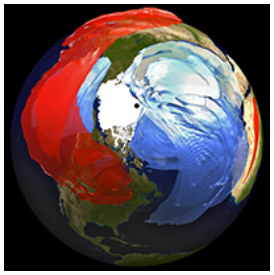

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Gravity Waves as a Driver of the 2002 SH SSW

Sudden stratospheric warmings (SSWs) are one of the most extreme phenomena in the atmosphere. They are associated with an abrupt increase in polar stratospheric temperature, preceded by the reversal or deceleration of zonal winds. Although they are stratospheric phenomena, the effects of SSWs extend from troposphere to ionosphere. These phenomena can trigger extreme winter events in surface weather and are therefore a robust example of stratosphere-troposphere interaction.
Previous works have concluded that SSWs occur because of the anomalous propagation of large scale planetary waves. However, recent studies hypothesise that along with planetary waves, small scale gravity waves play an important role in causing such phenomena.
In the present study, we investigate the role of gravity waves in driving the unique 2002 SSW which occurred in the Southern Hemisphere (SH). Due to limited sources of planetary waves in the Southern Hemisphere, it has been suggested that gravity waves played a major contributing role in triggering this SSW. Here we use gravity wave measurements from AIRS on-board NASA's Aqua satellite. We study the gravity wave climatology of background conditions for the period of 2003-2018. Then we compare and contrast the unique case of 2002 to this background. The outcome of this study provides a different insight into the core dynamics of SSW development, with implications for Northern Hemispheric warming events.

Primary authors: NATH, OINDRILA (UNIVERSITY OF BATH); Dr HINDLEY, Neil (Centre for Space, Atmospheric and Oceanic Science, University of Bath, UK); WRIGHT, Corwin (University of Bath)

Presenter: NATH, OINDRILA (UNIVERSITY OF BATH)

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