GuyCarpenter

MANAGING 'SECONDARY' PERILS IN ASIA PACIFIC REGION

Secondary perils represent a complex and nuanced challenge for the (re) insurance industry. In essence, these natural perils are “known, unknowns.” They are known to pose a risk, but our industry does not always have a full understanding of their potential impacts.

While the focus has traditionally been on peak perils, there have been sizeable individual losses from these secondary perils. A number of smaller loss events across a year can add up quickly. In 2021, these purported secondary perils caused significant losses at a global level, serving as a wake-up call for many regions. However, for businesses in Asia Pacific (APAC), the secondary-peril losses were less severe than in those Europe and North America. Last year should serve as a reminder to continue learning from the past and diligently enhance the regional understanding of these often-underplayed drivers of loss.

The term “secondary perils” is itself not well defined. Historically, the focus of the catastrophe modeling industry has been on the “peak perils” of tropical cyclones and earthquakes. While progress has been made to better understand floods, fires and a host of other perils that frequently take place subsequent to destructive primary events, they have tended to take second place (hence the name) when it came to risk management. In practice, the insurance industry has considered secondary perils to be small- to medium-sized catastrophe events that occur at a higher frequency than do their primary-peril counterparts.

The designation of these perils is regionally specific. In APAC, what may be a secondary peril may, in other territories, often be considered a core focus, and vice versa. For instance, floods that occur in Malaysia or Thailand may be prioritized by insurers and reinsurers. However, in 2021, floods across Central Europe led to significantly higher losses than expected, yet were considered secondary-peril events. Other notable, global secondary perils from last year included major Winter Storm Uri, destructive wildfires in Canada and the massively damaging December tornadoes in the US.

For purposes of this discussion, “secondary” or “other” perils exclude the global probable maximum loss drivers of earthquake or wind but include the additional losses originating from the main shake of a seismic event (such as tsunami), or the core wind damage from a cyclone (such as flooding).

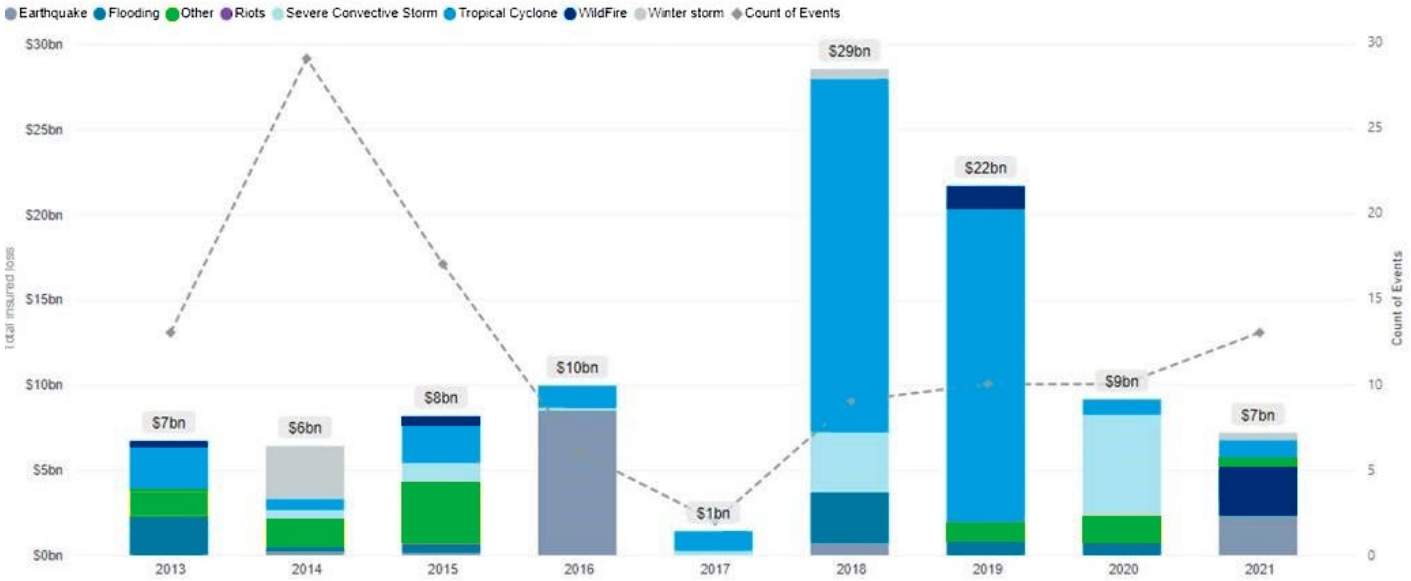
Through the creation of innovative and tailored solutions derived from a comprehensive and integrated risk-management approach, (re)insurers can overcome the challenges posed by secondary perils to help achieve long-term growth and profitability.

Quantifying Secondary Perils

In the last decade, secondary peril losses in APAC have trended, as a percentage of total losses, lower (40%) than the percentage in other regions (global average of 60% of total losses, or global average excluding APAC of 63% of total losses).[1] Nonetheless, the region has experienced a number of historic secondary-peril losses. These include, but are not limited to, tsunamis in 2004 and 2011, major floods in India in 2005 and 2018 and in Thailand in 2011, or floods and bushfires in Australia in 2011 and 2019-20, respectively.

1. Guy Carpenter

Figure 1: APAC Significant Insured Losses 2013-2021.



Source: Guy Carpenter

Globally, significant insured losses for 2021 are projected to be USD 105.1 billion, with APAC accounting for USD 8.3 billion of the total incurred figure. Parsing through 2021 APAC losses, nearly USD 3 billion can be attributed to floods, which are customarily considered a secondary peril.

Despite the label of "secondary," flood losses are the costliest of all 2021 losses–they have consistently propelled loss totals. For example, significant flood losses are now developing in Malaysia from events in December 2021. Each event caused sizable surges in significant insured losses. See Figure 1, above.

Influential Factors

Climate Change

Looking ahead, climate change may escalate the intensity and frequency of secondary perils throughout APAC, leading to increased local community vulnerability. *The Sixth Assessment Report (AR6) on the Physical Science Basis of Climate Change* was released by the Intergovernmental Panel on Climate Change (IPCC) in August 2021. The IPCC was highly confident that in Asia "[t]he observed mean surface temperature increase has clearly emerged out of the range of internal variability compared to 1850-1900. Heat extremes have increased while cold extremes have decreased, and these trends will continue over the coming decades."[2]

It is likely that average and heavy precipitation will increase, and regional-mean sea level will continue to rise.[3] These variable conditions, among others, may lead to further flooding, landslides, fires and severe convective storms. The nature of some of these perils is very location-specific, and a better understanding of the detailed site of insured risks will enable more accurate modeling in the future.

Recent studies[4] have examined climate-related increases in the intensity of tropical cyclones at landfall due to coastal warming, and longer decay times resulting in increased rainfall intensity in affected areas. These factors may have led to increased damage caused by inland flooding.

Economic Factors

While the growing frequency and intensity of secondary perils are contributing to rising losses, there are other factors in play as well. A growing urbanized and coastal population has increased and concentrated asset exposure. Broader insurance coverage terms have led to cover for previously excluded perils, or additional lines of business being covered. For example, automobiles may be covered for flood losses where they were not previously; at the same time, the number of policies and insured values are increasing.

As asset values are increasing, low insurance penetration still leaves the region without adequate protection. This is known as the "protection gap" between economic and insured losses. For instance, the Jakarta floods that occurred in January 2020 resulted in USD 900 million of economic losses, while insurance provided coverage for

2. Intergovernmental Panel on Climate Change (2021). Sixth Assessment Report Working Group I – *The Physical Science Basis Regional Fact Sheet – Asia* [Fact sheet]. https://www.ipcc.ch/report/ar6/wg1/downloads/factsheets/IPCC_AR6_WGI_Regional_Fact_Sheet_Asia.pdf.

3. Id.

4. Chen J, Tam C-Y, Cheung K, Wang Z, Murakami H, Lau N-C, Garner ST, Xiao Z, Choy C-W and Wang P (2021) *Changing Impacts of Tropical Cyclones on East and Southeast Asian Inland Regions in the Past and a Globally Warmed Future Climate*. Front. Earth Sci. 9:769005. doi: 10.3389/feart.2021.769005.5

only USD 79 million of the losses.[5] Similarly, the 2018 floods in Kerala, India, caused approximately USD 3 billion in economic loss, with insured loss totaling only USD 500 million.[6]

More recently, the disruption to global supply chains brought about by COVID-19 has led to potentially short-term increases in post-event costs and length of time needed for reconstruction. These increases have caused even greater disturbances in affected communities and the potential for short-term elevated losses for (re)insurers.

The ripple effects of secondary perils can be vast. The 2020 floods in China put additional stress on the already fragile supply chain, leading to consequences on an international scale, including the disrupted delivery of personal protective equipment used around the world in the COVID-19 pandemic.[7]

Proactive Risk Management

Considering a four-pronged, solutions-oriented approach to secondary perils can help manage these volatile natural catastrophes and strengthen resilience. The steps include risk and exposure identification, modeling and quantification, risk management and risk transfer, and strategic portfolio optimization. By identifying the peril, understanding its risks, and proactively managing and transferring risks where appropriate, insurers can diversify and protect their portfolios.

Risk and Exposure Identification

As noted, secondary perils have the potential to be key drivers of loss, particularly when there is a frequency of losses and an accumulation of events within a financial year. The historical secondary-peril definition is now a relic of a top-down view of natural catastrophes that focused on "the big one," or where catastrophe models were available off-the-shelf, and did not focus on the full picture in some regions.

Figure 2: Managing Secondary Perils.

Source: Guy Carpenter

Instead, a bottom-up approach might use the differentiator between well-modeled (primary) perils and lesser-known or understood (secondary) perils. A review should be undertaken of all the potential perils to which a portfolio could be exposed, and a risk-assessment approach then developed. It also should be remembered that a secondary peril can be a stand-alone event or act as an additive peril that compounds losses from a primary event.

In addition to having a clear identification of the perils an insured or prospective insured is facing, the industry needs to continue enhancing its understanding of the insured asset, to identify the true exposure. There has been much improvement around data, information about insured risk and high-resolution location information. However, there is still much room for improvement across many parts of APAC. The models can only be as good as the data used to build and calibrate them. Making assumptions rather than using actual data reduces the accuracy and increases uncertainty in outputs.

Modeling and Quantification

Often the issue is not the identification of the peril, but lack of focus on assessing the risk. Risk measurement and assessment are crucial to (re)insurers' resilience and long-term growth opportunities.

Globally, the most pervasive and costly natural catastrophe is the "secondary" peril of flooding.[8] Asia learned this lesson the hard way from the 2011 Thailand flood, which resulted in insured losses of around USD 15 billion.[9] Today, it remains the largest insured flood loss on record. At the time, it was known that severe flooding could occur in the area around Bangkok, a major city situated on the banks of a large river, in a region that experiences monsoons. The problem arose because of a lack of focus on the growing accumulation issue presented by the proliferation of industrial parks in the wider area.

It is vital for (re)insurers to assess and monitor their entire portfolios regularly, not solely the parts located in the traditional hot spots. There has been an increase in the available flood models covering the APAC region since 2011, as brokers, insurers, reinsurers and governments have worked with academic and scientific/engineering partners to develop an understanding of the peril. Guy Carpenter has invested heavily in our G-CAT® fully correlated models that cover the APAC region, so model

5. *From the ground up: Tackling the secondary perils protection gap in the Asia Pacific*, (14, June 2021). Swiss Re Group, https://www.swissre.com/risk-knowledge/mitigating-climate-risk/tackling-secondary-perils-protection-gap-in-apac.html.

6. AXCO

7. Bailey, Rob, Sumer Drall, and Claudio Saffioti. *Sunk costs: The socioeconomic impacts of flooding: Rethinking Flood Series*, Report 1, pg. 15. Marsh McLennan, 2021, https://www.marshmclennan.com/content/dam/mmc-web/insights/publications/2021/june/Sunk-Cost_Socioeconomic-impacts-of-flooding_vF.pdf.

8. Id. at 5.

9. Bevere, Lucia and Kishor Dhore (30, September 2021). *The world's costliest flood: the 2011 Thailand flood, 10 years on*, Swiss RE Institute, https://www.swissre.com/institute/research/sigma-research/Economic-Insights/the-costliest-flood-thailand-flood.html.

events can be viewed through multiple territories rather than through individual countries–Guy Carpenter's G-CAT® Thailand and Malaysian flood models are widely used.

Where there have been modeling gaps from the global vendor companies, smaller, niche modeling companies, local academic and commercial enterprises, and reinsurance brokers have created solutions. For example, Guy Carpenter worked with two specialist flood modeling companies and local governmental agencies to produce the G-CAT® Malaysian flood model.

The development of catastrophe models and related tools for less well-understood perils is critical in supporting the long-term management and response to these phenomena. This investment and commitment will help (re)insurers develop new products to help close the protection gap and to avoid surprise portfolio exposures from secondary perils. On a macro level, the garnered data can help all stakeholders—including citizens, governments and (re)insurers—make strategic decisions.

Risk Management and Risk Transfer

Governments across the region are investing in flood defenses and other mitigation schemes. For example, to cope with future flooding and to combat drought, China is constructing "Sponge Cities," utilizing internationally recognized, integrated urban water-management strategies.[10] At its core, these communities "use the landscape to retain water at its source, slow down water flow and clean it throughout the process."[11] For example, in Zhengzhou, the Sponge City efforts have eliminated 125 previous flood-prone locations.[12] Investing in Sponge City development is "effective for light to medium precipitation, reduces the formation of flood peaks, and promotes the sustainable circulation as well as the recovery of rainwater."[13]

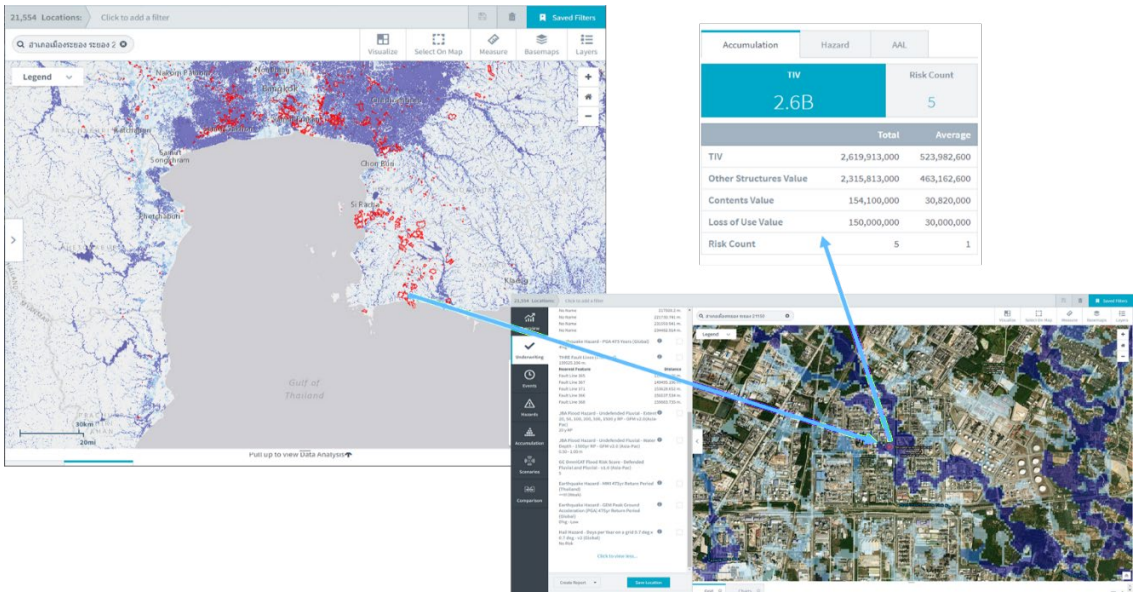
The insurance industry as a whole has an important role to play in helping societies manage and respond to natural perils. Traditional insurance and reinsurance are critical factors in helping communities and businesses recover more rapidly after a catastrophic event.

Governments are working with the insurance industry to create catastrophe pools for perils and territories that traditionally have not attracted significant support from the insurance market, as a way of helping to provide coverage for their citizens and to help kick-start the local insurance market. The Southeast Asia Disaster Risk Insurance Facility (SEADRIF) initiative is an example of an important, new catastrophe pool development in APAC. There, the Association of Southeast Asian Nations countries, and Japan, have worked with the World Bank to create a new dedicated insurance company supporting the development of insurance products and disaster-risk financing for the region.

Strategic Portfolio Optimization

As the understanding of the risk increases, responses more sophisticated than simple accumulation control

Figure 3: Guy Carpenter's AdvantagePoint® portfolio management tool.



Source: Guy Carpenter

10. Campbell, Maeve. (2021, November 15). *China's sponge cities are a 'revolutionary rethink' to prevent flooding*. Euronews. https://www.euronews.com/green/2021/11/15/china-s-sponge-cities-are-a-revolutionary-rethink-to-prevent-flooding.

11. Id.

12. Id.

13. Id.

may be available. Modeling has tended to focus on the impact on the existing insured portfolio, effectiveness of reinsurance purchase and bearing on the capital position of a company, including response to regulatory or rating agency requirements. However, catastrophe models may also be used proactively in underwriting and pricing.

Additionally, catastrophe models may be applied more strategically to review the marginal costs of expanding portfolios into new regions and/or lines of business. This may allow companies to develop plans to identify areas for profitable growth, by either avoiding or pricing risk appropriately, and to project future costs and opportunities for investment.

Recently, the integration of climate change scenarios into catastrophe models, such as Guy Carpenter's G-CAT® flood models, has allowed insurers to examine the complexities of climate change patterns with respect to their regulatory requirements and long-term planning. Guy Carpenter's AdvantagePoint® system allows users to assess natural peril risk for individual locations through to portfolios. In the example in Figure 3, below, the user has entered a location address in Thailand, which allows visualization of the flood hazard (along with other perils) and accumulation within a user-defined distance.

As previously noted, secondary perils may occur as a single large event (for example, Thai floods), or as multiple, smaller events that accumulate over time. The exposure of a portfolio to the potential mix of events and potential losses will determine the most appropriate reinsurance solutions, such as aggregate covers to assist with multiple, smaller events. Accurate modeling is increasingly important to support the placement of these events in a marketplace that has experienced significant global losses and may require better modeling detail and transparency to secure appropriate reinsurance coverage.

Other alternatives exist beyond traditional insurance, such as insurance-linked securities (ILS) and parametric modeling solutions. ILS products, such as catastrophe bonds, may be an attractive option for governments and their critical infrastructure needs, as they can provide rapid payment after an event without the need to quantify damages.

The key challenge with ILS products for non-peak perils is that lack of modeling can make quantifying the likelihood of the risk difficult, as can defining the appropriate trigger. This may create challenges in attracting investment. However, multi-peril catastrophe bonds have been successfully placed in the market, covering secondary perils, such as volcanic eruption and wildfires, so it is possible to package primary and secondary perils in a way that will work in the ILS space. Additionally, this allows for diversification of ILS and catastrophe bonds away from peak perils, but appropriate modeling must support it.

Conclusion

The industry's understanding of secondary, or lesser-known, perils is growing, but we need to match our understanding of the risks to the management of (re) insurance. For flood, storm and wildfire, we now have better coverage and improved modeling available. For other perils, such as volcano and tsunami, strong academic models exist to quantify the hazard, and the more sophisticated practitioners in the industry have the development capabilities to build scenario models from these tools. Guy Carpenter G-CAT® model development is bridging the gap between lesser-known perils and known perils to augment risk management and capital management.

In APAC, the protection gap remains large, and for (re) insurers that can understand, manage and price risk, a huge opportunity exists. It is essential that (re)insurers continue to expand their offerings and help support the development of resilient societies, while at the same time growing a sustainable and profitable business.

Contacts

Karl Jones

Head of Global Strategic Advisory, Asia Pacific

karl.jones@guycarp.com

+61 439 715896

Mark Weatherhead

Head of Catastrophe Advisory, SEAKI

mark.weatherhead@guycarp.com

+65 8380 2989

About Guy Carpenter

Guy Carpenter & Company, LLC is a leading global risk and reinsurance specialist with more than 3,400 professionals in over 60 offices around the world. Guy Carpenter delivers a powerful combination of broking expertise, trusted strategic advisory services and industry-leading analytics to help clients adapt to emerging opportunities and achieve profitable growth. Guy Carpenter is a business of Marsh McLennan (NYSE: MMC), the world's leading professional services firm in the areas of risk, strategy and people. The Company's 83,000 colleagues advise clients in 130 countries. With annual revenue of nearly $20 billion, Marsh McLennan helps clients navigate an increasingly dynamic and complex environment through four market-leading businesses including Marsh, Mercer, and Oliver Wyman. For more information, visit www.guycarp.com and follow us on LinkedIn and Twitter @GuyCarpenter.