Atmospheric
Chemistry
and Physics

Supplement of

New insights into Rossby wave packet properties in the extratropical UTLS using GNSS radio occultations

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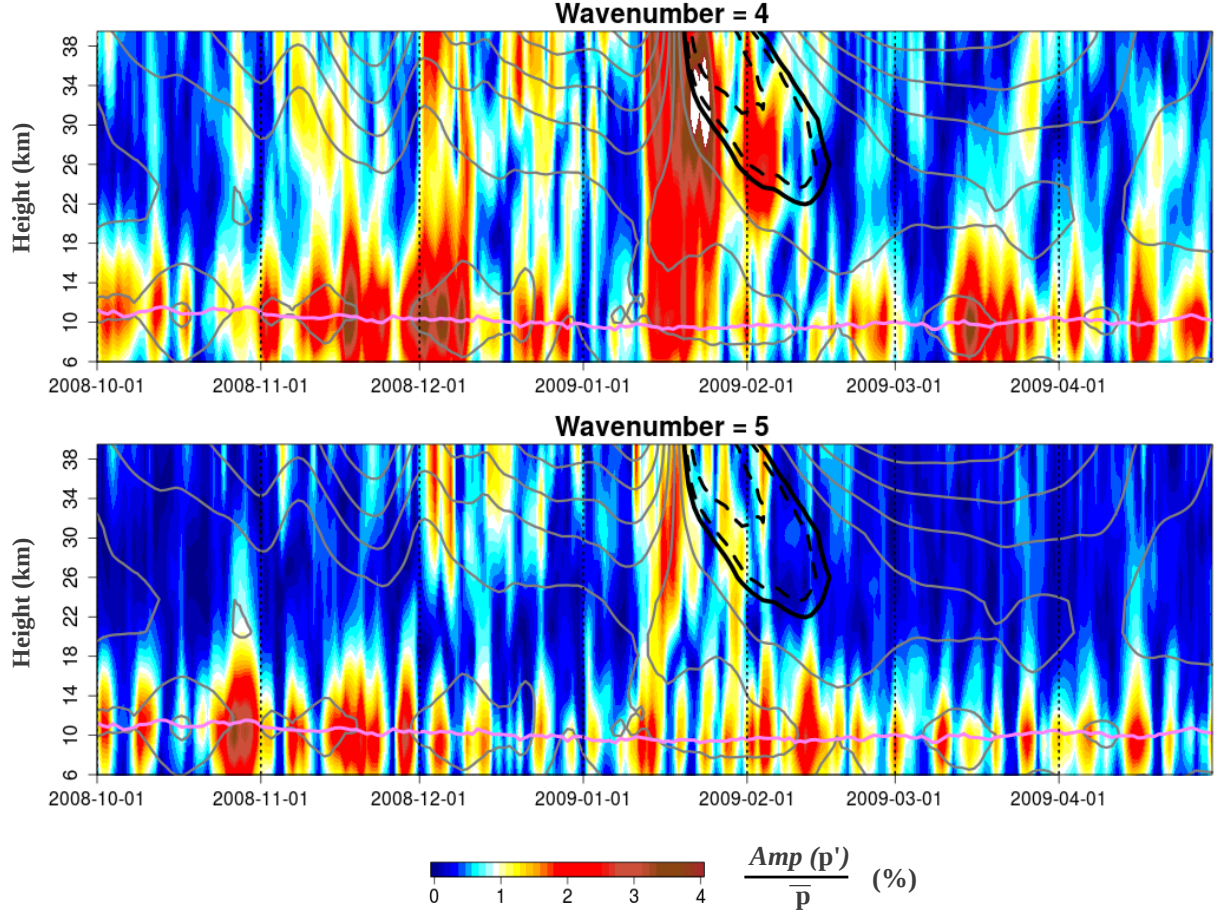*Correspondence to:* Robin Pilch Kedzierski (rpilch@geomar.de)

Figure S1. Time-height sections of wave activity for wavenumbers 4-5 at 50°N, in terms of the amplitude of the individual harmonics of pressure anomalies, relative to the mean pressure of each vertical level (colours). Magenta line denotes the zonal-mean TP_z. Grey solid lines denote westerly zonal winds, with 10 ms^{-1} separation. Thick black solid and dashed lines denote 0 ms^{-1}, -3 ms^{-1} and -10 ms^{-1}, respectively. To improve visibility, the ERA-Interim zonal-mean zonal wind is displayed with a running mean of +-15 days. Same as Fig. 2 from the main manuscript, but focused on w4/w5, winter/spring time and with extended vertical range.
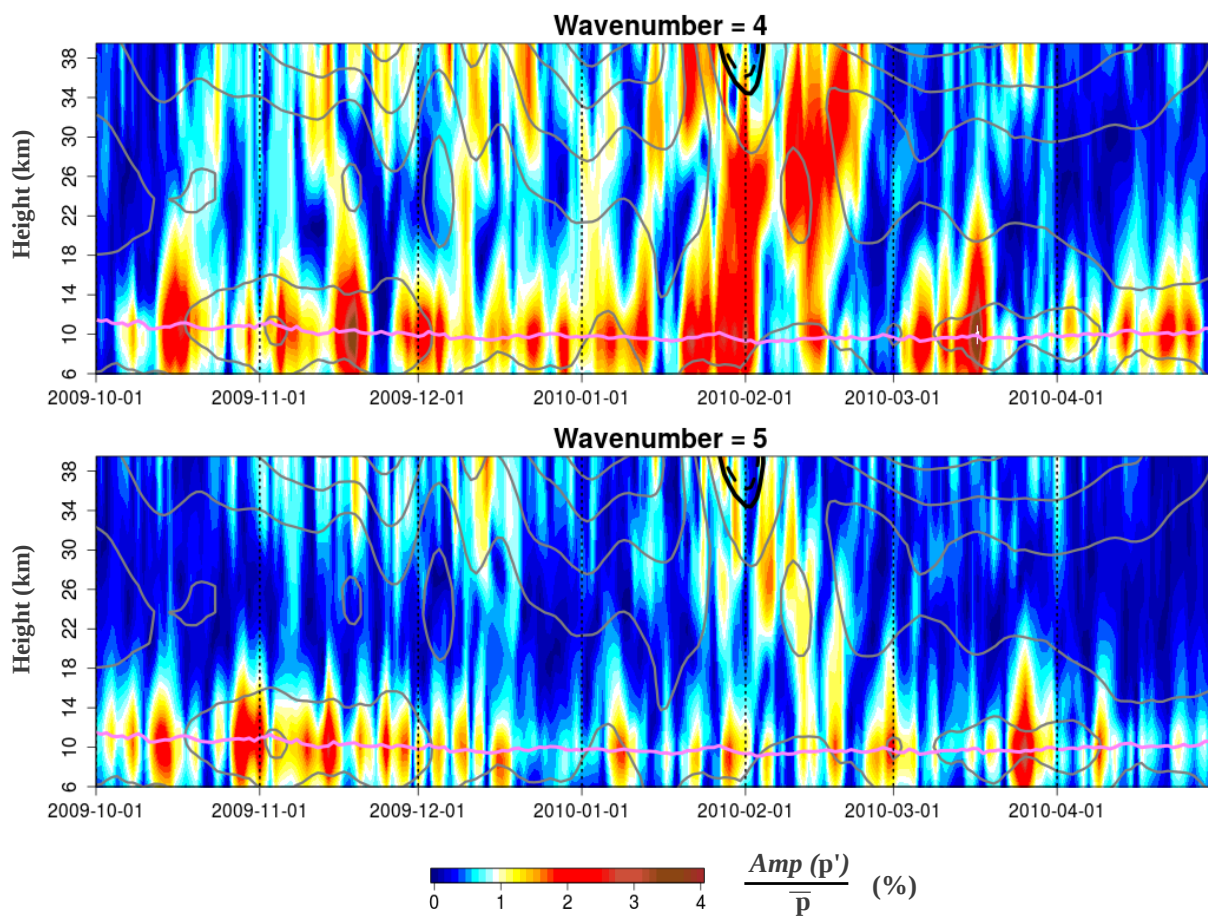
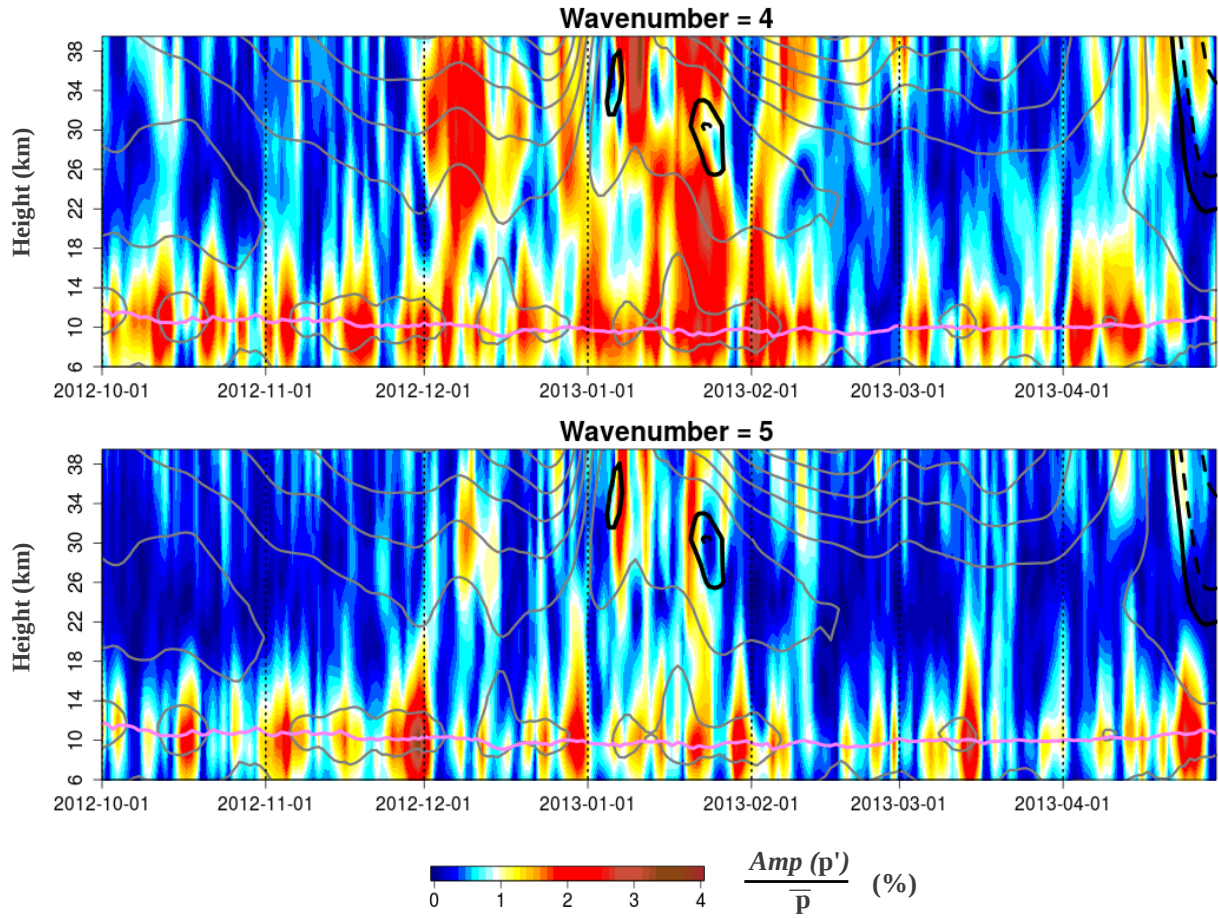**Figure S2.** Same as in Fig. S1 but for the 2010 SSW case.

Figure S3. Same as in Figs. S1 and S2 but for the 2013 SSW case.

a) **Vertical power spectra for 40-60° latitude**

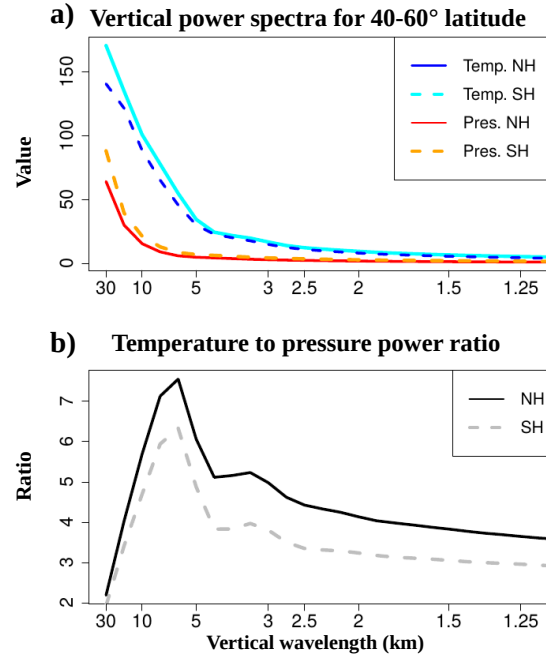b) **Temperature to pressure power ratio**

Figure S4. (a) Vertical power spectra of all RWP (w4-8) longitude-height snapshots between 40-60° latitude for both hemispheres. (b) Ratio of temperature and pressure power spectra. Same as Fig. 10 from the main manuscript, only w4-8 are filtered also in the time dimension as 2-20 day, eastward-propagating.
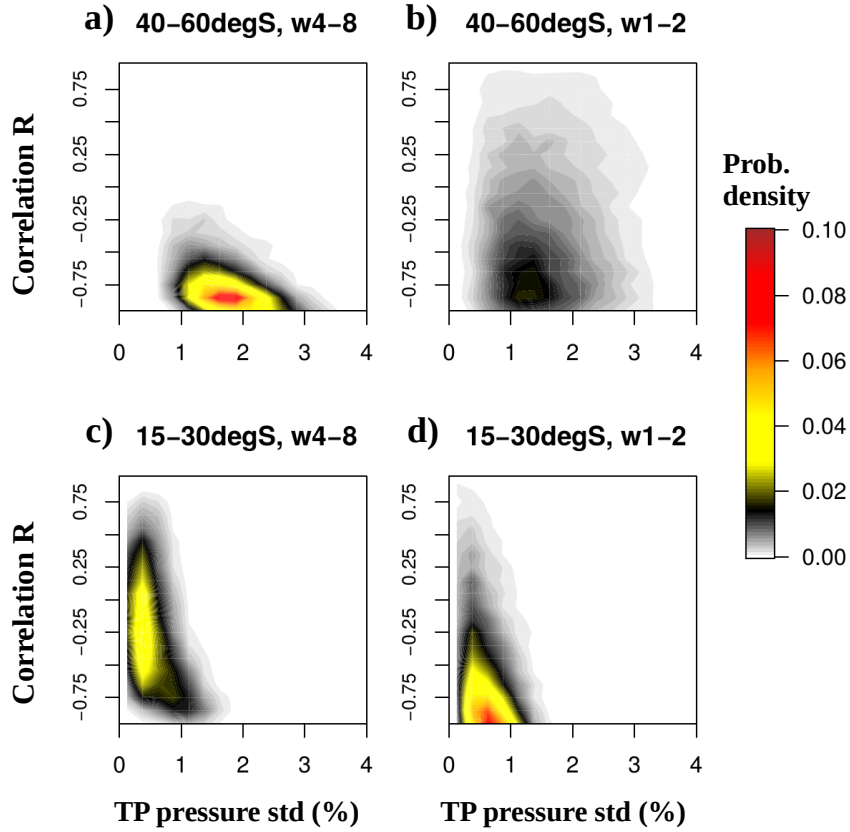
Figure S5. Probability density functions of the UT-LS temperature correlation -vs- wave amplitudes for RWPs (w4-8, left column) and planetary waves (w1-2, right column) at mid-latitudes (top row) and the subtropics (bottom row). Same as Fig. 11 in the main manuscript, but for the Southern hemisphere.