Study of ^{226}Ra and excess ^{210}Pb in hydrothermally altered sediments in the southern Okinawa Trough

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Geochemical characteristics of ^{210}Pb and ^{226}Ra in hydrothermal fluids/venting waters and massive deposits have been intensively and well studied in the Okinawa Trough for constraining the timescales, further to provide an insight of fluid-sediment reactions. But, little is focused on those in hydrothermally altered sediments. Here, we present our study conducted in the Geolin Mounds (GLM) and Penglai Fault Zone (PFZ) hydrothermal fields of the southern Okinawa Trough. Hydrothermal activities in these two fields were confirmed by the anomalous acoustic reflections of flame in water column, the unique geochemical features in sedimentary pore water (high $^{3}He/^{4}He$ values, total alkalinity, and CH_4 concentrations), and the observations of hydrothermal sulfide ores on the seafloor. Sediment cores collected from GLM and PFZ hydrothermal fields leveled extreme enrichments of Au, Ag, As, Bi, Cu, Cd, Pb, Sb, Sn and Zn within some specific layer as well as low to very low sulfidation minerals found. Sediments within these layers are confirmed to be associated with hydrothermal alteration and activities of ^{226}Ra and excess ^{210}Pb showed much higher (up to 11.36±0.1 and 453.1±2.25 dpm g^{-1} for ^{226}Ra and excess ^{210}Pb, respectively) relative to unaltered background sediments. These resulted in significantly high total inventories of excess ^{210}Pb (up to 3005±107 and 2081±49.4 dpm cm^{-2} for GLM and PFZ hydrothermal field, respectively) with 45~65 % estimated to be attributed to hydrothermal precipitation.