavy Cd observed in the seawater and particles [1]. Spatially, the composition over NSCS varied significantly, with the value larger than +10 ε nearby southwest Taiwan, decreasing to the range between +10 and +5 ε in the offshore region, then decreasing to the range between +6 and +1 ε near Chinese coastal region. The spatial variation may be influenced by the different composition of various regional sources. In conclusion, our study indicates that aerosol deposition can be an important source of heavy dissolved and particulate Cd observed in the surface water of the ocean.

[1] Yang *et al*. (2012) *Geochim Cosmochim Acta* **98**, 66-77. [2] Yang *et al*. submitted to *EPSL*. [3] Cloquet *et al*. (2005) *Geostand Geoanal Res* **29**, 95-106. [4] Shiel *et al*. (2010) *Sci Total Environ* **408**, 2357-2368.