



Provenance discrimination in surface sediments of the Amerasian Basin (Arctic Ocean) constrained by quantitative mineralogical analyses

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This study focuses on the determination of potential source areas for the terrigenous material derived from Eurasia and North America to reconstruct the sedimentary environments in the Amerasian Basin of the Arctic Ocean. When compared to the potential source areas in the Arctic Ocean hinterland, spatial variations in bulk mineralogy of surface sediments may provide important information on the trajectories of sea-ice drift and oceanic currents. Investigations are carried out on surface samples recovered from the Mendeleev Ridge and shelves of the East Siberian and the Chukchi seas. Mineralogical analysis was performed on bulk sediments by the X-ray diffraction (XRD) method. Dry powder samples were mixed together with corundum for further quantification of mineral contents. Raw XRD data were processed using the RockJock (Eberl, 2003) and QUAX (Emmermann & Lauterjung, 1990; Vogt, 1997) software to test the consistency of both methods. Additionally, composition of artificial mixtures was determined to test the accuracy of mineral standards.

Obtained results are used to identify mineralogical provinces in the surface sediments of the Amerasian Basin. This geographical distribution is also compared to the previously published studies, including the numerous research activities carried out in the Siberian shelf seas in the middle of the 20th century.

Bulk mineral composition of surface sediments will be further used for unmixing of the downcore mineralogical records for sediment cores recovered along two transects across the Mendeleev Ridge during the ARK-XXIII/3 Expedition of RV "Polarstern" (for details see Stein et al., 2010). Trends in mineralogical composition will be also compared to the grain-size distribution in order to attribute the provenance changes to different transportation mechanisms in variable sedimentary environments.

References:

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