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Landscape scale patterns of smoldering combustion in the boreal forest floor organic layer.

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Smoldering combustion removes varying amounts of the boreal forest floor organic layer (duff). This is important for the release of carbon and because post-fire tree recruitment occurs only where the duff has been consumed. Smoldering combustion is controlled by bulk density, moisture content and depth (thickness). We show in boreal forest stands in Western Canada that these three determining variables are controlled by three spatial scales: first, the regional temperature and precipitation for the last 30 days; second, the hillslope substrate and hydrology; and third, the local canopy composition and coverage. A duff water budget showed the duff moisture is controlled in the spring by local precipitation and hillslope hydrology and in summer, only by local precipitation.