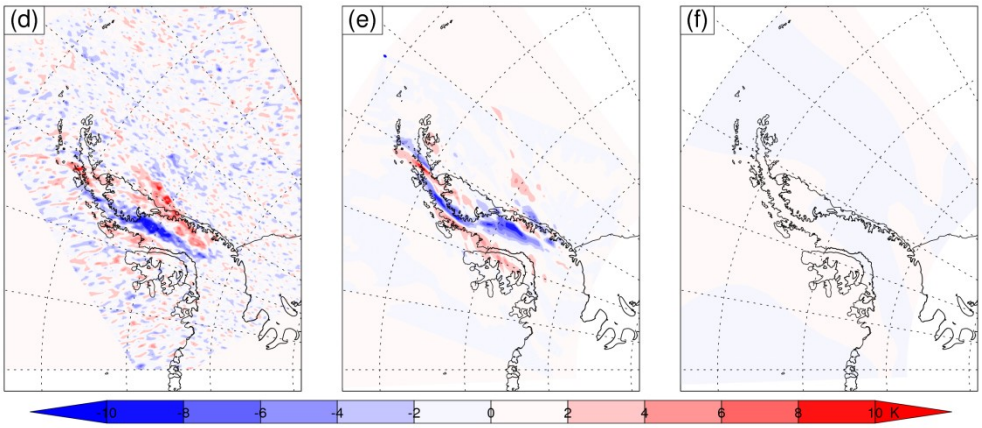

Figure 1: Measured (d), mesoscale model (e), and climate model (f) estimates of the temperature perturbation (K) at 21 km at the time of the CS1 mountain wave event. Measured data corresponds to the 666.5 cm^{-1} AIRS channel. Mesoscale model data corresponds to the 4-km-resolution UM regional mesoscale model. Climate model data corresponds to the N96 (1.875° × 1.25°) UM global climate model.

Below are revised Figs. 2, 5, 6, 7, and 8 which are included in the paper.

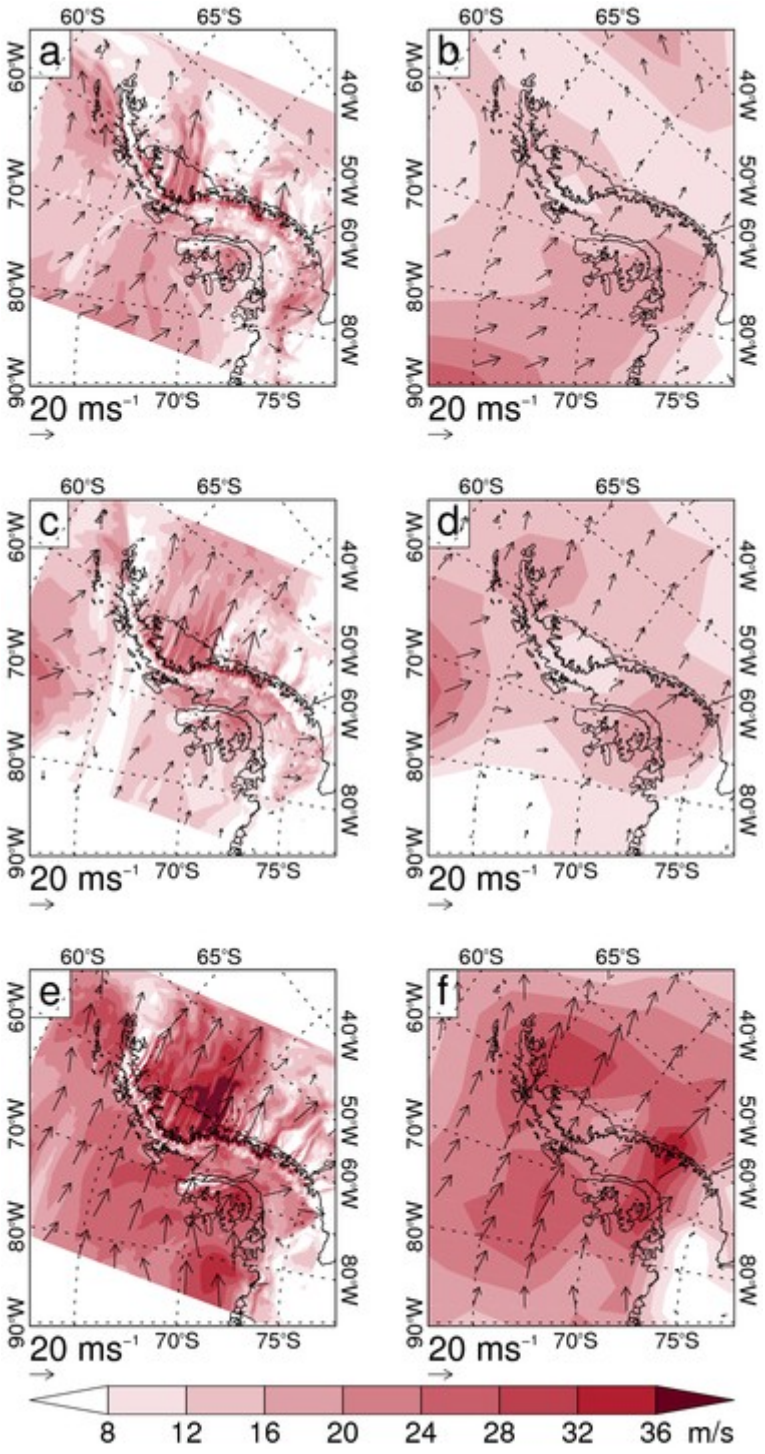

Figure 2. Mesoscale model (left) and climate model (right) simulation of the 850 hPa wind field (m s^{-1}) over the Antarctic Peninsula at the time of the CS1 **(a, b)**, CS2 **(c, d)**, and CS3 **(e, f)** mountain wave events. See Table 1 for dates. The black arrows are wind vectors (for the mesoscale model only 1 in every 40 grid points is shown). The colour shading indicates the wind speed. Also shown is the coastline of the Antarctic Peninsula.

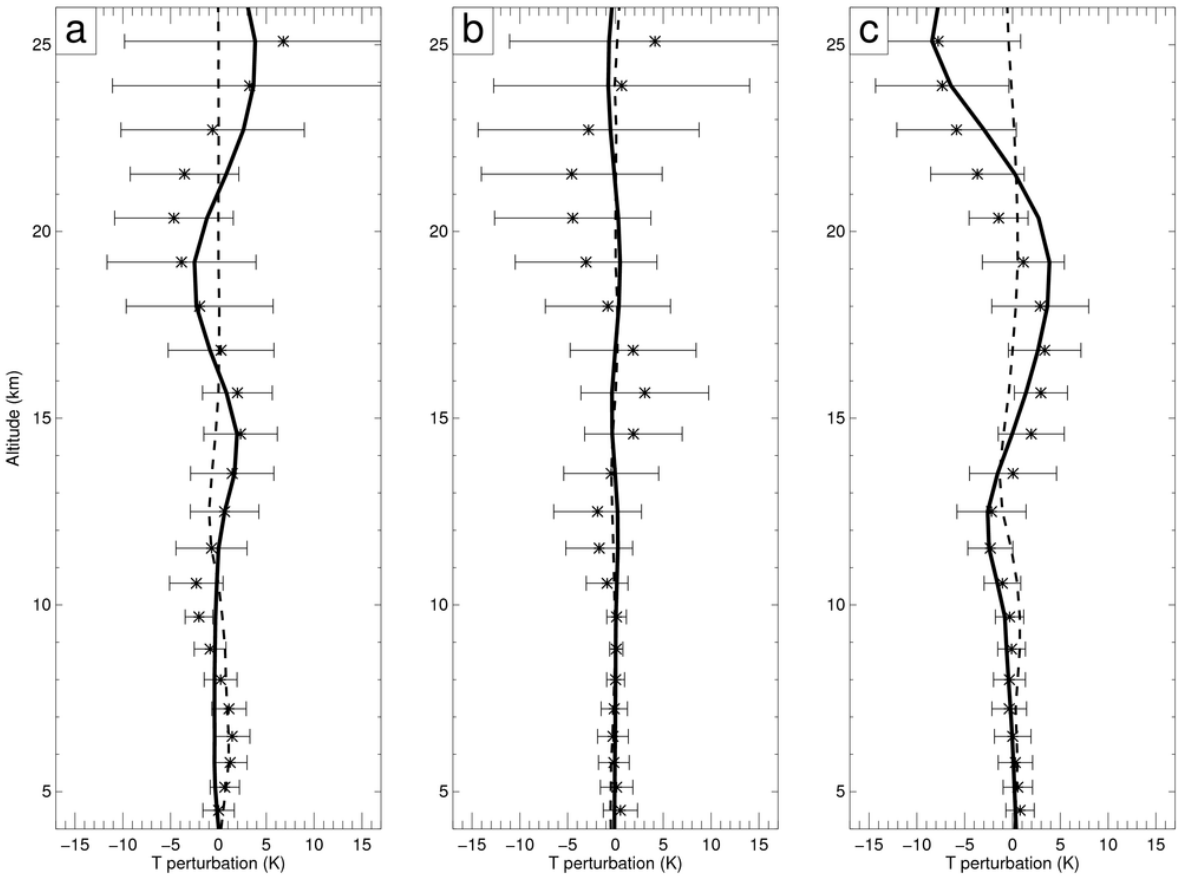

Figure 5. Vertical profile of temperature fluctuations (K) resolved by the climate model (dashed line), resolved by the mesoscale model (stars and horizontal bars), and parameterised by the mountain wave scheme ΔT_{SSO} (solid line) at the time of the CS1 **(a)**, CS2 **(b)**, and CS3 **(c)** mountain wave events. See Table 1 for dates. The temperature fluctuations resolved by the climate model and parameterised by the scheme are for the grid boxes located at (70°S, 63.75°W) for CS1, (65.0°S, 60.0°W) for CS2, and (70.0°S, 60°W) for CS3, i.e. selected to coincide with the location of their respective mountain wave events. These locations are displayed on Fig. 3. The mesoscale model temperature fluctuations are the mean (stars) and spread (± two standard deviations, horizontal bars) of all the mesoscale model points within the same climate model grid box.

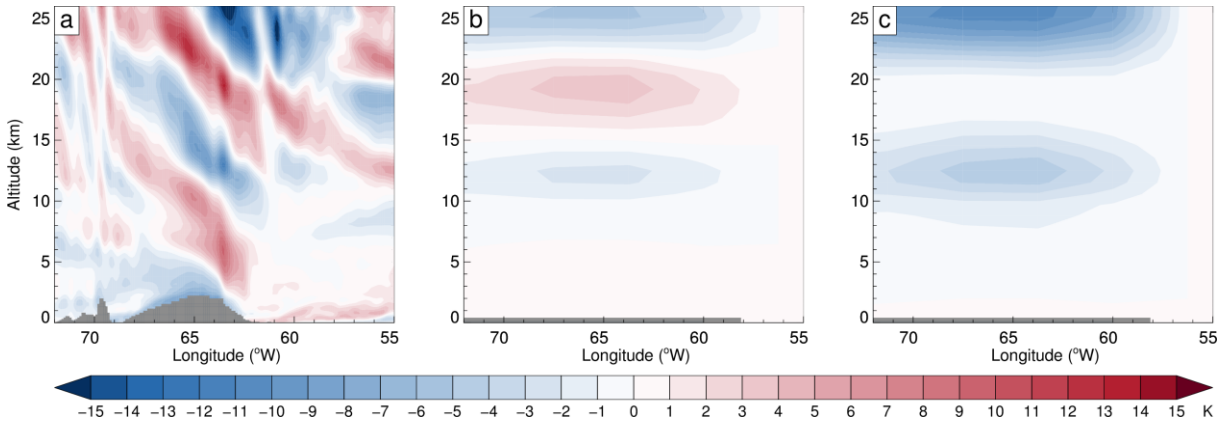

Figure 6. Vertical cross section intersecting the Antarctic Peninsula along a latitude band at 70°S of the temperature fluctuations (K) simulated by the mesoscale model **(a)** and parameterised by the mountain wave scheme **(b)** at the time of the CS3 mountain wave event. See Table 1 for dates. The grey shading indicates the height of the explicitly resolved orography. Also shown is the cooling phase of the parameterised temperature fluctuations ΔT_{SSO}^{-}**(c)**, i.e. the field which is actually coupled to the PSC scheme of the chemistry-climate model.

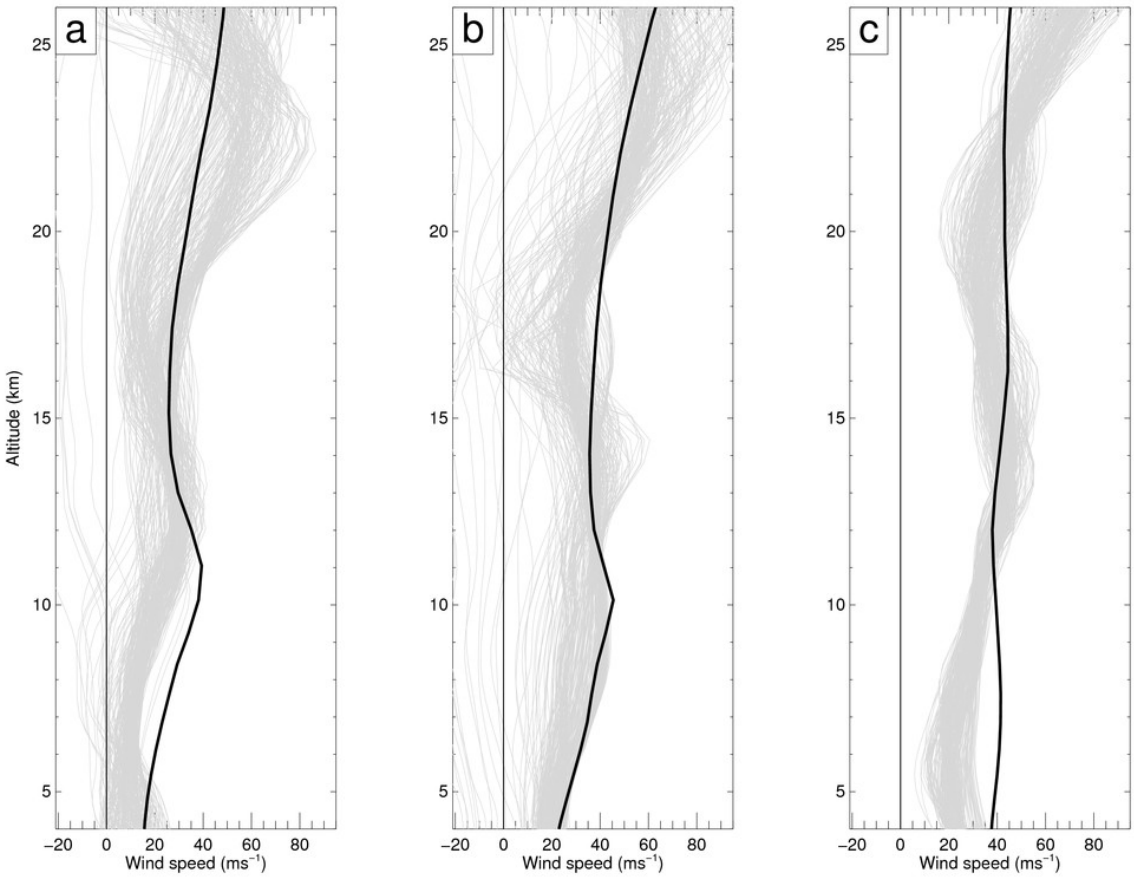

Figure 7. Vertical profile of the wind speed *U* (resolved in the direction of the wave vector, which is taken to be the direction of the 850 hPa wind vector) simulated by the climate model (black line) and the mesoscale model (grey lines) at the time of the CS1 **(a)**, CS2 **(b)**, and CS3 **(c)** mountain wave events. See Table 1 for dates. The climate model profile is for the same grid box used for Fig. 5. The mesoscale model profiles are for all the mesoscale model points within the same climate model grid box.

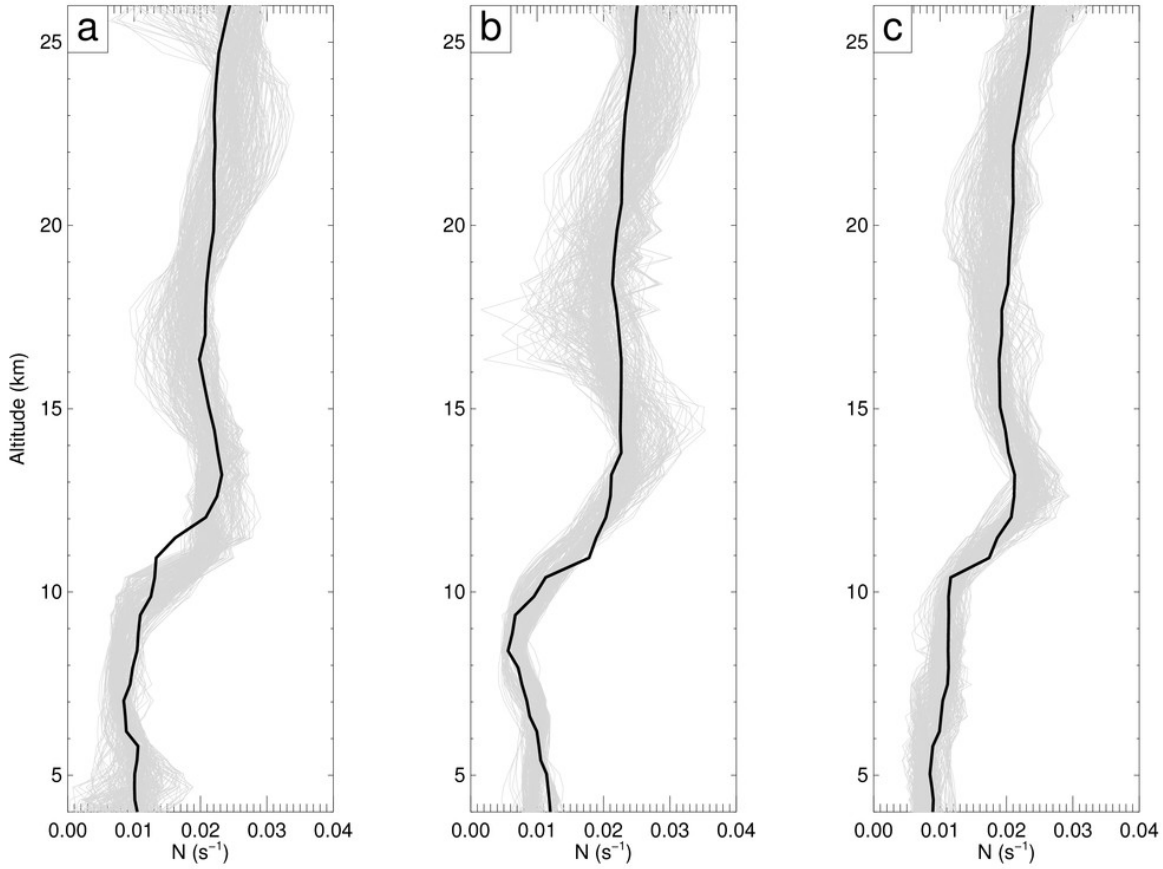

Figure 8. As Fig. 6, but for Brunt-Väisälä frequency N (s^{-1}).