

A 1D velocity model of northern Thailand: Preliminary results

Sutthida Mungharkaew¹, Patinya Pornsopin², Songkhun Boonchaisuk^{1,2,*}

¹Geoscience, Mahidol University, Kanchanaburi Campus, Kanchanaburi, 71150, Thailand

²ThEP Center, Commission on Higher Education, 328, Si Ayutthaya Road, Rachatawee, Bangkok, 10400, Thailand

³Seismological Bureau, Thai Meteorological Department, Bangkok, 10260, Thailand

ABSTRACT

The earthquakes in Thailand and adjacent areas have been monitored by earthquake observation division, Thai Meteorological Department (TMD). The earthquake location was calculated by using a global velocity model IASP91 (Kennett and Engdahl, 1991). The earthquake location mainly depends on the accuracy of predicted travel-times and crust and mantle velocity structure (Flanagan et al., 2007). Therefore, an appropriate regional velocity model was required to improve the earthquake location accuracy. This study aims to develop 1D velocity model used for local epicenter location calculation. A total of 156 earthquakes were selected base on azimuthal gap, minimum number of stations, and root mean square travel-time residuals that have similar criteria as work of Shiddiqi, et al. (2019). The VELEST program (Ellsworth, 1978; Kissling et al., 1994) was used to obtain the 1D seismic velocity model. After testing the layer thickness of IASP91 model, the 2 km grid size and 32 km crustal thickness were used for 6 different initial models. The 6 initial models were tested to obtain the best 1D velocity model, called NTh1D model, to improve earthquake location in the northern part of Thailand. The NTh1D model shows more accurate hypocenter solution compare with original IASP91 and other models. The station corrections were also reported to produced better earthquake locations. However, to improve the velocity model, more earthquake stations and earthquake events must be increase.

Keywords: Velocity model, VELEST, Northern Thailand, Relocation