

P.10 PICTURE OF THE GLOBAL FIELD OF "QUASI-MONOCHROMATIC" GRAVITY WAVES OBSERVED BY STRATOSPHERIC BALLOONS AND MST RADARS

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In MAP observations we have found that (i) gravity waves in selected or filtered portions of data are fit for monochromatic structures, whereas (ii) those in fully continuous and resolved observations take "universal" continuous spectra. It is possible to explain (ii) by dispersion of "quasi-monochromatic" (or slowly varying) wave packets observed locally as (i), since the medium atmosphere is unsteady and nonuniform. Complete verification of the wave-mean flow interactions by tracking individual wave packets seems hopeless, because we cannot distinguish the wave-induced flow from the basic flow independent of the waves. Instead, we go back to the primitive picture before MAP, that is, the atmosphere is just like an entertainment stage illuminated by cocktail lights of quasi-monochromatic gravity waves. The wave parameters are regarded as functions of time and spatial coordinates. The observational evidences (i) and (ii) suggest that the wave parameter field is rather homogeneous, which can be explained by interference of quasi-monochromatic wave packets.

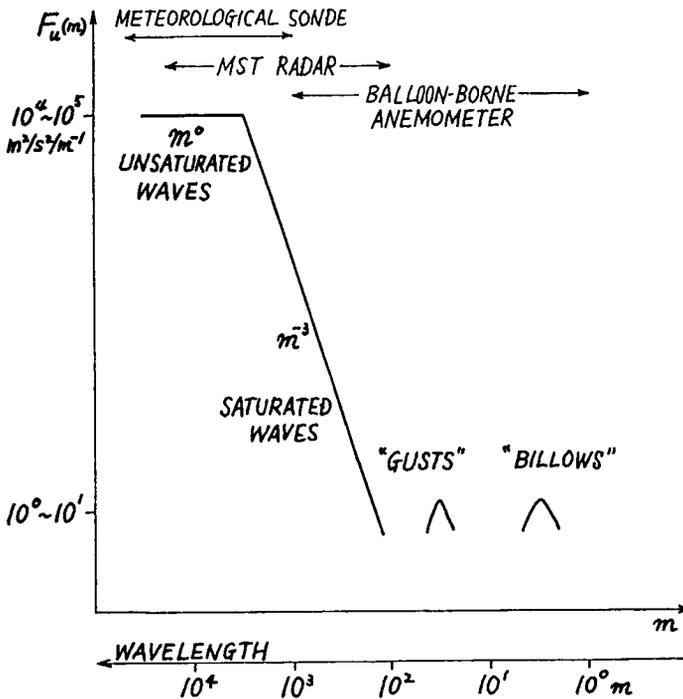


Figure 1. A model of vertical wave number (m) spectrum for stratospheric internal gravity waves and turbulence observed mainly during MAP.

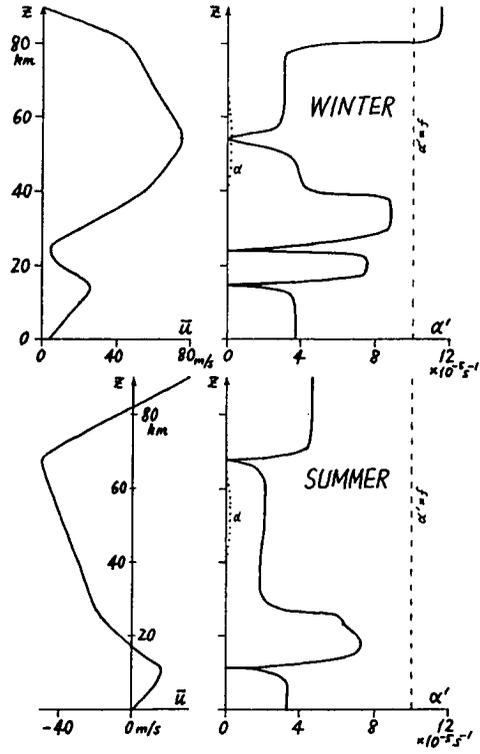


Figure 2. Rayleigh-type damping coefficient α' calculated for typical values of parameters in the midlatitude stratosphere ($f = 10^{-4} s^{-1}$, $N = 2 \times 10^{-2} s^{-1}$; $|\partial \bar{u} / \partial z|$ is obtained from a model profile shown in the left-hand side). Dashed line shows $\alpha' = f$. Dotted curve shows the Newtonian cooling coefficient.