Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Nonlinear propagation of acoustic-gravity waves from explosive sources in the atmosphere CHRISTOPHE MILLET, CEA, Bruyeres-le-Chatel, France, VIRGINIE DARU, LIMSI-CNRS, Orsay, France — The linear euler equations are widely used by the geophysical community to compute low frequency acoustic waves in the atmosphere. Although this model permits to explain basic properties of signals associated with large-intensity events, it fails to predict both waveforms and amplitudes. Due to the exponential decrease of air density with altitude, the acoustic waves give rise to shock waves, especially in the stratosphere. In this study, we compute both acoustic waves and gravity waves generated by the high explosive "Misty Picture" test, on May 14, 1987. In order to represent, in the same computation, different-scale wave motions without generating spurious numerical oscillations, we use a recent class of shock-capturing schemes, the so-called OSMP schemes. The wavefront arrival times of acoustic waves are in good agreement with computations based on Dispersion-Relation-Preserving (DRP) schemes used in our former studies. Comparisons of calculations and experimental data permit to discuss the role of atmospheric absorption and nonlinear propagation on amplitudes of signals.

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Date submitted: 01 Aug 2008 Electronic form version 1.4