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Geo-chemical Characteristics of the Sediments in Southwest Indian Ridge

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Abstract: Major elements,trace elements and rare earth elements measurements were carried out on twenty-one sediment samples taken from the Leg II and III in Chinese reasearch cruise DY-30 which explored in Southwest Indian Ridge. The results show that all of the samples can be divided into to two groups: Si-rich group and Ca-rich group. Similar to silicates/aluminosilicates, Si-rich group sediments enrich Si(SiO_2:34% to 49.6%), Mg(MgO:4.92% to 27.5%),Fe (Fe2O_3:7.78% to 10.65%)and Al(Al2O_3:4.87% to 12.15%) , which are very different from Ca-rich group sediments that enrich Ca(CaO:39.7%∼53.9%), LOI(29.32% to 42.98%) and Sr(972ppm to 1680ppm) that are similar to biogenetic carbonate. The variation range of $\sum$REE of Si-rich group sediments is 12.89ppm to 44.90ppm similar to Ca-rich group sediments that is 16.82ppm to 35.11ppm, while the ratio of LREE/HREE of Si-rich group sediments(1.03 to 1.83) is much less than Ca-rich group sediments(2.39 to 5.36). The normalized REEs with North American Shale Composite(NASC) in samples show N-MORB characteristics in Si-group sediments though the $\sum$REE are a bit lower, and slight negative Ce anomaly in both two groups(δCe: 0.80 to 0.43) while positive Eu anomaly is relatively distinctive in Si-group sediments(δEu: 1.14 to 1.60). Contens of CaO+LOI in Ca-rich group sediments are mostly higher than 80%(even 90%) indicate biodeposition is prominent in contrast to Si-rich group sediments(CaO+LOI: 11.33% to 46.68%) that are concerned with the mixture of basalt, ultrabasic rocks and calcareous sediments. The good correlation coefficients for major elements (SiO_2,Al2O_3,MgO,TiO_2 and LOI) corrected by CaO(for mitigating the effects of biodeposition) in Si-rich sediments with the comparison of the $\sum$REE-P2O5 among the Si-rich group sediment, Ca-rich group sediments and basalt in Southwest Indian Ridge also support the basalt is the main material source of Si-rich group sediment. Both of the δCe values and the U/Th-V/(V+Ni [U+FF09] plot show an oxide sedimentary environment, and content of CaO with linearity among the major elements in Ca-rich group sediments point out the study area is above the Carbonate compensation depth(CCD) and sedimentary environment is quite stable.