

## U-Th radioactive disequilibrium dating of hydrothermal sulfide minerals from Okinawa and South Mariana Trough

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The time scale for a hydrothermal activity is an important factor controlling the size of hydrothermal ore deposits (Tivey, 2007) and the evolution of chemosynthesis-based communities in a submarine hydrothermal system (Watanabe et al., 2005). Many dating techniques using radioactive disequilibria of <sup>235</sup>U, <sup>238</sup>U, and <sup>232</sup>Th decay series have been applied for hydrothermal submarine ore deposits (Lalou et al., 1993, Kadko, 1996). As one of several possible decay systems, <sup>230</sup>Th-<sup>234</sup>U disequilibrium dating uses the increase of (<sup>230</sup>Th/<sup>234</sup>U) (parentheses denote activity ratios), which starts from zero in hydrothermal deposits. The maximum dating range of this method is up to 450 kiloyears (kyr). The system has been applied for massive sulfide mounds from Transatlantic Geotraverse (TAG) deposit on the mid-Atlantic Ridge using a thermal ionization mass spectrometer (TIMS), which yields a wide range of <sup>230</sup>Th-<sup>234</sup>U ages: 2.6-38 kyr. Results show that episodic activities lasting more than 30 kyr in the TAG area which is positioned on a slow spreading ridge.

We will analyze several fractions of a sulfide crust collected from the South Mariana Trough and Okinawa Trough using <sup>230</sup>Th-<sup>234</sup>U method by MC-ICP-MS.

The samples used in this study contain high amounts of sulfide and barite. Pb and Ba causes analytical interferences for U and Th isotope analyses, thus a good separation of the two elements is necessary. A two stage column chromatography was therefore used for the separation process.

The sulfide mineral from Izena hole of Okinawa Trough yielded ages ranging from 700 to 1000 years. Archean site of Mariana Trough yielded ages ranging from 0 to 2450 years with high U/Th ratio. Pika, Urashima and Snail site yielded ages ranging from 250 to 5000 year.

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