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Acoustic-gravity waves generated by wake flows CHRISTOPHE MILLET, CEA, DAM, DIF, F-91297 Arpajon, France, STÉPHANE LE DIZÈS, IRPHE, CNRS, F-13384 Marseille cedex 13, France — The wavy wall analogy framework is used to obtain a model problem for the acoustic-gravity wave field generated by a three-dimensional wave packet, that may be seen as a model for wake flow instabilities. In this study, we use asymptotic methods to analyse the manner in which the pressure field structure changes, and more specifically, we estimate the properties of acoustic and gravity waves in terms of saddle-point contributions. The saddle-points are computed from the general dispersion relation that we deduce from a compressible model with earth rotation and non-Boussinesq effects. Particular attention is paid to the far-field limit for which a single saddle-point contribution enables the description of both acoustic and gravity waves, also depending on the streamwise phase velocity of the wave packet. The transition from low-frequency acoustic waves (or infrasounds) to gravity waves can be treated in the same way as the acoustic radiation of supersonic two-dimensional shear layers.

Christophe Millet
CEA, DAM, DIF, F-91297 Arpajon, France

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