No 1/2020
June

PERILS

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Dear Reader,

Since our last newsletter one year ago, the world has become a very different place. It is in the firm grip of the Coronavirus pandemic and we have all been affected in one way or another.

The spread of Covid-19 has been a true global disaster – a global PML event. From a risk management perspective, there are parallels that can be drawn with natural catastrophes. For one, the Coronavirus pandemic has clearly demonstrated that preparation is key – some countries were better prepared than others. Another is the need to understand the risk. Covid-19 is a novel virus and as such there is little data available, so assessing the risk and taking effective counter-measures are incredibly challenging.

Compared to the Coronavirus pandemic, natural catastrophe risk managers are arguably in a better position. The risk is better understood and as a consequence, tried and tested tools are available to manage it. But as any risk manager knows, these tools are only as good as the data they are based on. It is therefore crucial to continuously enhance the availability and quality of that underlying data.

At PERILS, we operate as a source of reliable data. Our industry loss footprints and exposure data, which are not modelled but based on 'ground-truth' collected from insurance companies, can form a reliable foundation to better understand and assess natural catastrophe risk. From day one, this has been our primary focus and we are convinced our databases provide critical information on Cat-exposed countries. Thankfully, this was not just our focus, but also of many insurance companies, enabling us to continuously expand our market coverage over the last 11 years.

Our latest additions to our list of countries covered include New Zealand and Canada, the latter being managed by our subsidiary CatIQ. Both countries have significant Cat exposures and in this newsletter we examine the extent to which these exposures are insured. Furthermore, we report on the Australian summer and European Windstorm seasons 2019/2020, the latest update of our Industry Exposure Database, and the usage of PERILS data in industry-loss-based risk transfer.

We hope you find our newsletter of interest and welcome any feedback you may have.

With our sincere thanks for your continued support,

Luzi Hitz, CEO PERILS

Figures & Facts

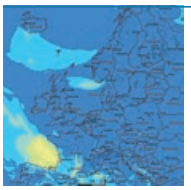
per 31 May 2020

2	new territories included: Canada, New Zealand
>70%	PERILS overall market coverage as measured in % of property premium
>160	number of national insurance companies providing exposure and loss data to PERILS
17	number of countries covered: AUS, AUT, BEL, CAN, CHE, DEU, DNK, FRA, GBR, IRL, ITA, LUX, NLD, NZL, NOR, SWE, TUR
6	number of perils covered: bushfire, earthquake, extratropical and tropical cyclone, flood, hail
11	number of industry exposure databases released since 1 Apr 2010
AUD 119m	Personal Lines Motor Hull sums insured in CRESTA Zone AUS_2022 (Bondi Junction)
50	number of qualifying events captured in the PERILS loss database
EUR 3.1m	Industry Loss for commercial property from windstorm Dragi-Eberhard in CRESTA Zone DEU_56 (Koblenz)
214	number of event gust footprints in the PERILS-UKMO European winter storm catalogue
277*	number of PERILS-based transactions placed since 1 Jan 2010
24*	number of PERILS-based transactions at risk
USD 17.1bn*	total of PERILS-based limits placed since 1 Jan 2010
USD 3.2bn*	total of PERILS-based limits at risk

* per 31 Dec 2019

Cat Events

This section provides an overview of all major European extratropical cyclones which occurred during the 2019/2020 winter. It also provides a summary of all qualifying events which have been captured or revised by PERILS since May 2019.



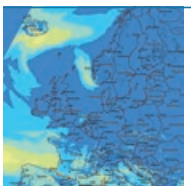
ARNE (AMELIE)

3 Nov 2019
Industry Loss < EUR 200m
Country most affected: FRA

VICTORIA (DENNIS)

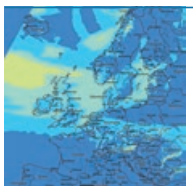
15 Feb 2020
Industry Loss = EUR 286m (2nd Loss Report)
Countries most affected: BEL, DEU, DNK, FRA, GBR, IRL, LUX, NLD, NOR, SWE

QUALIFYING



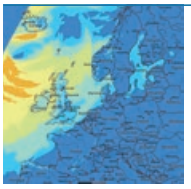
ZELIO (ELSA) - AILTON (FABIEN)

20 Dec 2019
Industry Loss < EUR 200m
Country most affected: FRA



XANTHIPPE-YULIA

22 Feb 2020
Industry Loss < EUR 200m
Countries most affected: AUT, BEL, DEU, DNK, GBR, IRL, NLD, NOR

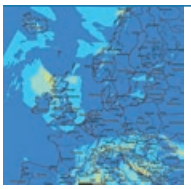


FENJA (BRENDAN)

13 Jan 2020
Industry Loss < EUR 200m
Countries most affected: FRA, GBR, IRL

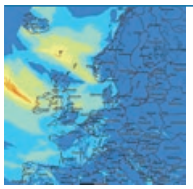
BIANCA

27 Feb 2020
Industry Loss < EUR 200m
Countries most affected: AUT, CHE, DEU, FRA



PETRA

4 Feb 2020
Industry Loss < EUR 200m
Countries most affected: AUT, CHE, DEU



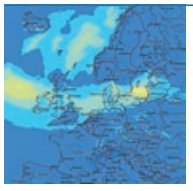
CHARLOTTE (JORGE)

29 Feb 2020
Industry Loss < EUR 200m
Countries most affected: BEL, DEU, FRA, GBR, IRL, LUX, NLD

SABINE (CIARA, ELSA)

9 Feb 2020
Industry Loss = EUR 1'551 (2nd Loss Report)
Countries most affected: AUT, BEL, CHE, DEU, DNK, FRA, GBR, IRL, LUX, NLD, NOR, SWE

QUALIFYING



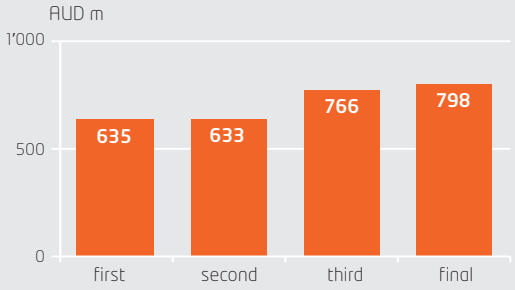
HANNA (LAURA)

12 Mar 2020
Industry Loss < EUR 200m
Countries most affected: DEU, DNK, GBR, IRL, SWE

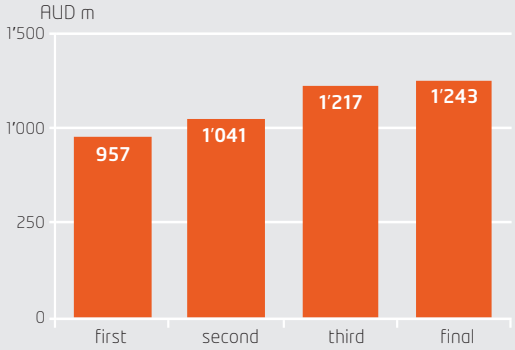
< 80 km/h (<22m/s; <50mph)
80-100 km/h (<22-28m/s; 50-62mph)
100-120 km/h (28-33m/s; 62-75mph)
120-140 km/h (33-39m/s; 75-87mph)
140-160 km/h (39-44m/s; 87-99mph)
160-180 km/h (44-50m/s; 99-112mph)
> 180 km/h (>50m/s; >112mph)

Maximum gust speeds
Source: ICON-EU, DWD

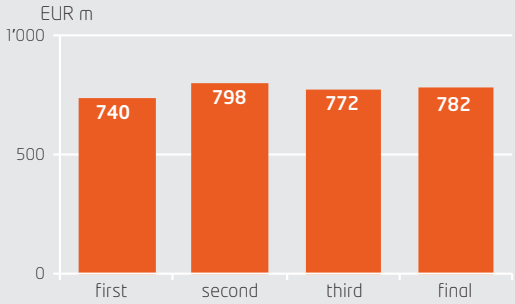
SYDNEY HAILSTORMS	
Start to end date	20 to 22 Dec 2018
Territories affected	AUS (NSW)
Description	On 20 December 2018, a convective storm system caused significant damage in Sydney and the surrounding regions in NSW. Severe storms also occurred in Brisbane and on the Gold Coast over the following two days. Note: the PERILS loss numbers cover Property line of business only – losses from Motor and other lines of business are not included.
Market loss	AUD 798m (as at 20 Dec 2019, final loss report)



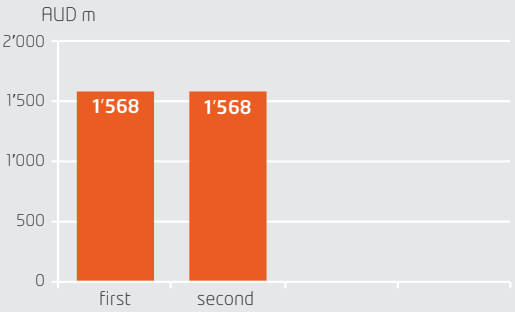
TOWNSVILLE FLOOD	
Start to end date	26 Jan to 10 Feb 2019
Territories affected	AUS (QLD)
Description	From 26 January into early February 2019, a slow-moving low-pressure system brought exceptional rainfall to Northern Queensland causing major river and surface water flooding. The flood waters caused six fatalities and major damage to private and public property, particularly in Townsville on the north-eastern coast of Queensland, Australia.
Market loss	AUD 1'243m (as at 10 Feb 2020, final loss report)



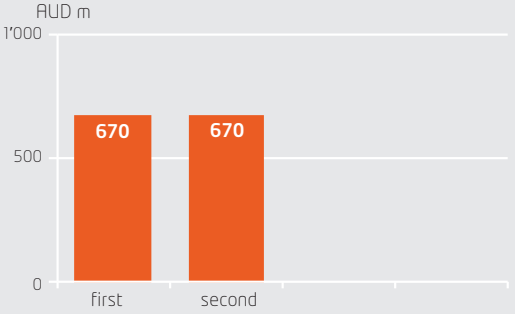
EXTRATROPICAL CYCLONE DRAGI-EBERHARD	
Start to end date	9 to 10 Mar 2019
Territories affected	BEL, CHE, DEU, FRA, GBR, LUX, NLD
Description	On 9 and 10 March 2019, extra-tropical cyclones Dragi and Eberhard caused significant damage in Western/Central Europe. Eberhard was by far the stronger of the two storms. In addition to the countries covered by PERILS, Dragi-Eberhard also affected the Czech Republic, Poland and Slovakia.
Market loss	EUR 782m (as at 9 Mar 2020, final loss report)



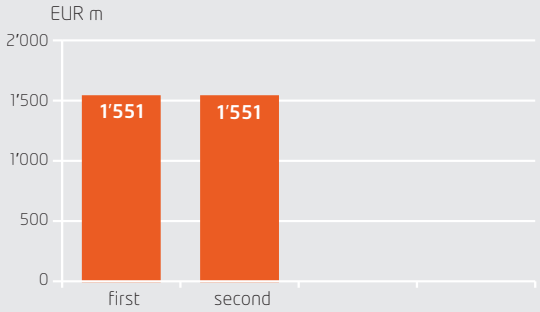
AUSTRALIAN BUSHFIRES	
Start to end date	30 Dec 2019 to 5 Jan 2020
Territories affected	Australia (NSW, VIC, SA)
Description	During the Australian bushfire season 2019/2020, devastating fires caused major property losses in rural towns with approx. 19m hectares of burnt bushland overall, causing at least 34 fatalities. States most affected were New South Wales, Victoria and South Australia. For the definition of a bushfire event, the 168hrs clause was applied as it is predominantly used in the Australian re/insurance market.
Market loss	AUD 1'568m (as at 6 Apr 2020, second loss report)



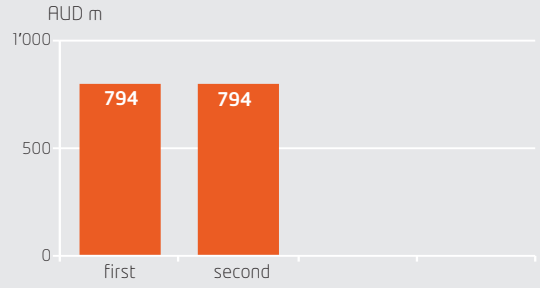
AUSTRALIAN HAILSTORMS	
Start to end date	19 to 21 Jan 2020
Territories affected	Australia (NSW, VIC, QLD, ACT)
Description	From 19 to 21 January 2020, a series of intense convective storms caused considerable property damage, especially in the Canberra, Melbourne and Sydney regions. The event was not as large as other historical hailstorms but was unique given it covered a wide geographic area over three consecutive days.
Market loss	EUR 670m (as at 21 Apr 2020, second loss report)



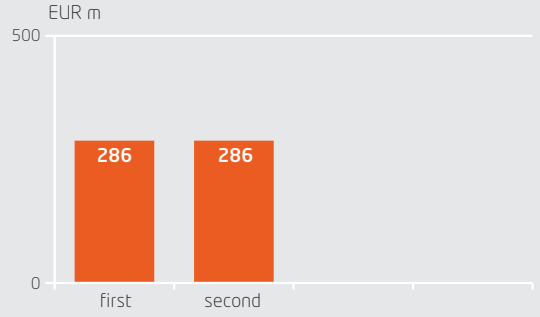
EXTRATROPICAL CYCLONE SABINE (CIARA, ELSA)	
Start to end date	9 to 11 Feb 2020
Territories affected	AUT, BEL, CHE, DEU, DNK, FRA, GBR, IRL, LUX, NLD, NOR, SWE
Description	Sabine was a major European winter storm that affected an exceptionally large area across the British Isles and Continental Europe for an unusually long period causing 14 fatalities. The loss to the insurance industry represents the largest loss from a European windstorm since Friederike (David) in January 2018.
Market loss	EUR 1'551m (as at 11 May 2020, second loss report)



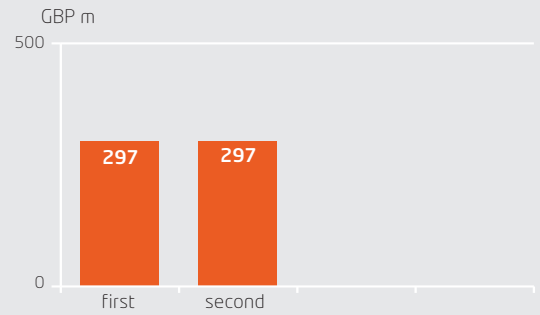
AUSTRALIAN EAST COAST LOW	
Start to end date	5 to 13 Feb 2020
Territories affected	Australia (QLD, NSW)
Description	This event can be considered a typical Australian East Coast Low with intense rainfall, strong winds, high waves and storm surge along the Australian East Coast. The damage caused stretched from South East Queensland to New South Wales coastal regions with the Greater Sydney area being particularly affected. The resulting insurance loss was the third major Cat event during the Australian summer 2019/2020 (after the Bushfires and the January Hailstorms).
Market loss	AUD 794m (as at 13 May 2020, second loss report)



EXTRATROPICAL CYCLONE VICTORIA (DENNIS)	
Start to end date	15 to 17 Feb 2020
Territories affected	BEL, DEU, DNK, FRA, GBR, IRL, LUX, NLD, NOR, SWE
Description	Victoria developed through an explosive cyclogenesis with a minimum central air pressure of 920mB, one of the lowest values ever measured over the North Atlantic. Similar to Sabine, which occurred six days earlier, Victoria affected a large area across the British Isles and north-western Europe.
Market loss	EUR 286m (as at 18 May 2020, second loss report)



UK FLOODS	
Start to end date	9 to 29 Feb 2020
Territories affected	GBR
Description	This flood event was the result of record-breaking rainfall on saturated grounds leading to extensive river flooding. The rainfall was mainly associated with the three named storms of Ciara, Dennis and Jorge. Most affected areas were the English regions of West Midlands, North West and Yorkshire, as well as Wales, parts of Northern Ireland and Scotland.
Market loss	AUD 297m (as at 29 May 2020, second loss report)



IED 2020

Release of the PERILS Industry Exposure Database 2020. The PERILS IED 2020 contains updated property market sums insured for 17 countries. The update includes the addition of industry sums insured for Canada and New Zealand as well as Motor Hull in Australia.

PERILS IED 2020	
In force date	1 Jan 2020
Content	– sums insured – number of policies – information on prevailing limits, deductibles
Resolution	– CRESTA zone – property line of business (residential, commercial, industrial, agricultural) – coverage type (building, content, business interruption) – motor hull line of business (for Australia and Canada)
Methodology	TSI collected from scratch from >160 national and international insurance companies (>70% market coverage, see Fig. 1) → data anonymization → data validation → data aggregation → extrapolation by CRESTA/LoB to 100% market
Release date	28 April 2020 (Canada IED released by PERILS CatIQ in June 2020)

PERILS AND TERRITORIES	
Bushfire, Hail	Australia, Canada
Earthquake	Australia, Canada, Italy, New Zealand, Turkey
Flood	Australia, Canada, Italy, New Zealand, Turkey, United Kingdom
Windstorm	Australia, Austria, Belgium, Canada, Denmark, France, Germany, Ireland, Luxembourg, Netherlands, New Zealand, Norway, Sweden, Switzerland, United Kingdom

APPLICATIONS

- market share analysis
- natural catastrophe model validation
- structuring and risk assessment of risk transfer products (Cat bonds, ILW)
- calculation of the protection gap
- and more

To ensure that the quality of the PERILS database is continually enhanced, the IEDs are updated annually. Subscribers to the PERILS database have access to the data at full granularity: per CRESTA zone, property and motor lines of business, and coverage type.

For the first time, the PERILS IED 2020 includes market-wide sums insured for Australia for two Motor Hull lines of business, namely personal lines and commercial lines. The geo-resolution is high-res CRESTA Zones (postcodes), as it is for property (Figure 2).

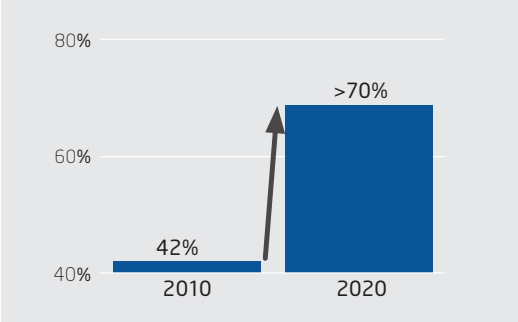


Figure 1, PERILS Market Coverage - 2020 vs. 2010: *The chart shows the increase in PERILS market coverage (measured by property premium) for all countries covered by PERILS. Over the last 11 years, PERILS has succeeded in continuously increasing its market penetration by increasing the number of data-providing insurers in all markets covered.*

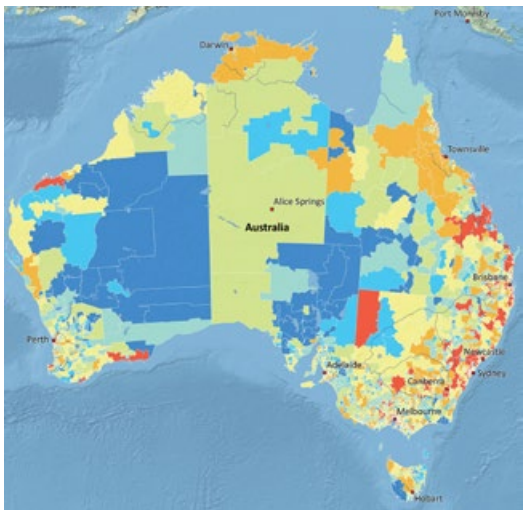


Figure 2, Motor Hull Sums Insured, Australia.

PERILS Transaction Statistics

PERILS industry exposure and loss data are used for risk assessments and as triggers for industry-loss-based risk transfer products. Transaction forms include Cat Bonds (144A ILS), Industry Loss Warranties (ILW) and Risk Swaps.

Risk Transfer per 31 December 2019	
Limits at Risk, total[1]	USD 3'216m
Split ILW / Cat Bonds (144A ILS)	ILW: USD 461m ILS: USD 2'755m
No. of Transactions at Risk	Total: 24 (ILW: 15, ILS: 9)
% Structured Triggers[2]	>90%
Geography	– Europe Wind: USD 3'186m – Australia ANP: USD 1'545m – Italy EQ: USD 115m – Turkey EQ: USD 115m – New Zealand EQ: USD 90m
Total issued since 1 Jan 2010	USD 17'104m
Total No. of Transactions since 1 Jan 2010	277

1: can cover multiple territories
2: % limits, transactions with CRESTA or country weighting

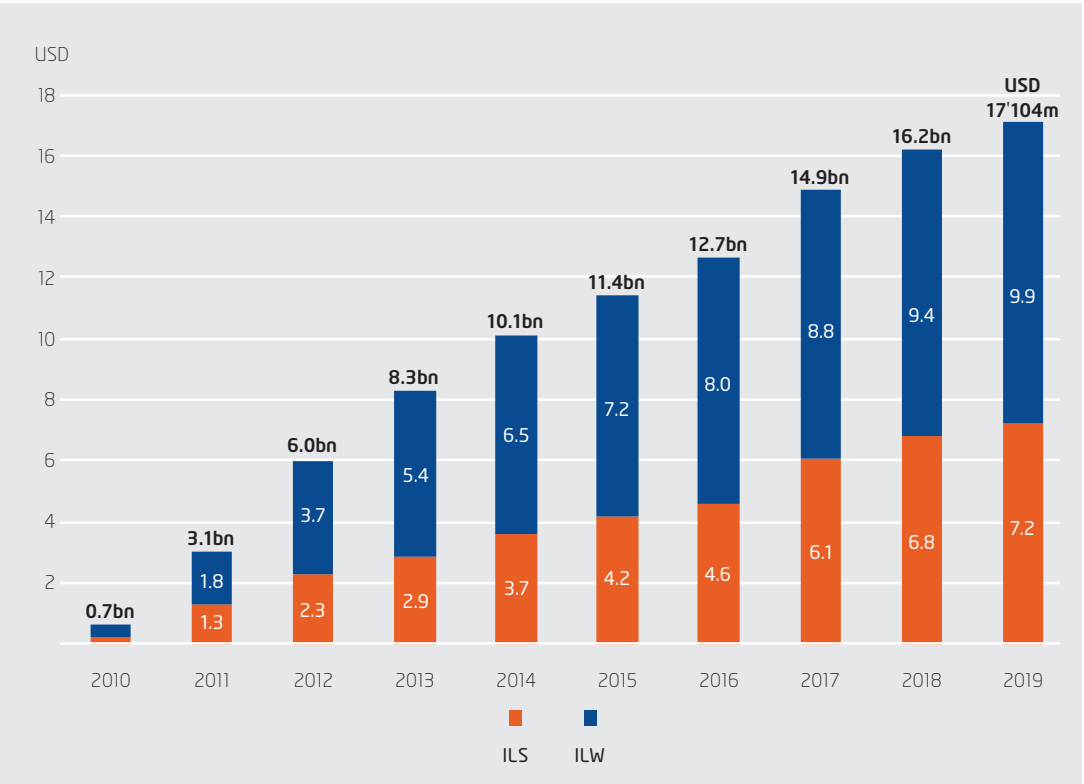


Figure 3, Aggregated PERILS-based Limits as at 31 Dec, in USD m: *On a cumulative basis, PERILS data have facilitated more than USD 17bn in Cat risk capital. This provides a good example of how market data made available by PERILS has supported the creation of additional risk capacity.*

Residential Earthquake Insurance – A Tale of two Countries

Earthquake risk is insured in various ways around the globe. In this short article, we consider the approach to earthquake cover in two countries – Canada and New Zealand – both recent additions to the PERILS country coverage.

Earthquake is a challenging peril to insure. For many years, insurers believed that earthquake risk was incalculable and therefore uninsurable. As a consequence, earthquake insurance was simply not available.

Today, the market is very different. Insurance companies have access to risk models and sophisticated monitoring tools to control the accumulation of sums insured exposed to earthquakes. Thus, they know what to expect. However, earthquake risk is not insured in a uniform way around the world. In this article, we look at two examples, New Zealand and Canada, and how they insure earthquake risk.

A level of demand

Demand for earthquake insurance is very much driven by the seismic hazard itself. A homeowner in San Francisco or Tokyo, regions which have experienced major events and where small quakes are a frequent occurrence, will very likely have considered buying earthquake insurance. A homeowner in London or Shanghai, on the other hand, is unlikely to have done so given the fact that the earth has never shaken during their lifetime and both cities are generally not known to have suffered from large earthquakes in historic times.

Perceptions, however, can be deceptive. Seismic hazard, which describes the probability of earthquakes at a given location, varies significantly around the world, from virtually no seismic activity to extremely high seismic activity. Between these two extremes, you have seismic activity which is low in living memory, but where there is historical evidence of destructive events and where such events could occur again at any time. Canada is one such location.

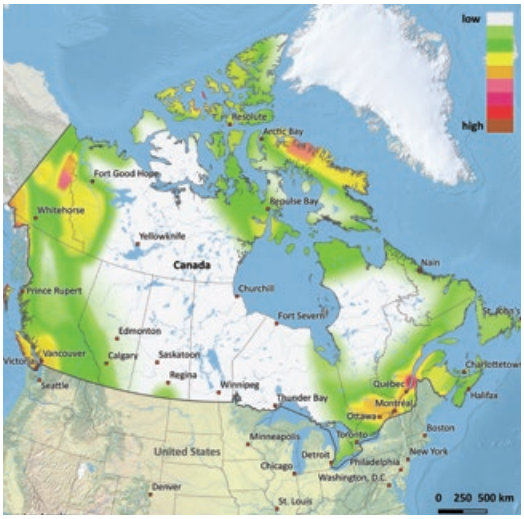
The seismic hazard data for Canada (Figure 4) shows large areas of very low seismic hazard and two areas with elevated hazard, namely British Columbia in the west and the St. Lawrence and Ottawa valleys in the southeast. In particular in the latter area, which encompasses major cities including Montreal, Quebec City and Ottawa, seismic hazard is of the "problematic" type. It is too low for there to be regular small events or recent historical losses to keep the risk front of mind, but significant events happened in the past and could happen again in the future.

New Zealand, in contrast, does not have this 'problem'. The seismic hazard is high throughout the territory (Figure 4) and people are constantly reminded of it by frequent ground shaking from smaller tremors and by recent major earthquakes, such as the Christchurch and Kaikoura earthquakes of 2010-2011 and 2016, respectively.

These different levels of seismic hazard have an impact on the respective insurance markets.

The market impact

In New Zealand, the government recognised early on that earthquake posed a serious risk to its people and economy and that insurance could play an important role in managing that risk. New Zealand originally passed the Earthquake & War Damages Act in 1945 to establish a financing scheme funded by a compulsory levy imposed on all fire insurance policies. This was superseded in 1993 by the Earthquake Commission Act requiring each private residential household to purchase



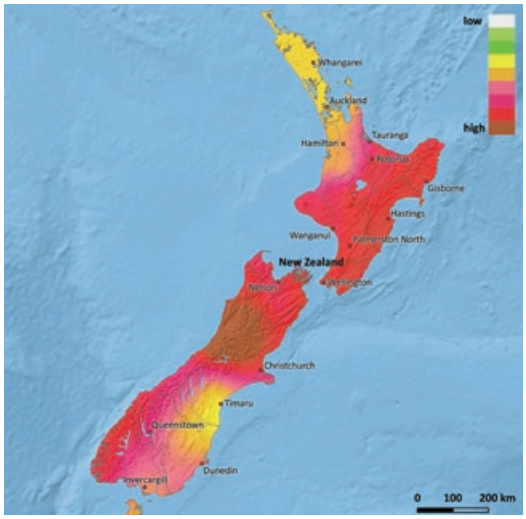


Figure 4, Seismic hazard as Peak Ground Acceleration at a return period of 475 years (source: Global Seismic Hazard Program): *Canada (left) shows low to intermediate seismic hazard whereas New Zealand (right) shows very high seismic hazard. Perception of earthquake as a major risk is omnipresent in New Zealand. In Canada, given the seismic hazard level, the earthquake risk perception is generally low, even though destructive earthquakes in the west and southeast could cause significant loss of life and tens of billions of Canadian Dollars.*

earthquake insurance from a state-owned insurance pool, the New Zealand Earthquake Council (EQC). The EQC provides first-loss coverage (currently up to NZD 150,000) at an affordable premium for all privately-owned buildings. For losses above the EQC limit, New Zealanders can buy earthquake coverage from the private industry. As a result, virtually every residential building in New Zealand is insured against earthquake damage (Figure 5).

In Canada, where seismic hazard is low to intermediate, there is no joint approach between government and the insurance industry. Instead, earthquake insurance is only available through the private market. Consumers can opt-in to include earthquake coverage in their property policy but the majority do not (Figure 5), either because they are not aware of the risk or do not want to spend additional premium dollars and accept high deductibles. As a result, many people (and their mortgage providers) living in areas of intermediate seismicity in the west and southeast of Canada would be left to carry the entire loss burden in the event of a damaging earthquake. Arguably, therefore, New Zealand is well prepared for earthquakes, whereas Canada is less so.

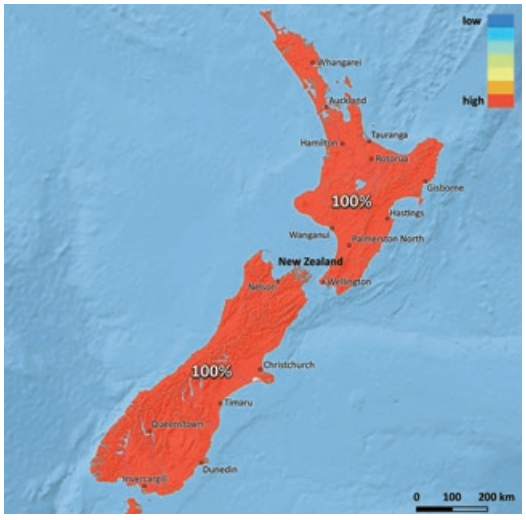


Figure 5, Residential Earthquake Insurance Take Up Rates in Canada and New Zealand: *Take up rates are defined as earthquake sums insured divided by fire sums insured (source: PERILS Database). Canada shows low earthquake insurance take up rates and many people would be uninsured in the event of a damaging earthquake. New Zealand has a joint government / private-industry approach and as a result, the earthquake insurance take up rate for residential property is virtually 100%.*

Despite these differences, the domestic insurance sectors in both locations (and the EQC in the case of New Zealand) work closely with the global reinsurance industry to make earthquake insurance available, purchasing large amounts of earthquake reinsurance cover. A domestic insurer is thus protected in the event of a large earthquake, similar to a private policyholder being protected by his or her insurance. This risk transfer between policyholder, domestic insurance company and reinsurance company (and eventually capital markets via Cat bonds), makes natural catastrophe insurance possible in the first place (Figure 6).

Facilitating the risk transfer

The prerequisites for this risk-transfer chain to work effectively are essentially threefold. Firstly, there must be capital and risk appetite to cover the risk (the supply side). On the re/insurance side, this is largely the case with the occasional exception (depending on the market cycle) of peak loss potentials such as Florida Hurricane.

Secondly, there must be demand from businesses and consumers for Cat insurance (the demand side). This is very much driven by risk awareness and the affordability of Cat insurance. In many low- to mid-income economies exposed to natural catastrophes, the risk awareness is there, but the cover is not affordable. In high-income economies, it can be the reverse, such as for earthquake insurance in Canada.

Thirdly, for Cat insurance to work properly, the understanding and quantification of risk is essential. Insurance and reinsurance companies cannot accept risk without being able to quantify it – which is where PERILS contributes.

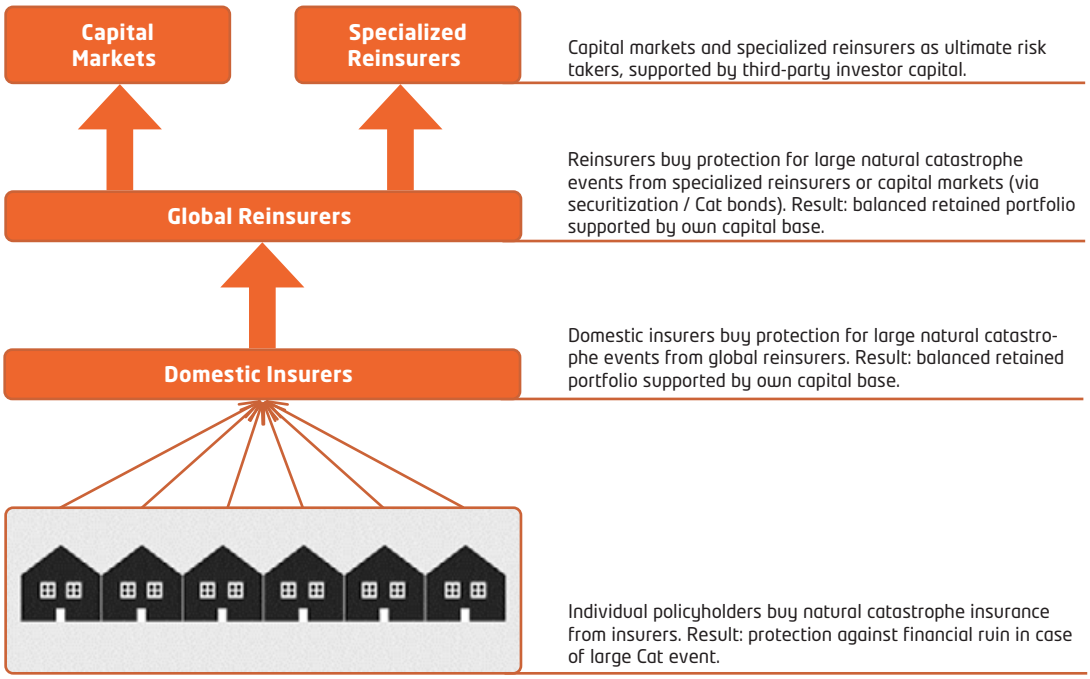


Figure 6: *Natural catastrophe insurance would not be possible without reinsurance where insurance companies buy protection for large catastrophe events, similar to consumers buying protection from insurers for their own property. For this risk transfer to work effectively, the understanding and quantification of risk is essential. PERILS data for Canada and New Zealand and many other insurance markets aim to facilitate this understanding.*

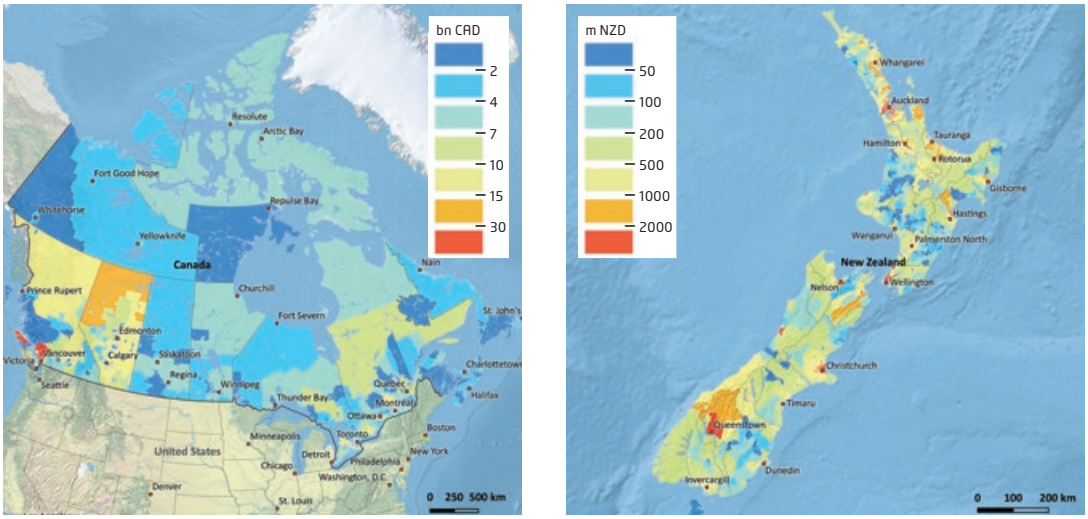


Figure 7, Industry Sums Insured for the peril of earthquake in Canada and New Zealand: *PERILS, and in the case of Canada the PERILS subsidiary CatIQ, collect sums insured and event loss data from the majority of the insurance market and produce market-level exposure and loss footprints for natural catastrophes. The covered territories are Australia, Austria, Belgium, Canada, Denmark, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, New Zealand, Norway, Sweden, Switzerland, Turkey, and the United Kingdom. The PERILS data sets are useful for the calibration of risk models and are also being used as triggers for industry-loss-based risk transfer.*

PERILS makes available detailed market loss footprints along with physical metrics for major natural catastrophe events in the following territories: Australia, Austria, Belgium, Canada, Denmark, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, New Zealand, Norway, Sweden, Switzerland, Turkey, and the United Kingdom.

Alongside the event loss data, PERILS also provides the market sums insured for these countries (see Figure 7 for an example of the industry sums insured in Canada and New Zealand). These data sets are not produced by models or top-down estimates but are based on the aggregation of detailed data provided directly by insurance companies to PERILS. As such the PERILS industry loss footprints and sums insured should reflect the ground truth as closely as possible.

This data can be used in a variety of actuarial analyses, including the testing of Cat models used to measure catastrophe risk. Broadly speaking, Cat models are only as good as their assumptions, and these assumptions are only as good as the data they are based on. Data availability and data quality are therefore critical. Unfortunately, available information for large catastrophes is often inaccurate or of poor resolution. The knock-on effect is that the quality of Cat model results is not as high as it could be if more reliable and detailed information were available for model testing and calibration.

The aim of PERILS is precisely that – to provide high-resolution, accurate data to help model builders, and by extension insurers and their reinsurers, better measure the risk from natural catastrophes. This is an iterative process and progress is only made over time. But ultimately it will have a positive impact on the insurability of natural catastrophes, such as earthquakes, and will help to close protection gaps prevalent in many emerging and developed economies alike.

Outlook

Over the coming months, we will be reporting on the Australian Bushfires 2019/2020, the Australian Hailstorms of January 2020, as well as the East Coast Low of February 2020. In addition, we will report on the European Windstorm season, with event loss reports including extratropical cyclones Sabine and Victoria, as well as the UK Floods of February 2020.

We are also working on a new real-time loss forecasting tool (another tool on our "Jeannie" platform), as well as the continued expansion of our coverage into new territories. And last but not least, we are undertaking an exciting CRESTA project, the result of which we aim to release in September.

All in all, these are busy times at PERILS.

We thank our data providers and subscribers for their continued support and remain, as always, committed to providing value in return.

Your PERILS Team

Zurich, June 2020



The CatIQ Team. From left to right, Joel Baker (CEO), Laura Twidle (Managing Director), Caroline Floyd (Asst. Director).
CatIQ was acquired by PERILS in June 2019. The Toronto-based organisation is supported by the majority of the Canadian insurance market and offers an independent Industry Exposure & Event Loss Database for Canada.
The data can be accessed via CatIQ or PERILS.