

Geomorphic and land cover characterization of dust storm sources in the Chihuahuan Desert: A decadal assessment of events

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Soil degradation, natural or anthropogenic, takes an important toll on susceptible environments such as the desert soils of the northern Chihuahua. This area of the Chihuahuan Desert is a prominent source of aeolian sediments eroded from alluvial, fluvial, lacustrine, aeolian deposits and anthropogenically disturbed land. Dune fields and dust storms are permanent and seasonal features in the region. Large-scale dust storms originating within the region occur in a yearly basis from November to May. These storms are associated with strong winds generated by northern cold fronts during the winter, and the passing of the Pacific Jet Stream in early spring; coinciding spatially and temporally with the peak dry season. Performing a direct identification through the use of MODIS satellite imagery, 1759 individual initiation sources of dust storms were identified and described on the basis of geomorphic and land cover descriptions. These sources are associated with 73 dust storm events spanning from the year 2002 until 2013. Dust storms identified here average 6 events per year, with a notable increase in recent years peaking at 10 events during 2010. Seasonally, February through April are the months with more events with 14 for February and 15 for each March and April. The number of individual initiation points also displays a noticeable increase starting from the year 2010 (223) and peaking in 2013 with 441 individual points. Detailed knowledge of these events could help develop strategies oriented to mitigate the effects of soil degradation in the northern Chihuahuan Desert.