

- ADVANCED HAZARD MODELING
- STATE-OF-THE-ART ENGINEERING
- DEVELOPED FOR THE CHINA MARKET

The AIR Typhoon Model for China

ADVANCED HAZARD MODELING

Captures Risk from Both Wind and Flood

Most typhoons that impact China have relatively low wind speeds (Category 2 or lower). But even weak wind events can cause significant damage from flooding, which can extend hundreds of kilometers inland and persist for several days.

Accounts for Impact of Region-Specific Meteorological and Geographic Factors on Flood Hazard

Several factors unique to China influence typhoon-induced flood. Storms approaching the mainland commonly undergo extratropical transition, which can increase precipitation footprints. China's coastal mountains also enhance precipitation. Finally, in summer and fall, the South China Sea Monsoon pumps additional moisture into storms in southeastern China.

Basinwide Approach Provides More Accurate Loss View

Approximately 60% of loss-causing typhoons in the Northwest Pacific impact multiple countries. Models that do not account for the dependence in typhoon-related losses between countries can underestimate risk.

THE ISSUE.

THE SOLUTION.

In addition to typhoon wind, the AIR model explicitly captures the risk from precipitation-induced flooding—a critically important feature given that flood is covered in standard insurance policies in China. Flood computations are based on total accumulated precipitation, soil type, land use/land cover, and topography.

Using satellite imagery and event precipitation data from the Tropical Rainfall Measuring Mission, the AIR model explicitly accounts for a storm's potential to undergo extratropical transition, as well as the impact of a storm's interactions with coastal mountains and the moisture supplied by the annual monsoon.

The AIR model shares a basinwide catalog with Japan, Taiwan, Hong Kong, the Philippines and South Korea. By appropriately accounting for the correlations of risk between countries, the AIR model facilitates the analysis of policies and portfolios that span multiple countries.

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Separate Damage Functions for Wind and Flood

The damage patterns and mechanisms for cyclone winds vary significantly from those for precipitation-induced flood.

The AIR model includes separate damage functions for wind and flood that capture the relationship between wind speed or accumulated precipitation runoff, respectively, and the vulnerability of affected structures. Damage functions vary by occupancy, construction type, and height.

continued

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MODEL AT A GLANCE

FIRST RELEASED 2007

LAST UPDATED 2010

MODELED PERILS Tropical cyclone winds and precipitation-induced flooding.

CATALOG The Northwest Pacific basinwide model has a 10,000-year catalog that includes 86,448 loss-causing events.

HAZARD MODULE

- Developed in collaboration with the Shanghai Typhoon Institute and other leading local research organizations
- Captures the risk from both wind and flood
- Captures geographic and meteorological factors unique to China, and their impact on the wind and flood hazards

VULNERABILITY MODULE Separate wind and flood damage functions for the full range of construction and occupancy types, including apartment/condo and CAR/EAR.

MODEL VALIDATION Hazard and vulnerability components validated against data from historical storms and AIR damage surveys; modeled losses validated using claims data from companies representing roughly 50% of the market in China.

Typhoon Neoguri Image Courtesy of NASA. ISO's Property Claim Services is a registered trademark of ISO. AIR Worldwide is a registered trademark.

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Customized Approach to Modeling Buildings Under Construction

China is growing at a rapid pace. As a result, the construction all risks / erection all risks (CAR/EAR) line of business comprises a larger share of exposure in China than elsewhere. Both the vulnerability and replacement cost buildings under construction vary over time, making them challenging to model.

AIR has developed specific damage functions to account for the time-dependent aspects of buildings under construction. The models accurately estimate the risk to buildings at each construction phase, from the foundation and substructure to finishing. Wind and flood vulnerability are evaluated separately.

Addressing the Challenges of Aggregate Data

Exposure information in China is often available only at low geographic resolution and with limited information about building characteristics.

Companies can leverage AIR's high-resolution industry exposure database to disaggregate the province-level exposure information and to incorporate additional information, such as occupancy and construction. The result is improved loss estimates.

DEVELOPED FOR THE CHINA MARKET

NO ISSUE HERE.

Serves Industry Leaders

Already licensed by all major reinsurance brokers and the largest insurers in China, AIR modeling is satisfying the growing need for a fully probabilistic approach to assessing and managing the risk.

Collaboration with Leading Local Research Organizations

AIR appreciates the value of local expertise. The model's catalog, for example, was developed in conjunction with the Shanghai Typhoon Institute, which provided track information that extends well beyond the point where a storm is no longer a typhoon, providing a more complete view of typhoon-induced flood risk.

Supports Wide Array of Insurance Policy Conditions Specific to China

The model supports a wide array of policy terms and conditions, including facultative (assumed and ceded) and treaty reinsurances. It explicitly includes the maximum-of-site or percent-of-loss deductible, a commercial policy type commonly used in the China market.

About AIR Worldwide

AIR Worldwide (AIR) is the scientific leader and most respected provider of risk modeling software and consulting services. AIR founded the catastrophe modeling industry in 1987 and today models the risk from natural catastrophes and terrorism in more than 90 countries. More than 400 insurance, reinsurance, financial, corporate, and government clients rely on AIR software and services for catastrophe risk management, insurance-linked securities, detailed site-specific wind and seismic engineering analyses, and agricultural risk management. AIR is a member of the Verisk Insurance Solutions group at Verisk Analytics (Nasdaq:VRSK) and is headquartered in Boston with additional offices in North America, Europe, and Asia. For more information, please visit www.air-worldwide.com.



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