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Sand rubification with time? The case of the Sinai - Negev erg

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The redness index (RI) (RI = R2/(B*G3) of aeolian sand has been shown to be a promising qualitative spectroscopic method to define sand grain redness intensity, which reflects the extent of iron-oxide quartz grain coatings(1,2). Using the RI, this study investigates the relationship between redness intensity and optically stimulated luminescence (OSL) based depositional ages of sand samples taken from exposed and fully-drilled vegetated linear dunes in the northwestern Negev dunefield, Israel at the downwind end of the Sinai Negev erg.
Sand redness intensity did not vary greatly along the Negev sand transport paths and dune sections dated to be active during the Late Pleistocene, late Holocene, and modern times. No correlation was found between RI intensity (i.e. redness) and the depositional age of the sand.
The relatively uniform RI values and sedimentological properties along most of the dunes suggest that sand grain coating development, and consequent rubification, have probably been minimal since the Late Pleistocene. Although it is possible that RI developed rapidly following deposition in a wetter Late Pleistocene climate, the drier and less stormy Holocene does not seem conducive to sand-grain rubification. Based on analyses of northern Sinai sand samples, remote sensing, and previous studies, we suggest that the attributes of the sand grain RI have been inherited from upwind sources. We propose that the sand grain coatings are early diagenetic features that have been similarly red since their suggested aeolian departure from the middle and upper Nile Delta.

References

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