

What determines the spectral reflectance of the Negev-Sinai sand dunes

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Abstract

The difference in spectral reflectance between the north-western Negev desert and the adjacent Sinai sand dunes has attracted the attention of many scientists. Remote sensing analysis of three Landsat Multi-Spectral Scanner (MSS) images acquired in the summer of 1984, 1987, 1989, followed by intensive field work, indicate that the area is not homogenous and is undergoing a quick recovery from the intensive grazing that it suffered between 1968 and 1982. The outcome is a gradual decrease in the brightness of the Negev between 1984 and 1989 in all MSS bands except band 7 which shows very little or no change with time. This is due to the increase in biogenic crust and vegetation cover. The Sinai bare sand shows the opposite trend of little to no change in all bands but band 7, which shows an increase in reflectance with time. This is probably due to the effect of further destruction of vegetation in the Sinai after 1982.

In the northern part of the area, dunes are low, have a high percentage of fines (silt and clay) in the interdune areas, and stabilize quickly. This area is also covered by dense carpets of annuals which have a reflectance that is lower than that of the crusted area, but higher than the reflectance of *Artemisia monosperma*, the most widespread shrub. The contrast ratios, measured in the field between the Sinai bare sand and the Negev biogenic crust (on the same sand) is similar to the contrast ratios measured by Landsat MSS between the Sinai and the Negev.

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