



June 2012

RMS v11 – UK Overview

RMS' UK windstorm and storm surge losses have increased substantially – following a combination of higher:

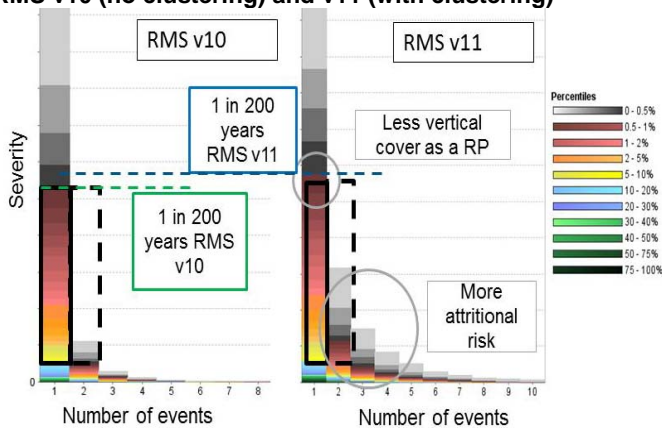
- Storm frequency – more small / mid- sized events
- Clustering – more propensity for aggregate losses
- Vulnerability – across all lines of business

Over the past year, Willis Re has assembled a team of meteorologists, engineers and analysts to consider the merits of these changes and help our clients through the adoption process. From validating against 3rd party hazard datasets and testing against our clients' loss experience we have confidence in the merits of certain aspects of the model change but less confidence in others. We consider that RMS v11 for the UK is unlikely to adequately reflect the nuances of all clients and portfolios. We see it therefore as our role to customize the view of risk to satisfy our clients' internal governance requirements and the increasing demands of external stakeholders.

Step 1. Review of changes

Willis Re think that the update in hazard modelling better reflects observed data but that vulnerability modelling consistently over-estimates historical claims in the UK. RMS v11 also now captures the possibility of multiple events clustering together as was notably observed in 1990 and 1999. Storm clustering was not explicitly considered in RMS v10.

Figure 1: Frequency (horizontal axis) and severity (vertical axis) of loss exceedance to the all lines industry portfolio – RMS v10 (no clustering) and v11 (with clustering)



Source: Willis iFM using RMS outputs

Figure 1, above, shows firstly that a client who was buying a property cat programme up to the 1 in 200 years return period now, for the same amount of FGU cover, only now has cover up to around the 160 year windstorm and storm surge return

period (0.6% loss percentile). Secondly, from considering the impact of clustering and increased frequency the probability of the second, third and subsequent events has also increased significantly in RMS v11.

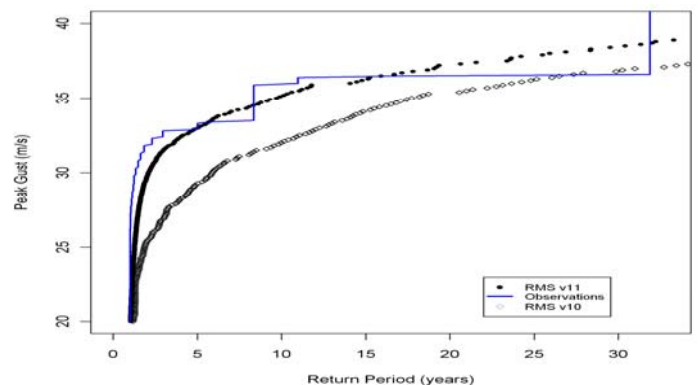
Clients seeking internal model approval, under Solvency II, will be required to demonstrate their net capital requirements are sufficient at the 1 in 200 year net AEP level (including clustering and net of outwards reinsurance). For the all lines industry portfolio, assuming a cat programme attachment of 1 in 10 years up to a 1 in 200 years exhaustion (both values taken from v10), this net capital requirement (capital charge for cat only and before any diversification benefits) has increased by 97% in RMS v11 from RMS v10.

Step 2. Review of hazard

Willis Re acquired several datasets of wind observations provided by the NOAA Global Summary of the Day, Weather Graphics and MeteoGroup; together these observations include around 1700 weather stations across the RMS modelled countries and up to 80 years of recordings.

Using these datasets, we have constructed frequency exceedance probability distributions at individual stations and compared these to RMS v10 and v11 modelled windspeeds at the same locations. Figure 2, below, is an example comparing observed wind-speed EP curves (in blue) against RMS v11 (black dots) and RMS v10 (white dots).

Figure 2: Peak gust EP curve; historical observed (blue), RMS v10 and v11 (Boulmer, Northumberland)



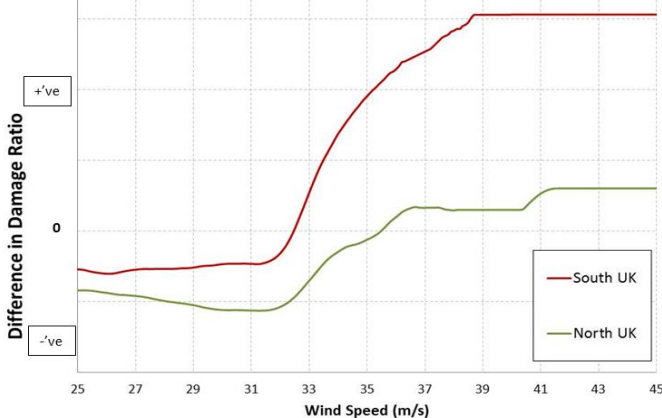
Source: Willis chart using RMS and Meteogroup outputs

Generally speaking, for the UK, we believe that historical wind-speeds are more closely represented by RMS v11 than they were in RMS v10. This is evident in most UK station observations that we have considered.

Step 3. Review of vulnerability

UK vulnerability functions have increased significantly for wind-speeds greater than 32.5 m/s. There is a decrease at lower wind-speeds but overall the net impact is, all other things being equal, for greater UK windstorm vulnerability in RMS v11. There is now also a big upwards shift in the view of windstorm vulnerability in the south compared to the north of the UK. According to RMS the southern UK region is, at 40m/s, around 4.5 times more vulnerable than in parts of Germany.

Figure 3: Change in mean damage by wind-speed band – Urban Residential occupancy. North and South UK



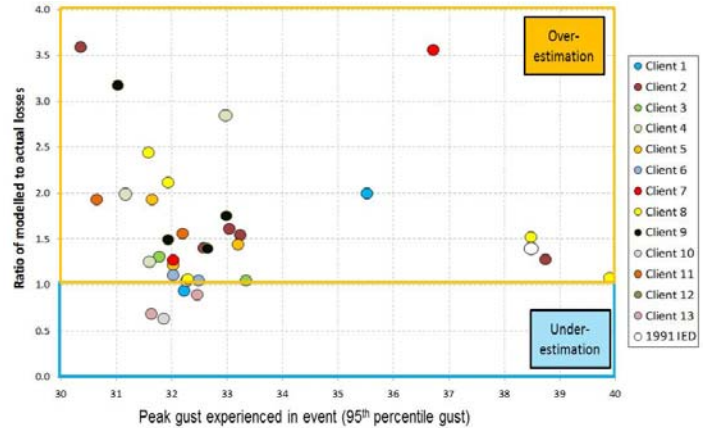
Source: Willis chart using RMS outputs

While we agree that there is evidence to support a view that vulnerability should be higher in the south of the UK than the north we believe that the overall increase does not have sufficient merit as:

- RMS appear to have a limited sample of detailed client claims data
- We believe that agricultural vulnerability was increased without any claims experience to validate this
- From testing against our extensive claims data catalogue it is apparent that in most cases that vulnerability does not match up against our sample of historical claims

To evidence these concerns Figure 4 shows that out of 38 modelled losses in our sample 34 of them are greater than the corresponding actual losses (most without indexation).

Figure 4: Ratio of modelled losses to actual claims; for 14 clients and 8 historical events. Both mono-line and composite insurers.



Step 4. Willis Re View of RMS v11 for UK

Willis Re has devised an adjustment to correct for our perceived over-estimation of UK vulnerability in RMS v11. This adjustment, derived from detailed claims data, acts to reduce modelled losses depending on the modelled wind-speed. Only wind-speeds that correspond to our claims sample are adjusted: 20-42.5 m/s – higher windspeeds are not adjusted.

The Willis Re adjustment is customisable and is applied by line of business; also taking into account a client's regional exposure distribution, limits and deductibles. We believe that this approach whilst transparent and easy to follow also has sufficient rationale to base decision making upon.

Willis Re will issue further white papers in due course. For the UK these will consider: 'Hazard validation', 'Historical loss benchmarking' and 'Clustering'.

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