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Three-dimensional structure and daily evolution of vertically-coherent troposphere-stratosphere wave activity pulses

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Previous research has shown that wave activity flux from the troposphere into the stratosphere can displace or split the polar vortex and that these changes, in turn, can have an important influence on surface sensible weather. In daily data, anomalies of vertical wave activity flux from the troposphere to the stratosphere are often seen to occur as a short time-scale (two weeks or less), vertically-coherent pulse.

Here, we consider the three-dimensional, daily evolution of these events, both in terms of composites and individual case studies, focusing primarily on vertically coherent events – events where the anomalous vertical wave activity flux has the same sign throughout the troposphere. As expected, Siberia is an important locus for these events, and the role of surface pressure, and the interaction of synoptic-scale variability with hemispheric-scale circulation anomalies in the development of these pulse events is explored in that region.