

Remote sensing signatures of geomorphic processes in northwestern China

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Remote sensing techniques may be used to assist in regional mapping of geomorphic units related to past climate changes through their sensitivity to roughness and composition. Radar images from the recently flown Spaceborne Radar Laboratory and visible-wavelength images from the French SPOT satellite were used to determine remote sensing signatures of alluvial fan units for an area in the Kun Lun Mountains of northwestern China. These data were then used, with field observations, to compare surface processes and their effects on remote sensing signatures in northwestern China and the southwestern United States. Geomorphic processes affecting alluvial fans in the Kun Lun Mountains include aeolian deposition, desert varnish, and fluvial dissection. However, salt weathering is a much more important process in the Kun Lun than in the southwest U.S. This decreases the effectiveness of desert varnish and prevents desert pavement from forming. Thus, the Kun Lun signatures are diagnostic of the dominance of salt weathering while signatures from the southwest U.S. are indicative of the dominance of desert varnish and pavement processes. Remote sensing signatures are consistent enough in these two regions to be used for mapping fan units over large areas.

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