

## Pyrogenic lightning and wildfire ignition on Black Saturday in southeast Australia

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A number of devastating wildfires occurred in southeast Australia on 7 February 2009, known as Black Saturday. We examine six different fire complexes on Black Saturday using a combination of ground-based radar, satellite, lightning and station observational data sets. Three clearly distinct pyrocumulonimbus storms are apparent, the largest of which reached heights of 15 km on that day and generated hundreds of lightning strokes. One of the pyrocumulonimbus storms was initiated close to midnight due to mesoscale influences, consistent with extreme fire behavior observed at that time for that particular fire. As another example of fire-atmosphere interactions, a fire that started late on Black Saturday is examined in relation to ignition caused by pyrogenic lightning, with implications for understanding the maximum rate of spread of a wildfire. We also demonstrate the potential for using lightning, radar, and satellite remote sensing in combination with thermodynamic analyses as well as synoptic and mesoscale dynamics to provide enhanced real-time guidance for dangerous fire conditions associated with pyroconvection, as well as for the risk of new fire ignitions from pyrogenic lightning.