Methods of Microearthquake Location and Magnitude Determination: A Comparative Study for Use in Geothermal Exploration

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The utility of microearthquake detection in geothermal exploration has been established by others. This paper addresses the problem of location of these very small events when they are detected on 1 to 8 seismic stations in areas with poor velocity control. A comparative study of both the accuracy and precision of various location methods is given using examples from a Nevada geothermal survey funded by NSF.

A method of magnitude determination based on amplitude and duration was used to assess the seismicity of the area surveyed. The seismicity of an area can be established if a large number of events are recorded and if magnitudes are assigned to the events detected. When a commercial geothermal reservoir is found, careful monitoring of seismicity is necessary to establish the effect of fluid withdrawal and reinjection on the active tectonics of such regions.