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On resonant coupling of acoustic waves and gravity waves CHRISTOPHE MILLET, CEA, DAM, DIF — Acoustic propagation in the atmosphere is often modeled using modes that are confined within waveguides causing the sound to propagate through multiple paths to the receiver. On the other hand, direct observations in the lower stratosphere show that the gravity wave field is intermittent, and is often dominated by rather well defined large-amplitude wave packets. In the present work, we use normal modes to describe both the gravity wave field and the acoustic field. The gravity wave spectrum is obtained by launching few monochromatic waves whose properties are chosen stochastically to mimic the intermittency. Owing to the disparity of the gravity and acoustic length scales, the interactions between the gravity wave field and each of the acoustic modes can be described using a multiple-scale analysis. The appropriate amplitude evolution equation for the acoustic field involves certain random terms that can be directly related to the gravity wave sources. We will show that the cumulative effect of gravity wave breakings makes the sensitivity of ground-based acoustic signals large, in that small changes in the gravity wave parameterization can create or destroy specific acoustic features.

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