



## **Insurance-focussed prototype models for analysing and visualising flood risk in Latin American megacities**

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Recent flooding events in Latin American cities such as Bogota, Colombia; São Paulo, Brazil; and Santiago, Chile during the past decade have resulted in considerable human and financial impacts.

Densely populated megacities such as these are particularly vulnerable to flooding from a variety of sources, including river, pluvial (surface water) and dam failure. In addition, factors such as poor development control, insufficient drainage capacities, and the influence of global teleconnections such as El Niño/La Niña conspire to increase flood risk at the local and regional scales. However, a lack of readily available input data, both from state and private sources has, until now, made the creation of city-wide flood maps and models for commercial purposes difficult.

The growth of emerging insurance markets in Latin America requires reliable, consistent flood risk data upon which to make educated underwriting decisions and business development plans. This presentation will provide examples of prototype river and pluvial flood models, developed using the best available free-to-access data. A parsimonious modelling framework is described, so as to provide a “first pass” flood modelling strategy for insurance-focussed flood modelling in Latin America. These prototype models, created in a rapid and cost-effective manner, are seen to have considerable potential for inclusion within catastrophe modelling approaches so as to extend coverage to emerging insurance markets, whilst providing useful information upon which to parameterise and test loss models for commercial applications.

Validation of the flood models using available historical flood records and technical issues relating to model uncertainties and the effective deployment of 1-dimensional and 2-dimensional flood modelling approaches in the absence of high resolution (e.g. LiDAR) topographic and drainage data are discussed. Alternative methods for high impact visualisation, integration and distribution of the flood models within 3rd party applications such as Google Earth are also introduced, so as to encourage uptake of the data by non specialists and decision makers within the insurance industry.

Potential future extensions of the prototype models will also be presented, including:

- scenario modelling based on available records of rainfall depths and river flows associated with extreme historical flood events;
- sensitivity analyses to explore the effects of using spatially and temporally variable rainfall upon modelled flood depths and extents;
- application of areal reduction factors, relative to a specified point source, for each city;
- inclusion of a simplified representation of the drainage network for one or more cities;
- re-running of flood models using higher resolution topographic data with a view to enhancing predictive accuracy and spatial resolution / granularity.