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Identification of suitable locations for seismic stations in Sri Lanka

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Although Sri Lanka is situated away from major plate boundaries or any active faults, during the last decade, there have been considerable numbers of earthquakes and earth tremors reported in and around Sri Lanka. Recently we experienced several earth tremors in the Central and Eastern parts of Sri Lanka. Although the reason for the occurrence of such events is not known, studying the locations of those events and mechanism related to the tremors is very useful in understanding the tectonic setting of the region. In order to closely monitor those smaller events, in addition to three global stations situated in Sri Lanka a suitable local station system is required.

The main purpose of this study is to propose suitable locations of seismometers to establish an inland seismic network system in the country. For this purpose, the seismic activity of the nearby Indo-Australia plate margin and inland and offshore of the Sri Lanka within Indo-Australia plate region was analyzed. Offshore earthquake locations and their magnitudes were also analyzed by plotting topographical and contour maps. Hypocentral data obtained from the Data Management Center at the Incorporated Research Institutions for Seismology for the period from January 1964 to December 2011 of magnitude 4.3 were used for the analysis. By dividing the study region into several sub regions, seismic activity was analyzed. Distances from each event in the each sub region to the selected inland location were calculated. On the basis of the analyzed results, especially distances to offshore events, several stations are proposed in the Eastern part of the country. These stations will be useful in analyzing earthquakes occurring in the Sumatra region and offshore South-East of Sri Lanka by using later phase data. Further, considering the geological margins, geological features and dams in upcountry region of Sri Lanka, suitable locations for stations were identified. The broad band and short period seismic station system proposed in the present study would be very useful in monitoring offshore earthquake activity and inland earth tremors.

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