Investigating the connection between tropospheric blocking and sudden stratospheric warming events using GNSS radio occultation observations

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Both sudden stratospheric warming (SSW) events and tropospheric blocking events can have a significant influence on winter extratropical surface weather. Upward propagating planetary waves from the troposphere can interact with the stratospheric mean flow and disrupt the stratospheric polar vortex, which is associated with an SSW event. Blocking has often been suggested as one of the tropospheric precursors for anomalous upward propagating wave activity flux. It remains an open question to what extent upward wave activity caused by blocking is related to SSW events. In the present study, we examine the evolution of the Eliassen-Palm fluxes during blocking events that precede SSWs. We use Global Navigation Satellite System radio occultation measurements for this analysis to provide accurate and vertically well-resolved information on the wave coupling between these two phenomena in the upper troposphere and stratosphere. First results will be presented and discussed.

Keywords: sudden stratospheric warming, Eliassen-Palm flux, blocking