

**SH3/P16/ID162 – TIME-INDEPENDENT PROBABILISTIC
SEISMIC HAZARD ASSESSMENT
IN WESTERN INDONESIA - ISSUES, INSIGHTS
AND NEW APPLICATIONS**

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The issue of earthquake hazard and risk in western Indonesia has gained prominence in recent years following several deadly earthquakes that have occurred along the Sunda Arc (e.g. Aceh, 2004 [M_w 9.0]; Nias, 2005 [M_w 8.6], Padang, 2009 [M_w 7.5]). The mechanism and behaviour of major subduction events has become an important focus of earthquake research in this region; however, there are still many challenges in modelling the seismic hazard and risk across Sumatra and Java. This must take into consideration damaging shallow crustal earthquakes onshore (e.g. Bantul, 2006 [M_w 6.3]), in addition to the major offshore seismogenic sources. New seismic hazard maps have recently been produced for Indonesia for the publication of the 2010 seismic design code, but there remain many aspects of the hazard analysis for which new developments and alternative approaches could be considered. The Monte Carlo method of seismic hazard analysis is used to illustrate some of these alternative techniques. This work explores the delineation of seismogenic sources in Indonesia, and the extent to which they are reconciled with observed seismicity. The selection of appropriate attenuation models is also considered, as are strategies for validating the seismic hazard analyses given the limitations of existing earthquake data. The current national seismic hazard maps clearly illustrate the development of the Indonesian seismic design code in the context of design practice across the globe. As Indonesia develops economically and undergoes greater urbanisation it is necessary to assess the potential needs of seismic hazard analysis in the future. This may require greater consideration of performance-based seismic design objectives, seismic risk to increasingly complex structures and the potential for secondary co-seismic effects such as landsliding and liquefaction. New modifications to seismic hazard in western Indonesia are introduced with these issues in mind.