

Once the dust settles – Assessing wind erosion after bushfires

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Wind erosion in Australia has created interest for several decades due to its impact on agricultural productivity (e.g. loss of vital nutrients, sandblasting of crops) and general health (e.g. air quality, asthma and other respiratory problems). Thanks to recent improvements in land management practices in South Australia, soils are now protected 93% of the time limiting soil loss through wind erosion. However current global climate models predict overall warmer conditions for Australia and an increased risk in extreme weather conditions such as floods and wildfires. Hence a future increase in soil loss is likely, but there is limited knowledge about the link between bushfires and wind erosion.

Here we report on a rare study of soil loss immediately after a large bushfire. The logistic difficulties of assessing wind erosion after wildfires are massive as wind erosion is generally most severe immediately after a fire. Landholders of the affected land need to support scientific research, as experimentation impacts their activities in a situation of severe stress. Furthermore, the phenomenon is highly variable in space and time. Therefore, we explored an inexpensive method to estimate the spatial distribution of sediment transport. This method follows a protocol developed by the US Department of Agriculture to monitor wind erosion on a range of different landscapes. We installed an array of dust samplers at different heights on adjacent burnt and un-burnt cropped paddocks.

The results demonstrate how wildfires affect wind erosion risk. They show marked differences between sites, a high spatial variability within sites and, as expected, an exponential decline with sampling height. We discuss how the results of this research can be used for decision support in fire prevention and post-fire management (e.g. clay spreading). The research outcomes could assist landholders in land management planning as well. Additionally, the experimental layout is sufficiently simple to be widely adopted for a broad-scale parameterisation and validation of soil erosion models.

Keywords: Erosion modelling, Land management, Future climate

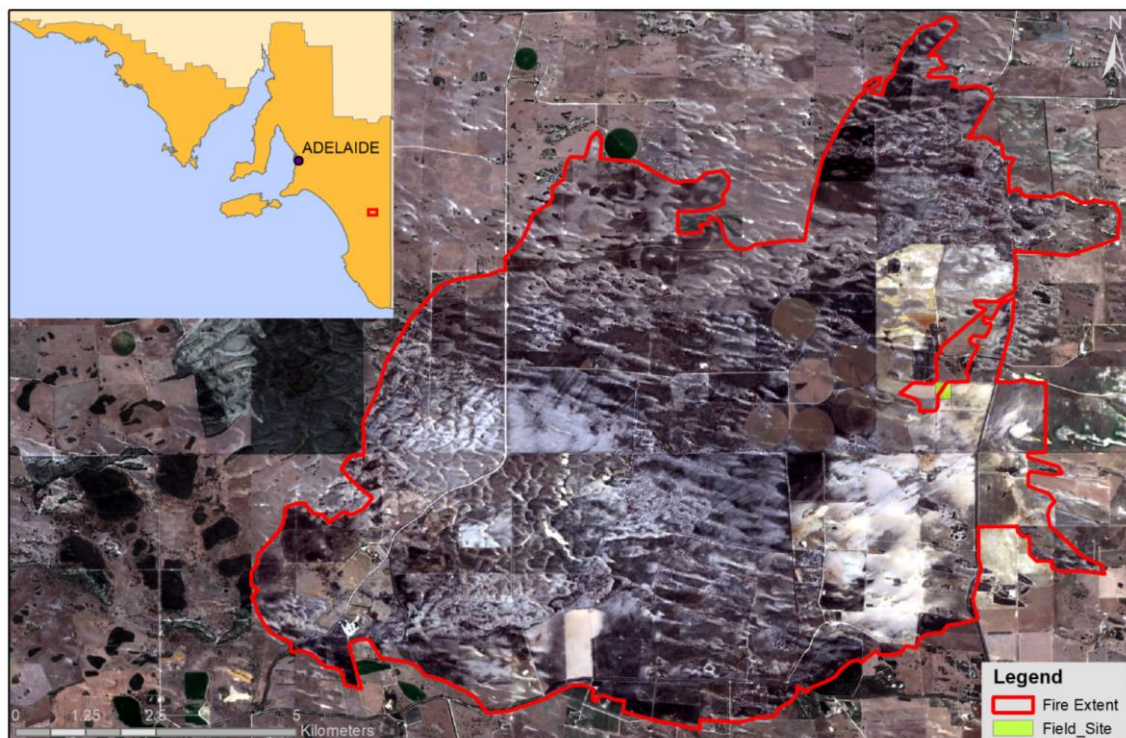


Figure 1: Location map and extent of the Sherwood bushfire, Sherwood, South Australia.

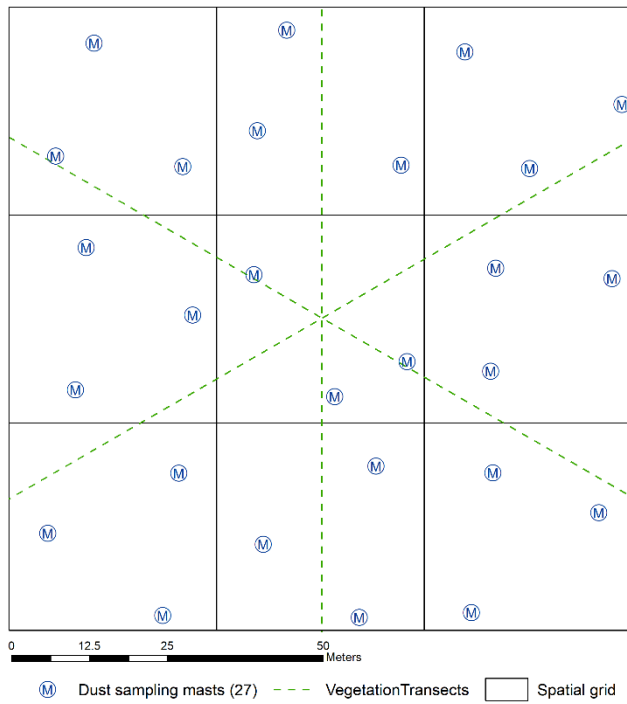


Figure 2: Experiment layout, showing the spatial distribution of sampling masts



Figure 3: Example of dust sampling mast and collectors