Geophysical Research Abstracts
Vol. 14, EGU2012-3376, 2012
EGU General Assembly 2012

Autonomous telemetry system by using mobile networks for a long-term seismic observation

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When a large earthquake occurs, it is important to know the detailed distribution of aftershocks immediately after the main shock for the estimation of the fault plane. The large amount of seismic data is also required to determine the three-dimensional seismic velocity structure around the focal area. We have developed an autonomous telemetry system using mobile networks, which is specialized for aftershock observations. Because the newly developed system enables a quick installation and real-time data transmission by using mobile networks, we can construct a dense online seismic network even in mountain areas where conventional wired networks are not available. This system is equipped with solar panels that charge lead-acid battery, and enables a long-term seismic observation without maintenance. Furthermore, this system enables a continuous observation at low costs with flat-rate or prepaid Internet access. We have tried to expand coverage areas of mobile communication and back up Internet access by configuring plural mobile carriers. A micro server embedded with Linux consists of automatic control programs of the Internet connection and data transmission. A status monitoring and remote maintenance are available via the Internet. In case of a communication failure, an internal storage can back up data for two years. The power consumption of communication device ranges from 2.5 to 4.0 W. With a 50 Ah lead-acid battery, this system continues to record data for four days if the battery charging by solar panels is temporarily unavailable.