

Modern radial sand ridges in the southern Yellow Sea Sediment: sources and transport trajectories

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The radial sand ridges (RSRs) in the southwestern Yellow Sea off the Jiangsu Coast, East China have been intensively studied at least since 1975. The sources of sediment for such a huge depositional system is one of the scientific focus and have attracted considerable speculation. Despite decades of studies, the provenance of the RSR sediments remains uncertain. To investigate sediment provenance of the radial sand ridges (RSR) off the Jiangsu coast of China in the Yellow Sea, mineralogy of modern RSR and their riverine source sediments associated riverine sediments (Changjiang River and Yellow River) were studied by X-ray diffraction (XRD), diffuse reflectance spectrophotometry (DRS) and scanning electron microscope (SEM) analysis.

SEM observations show that Changjiang sediments tend to be partly armored with smaller grains of clay minerals. Mineralogical composition of RSR sediments consists mainly of quartz and feldspar as framework constituents. Changjiang sediments generally have a lower feldspar/quartz ratio than those from the Yellow River and RSR. The higher abundance of K-feldspar and plagioclase in the sand ridges suggest the Yellow River is a potentially significant sediment contributor for the modern RSR. Factor analysis of DRS data from all sediments and the relative abundance of goethite and hematite reflecting climate influence, and therefore can be used as a sediment sources proxy in the Yellow Sea. The relative low abundance of hematite in RSRs sediments may contribute by the Changjiang River. The results show that coarse-grained sediment of RSR may be transported from the Yellow River, and fine-grained sediments from the Changjiang River. Based on the current circulation of the study area, the fine grained sediments of the Changjiang could influence the Jiangsu coastal zone.