

Variations of clay mineralogy during glacial - interglacial period: the Southern Drake Passage

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Marine sediments with various clay minerals and crystal structures/distribution are associated with a sediment provenance and climatic conditions. Objective of this study is tracing sediment provenances through clay mineralogy, elemental composition and grain-size distribution of clay mineral in sediment core from the Southern Drake Passage. In the present study, X-Ray Diffractometer (XRD) measurements showed that smectite, illite and chlorite are dominant phases. The semi-quantitative analysis showed that the proportion of smectite is 50 - 60% in interglacial stage, 30 - 39% in glacial stage. Comparing with REE data, sediments supply was influenced by Weddell sea current and Antarctic Circumpolar Current (ACC). X-ray fluorescence (XRF) showed the heterogeneous amount of K₂O in illite with various depths. Moreover, Microanalysis and observations of smectites were carried by Transmission Electron Microscopy (TEM). Elemental compositions of smectite were performed by TEM - EDS. Tertiary diagram showed that smectite in Drake Passage was transported from three provenances : South Shetland island, east and west side of Antarctic peninsula. Crystal size distributions of smectite will be discussed to verify the origin of those minerals during glacial and interglacial periods. The study, therefore would suggest that mineralogical/chemical assessment should be used to trace the sediment transportation during glacial-interglacial periods.