Clustering of severe storm environments across Australia

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Severe storms have significant impacts on communities worldwide and are a leading driver of insured losses in Australia. In this study, we focus on Australian severe storm environments, aiming to identify distinct clusters of environments based on convective parameters. Our methodology involves extracting storm locations using overshooting top satellite data and lightning detection networks. We apply cluster analysis to a selection of reanalysis-derived convective parameters at these locations to identify the spectrum of environments associated with severe storms across Australia. By considering cluster characteristics, along with spatial and temporal variations in their frequency, we assess how the ingredients for severe storms vary regionally and seasonally.