Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

STT53-P09 Room:Convention Hall Time:May 24 18:15-19:30

Use of fuel cell system as a power source for seismic observation

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Observation of earthquake or crustal deformation often deployed at sites where commercial power supply is not available. For example, temporal observation after large earthquakes or observation area that is not covered by existing observation network. Even at the site with commercial power supply, backup of power supply is essential in preparation for power cut caused by disasters. In order to acquire continuous data before and after a large earthquake is

Battery or solar cell have been used for observations at the site where commercial power supply is not available. Batteries are usually heavy and unsuitable for transportation. Solar cells cannot produce power during cloudy or rainy weather and night. Although observation system with smaller power have been developed, a certain amount of power is still needed for particular sensors and telemetry.

Fuel cell systems that can be used for seismic and crustal deformation observation is recently developed. Fuel cell systems stably supply power for long time. We made seismic observation at the Yagi observatory (DP.YGI) using a fuel cell system as power supply to test feasibility of the fuel cell system. The system consists of a seismimoter, data logger (LS-7000XT, Hakusan Corporation), fuel cell (TOYOBO ProtonCube(R)), solar cell, power controller, and mobile router (MR03LN, NEC Platforms). The observation was began from December, 2014. The observation system satisfactorily operates in spite of poor power production of solar cell because of snow and bad weather. The fuel cell equipped with two fuel tank of 10L, which can continue the observation for a half year. Increase of number of the fuel tank extends the observation period without exchange of the tank. We have plan to make test observations using the fuel cell system at other sites sensors and with different sensors.

Keywords: fuel cell, seismic observation, crustal deformation observation, temporal observation, power supply