## Modeling of Strong Motion Generation Areas of the 2011 Tohoku, Japan Earthquake Using Modified Semi-Empirical Technique Incorporating Frequency Dependent Radiation Pattern Model

Authors : Sandeep, A. Joshi, Kamal, Piu Dhibar, Parveen Kumar

**Abstract :** In the present work strong ground motion has been simulated using a modified semi-empirical technique (MSET), with frequency dependent radiation pattern model. Joshi et al. (2014) have modified the semi-empirical technique to incorporate the modeling of strong motion generation areas (SMGAs). A frequency dependent radiation pattern model is applied to simulate high frequency ground motion more precisely. Identified SMGAs (Kurahashi and Irikura 2012) of the 2011 Tohoku earthquake (Mw 9.0) were modeled using this modified technique. Records are simulated for both frequency dependent and constant radiation pattern function. Simulated records for both cases are compared with observed records in terms of peak ground acceleration and pseudo acceleration response spectra at different stations. Comparison of simulated and observed records in terms of root mean square error suggests that the method is capable of simulating record which matches in a wide frequency range for this earthquake and bears realistic appearance in terms of shape and strong motion parameters. The results confirm the efficacy and suitability of rupture model defined by five SMGAs for the developed modified technique.

**Keywords :** strong ground motion, semi-empirical, strong motion generation area, frequency dependent radiation pattern, 2011 Tohoku Earthquake

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020