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Rainfall feedback patterns inferred from hundred-year rainfall records in Western Australia

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Following a heavy fall of rain, factors that might influence following rainfall are: moisture availability and changed surface albedo that could aid convection, moisture-induced microbiological activity and plant growth that could lead to enhanced concentrations of airborne particles such as large hydrophilic particles and ice nuclei that affect both probability and amount of precipitation. To identify possible feedbacks among rainfall events we calculate the differences in amount and frequency of rain in the 20 days preceding and following a heavy fall of rain for data from 22 sites covering areas of the western half of Australia for which long rainfall records are available, the data being split into two 50-year periods. Frequency of rainfall was used as the preferred variable as it gives representative and the least "noisy" results. Calculations were corrected for artefacts resulting from differences in the occurrence of heavy falls of rain at the onset and decline of the rainy season. During the first 50 years rain fell more frequently after heavy rain at 76% of sites but at only 55% in the second half, 14% of results being indeterminate in each half. Less frequent rain followed heavy rain at the remainder. At low rainfall sites apparent effects lasted only about ten days. The proportion of after-before differences in each fifty year period that were statistically significant has been assessed. We propose that the influence of rainfall on the abundance of ice nuclei provides a coherent explanation of the results.

Bioaerosol Effects
on Clouds 2012



Storm Peak
Laboratory

Steamboat Springs, CO
August 4-7, 2012

Program and Abstracts