SH3/TH/O5 - SEISMIC HAZARD IN JAVA, INDONESIA: APPROACHES TO SEISMIC HAZARD AT THREE DIFFERENT SCALES

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As a consequence of the incentive and goad provided by recent, large, varied and destructive earthquakes in Indonesia (Aceh 2004 (tsunami earthquake), 9.0 Mw; Nias 2005, 8.6 Mw; Padang (Pariaman) 2009, 7.5 Mw), and specifically the remarkably building-destructive Bantul, Yogyakarta 2006, 6.3 Mw earthquake, a team has been investigating determination of seismic hazard at different scales. The three scales under consideration are: 1) national or Java Island scale, 2) provincial or Yogyakarta Special Province (YSP) scale and 3) local or sub-province Regency scale. Different analytical skills and property-sampling requirements are needed. Ideally there should be a coherent thread or overview connecting maps prepared by different means at different scales and usually for different aspects of mitigation and resilience strengthening. For instance, national scale for macrozoned viewing of seismic hazard directed at guidance through building codes, provincial scale for general understanding of regional geology influencing the seismic hazard, and local for specific, detailed microzoned advice on areas at risk and related development.

This work has resulted in: 1) Monte Carlo based seismic hazard maps for all Java, 2) estimation of expected incremental-intensity amplification referred to igneous rock basement in YSP and 3) surveyed and mapped microzoned seismic hazard in three regencies of YSP. The first two scales and styles of seismic hazard maps are reviewed and briefly explained, the third is described in more detail for the Bantul locality of YSP. Microtremor surveys, geotechnical borehole drilling, SPT testing, S-wave velocity sampling, earthquake wave form modelling, were all carried out for the Bantul region in Southern Yogyakarta Depression Area. Ensuing data analyses allow preparation of a suite of maps showing amplification factor, predominant period, sediment thickness, PGA and PGV. These maps can be validated and interpreted with respect to damage distributions observed

during the Bantul earthquake. These results indicate contrasting outcomes, for example, high amplification regions with severe damage and lower amplification areas where high damage is generated by high PGV and PGA. Such combined information will help to diagnose and mitigate future seismic risks in the YSP and aid understanding of earthquake impacts elsewhere.