5007-86-138 **Chen Wei*** (weichen@cims.nyu.edu), 251 Mercer Street Office 718, New York, NY 10012, and **Oliver Buhler** and **Esteban G. Tabak**. *Tsunami-Induced Gravity Waves: Time-Resolving Model and Early Detection.*

Vertically propagating gravity waves can provide a very fast mechanism for information transfer across the atmosphere, from ground level all the way up to the ionosphere, which raises the possibility of tsunami detection via gravity-wave-induced modulations in the airglow patterns in the ionosphere. However, the current gravity-wave modeling approach relies on many restrictive assumptions that are simply not satisfied in the real-world complex atmospheric environment. We develop a time-resolving model to solve the initial-value problem for the gravity waves by using Laplace transforms in time whilst allowing for jumps in stratification. The Laplace transform method gives new numerical results in the non-uniformly stratified atmosphere model. We develop a wave-train approximation including possible reflected and transmitted waves, and obtain a closed form. The wave-train solution approximates the numerical transform solution with a great numerical satisfaction, and we recover the gravity-wave propagation mechanism. We develop an asymptotic theory for gravity wave caustics formation in the upper atmosphere for the tsunami scenarios with variable ocean depth. The identification of specific locations where caustics form provides ideal sites for early detection. (Received May 02, 2013)