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May

PERILS

Dear Reader,

It is a pleasure to present to you our latest Newsletter. In this edition, we cover the 2015/2016 European Windstorm season, the recent flood events in the UK, the update of the PERILS Exposure Database, the use of PERILS data in risk transfer products, and the addition of Turkey to our database.

During the winter of 2015/2016, we investigated no less than ten storms which had the potential to exceed our EUR 200m market loss capture trigger. In the end, none of the events did. However, a number of the depression systems generated intense rainfall which led to flooding in Northern England and Scotland. We divided this period of flooding into two events, "Desmond" and "Eva-Frank", and so far have produced two loss reports for each.

PERILS not only reports on event losses but also captures the property sums insured for natural hazards. On an annual basis, we update the total sums insured (TSI) data, and on 1 April 2016 we released the latest update of the PERILS Industry Exposure Database. This is always a major exercise as we start the collection of the TSI data from the data-providing insurance companies from scratch. We are as ever extremely grateful for their ongoing support and are happy to report that our market penetration has further increased in 2016.

Finally, we would like to give special thanks to the Turkish insurance companies which have provided their TSI and event loss data. Throughout the process, we were struck by their openness, the quality of their data and their willingness to help advance the industry's understanding of catastrophe risk. This enabled us to release the Turkish Database in record time. We are confident that the resulting increase in data availability will help boost our understanding and improve the tradability of Turkish Cat risk, as we have seen in other markets covered by PERILS. Teşekkür ederim!

Best regards,

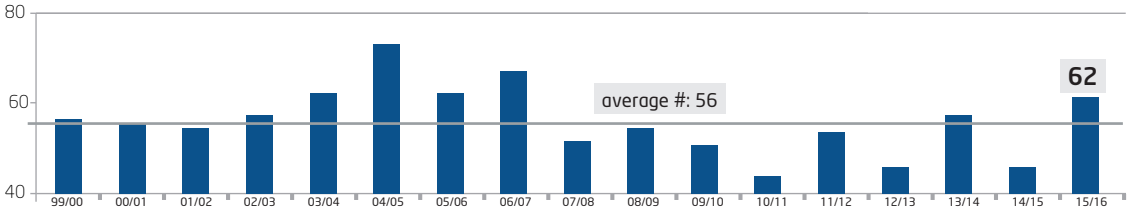
Luzi Hitz
CEO PERILS AG

Figures & Facts

> 60	PERILS overall market coverage as measured in % of property premium
14	number of countries covered: AT, BE, CH, DE, DK, FR, IE, IT, LU, NL, NO, SE, TR, UK
3	number of perils covered: wind, flood and earthquake
7	number of industry exposure databases released since 1 Jan 2010
19	number of captured events in the PERILS loss database
> 180	number of PERILS-based transactions placed since 1 Jan 2010
26	number of PERILS-based transactions at risk per 31 Mar 2016
USD 11.8bn	total of PERILS-based capacity placed since 1 Jan 2010
USD 2.9bn	PERILS-based capacity at risk per 31 Mar 2016

Cat Events

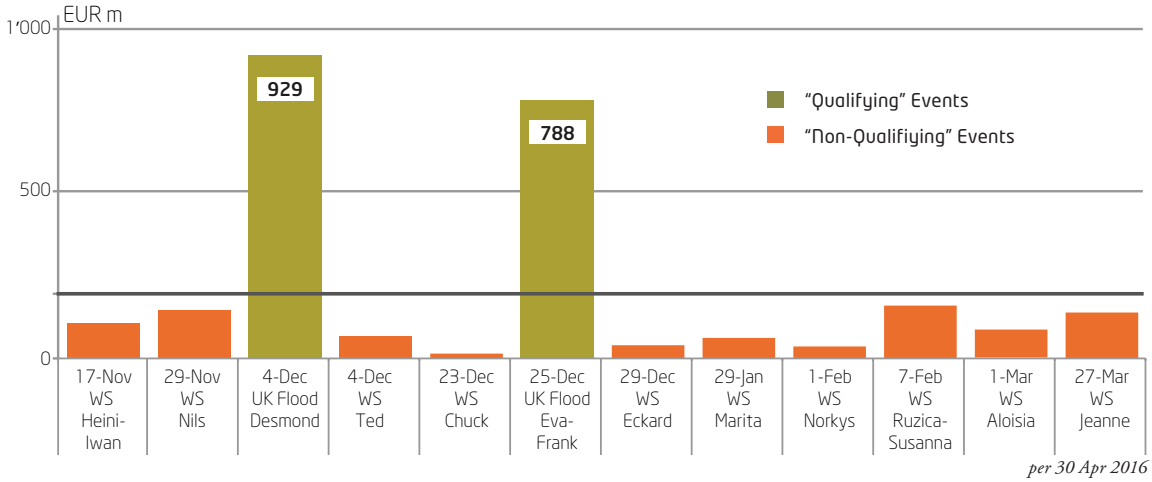
The 2015/2016 winter season in Europe was characterised by a high frequency of extratropical cyclones, and mild and extremely wet weather affecting parts of the British Isles. The total combined industry loss from these events amounts to an estimated EUR 2.6bn, with the floods in the UK accounting for EUR 1.7bn of that figure.



Source: http://www.met.fu-berlin.de/adopt-a-vortex

Figure 1: Number of named depressions November to February, Freie-Universität Berlin. *With 62 named depressions the period 1 Nov 2015 to 29 Feb 2016 showed above average activity.*

The 2015/2016 European winter season witnessed an above average frequency of low-pressure systems (see Figure 1). A key factor in this was a pronounced south-west wind drift of moist tropical air masses which caused record high rain fall amounts over Wales, northern England and much of Scotland. In many of those regions, precipitation levels were between 200% and 400% of the average total for the month of December. Coupled with the saturated soil from exceptionally wet weather in November, this led to extensive flooding in the UK in December 2015 and January 2016.



per 30 Apr 2016

Figure 2: Industry event loss estimates for the European winter 2015/2016: *UK Flood events "Desmond" and "Eva-Frank" were the only qualifying events (> EUR 200m) during the winter of 2015/2016. All other events investigated were classified as "non-qualifying" because industry event losses were estimated to fall below PERILS' EUR 200m capturing threshold.*

Event Name	Event Start Date	Event EndDate	Peril	Regions most affected	Loss estimate *
Desmond	4-Dec-2015	24-Dec-2015	FL UK	Northwest England	GBP 662m (EUR 929m)
Eva-Frank	25-Dec-2015	14-Jan-2016	FL UK	Wales, Northern England and Scotland	GBP 578m (EUR 788m)

**latest available loss estimates, according to the 2nd PERILS loss reports*

Table 1: "Qualifying" events during the winter 2015/2016. *The two qualifying UK Flood events "Desmond" and "Eva-Frank" caused a total insured property loss for both events combined of GBP 1.2bn (EUR 1.7bn).*

This weather pattern persisted for a number of weeks, and as a result PERILS investigated no less than ten European windstorms and two floods events in the UK to assess whether they had exceeded our EUR 200m market-wide insured property loss capture threshold (Figure 2). But only flood events "Desmond" and "Eva-Frank" were deemed to have qualified. "Desmond" (Figure 3, left) affected mainly England's north-western counties of Cumbria and Lancashire while "Eva-Frank" (Figure 3, right) mainly affected northern England, Scotland and Wales. Together the two events resulted in a total combined UK loss of GBP 1'240m (Table 1, Figure 3). For the flood event definition, PERILS applied the prevailing reinsurance hours clause of 504 hours.

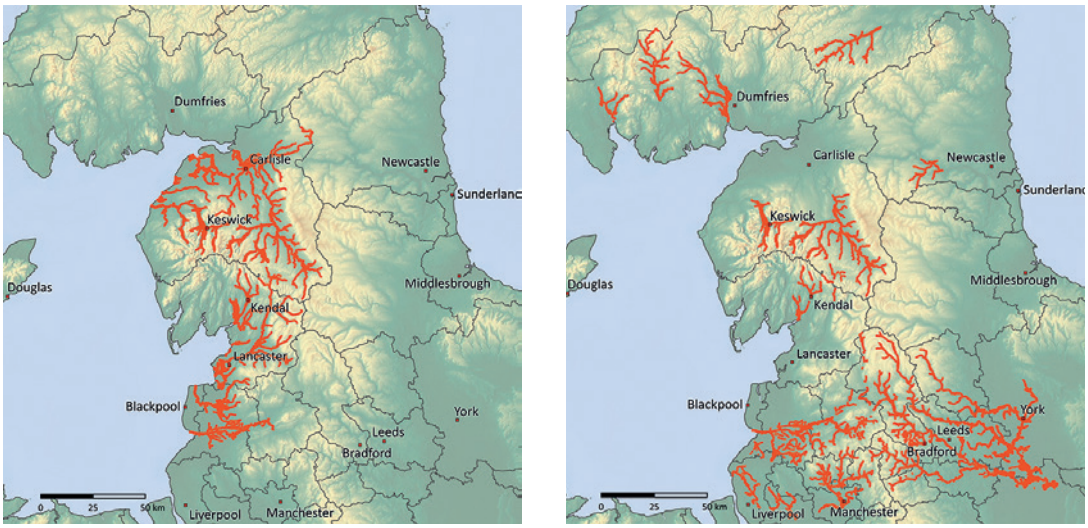


Figure 3: UK Floods "Desmond" and "Eva-Frank". *For subscribers to the PERILS Database, the industry loss figures in the third and fourth loss reports will be made available in full resolution, i.e. by CRESTA zone and by the property sub-lines Residential and Commercial.*

Flood Footprint

The decision to stop investigating an event is generally based on scenario loss calculations using post-event gust values and market-specific vulnerabilities derived from previous storm events. It also factors in media and industry reports, as well as informal loss surveys conducted among key insurance companies operating in the affected areas. In the case of the ten storms investigated during the winter 2015/2016, PERILS concluded that none of these had the potential to cause a loss exceeding EUR 200m (Table 2).

Event Name	Date	Peril	Countries most affected
Heini-Iwan	17-19 Nov 2015	WS	D, UK
Nils	29-30 Nov 2015	WS	DK, S, D, UK
Ted	4-5 Dec 2015	WS	S, UK
Chuck	23-24 Dec 2015	WS	UK
Eckard	29-30 Dec 2015	WS	UK, N
Marita	29-30 Jan 2016	WS	UK, N
Norkys	1-3 Feb 2016	WS	UK
Ruzica-Susanna	7-9 Feb 2016	WS	F, D, UK, B
Aloisia	1-2 Mar 2016	WS	UK
Jeanne	27-28 Mar 2016	WS	UK, F, B

Table 2: "Non-qualifying" events during the winter 2015/2016. *Ten events were investigated by PERILS but all were found to be below the market-wide event loss threshold of EUR 200m.*

Wind-Jeannie (www.wind-jeannie.org)

Another way to obtain an indication of the potential market loss, even prior to an event, is to use the results from PERILS' live loss-forecasting website 'Wind-Jeannie' (WJ, www.wind-jeannie.org).

WJ makes available insured property market loss forecasts for windstorm events across Europe for the forthcoming 72-hour period. The expected insured loss estimates are computed using gust forecast data provided by the German Weather Service (DWD). The loss forecasts are updated twice a day, at 06:00 and 18:00 CET.

WJ can support insurance companies in their efforts to prepare for large windstorm events by providing information on the expected magnitude and geographical extent of a loss in advance of it occurring.

Figure 4 shows the losses forecasted by WJ for windstorm Nils (also known as Clodagh or Gorm) starting 48 hours before the event actually occurred. The average loss from the final two forecasts generated prior to the event occuring (in Figure 4: dark green) amounted to EUR 135m. This compares favourably to the actual loss of EUR 148m which is based on actual loss data received from affected insurance companies.

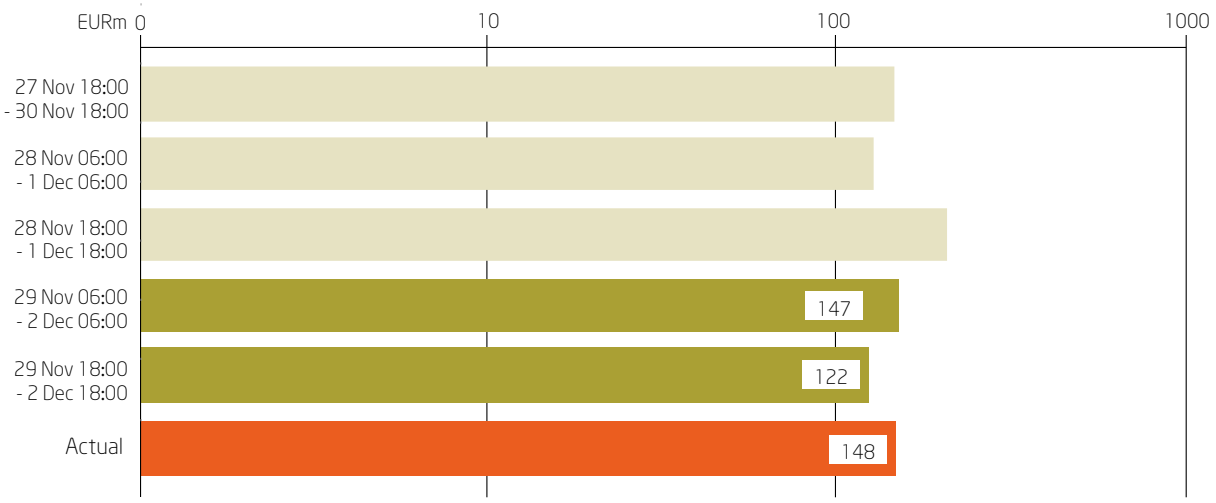
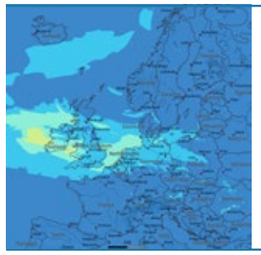


Figure 4: Development of industry loss forecast over time for Windstorm Nils (29 Nov 2015). *The green bars show successive Wind-Jeannie loss forecasts over time. The orange bar shows the actual loss based on actual loss data collected by PERILS from insurance companies.*

2015/2016 Europe Windstorm Season

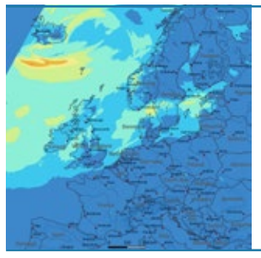
< 80 km/h (<22m/s; <50mph)
80-100 km/h (<22-28m/s; 50-62mph)
100-120 km/h (28-33m/s; 62-75mph)
120-140 km/h (33-39m/s; 75-87mph)
140-160 km/h (39-44m/s; 87-99mph)
160-180 km/h (44-50m/s; 99-112mph)
> 180 km/h (>50m/s; >112mph)

Maximum gust speeds in km/h
Source: ICON-EU, DWD



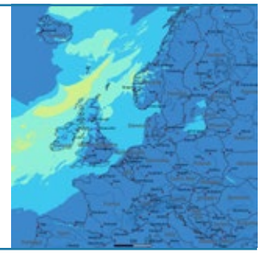
HEINI-IWAN (BARNEY)
17-19 Nov 2015
loss < EUR 200m
countries most affected: Germany, United Kingdom

NILS (CLODAGH, GORM)
29-30 Nov 2015
loss < EUR 200m
countries most affected: Denmark, Sweden, Germany, United Kingdom

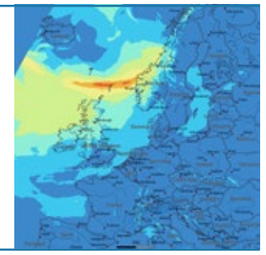


TED (DESMOND, HELGA, SYNNE)
4-5 Dec 2015
loss < EUR 100m
countries most affected: Sweden, United Kingdom

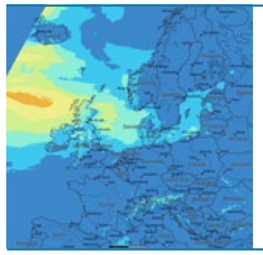
CHUCK (EVA, STAFFAN),
23-24 Dec 2015
loss < EUR 100m
country most affected: United Kingdom



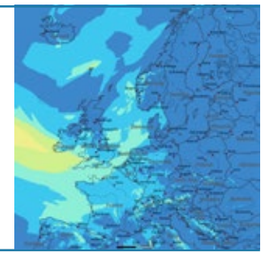
ECKARD (FRANK)
29-30 Dec 2015
loss < EUR 100m
countries most affected: United Kingdom, Norway



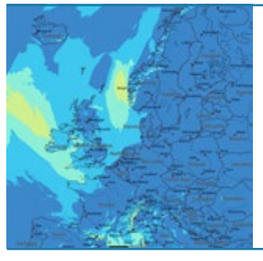
MARITA (GERTRUDE, TOR)
29-30 Jan 2016
loss < EUR 100m
countries most affected: United Kingdom, Norway



NORKYS (HENRY)
1-3 Feb 2016
loss < EUR 100m
country most affected: United Kingdom



RUZICA-SUSANNA (IMOGEN)
7-9 Feb 2016
loss < EUR 200m
countries most affected: France, Germany, United Kingdom, Belgium



ALOISIA (JAKE)
1-2 Mar 2016
loss < EUR 100m
country most affected: United Kingdom

JEANNE (KATIE),
27-28 Mar 2016
loss < EUR 200m
countries most affected: United Kingdom, France, Belgium

Business Update

Release of the updated PERILS Industry Exposure Database for 2016.

Diminished use of PERILS data in risk transfer products.

Release of the PERILS Industry Exposure Database for 2016

On 1 April 2016, PERILS released its Industry Exposure Database (IED) for 2016. It contains updated market-wide property sums insured exposed to:

- **Windstorm** - Austria, Belgium, Denmark, France, Germany, Ireland, Luxembourg, the Netherlands, Norway, Sweden, Switzerland and the United Kingdom
- **Flood** - Italy, Turkey and the United Kingdom
- **Earthquake** - Italy and Turkey

The in-force date of the sums insured is 1 January 2016. The IED consists of more than 40'000 individual data entries defining the natural perils exposed sums insured per CRESTA zone, property line of business (residential, commercial, industrial, agricultural) and coverage type (building, content, business interruption), see Figure 5. Information about prevailing deductibles and limits has also been updated.

Country, Peril	Change Total Sums Insured 2016 vs 2015 (in original currency)
Austria	4.1%
Belgium	0.1%
Switzerland	1.9%
Germany	4.3%
Denmark	3.1%
France	0.3%
United Kingdom	2.8%
Ireland	5.1%
Luxembourg	5.0%
Netherlands	1.3%
Norway	6.9%
Sweden	5.7%
Total Windstorm	2.8%
Italy Flood	16.8%
Italy Earthquake	18.9%
Turkey Flood	new
Turkey Earthquake	new
UK Flood	3.2%

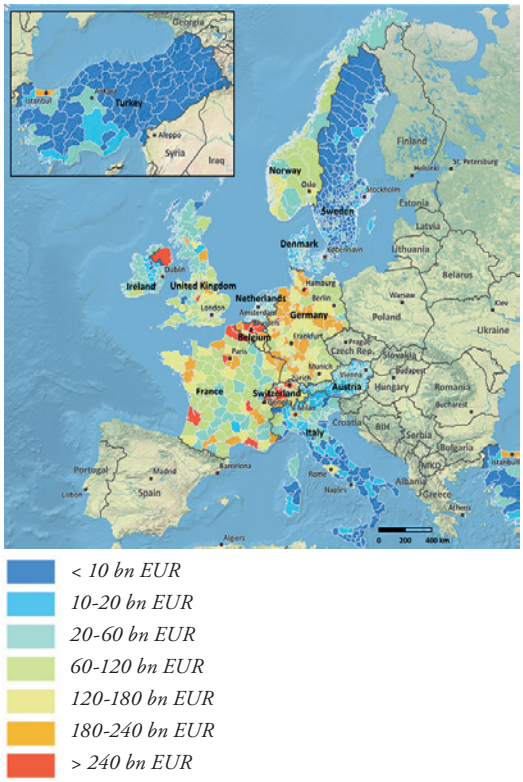


Figure 5: PERILS Industry Exposure Database 2016: *The table shows YOY changes 2016 vs. 2015. Changes in the market-wide sums insured are driven by changes in collected exposure and premium information, changes in market premium, and changes in FX rates. The map shows property sums insured exposed to the peril of windstorm and earthquake (Italy, Turkey) as at 1 January 2016. For subscribers to the PERILS Database, the data are available by CRESTA zone, property line of business (residential, commercial, industrial, agricultural) and coverage type (building, content, business interruption).*

The 2016 IED has once again been produced from scratch based on insurance data freshly collected from insurance companies representing more than 60% of the market in the covered territories, spanning more than one hundred national insurance companies. This effort ensures that the database contains the latest data available. In addition, the quality of the IED is further enhanced by the continually increasing market coverage.

The exposure data are useful for a number of applications, including TSI market share analysis and the validation of other commercially available IEDs. In addition, the combination of the PERILS exposure data with the PERILS event loss data – both of which are based on identical sources and methodologies – enables users to validate vulnerability functions and to calibrate event losses produced by models. For insurance risk transactions based on industry losses, the database facilitates the definition of custom-made triggers resulting in reduced basis risk for protection buyers. PERILS exposure data are also being used to carry out the risk assessment of such transactions, thereby ensuring consistency with the trigger definition.

Diminished use of PERILS data in industry-loss-based risk transfer

At 31 March 2016, there were USD 2.9bn of PERILS-based limits at risk, of which more than 90% were based on structured triggers with a weighted index, and more than 80% were used for retrocessional purposes. Out of the total capacity at risk per end March 2016, 73% was in the form of Cat bonds (144A ILS) with the remaining 27% in the form of private transactions (see Figure 6).

Compared to the peak of USD 4.4bn in 2014, the decrease in limits from ILS (Cat bonds) was less pronounced (-27%) than the decrease from private transactions (ILWs, swaps; -55%). There are two primary reasons for these decreases. Firstly, abundant equity capital which is facilitating greater risk retention. Secondly, the industry loss-based risk transfer market faces ongoing competition from indemnity covers. The impact of the latter is, however, less pronounced for retrocession than for covers bought by primary insurance companies.

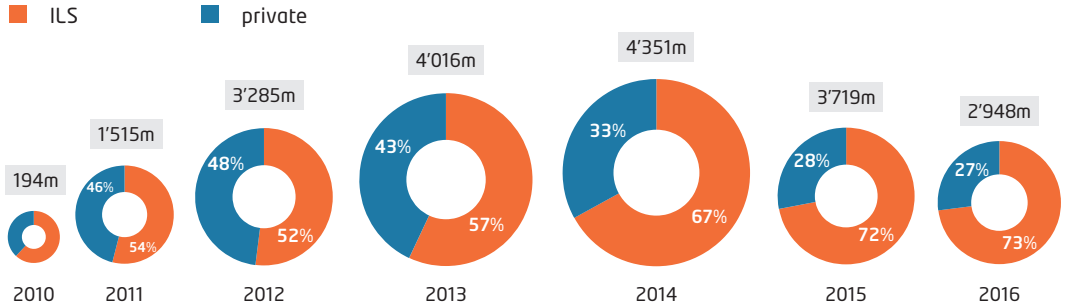


Figure 6: PERILS-based limits at risk in USD, 2010 to 2016 (per end March). *As at 31 March 2016, a total of USD 2.9bn of PERILS-based limits were at risk. Of this, USD 2.2bn (73%) related to 144A ILS and USD 0.8bn (27%) to private transactions. The cumulated total of limits issued since 1 Jan 2010 was USD 11.8bn.*

Turkey

On 25 November 2015, PERILS extended its market coverage to include Turkey and now provides market-wide property sums insured, as well as event loss data, for earthquake and flood perils in the country.

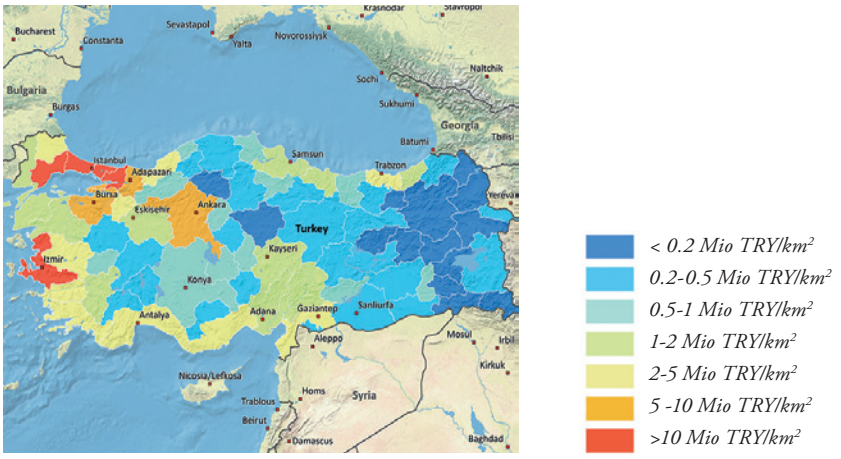


Figure 7: PERILS Industry Exposure Data for Flood Turkey. *The map shows market-wide property flood sums insured per km² and per province (iller). The distribution of the market-wide earthquake exposure does not significantly differ from the here displayed flood exposure.*

In November 2015, PERILS announced the extension of its database to include Turkey. This was an achievement, as PERILS had only visited the primary insurance companies in the region to seek their support a few months earlier. A large majority of the market participants immediately recognised the benefits of high quality industry data both to their own organisations and the Turkish market as a whole. As a result, PERILS was able to achieve a penetration in excess of two-thirds of the overall market. This ensures that the PERILS market data has a high degree of stability and credibility.

The database makes available market-wide property sums insured exposed to earthquake and flood events in Turkey, as well as loss data for significant future Cat events. The database also includes information on the number of risks and the number of affected policies, as well as information on deductibles and limits. The geographical resolution is per province (iller or CRESTA) and the property lines of business, residential and commercial (see Figure 7 and Table 3).

Aggregate Exposure Data - Earthquake Turkey										
					Total Sum Insured per Coverage, in TRY			Loss Limits	Deductibles	...
CRESTA ID	CRESTA Description	Occupancy Type	Currency	Number of Risks	Buildings Value	Contents Value	BI Value	Best Estimate, in % of Average TSI	Best Estimate, in % of Average TSI	...
TUR 01	Adana	COMMERCIAL	TRY	24'071	5'908'231'161	8'500'880'494	1'059'184'756	99.0%	2.7%	...
TUR 01	Adana	RESIDENTIAL	TRY	174'795	12'363'590'462	666'738'046	2'505'905	99.0%	2.0%	...
TUR 02	Adiyaman	COMMERCIAL	TRY	1'923	735'941'443	1'561'122'607	68'796'002	99.0%	2.7%	...
TUR 02	Adiyaman	RESIDENTIAL	TRY	28'121	1'923'004'152	105'562'013	0	99.0%	2.0%	...
...	...	...	...	...	...	...	...	...	...	...

Table 3: Extract from the Industry Exposure Database for Earthquake Turkey. *The database includes market-wide numbers of risks, sums insured for building, content and business interruption, loss limits and deductibles. The data is available per CRESTA zone (province) and property occupancy type. Residential building sums insured include exposure from DASK/TCIP. The format for the database for Flood Turkey is identical.*

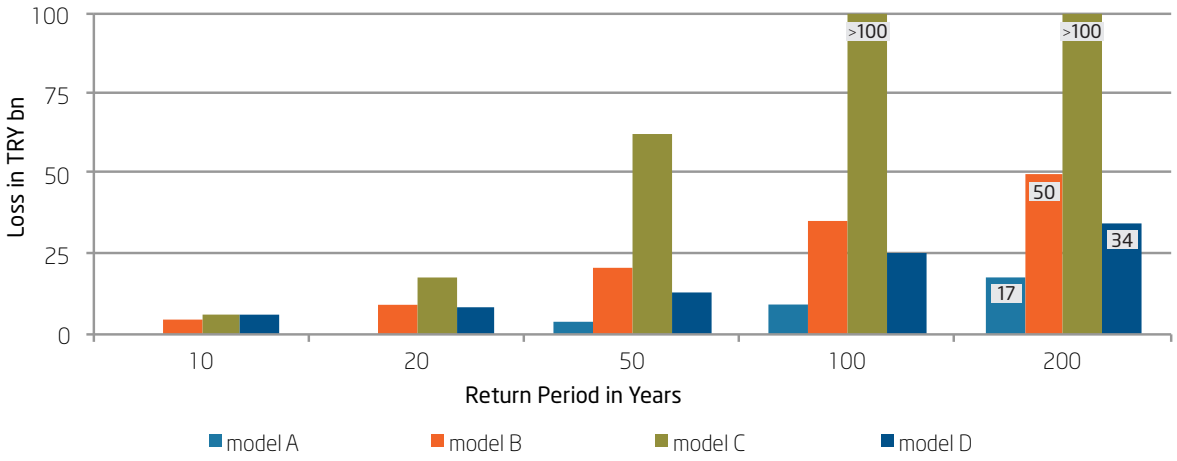


Figure 8: Market Losses for EQ Turkey based on different vendor models. *The PERILS IED enables the computation of market PMLs and the direct comparison of the outputs of different vendor models for Turkish EQ risk. The chart shows that the modelled EQ market losses to be expected once in 200 years varies greatly from TRY 17bn to >TRY 100bn (USD 6bn to >USD 34bn). This large range of model outcomes is living proof of the need of independent high-quality market data for a more robust Cat risk modelling in Turkey.*

The probable maximum market loss (PML, Figure 8) from an earthquake in Turkey ranks in the top 10 global losses, and for some reinsurers it can even represent a top 5 Cat scenario. As such, the value of having an independent industry database and reporting agency for Turkish Cat risk is clear, as it facilitates the ongoing development of a professional industry-loss risk transfer market for Turkey.

This is further enhanced by the resolution of the reported data which enable the definition of geo-weighting factors for structured industry-loss triggers with reduced basis risk. So state-of-the-art industry-loss risk transfer similar to that conducted in the US or Europe is now possible in Turkey.

In addition to risk-transfer, the PERILS Industry Exposure and Loss Database for Turkey has a number of other applications. These include: exposure or loss market share analysis per CRESTA zone and per property line of business; the building and validation of Cat models; and in general facilitates a deeper understanding of the two main Cat risks in Turkey - earthquake and flood (Table 4).

The use of the PERILS Database for Turkey
Market share analysis, portfolio benchmarking
Development of new insurance products
Model building, model validation, model comparison
Scenario loss calculation
Industry-loss based risk transfer
Structured industry loss triggers

Table 4: Possible applications of the PERILS Exposure & Loss Database for Turkey.

The entire process of setting up the PERILS database for Turkey ran very smoothly. This was largely due to the willingness of the primary insurers to share their data with us. PERILS is very grateful for the trust that Turkish insurance companies placed in us throughout:

Outlook

In the coming months, we will be busy collecting data on the "Desmond" and "Eva-Frank" floods, and producing detailed loss footprints for both events. In addition, we will be working on further expanding our market coverage in an easterly direction, which was demonstrated by the recent announcement that PERILS has joined the Singapore-based Natural Catastrophe Data and Analytics Exchange (NatCatDAX) Alliance. More on NatCatDAX in a future Newsletter!

We remain, as ever, committed to providing a valuable service to the insurance industry. Over the last seven years, PERILS has shown that having Nat Cat-focused industry data which is based on actual rather than modelled data benefits all insurance stakeholders. In our view, it is therefore imperative that we look to do the same for other markets not yet covered by PERILS.

With our very best regards,
Your PERILS Team

Zurich, May 2016

The PERILS Team, from left to right: Georg Andrea, Edina Gallos, Luzi Hitz, Catherine Weber, Eduard Held.