

RMS China Typhoon Model

Captures Risk From Wind, Inland Flood, and Storm Surge in China, including Hong Kong and Macau

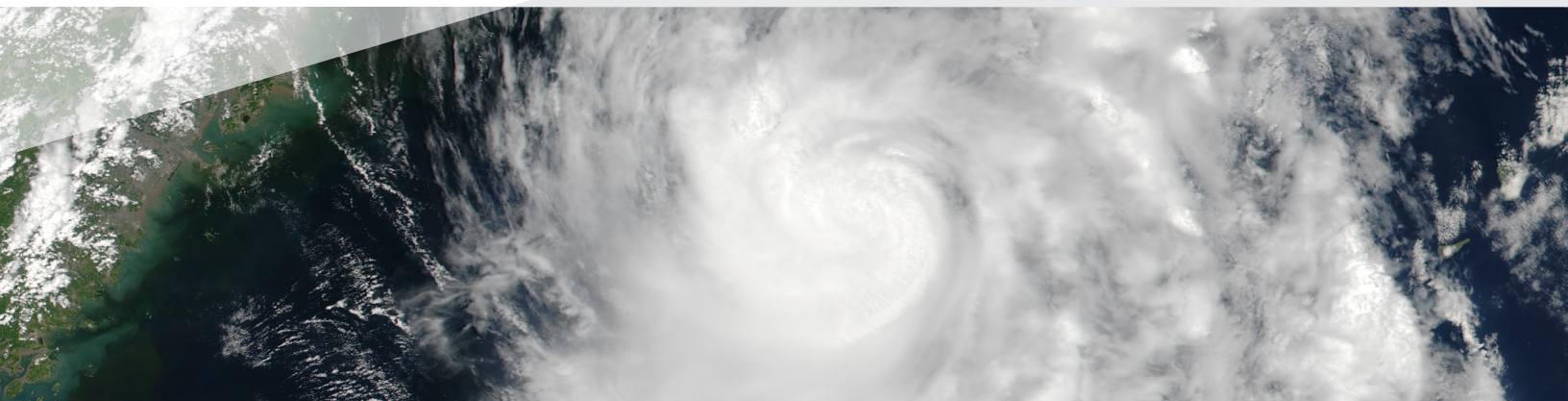


Image Source: NASA



KEY FEATURES AND BENEFITS

- Model captures the risk from typhoon winds and typhoon-driven flooding
- Features a precipitation-driven typhoon inland flood model, parametric surge model for China, and fully hydrodynamic surge model for Hong Kong
- High-resolution hazard modeling and sophisticated methodology used to create aggregate hazard
- Stochastic event set contains 25,000 tropical cyclone tracks to capture the full spectrum of possible typhoons
- Model includes over 1,500 unique region-dependent vulnerability curves reflecting local design and building practices
- Modeled losses have been calibrated using 10 years of claims and exposure data representing a 50% market share

Overview

An average of six typhoons make landfall in China every year, and they can bring strong, damaging winds and widespread precipitation-induced or storm surge-driven flooding to the eastern provinces. Economic expansion, urbanization, and increased insurance penetration in the Chinese market has led to an increase in at-risk exposure.

The RMS® China Typhoon Model captures the risk from typhoon wind, typhoon-driven inland flood, and storm surge, and it can assist users in understanding and managing this increasingly important risk. The model covers all provinces in China that are at risk from typhoon-related perils, as well as the special administrative regions of Hong Kong and Macau.

Complete View of Typhoon Risk

The model includes approximately 25,000 stochastic events, extensively calibrated against historical typhoon data. It captures the risk from typhoon wind, tropical cyclone rainfall-driven flooding, and coastal storm surge-driven flooding. Capturing this range of potential events and perils allows for a robust determination of tail risk, enabling more informed reinsurance-based decision-making and more accurate risk-based capital requirement calculations.

The stochastic event set drives independent models for the wind and flood perils, so users can view the separate contribution of typhoon-related wind and flood losses to the total loss. The flood model includes a precipitation-driven hydrological and hydrodynamic model that considers the impact of antecedent conditions, extra-tropical transition, and inland decay, and it is fully linked with the wind model. A parametric storm surge model is included for the coastline of China, while a detailed hydrodynamic storm surge model is used for Hong Kong, with its complex system of islands and bays.

SUPPORTED SOLUTIONS

RiskLink®, RiskBrowser®, and Risk Modeler™

- Detailed Loss Model (DLM) accepts high-resolution exposure data for residential, commercial, and industrial lines of business including detailed address information, construction, and occupancy descriptions, building height, and year built, for buildings, contents, and time-based risk coverages
- Aggregate Loss Model (ALM) available for aggregate exposure for residential, commercial, and industrial lines of business

Client Support

- Global Client Support services ensure continuous availability of knowledgeable support staff, fulfillment and deployment services, RMS experts, and product and industry training
- Access to comprehensive, transparent documentation, including model methodology and model validation
- Event Response Team provides accurate information about potential impacts of a major catastrophe within agreed peril-specific timelines

RMS

7575 Gateway Blvd.
Newark, CA 94560 USA

For Sales Inquiries:

+1.510.505.2500
+44.20.7444.7600
sales@rms.com
www.rms.com



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High-Resolution Hazard

Typhoon-related flooding can have a high hazard gradient, with at-risk zones neighboring unaffected areas. Similarly, wind risk is highly location-dependent, with coastal properties more exposed to wind damage than inland areas. The China Typhoon Model incorporates detailed hazard mapping and supports high-resolution geographic and building classification input to capture wind and flood loss more realistically, assisting users with their risk selection and pricing decisions.

The wind hazard is modeled on a variable resolution grid (VRG) with the highest cell resolutions covering the areas of highest hazard and exposure. Typhoon-driven flooding is modeled on a 90-meter grid covering the entire model domain to capture the variations in flood risk at the location level. A sophisticated exposure disaggregation methodology is used to create the aggregate hazard layers, which preserves a good representation of the geographical distribution of the risk even with the use of lower resolution data.

Extensive Validation of Model Science and Results

RMS has worked closely alongside the China Meteorological Association, National Meteorological Center, and the City University of Hong Kong, as well as collaborating with local typhoon experts and institutions to validate the wealth of scientific information in the model and calibrate results. Modeled losses have been calibrated using 10 years of claims and exposure data representing 50 percent of the market share. The model includes 18 historical event reconstructions for China and four for Hong Kong, enabling users to validate the model against their own claims data.

Vulnerability Differentiation for Specialty Risks in China

The supplementary Industrial Facilities Model (IFM) is an advanced vulnerability module that assesses the damageability of a large set of industrial facilities more accurately. The IFM quantifies the subsequent loss estimates for buildings, contents, and business interruption coverages.

As a significant proportion of insured exposure at risk in China is for buildings under construction, the Builders Risk Model can be used to more accurately model buildings in the process of construction through differential vulnerability functions and property valuations, depending on the phase of construction.

The Marine Cargo and Specie Model can be used to analyze the risk for typhoon wind and storm surge that include hundreds of combinations of these specialty risks. The accompanying Global Ports Industry Exposure Database contains detailed information for 11 major ports in China and Hong Kong.

Find Out More

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