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Title: An improved algorithm for detecting blocking events
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Abstract:
Tropospheric blocks, whether of the "Rex" or "Omega" type, often spawn periods of exceptional weather. Statistical studies to uncover biases in the ability of climate or NWP models to generate blocking patterns typically rely on algorithms that detect a reversal of the meridional gradient of, for example, 500mb height, or of potential temperature on a PV surface near tropopause level.

One shortcoming of these algorithms is that they cannot easily distinguish gradient reversals caused by the presence of a genuine blocking anticyclone from gradient reversals reflecting a saddle point between the primary polar cyclone and a cutoff low. This shortcoming can lead to false positives when establishing a climatology of (predicted or observed) blocking events.

We show that this problem can be remedied by incorporating diagnostics of streamline curvature into the blocking index algorithm. We call a flow pattern a block only if a spatially isolated, locally dominant extremum in anticyclonic curvature is found poleward of the location where a gradient reversal of -say- 500mb height is detected.

The requirement to incorporate velocity data into the detection algorithm is a complicating factor. However, the unfamiliar task of diagnosing streamline curvature is no more complex than that of diagnosing vorticity.
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