



Baroclinic waves phase-lockings by double tropopause events

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Double tropopause events in Global Positioning radio occultation CHAMP and COSMIC data are analyzed. High frequency ($> 60\%$) of double tropopause events is found in the subtropical regions. In accordance with other studies, the statistics of tropopause heights suggest that the dominant process for double tropopause events is associated with an overlapping of the tropical tropopause on the extratropical one. Here we show that the overlapping variability is associated with baroclinic wave patterns in the subtropical and middle latitudes. The wave signature in the data can be uncovered due to wave phase-lockings by single and double tropopause events.