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石英の ESR・結晶化度分析に基づく、ユーコン川からベーリング海陸棚域へと運ばれる陸源砕屑物の評価
Contribution of detrital materials from the Yukon River to the continental shelf sediments of the Bering Sea

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Bering Sea sediments contain detrital materials from the Yukon River. These materials may contain records of past climate changes in the Arctic area, such as the melting of glaciers around the drainage basin of the Yukon River, which help to understand hydrological cycle in this area. In the Bering Sea, however, the spatial extent and pattern of the detrital materials supplied from the Yukon River is not yet fully understood due to the lack of proxy. For better discrimination of the detrital materials from the Yukon Rivers, we focused on quartz, because it is the major component of both the silt- and sand-sized populations of detrital materials from the Yukon River (Eberl, 2004) and because it is resistant to chemical alternation and physical ablation by weathering, transport, and diagenesis. We adopted two parameters of quartz, the electron spin resonance signal intensity of its E1' center (Toyoda and Hattori, 2000) and its crystallinity index (Murata and Norman, 1976), and characterized the quartz in different sizes derived from the Yukon River. We then estimated the spatial pattern of quartz contributed by the Yukon River on the Bering Sea shelf by applying the method to core-top samples from the continental shelf and slope of the eastern Bering Sea.

The results showed a large contribution of sand-sized quartz from the Yukon River to wide areas of the continental shelf and slope, whereas contributions of clay- to silt-sized quartz from the Yukon River were small, except on the northeastern shelf. These spatial distribution patterns suggest that sand-sized quartz was repeatedly reworked and transported by processes such as storm surges to the outer continental shelf, whereas the clay- to silt-sized quartz on the northeastern shelf was supplied, as suspended materials, directly from the Yukon River. Therefore, the clay- to silt-sized quartz on the northeastern continental shelf probably records past climate changes related to the amount and intensity of the Yukon River discharge, whereas the sand-sized quartz in the eastern Bering Sea probably records variations of stormy weather.

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