

# Development of Seismic Detection Technique in Thailand using STA/LTA Algorithm

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## ABSTRACT

Development of seismic detection technique in Thailand using STA/LTA algorithm project aims to test STA, LTA parameters and seismic threshold values which suitable for Thailand system. The parameters can be used to detect earthquakes more accurately. To do that we set up the STA, the LTA parameters and seismic threshold values for 90 experiments to analyze seismic wave data from earthquakes with magnitude equal to or greater than 3.0 ML in Thailand, consisting of 400 seismic data and 400 non-seismic data. The suitable parameters values were indicated by the following statistical values: accuracy, precision, sensitivity, specificity and balance error rate from the confusion matrix. The results showed that Experiment no. 85 with the parameters STA equal to 0.5 seconds, LTA equal to 3 seconds and seismic threshold equal to 3, indicating the highest accuracy was 67.88% and the precision was 100 %. The seismic stations which located apart from the active fault less than 150 kilometers have the accuracy in the range of 15 percent to 100 percent, and if the seismic stations are located away from the highway less than 3 kilometers, the accuracy trends to increase. The study also found that seismic stations which located on igneous rocks tend to have higher accuracy than those located on sedimentary rocks or sediments. In addition, the result indicated that the accuracy is independent of the type of land use and seismometer device. Regarding some seismic stations have large magnitude and numerous of background noise, the accuracy cannot be higher than 67.88%. Therefore, in the next research, the accuracy of the STA/LTA method should be improved by filtering out the background noise before analyzing. In the future, machine learning should be applied with the STA/LTA method, which will make seismic measurements in Thailand more accurate and faster. Moreover, there are also activities to organize a meeting to disseminate the project's result including discussion panel session to gathering researchers, staff from various departments and students. They discussed about problems and ways of cooperation in the future. Furthermore, they remark an important point that a central agency responsible for calculating the magnitude of earthquakes in the same system is needed.

**Keywords:** Earthquake, STA/LTA, Detection, Thailand