(17-240328-B) **Statistical Modelling of the Relationship between Climate Modes and Eastern Australia Atmospheric Carbon Monoxide**

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The 2019-2020 Australian wildfire season was notable in its severity, with impacts on local ecosystems, lives, property, and major atmospheric effects both locally and across the southern hemisphere. There is a strong connection between climate factors and severe wildfire events, particularly through climate modes that can influence local fire conditions. We present our initial modeling of the relationships between atmospheric carbon monoxide (CO) anomalies in eastern Australia and the climate mode indices of Niño 3.4, Dipole Mode Index (DMI), Tropical South Atlantic (TSA), and Southern Annular Mode (SAM), using atmospheric CO as a measure of fire intensity in two regions: northeast Australia (NE Aus) and southeast Australia (SE Aus). Initial analysis shows positive correlation between Niño 3.4 and both regions. Additionally, a strong positive correlation exists between the DMI and both regions, particularly during the most severe weeks of the 2019-2020 wildfire event, underscoring DMI's significant influence on the severity of wildfire events.

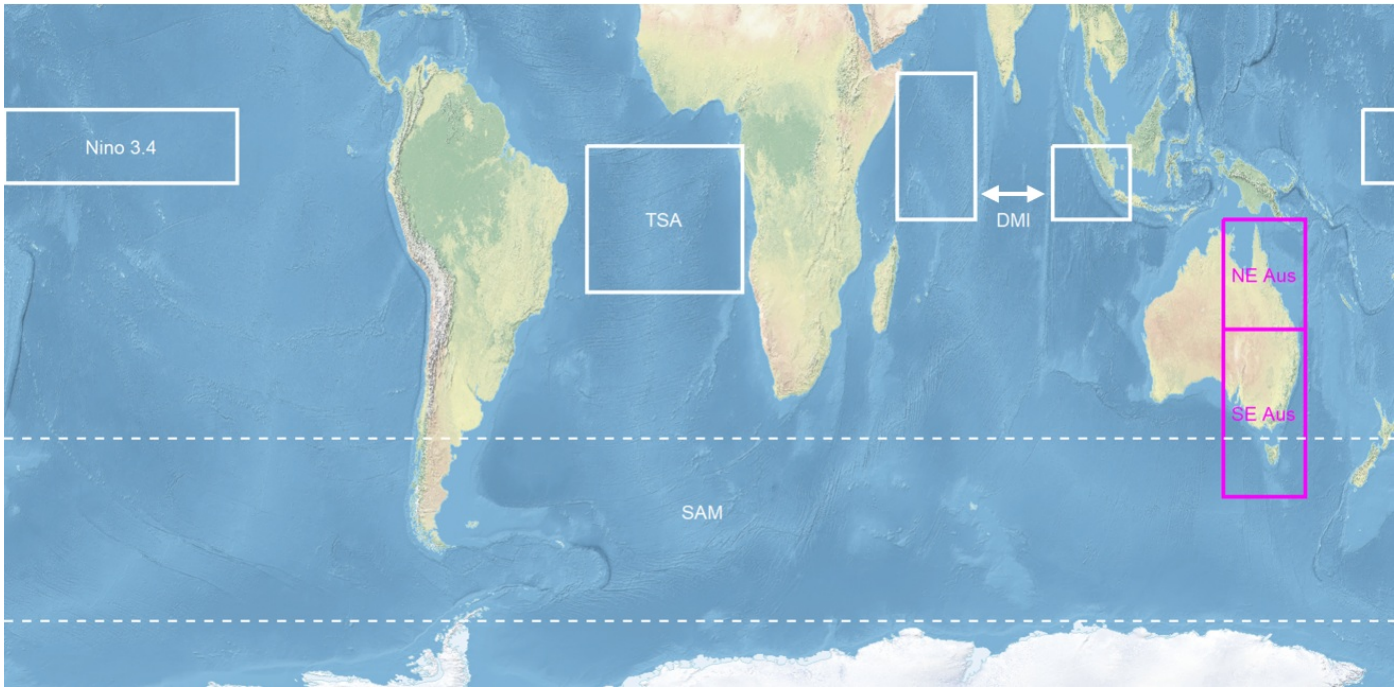

Figure 1. Examining the relationships between the climate mode indices (Niño 3.4, TSA, DMI, SAM) indicated in white and atmospheric carbon monoxide (CO) anomalies in the magenta-highlighted regions of eastern Australia (NE Aus and SE Aus).