



Wildfire and debris-flows in South East Australian catchments: threshold conditions and magnitude-frequency of post-fire erosion events.

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The effect of wildfire on catchment processes is highly variable depending on environmental and physical factors. Data from a range of conditions show elevated post fire erosion rates on hillslopes and increased sediment export from burnt catchments. However, most controlled experiments and catchment monitoring studies are unlikely and in most cases unable to capture rare events such as debris flows. In south east Australia, extreme erosion events have been reported in a range of catchments following major wildfires over the last 50 years. The circumstances under which these events occurred, the processes involved, the volumes of material exported and the impacts on water quality have remained largely unexplored.

In 2007, severely burnt catchments in north east Victoria produced a large number of mass erosion events following high intensity convective storms. Data on rainfall duration and intensity was available from nearby locations. More than 30 catchments were studied and mapped in detail to provide quantitative data on the conditions required for initiation of major erosion events after fire, and to estimate loads of sediment and other constituents delivered from the hillslopes and the channels of the study areas. The study established that the erosion events were triggered by runoff processes and sediment entrainment rather than mass failure, typical of fire-related debris flows reported from research in South Western USA. These loads are compared and contrasted with sediment load magnitude-frequency data collected from 5 fully instrumented burnt catchments in SE Australia with contrasting soil properties. This analysis has allowed an initial estimation of i) threshold conditions for debris flow initiation, and ii) recurrence intervals for fire related debris flow events.