

Supplementary Information

A Multi-Method Antarctic Atmospheric Blocking Dataset (1979-2024)

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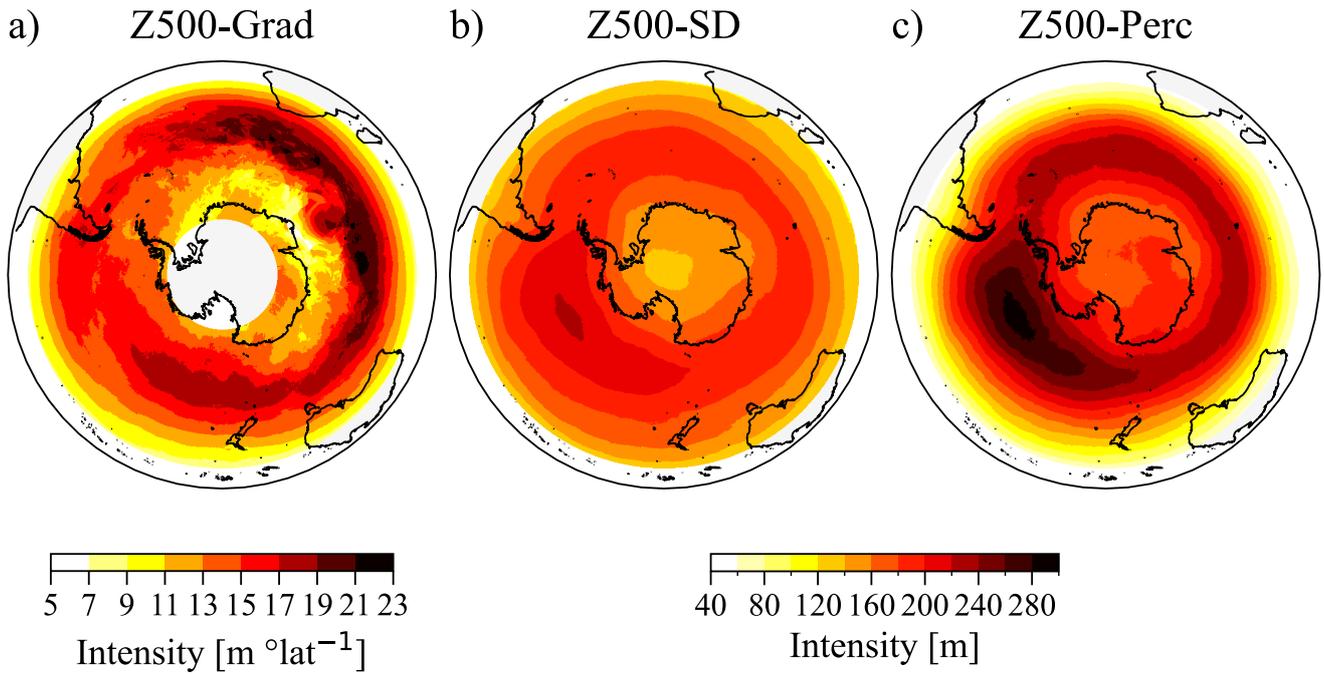
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Figure S1: Annual climatology of blocking intensity derived from Z500-based detection methods. Panels a) to c) show the mean blocking intensity for Z500 gradient (Z500-Grad), Z500 standard deviation-based anomaly (Z500-SD), and Z500 percentile-based anomaly (Z500-Perc), respectively. Intensity is defined following the native formulation of each method, with units indicated in the color bars.

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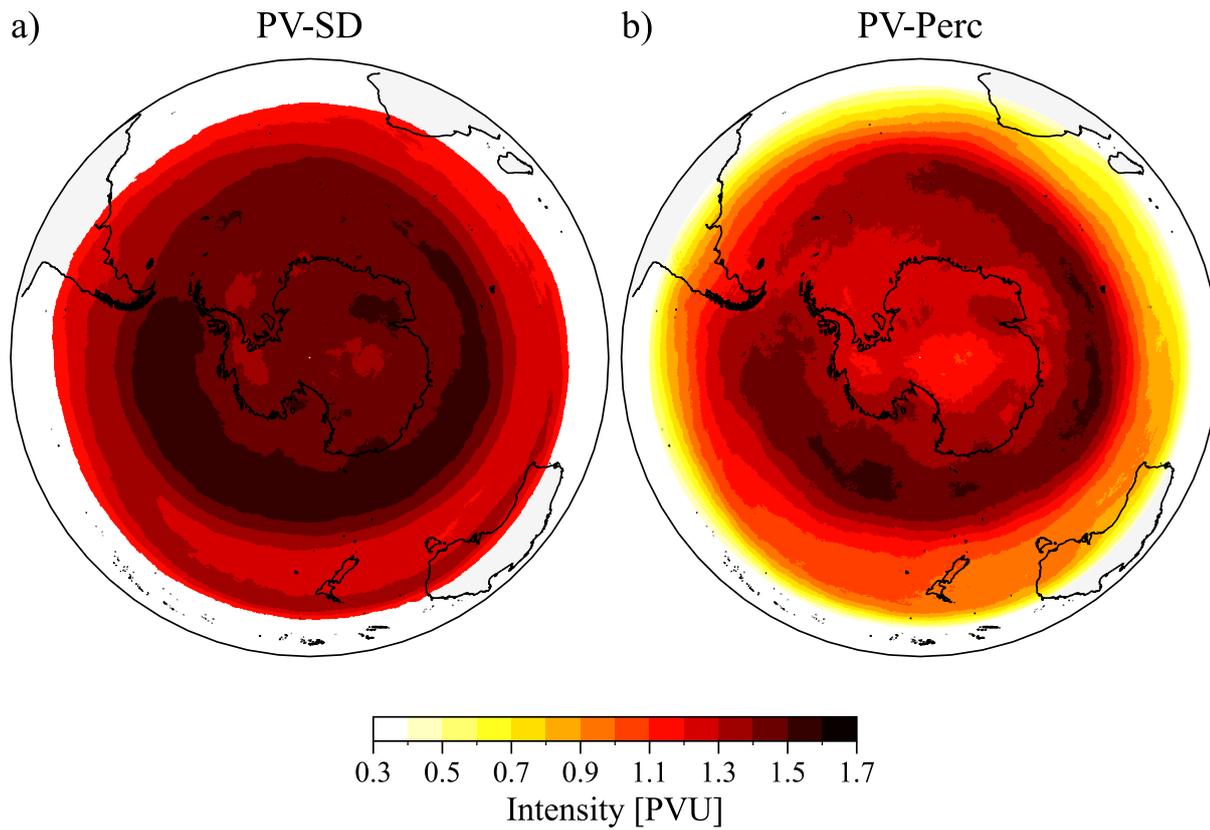
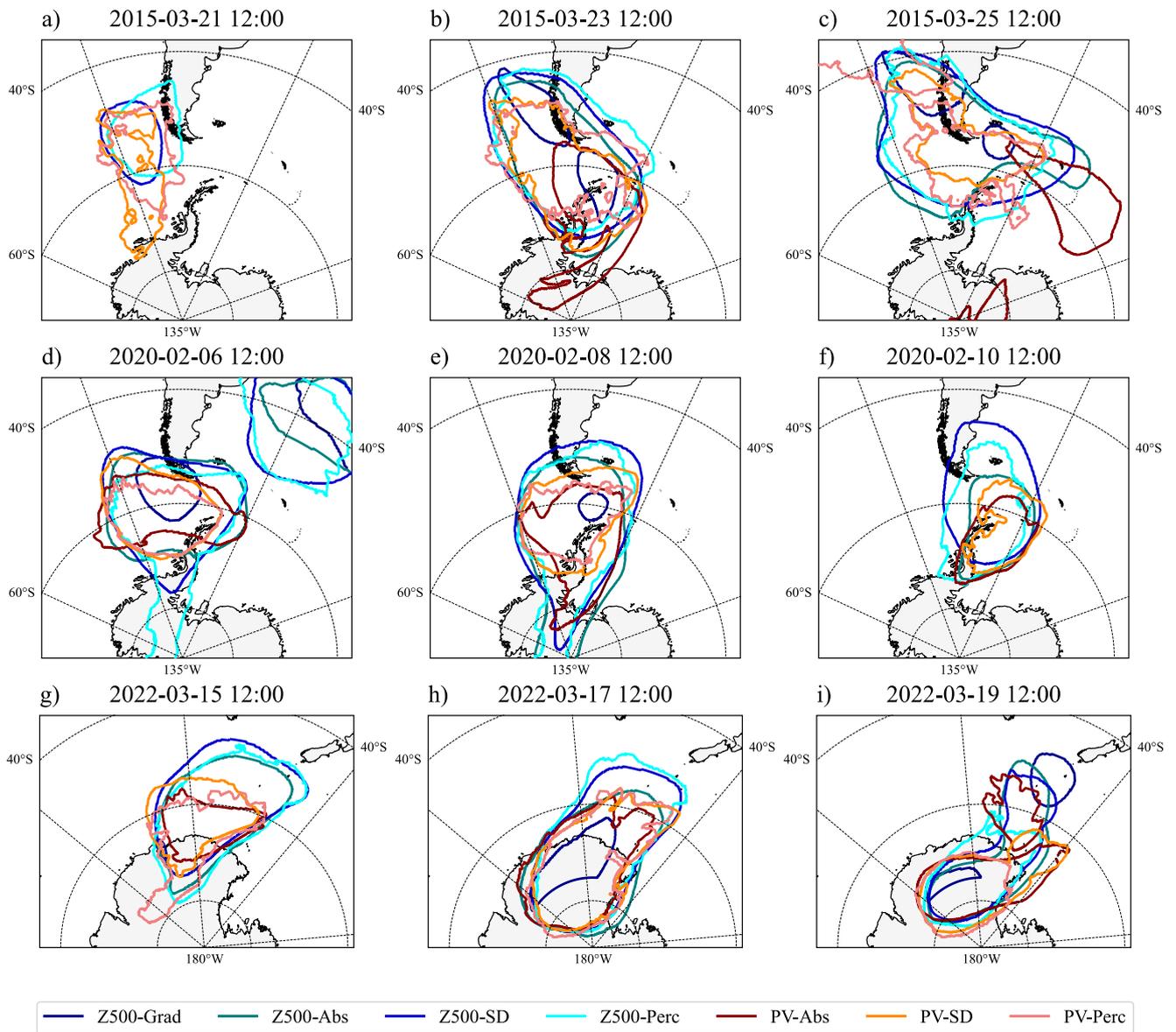


Figure S2: Annual climatology of blocking intensity derived from PV-based detection methods. Panels a) and b) show the mean blocking intensity for the standard deviation-based anomaly method (PV-SD) and the percentile-based anomaly method (PV-Perc), respectively. Intensity is expressed in potential vorticity units (PVU), as indicated by the color bar.



35 **Figure S3: Comparison of blocking events detected by different methodologies for three representative cases, shown prior to the application of any areal filtering. Panels a) to c) show the evolution of a blocking event in March 2015 over the Antarctic Peninsula, panels d) to f) show a blocking event in February 2020 over the Antarctic Peninsula, and panels g) to i) show a blocking event in March 2022 over East Antarctica. Colored contours indicate blocking regions detected by each method, as identified in the legend.**