# ICRM–CAT, Model Fact Sheet
Jakarta Flood

ICRM-CAT is a NatCat risk modeling platform introduced by ICRM in July 2015. It consists of two cat risk models developed by ICRM under funding by the Monetary Authority of Singapore (MAS), specifically a Jakarta flood risk (JKT FL) and a Singapore Earthquake (SIN EQ) risk assessment model. The models quantify the relevant hazards, assess the exposures and vulnerabilities from inputs provided by end-users, and compute the relevant loss risk metrics. This platform utilizes only open-source software components, specifically GIS, relational database and display/report generation components. Users can use the models by providing necessary exposure inputs and can visualize model outputs via map overlays, tables, charts and reports. An ICRM-CAT Users' Manual is further provided to facilitate ready use. ICRM-CAT is currently available to industry users for non-commercial use.

Model Highlights

- Model coverage – metropolitan Jakarta DKI
- Model development funded by the Monetary Authority of Singapore (MAS) and Nanyang Technological University (NTU), Singapore
- Analysis options: Probabilistic and Scenario providing standard risk metrics at location and portfolio level
- Resolution: lat./long, sub district (postal sector) "desa", district "kecamatan"
- Lines of business: Residential, Commercial, Industrial
- Coverages: Building, Content, no BI coverage
- Outputs: location and portfolio level risk metrics, loss analysis reports

Data Used in Development

- Daily precipitation data from stations covering Jakarta and the broader region.
- Digital elevation Model 5 m. resolution, 1 m. vertical accuracy in the risk concentration areas (Capital DKI region) and about 2 m. elsewhere
- Detailed information on Jakarta river levees system and its conveyance capacity
- River stage during the 2007 and 2002 floods
- Detailed building level information for a section of Jakarta and
- Claims data from insurance companies – 2007 and 2013 floods

100 Year Return Period Flood Hazard Map
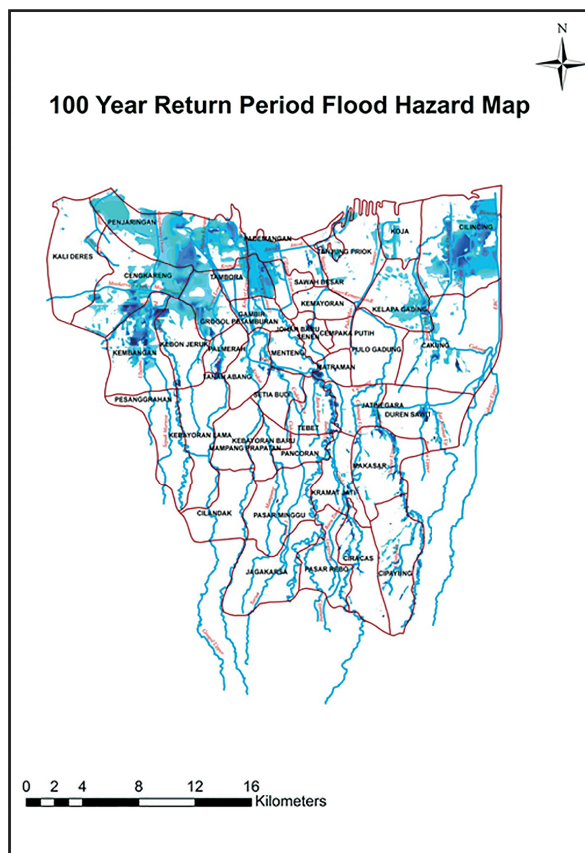
Modeling

- Modeling and analyses based on underlying 100m. resolution grid
- Probabilistic hazard maps with return periods from 2 years to several thousand years
- Jakarta specific Intensity Duration Frequency (IDF) curves used in developing return period rainfall
- HEC-HMS and HEC-RAS used in flood water routing and hazard modeling, including in-house developed add on for 2D flow channeling
- Vulnerability curves based on actual claims and reputable published curves with adjustments for Jakarta reflecting its economic development level – Residential, Commercial, Industrial occupancies.
- Component and model level validation carried out, including the 2002 and 2007 floods

Financial Model

- Policy and portfolio level, no reinsurance included
- Hazard and vulnerability uncertainty
- Detailed location level outputs by event accessible to the user for linking own Dynamic Financial Analysis (DFA) models

Software Platform

- Minimum configuration requirements to run the Platform and the model: Windows 7; 4GB RAM; 80 GB hard disk space; Intel core i3 2.3 GHz]
- Open source components and development platforms .NET Framework 4.5; Microsoft Report Viewer 2012; Microsoft Visual C++ runtime 2010; Microsoft Access DB engine; PostgreSQL 8.4; PostGIS] – no additional license fees for the users, and distributed as part of the installation.
- Front end, workflows, visualization, and back end exposure data implemented on RMSI's Safire Platform, available for non-commercial applications
- Indicative maximum number of locations on the minimum configuration (20,000)

Model Accessibility

- Model and the deployment platform are freely available to the insurance industry in Singapore and insurance industry service providers (e.g. modeling vendors) – only for non-commercial use

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