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Development and Implementation of a Regional Earthquake Early Warning System in Northern India

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Abstract

The Himalayan region has experienced many devastating earthquakes, due to the collision of the Indian Plate with the Eurasian plate. The movement of the Indian Plate is continuous but for a long time, this region has not released the accumulated energy. This accumulated energy makes this region more vulnerable to major to great earthquakes in near future. The urbanization and initialization in this region have magnified the effect of earthquakes by many folds. Earthquake Early Warning (EEW) systems are being used to mitigate the effects of earthquakes in many countries, by sending alerts of upcoming damaging waves to the users. The development of an EEW system in Uttarakhand was started in 2014 as a pilot project after validating its feasibility, which is now operational for the public. The operation EEW system includes (i) a central processing server at Roorkee; (ii) a warning server at Google cloud platform; (iii) around 160 sensors in Kumaun and Garhwal region of Uttarakhand; (iv) 80 public sirens at schools, hospitals, district emergency centers, etc. and (v) a smartphone for the public. This paper elaborates on the different components and architecture of the implemented EEW system. Further, this paper also includes information about the tasks carried out to aware the public about earthquakes safety tips and the EEW system to utilize its potential at the user end.

Keywords: Earthquake early warning system, Warning dissemination system, Disaster risk reduction, EEW smartphone app