

DISCRIMINATING ACCELERATED FROM NATURAL WIND EROSION AT CONTINENTAL SCALE IN AUSTRALIA

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Wind erosion is widespread in arid and semi-arid regions of Australia. While this erosion is a natural process that has been operating at least throughout the Quaternary, erosion rates in some areas have more recently been accelerated by poor land management. A major wind erosion monitoring challenge is to discriminate this natural process which is strongly driven by climate (mainly rainfall), from the land management-induced processes arising mainly from pastoralism, agriculture and mining.

Bureau of Meteorology records of dust storms and other wind erosion events are used to produce a Dust Storm Index (DSI) which measures wind erosion activity. Meteorological records have the advantage of providing daily data over long time scales, however they have a number of weaknesses which limit their spatial resolution to regional scales.

Land management effects on wind erosion rates are here discriminated using the new concept of, rainfall-adjusted wind erosion; in which wind erosion rates (expressed as DSI) are normalised for rainfall (expressed as DSI per 10mm of rainfall). This concept allows erosion rates of regions with different rainfall to be more accurately compared, and for the measurement of long term trends in erosion that are largely independent of rainfall changes.

The continent is divided into 3 mainland sectors; the West (Western Australia), Centre (Northern Territory and South Australia) and East (Queensland, New South Wales and Victoria). Erosion trends within each sector are measured in 5 time periods over 48 years (from 1960 to 2007). When total wind erosion rates are compared with rainfall-adjusted erosion rates, a hotspot of accelerated erosion is discriminated in the Alice Springs region of Central Australia. During the 1960-1965 drought, erosion in this region was accelerated by poor pastoral land management. This led to the implementation of one of Australia's earliest wind erosion rehabilitation programmes; involving the planting of buffel grass to stabilise soils in the region. Rainfall-adjusted wind erosion rates decreased in response to this rehabilitation programme.