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# A climatological link between slantwise instability and surface weather conditions

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Midlatitude weather phenomena including rainbands in fronts and cloud heads and the descending sting jets found in extreme windstorms have been attributed, in part, to the release of conditional symmetric instability (CSI). CSI is a slantwise parcel instability arising from the combination of inertial and gravitational instability in a baroclinic atmosphere; its release gives slantwise convection. However, to date, demonstration of the link between CSI and severe weather has been confined to a few case studies. Weather forecast models with domains big enough to encompass entire midlatitude storms do not have sufficient resolution to realistically resolve the release of CSI, and CSI release is not parameterized in these models. The consequences of this lack of representation of CSI release are currently unknown and motivate this study. We present a North Atlantic climatology of the energy available for slantwise convection due to CSI derived from the ERA-Interim re-analysis, and compare it with an equivalent climatology of CAPE (the energy available for upright convection due to conditional instability). The annual cycle of land and sea surface temperatures are shown to strongly modulate these instabilities. The statistical relationship between these instabilities and surface weather conditions are presented.