

CONTINENTAL CHINA FLOOD MODEL.

The first combined river and surface water flood model for China.

Enhancing province-level exposure. A detailed exposure database allows users to disaggregate province-level insurance data by specific lines of business (including residential, industrial and commercial) and model at the highest resolution available within the model domain.

Analysis of coordinate-level industrial exposure captures the range of flood potential across an industrial site's footprint. This provides a more representative view of flood risk for China's large industrial centres, typically impacted by significant losscausing events to the insurance industry.

Identify the loss drivers. China is susceptible to both river and flash flooding resulting from extreme rainfall. The model captures both types of flooding giving insight into which is driving losses in any particular area. The Continental China Flood stochastic event set categorises both non-typhoon and typhoon-driven flood events - this allows users to run the model with or without typhoon to understand the specific contribution these make to flood risk.

Validation. The model was developed in collaboration with Aspen Insurance Holdings Limited ("Aspen"). It combines Aspen's extensive understanding of exposure and vulnerability in China with JBA's industry-leading flood modelling expertise.

Uses

Assess the economic and insured loss due to river and surface water flooding across China (model includes coverage of Hong Kong and Macau)

Model flooding due to both extreme non-typhoon and typhoon precipitation

Quantify the flood risk to specific industrial park locations throughout China

Key Technical Details

Correlation of river and surface water flooding

Typhoon and non-typhoon driven events

Defences incorporated

Sophisticated disaggregation of aggregate data

Reporting of modelled losses at province, prefecture, county and sub-county level

Residential, industrial, commercial, agricultural, construction and motor lines of business

Building, contents and business interruption coverages

Model domain captures 98% of China's insured value and covers continental China, excluding the western-most provinces of Qinghai, Tibet and Xinjiang Uyghur, but including Hong Kong and Macao

As the first fully probabilistic model for inland flood in China, it will provide re/insurers with the necessary tools to help to better understand this risk in a growing market

Alan Calder, Head of Cat Risk Management, Aspen

Background

Flooding is the driving cause of economic loss from natural catastrophes in China due to a combination of significant flood hazard and fast-paced growth in flood-exposed areas. It is estimated to contribute 58.8% of the average annual losses due to natural hazards in China*. Although low insurance penetration in China has limited the insured losses from such events, there is a rapid growth in insurance take-up, meaning that flood events in China have increasing potential to impact global reinsurance markets.

Model access

The Continental China Flood Model can be accessed via portfolio analysis services provided by JBA or our catastrophe modelling platform, JCalf®. The model can also be accessed via Impact Forecasting ELEMENTS, Oasis and ModEx by Simplitium.



ASPEN

About Aspen Insurance Holdings Limited ("Aspen")

Aspen provides reinsurance and insurance coverage to clients in various domestic and global markets through wholly-owned subsidiaries and offices in Australia, Bermuda, Canada, Ireland, Singapore, Switzerland, the United Arab Emirates, the United Kingdom and the United States. For the year ended December 31, 2018, Aspen reported \$12.5 billion in total assets, \$7.1 billion in gross reserves, \$2.7 billion in total shareholders' equity and \$3.4 billion in gross written premiums. Aspen's operating subsidiaries have been assigned a rating of "A" by Standard & Poor's Financial Services LLC ("S&P"), an "A" ("Excellent") by A.M. Best Company Inc. ("A.M. Best") and an "A2" by Moody's Investors Service, Inc. ("Moody's"). For more information about Aspen, please visit www.aspen.co

About JBA

JBA is the global leader in flood risk management. Our flood maps, catastrophe models and analytics are used by some of the world's largest insurers, reinsurers, financial institutions, property companies and governments. We're part of one of the biggest and best global flood consultancies, employing over 500 experts who work with clients around the world. Our team is a collaboration of scientists who use their expertise to help keep us at the forefront of technical innovation.

Ref. * Prevention Web (UN Office for Disaster Risk Reduction (UNISDR)). 2014. China: Disaster Risk Profile. [online] Available at: <https://www.preventionweb.net/countries/chn/data/> [Accessed 1 April 2019].

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