[JJ] Evening Poster | H (Human Geosciences) | H-DS Disaster geosciences

[H-DS12]Human environment and disaster risk

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This session discusses disaster risks being inherent in the natural and human environment, which sometimes happen to appear at a disaster, from the viewpoint of not only natural sciences but also social and human sciences. Examples of discussion subjects are as follows: uncertainty of forecasting disaster and problems of huge disaster with low frequency that raised from the 2011 Tohoku earthquake, the methodology for improving hazard maps, national recovery plans considering probable changes or sustainability of the society, international cooperation for disaster mitigation, problems of active faults or liquefaction, adjusting disaster mitigation plan to the regional characteristics, technical development for supporting disaster prevention, education for the disaster mitigation.

[HDS12-P04]**Liquefaction at the Kobe University Campus during the Awaji-Hanshin Earthquake – Evidence from Ground Penetrating Radar**

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Keywords:Ground Penetrating Radar, Liquefaction, Hanshin-Awaji Earthquake

On January 17th, 1995 at 5:46AM, an earthquake of 6.9 magnitude shook the city of Kobe, leaving a clear imprint in the minds of Japanese people and any of its contemporary. As Kobe City is located by the sea on the edge of the Mts Rokko, an important blanket of sediments is intercalated with river and marine sediments, strongly increasing the shaking.

In the port area, the faculty of Martime Sciences of Kobe University (previously Shosen University) is built on reclaimed land, making it even more vulnerable to earthquake liquefaction, as evidenced by the liquefaction on campus, that resulted in numerous land cracks, mud volcanoes and the sinking of numerous concrete structures.

As the university was used to support the disaster management effort, the ground was very quickly leveled and used for various purposes and most of the impacts of the earthquake liquefaction have been poorly documented. In the present contribution, the authors propose to investigate the structure of the subsurface on the sports ground of the faculty using Ground Penetrating Radar.

Ground Penetrating Radar is a device using the properties of electromagnetic waves (speed, reflection and refraction) through a medium, in order to determine the structure of the subsurface. For the present study, a GSSI SIR-3000 was used with a shielded 500 MhZ antenna. The distance was measured with an attached

coding wheel, and the position of the transects were recorded using a GNSS receiver.

The data was processed using the Reflex-R software, from which the time through the air was suppressed using a static correction of time. The topography did not need to be corrected as the land is perfectly flat. The signal was then enhanced by using an AGC gain of 1.44 and the loss of energy compensated with an energy loss function with a scalar of 1.17. Using the slope of refraction hyperbolae, the velocity in the ground was then changed into depth.

The results show that the ground deformed following large-amplitude waves oriented N/S and that locally the ground was broken by features that correspond to known ground cracks. Furthermore, the location of previous buildings and debris is still detectable using Ground Penetrating radar showing heterogeneity in the subsurface. This is important for future liquefaction potentials, as those variations in sub-surface material will create response frequencies that will vary within single areas.