Hawaiian imprint on dissolved rare earth elements, Nd, and Ra isotopes at station ALOHA

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The central North Pacific at station ALOHA has been shown to receive seasonal dust input from Asia based on high iron concentrations in surface waters [e.g., 1]. Using dissolved rare earth element (REE) concentrations, and neodymium (Nd) and radium (Ra) isotopes from coastal stations around Oahu, Hawaii, and the upper water column at station ALOHA, we demonstrate that local input from Hawaii also significantly contributes to the trace element budget at station ALOHA. Samples around Oahu and at ALOHA were collected during *R/V Kilo Moana* cruise KM1107 (Feb. 2011), samples from the upper water column at ALOHA were collected on cruises KM1215 (July 2012), KM1219 (Aug. 2012), and KM1309 (June 2013).

All coastal sites show radiogenic ε_{Nd} values (ε_{Nd} = +0.6 ±0.8) similar to those of groundwater from Oahu (ε_{Nd} = +0.6 and +1.3), slightly elevated REE concentrations, and positive europium anomalies (Eu/Eu*), all indicative of an imprint from basaltic rocks. At ALOHA, surface waters in February also show positive Eu/Eu* and very positive ε_{Nd} values (ε_{Nd} = +0.8), significantly different from the open North Pacific. These observations coincide with elevated ^{228}Ra values, clearly indicating a local freshwater source of the trace elements. In June, July, and August, surface waters at ALOHA show a shift towards more negative ε_{Nd} values (ε_{Nd} = -0.6 to -2.0) and no positive Eu/Eu*. These months follow the spring/early summer dust peak from Asia, suggesting that Asian dust with ε_{Nd} = -10 contributes to the trace element budget at station ALOHA in summer. Yet, the majority of the background ε_{Nd} and REE signals at ALOHA are due to local input from Hawaii.

[1] Fitzsimmons, J.N. *et al.* (2015), *GCA* 171, 303-324.