REE composition of pore water in Pacific pelagic sediment

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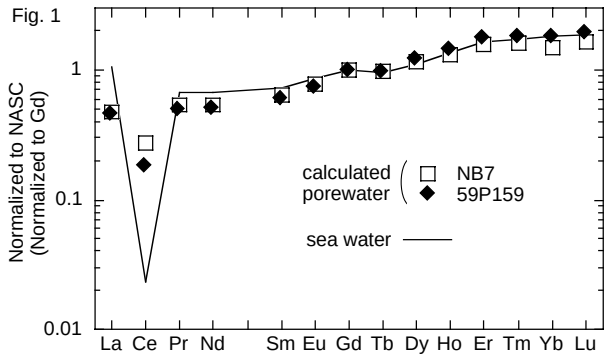
There have been few studies about the REE abundance of the pore water of pelagic sediment, despite that such studies may give us a clue to understand behavior of REE in sediment during diagenesis. In this study, the REE compositions (Ln/Gd ratio) of the porewaters in Pacific pelagic sediments were estimated from the REE abundances of the diagenetic Mn oxide and carbonate fluorapatite (CFA) components in the sediments, assuming the equilibrium relationships between porewater and respective components in terms of REE. The distinctive features of the estimated REE composition of the porewater are La depletion and a small negative Ce anomaly relative to that of deep seawater (Fig. 1). Except for the features, the porewater shows similar REE/Gd ratios to deep seawater. The La depletion may reflect preferential remove of La from porewater by authigenic materials or difference of content of total dissolved carbonate between porewater and seawater. The smaller negative Ce anomaly infers the preferential release of Ce from the Mn oxide component in sediment to porewater due to difference of the redox state between porewater and seawater. On the basis of the REE/Gd ratios of the porewater and BCFA, the relative distribution coefficients (Kd_{Ln}/Kd_{Gd} ratio) between CFA and porewater were estimated. The distribution coefficient shows a slight increase from La to Sm and a distinctive decrease from Sm to Lu.



Correlation of CO and CO_2 in Asian outflow plumes observed during PEACE campaign in January 2002

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In situ aircraft measurements of carbon monoxide (CO), carbon dioxide (CO_2), ozone (O_3), reactive nitrogen (NO and NO_y), and other species were made during the Pacific Exploration of Asian Continental Emission Phase A (PEACE-A) campaign in January 2002. The flights were conducted over the Sea of Japan (35-45 N) and the East China Sea (20-35 N). Large enhancements of CO, CO_2, and NO_y were frequently observed in the boundary layer (<~ 3 km), while the mixing ratios of these species in the free troposphere were low and fairly constant. The data collected in the boundary layer are used to investigate the chemical characteristics of Asian outflow plumes. The origins of air masses sampled in the boundary layer are estimated using backward trajectories. We use dCO/dCO_2 ratios in the observed air masses (linear regression slope of CO-CO_2 correlation) as a diagnostic of combustion efficiency of emission sources. The air masses sampled at 0-2 km over the Sea of Japan were mostly transported from northern China and dominated by relatively high combustion efficiency sources (dCO/dCO_2 = 0.02-0.04). By contrast, the air masses sampled at 2-4 km over the East China Sea were mostly transported from southern China and significantly affected by lower combustion efficiency sources (dCO/dCO_2 ratios = 0.04-0.15). A comparison of the observed dCO/dCO_2 ratios with the emission inventory is discussed in detail.