Global review of open access risk assessment software packages valid for global or continental scale analysis

James Daniell (1), Alanna Simpson (2), Rashmin Gunasekara (3), Abigail Baca (3), Andreas Schaefer (1), Oscar Ishizawa (3), Rick Murnane (2), Annegien Tijssen (2), Vivien Deparday (2), Marc Forni (3), Anne Himmelfarb (2), and Jan Leder (1)

(1) Karlsruhe Institute of Technology, Geophysical Institute, CEDIM, Karlsruhe, Germany (j.e.daniell@gmail.com), (2) Global Facility for Disaster Reduction and Recovery, The World Bank Group, Washington, D.C., USA, (3) Social, Urban, Rural Resilience (GSURR) Global Practice, The World Bank Group, Washington, D.C., USA

Over the past few decades, a plethora of open access software packages for the calculation of earthquake, volcanic, tsunami, storm surge, wind and flood have been produced globally.

As part of the World Bank GFDRR Review released at the Understanding Risk 2014 Conference, over 80 such open access risk assessment software packages were examined. Commercial software was not considered in the evaluation. A preliminary analysis was used to determine whether the 80 models were currently supported and if they were open access. This process was used to select a subset of 31 models that include 8 earthquake models, 4 cyclone models, 11 flood models, and 8 storm surge/tsunami models for more detailed analysis. By using multi-criteria analysis (MCDA) and simple descriptions of the software uses, the review allows users to select a few relevant software packages for their own testing and development. The detailed analysis evaluated the models on the basis of over 100 criteria and provides a synopsis of available open access natural hazard risk modelling tools. In addition, volcano software packages have since been added making the compendium of risk software tools in excess of 100.

There has been a huge increase in the quality and availability of open access/source software over the past few years. For example, private entities such as Deltares now have an open source policy regarding some flood models (NGHS). In addition, leaders in developing risk models in the public sector, such as Geoscience Australia (EQRM, TCRM, TsuDAT, AnuGA) or CAPRA (ERN-Flood, Hurricane, CRISIS2007 etc.), are launching and/or helping many other initiatives. As we achieve greater interoperability between modelling tools, we will also achieve a future wherein different open source and open access modelling tools will be increasingly connected and adapted towards unified multi-risk model platforms and highly customised solutions.

It was seen that many software tools could be improved by enabling user-defined exposure and vulnerability. Without this function, many tools can only be used regionally and not at global or continental scale. It is becoming increasingly easy to use multiple packages for a single region and/or hazard to characterize the uncertainty in the risk, or use as checks for the sensitivities in the analysis. There is a potential for valuable synergy between existing software. A number of open source software packages could be combined to generate a multi-risk model with multiple views of a hazard.

This extensive review has simply attempted to provide a platform for dialogue between all open source and open access software packages and to hopefully inspire collaboration between developers, given the great work done by all open access and open source developers.