

Cross-shore and longshore variations in residual doses of modern K-feldspar sands in the Kujukuri coast, central Japan

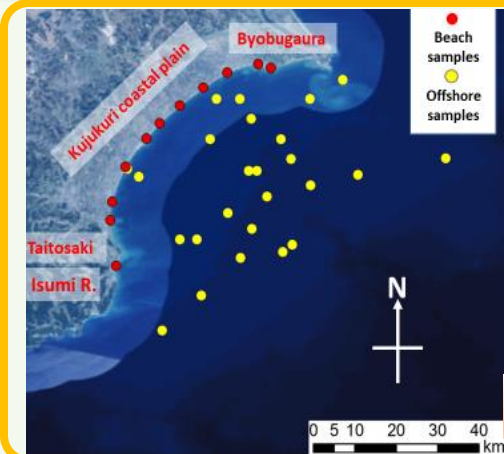
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Background

Residual dose is a problem for accurate dating, but it may also provide a clue to deciphering the sediment transport.

This study aims at characterizing the cross-shore and longshore variations of residual doses of IRSL and pIRIR from modern K-feldspar sands in the Kujukuri coast to discuss the sediment transport processes that the variations reveal.

Figure 1. Study site (the Kujukuri coast) Sampling points are indicated by circles.



Method

K-feldspar sands (180-250 μm and 2.53-2.58 g/cm³ fraction) extracted from modern beach and offshore surface sediments were measured to estimate their residual doses using the SAR protocols. pIRIR signals at 150, 225 and 290 °C after prior IRSL at 50 °C were obtained. The preheat (Ph) temperature is set +30 °C above the pIRIR measurement temperature.

Results and discussion

Figure 2. Cross-shore variations of residual doses between foreshore and dune at the central Kujukuri coast.

Landward decrease of residual dose from foreshore to dune

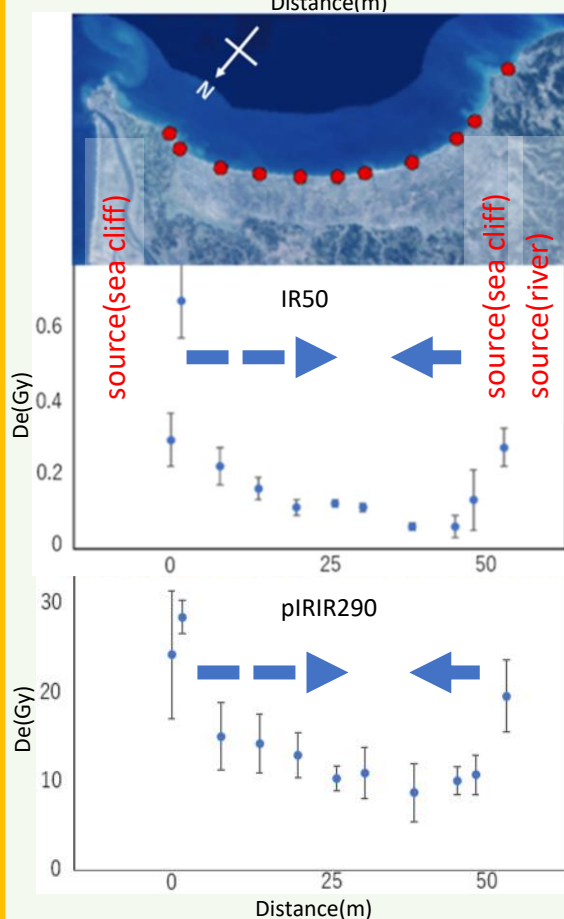
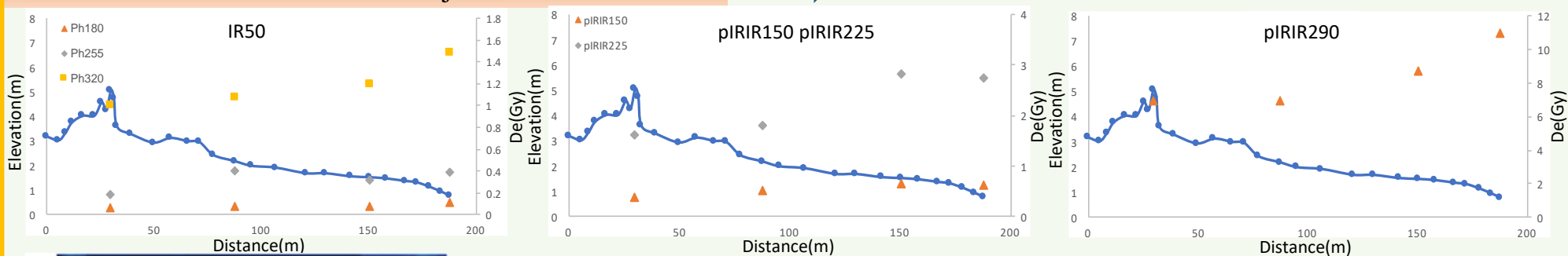


Figure 3. Longshore variations of residual doses in foreshore

Downdrift decrease toward the central coast

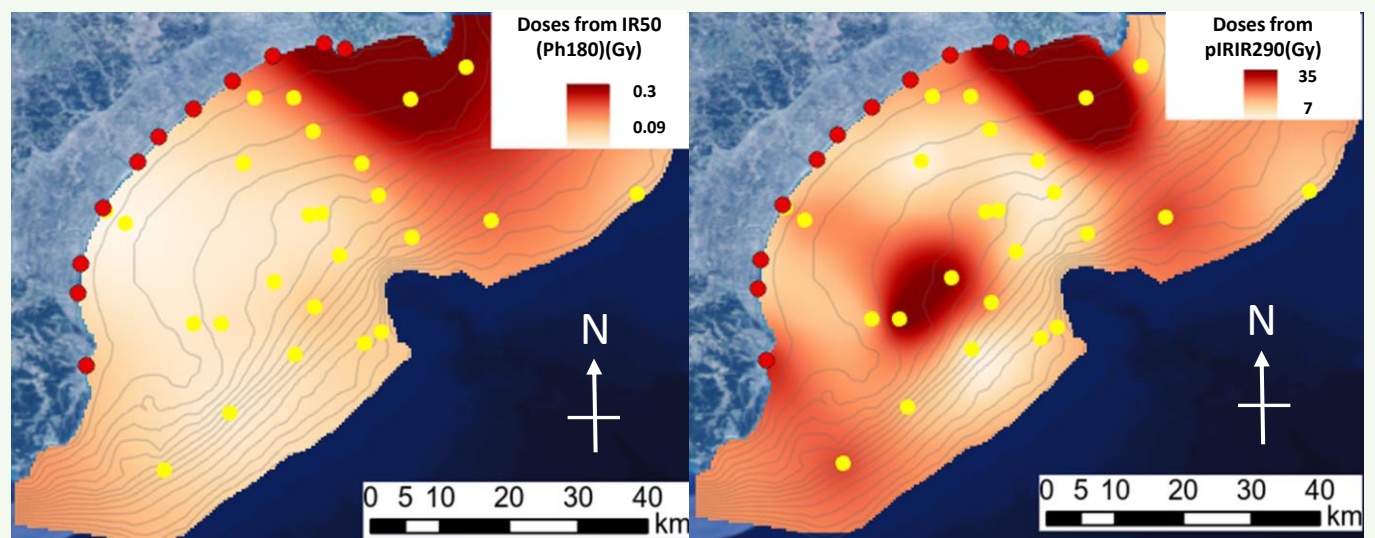


Figure 4. Offshore variations of residual doses from spatial interpolation

Residual doses are higher near the sediment sources and seem to have no clear relationship with the water depth.

Observed spatial variations are attributed to the sunlight exposure of sands during their longshore transport in shallow water and onshore aeolian transport. The inferred directions of the longshore transport are generally consistent with the prevailing direction of the sediment transport in the Kujukuri coast, supporting the effectivity of residual doses as a sediment tracer.