[JJ] Evening Poster | S (Solid Earth Sciences) | S-SS Seismology

[S-SS14]Strong Ground Motion and Earthquake Disaster

convener:Masayuki Kuriyama(Central Research Institute of Electric Power Industry) Tue. May 22, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe) Strong ground motion has social impacts as it induces earthquake disasters. We solicit contribution on any seismological topics related to strong ground motion that includes, but are not limited to, source processes, wave propagation, and site effects. We also welcome contribution on earthquake related disaster mitigation.

[SSS14-P20]Estimation of basement structure of Kathmandu valley, Central Nepal by using gravity survey method

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Gravity survey was conducted in Kathmandu valley from August to September, 2017 under the project 'Integrated research on great earthquakes and disaster mitigation in Nepal Himalaya', which has been started in 2016 and will continue for five years under the Science and Technology Research Partnership for Sustainable Development (SATREPS) program of Japan Science and Technology Agency (JST) and Japan International Cooperation Agency (JICA).

To estimate basement structure of Kathmandu valley, we conducted gravity measurement on total of 236 survey stations which were distributed over 15km×18km area to cover Kathmandu valley. The gravity survey was carried out by using two SCINTREX CG-5 gravimeters (S/N #918, #1052) with reading resolution of 0.001mGal. The locations of the measurement station (longitude, latitude and elevation) were decided by using differential GPS/GNSS instruments (JAVAD GNSS G3T) with the vertical accuracy better than 30 mm. The gravity base station and GPS base were established at same site at the premises of Department of Mines and Geology (DMG) which lies at almost central part of Kathmandu valley. The loop measurement method was adopted and everyday measurement was started and closed at DMG base station. The gravity acceleration at the DMG base station is established by gravimetric ties between DMG base station and existing Nagarkot-FAGB absolute gravity station (g=978494.8347 mGal).

The rock formation in the periphery of the Kathmandu valley consists mainly of limestone, schist and phyllite. We applied two layered model for the basement analysis considering sedimentary layer above basement rock. At least one of the boreholes data shows existence of phyllite rock in the basement. For this reason, we assumed Bouguer reduction density for topographic masses as 2.67 g/cm³ (2,670 kg/m³) for computing the Bouguer anomaly value. Due to lack of availability of average density of the sedimentary layer, we chose density difference between basement rock and sediment layer as 0.37 g/cm³, so that the residual Bouguer anomaly distribution satisfies the controlling data at one deep drilling spot and six circumference outcrops of bedrocks in a least squares fashion (Komazawa, 1995). The preliminary result (Fig.1) conforms to somewhat complex pattern of paleo river valley system, unlike a simple basin structure. Basement lows elongate in not only E-W direction, but also N-S or other direction resulted in that the ‘Y’ shaped paleo valley can be assumed to be confluence at the central

part of the present valley. The depth to the bedrock is estimated to be 600 to 700 m from the present ground surface. Typical cross-sectional shape of the paleo valley is characterized by an inverted trapezoid with the width of about 5 to 6 km, height of about 600 to 700m, and the dip angle of the slope on both sides about 20 degrees.