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The Australian Rangeland Society

The effect of fire frequency and patch dynamics on soil carbon fluxes in tropical rangelands

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Soil respiration is the major source of CO₂ flux to the atmosphere in terrestrial systems. In tropical rangeland ecosystems disturbance regimes, such as cattle grazing and fire, impact soil CO₂ fluxes and therefore, carbon stored in the soil. In this study we measured soil respiration in grazed experimental plots burnt every two, four and six years, as well as unburnt plots and a grazing exclosure at the Kidman Springs long-term fire experiment established in tropical woodlands of northern Australia. We tested the influence of patch type (grass vs. tree-dominated), soil temperature and soil moisture on soil respiration at the end of the wet season. We describe and quantify how fire and grazing influence soil respiration by altering soil physical conditions and vegetation patch dynamics. We conclude that changes to fire regimes and grazing intensity in tropical rangelands could have a large impact on soil carbon cycling.