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MANAGING RISK THROUGH PARAMETRIC INSURANCE

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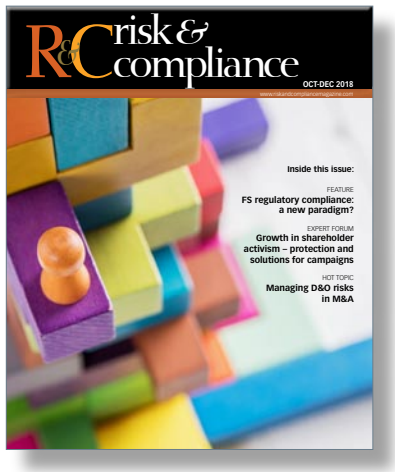

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WRMA
WEATHER RISK MANAGEMENT ASSOCIATION

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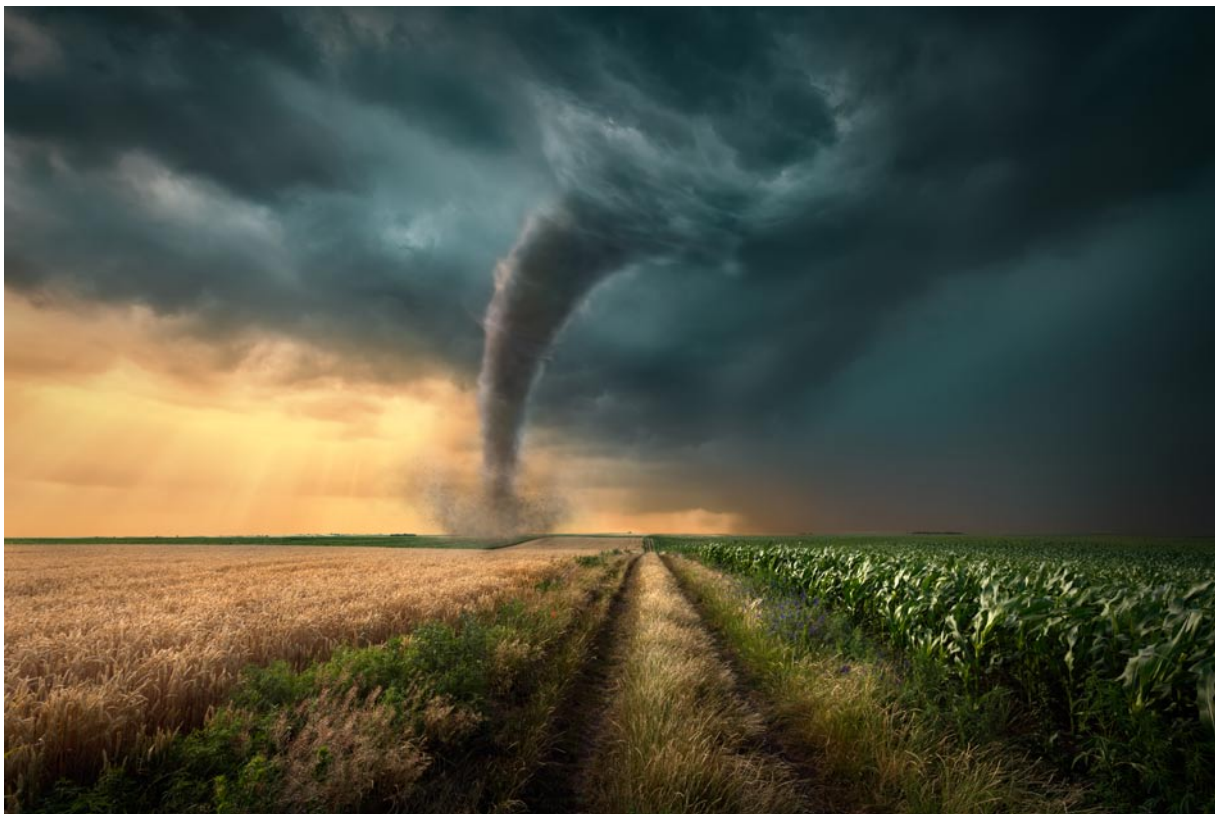
MINI-ROUNDTABLE

MANAGING RISK THROUGH PARAMETRIC INSURANCE



PANEL EXPERTS

Claire Wilkinson
Managing Director of Alternative Risk Transfer Solutions
Willis Towers Watson
T: +44 (0)20 3124 6014
E: claire.wilkinson@willistowerswatson.com

Claire Wilkinson is managing director of the Alternative Risk Transfer Solutions Group at Willis Towers Watson. She is responsible for origination, structuring and execution of weather-index and parametric solutions for companies across all industry sectors globally, as well as for developing and placing customised risk financing solutions to address complex risks and deliver improved pricing, resilience or capital management. Ms Wilkinson has been active in the weather-index market for 15 years, and is vice president of the Weather Risk Management Association (WRMA).

Ralph Renner
Head of European Origination
Sompo Global Weather
T: +44 (0)7582 631 102
E: rrenner@sompo-intl.com

Ralph Renner is director of European Origination for Sompo Global Weather (SGW) and responsible for developing and implementing structured solutions with SGW'S European and Asian clients. He was formerly head of power trading at Macquarie Bank, Dresdner Kleinwort Investment Bank and Centrica Energy. Mr Renner serves as the president of the Weather Risk Management Association (WRMA).

Bradley D. Hoggatt
Chief Portfolio Manager
MSI GuaranteedWeather
T: +1 (913) 253 1225
E: bhoggatt@guaranteedweather.com

In his current position as chief portfolio manager of MSI Guaranteed Weather, LLC (MSIGW, a wholly-owned subsidiary of Mitsui Sumitomo Insurance Co., Ltd), **Bradley Hoggatt** is responsible for the financial performance of MSIGW's global weather derivative, insurance and commodity portfolios. He is currently the immediate past president of the Weather Risk Management Association (WRMA). Mr Hoggatt has been involved in the weather risk management market since 1999.

Claude Brown
Partner
Reed Smith
T: +44 (0)20 3116 3662
E: cbrown@reedsmith.com

Claude Brown is a partner in Reed Smith's Structured Finance team. He has been involved in the weather markets since their earliest days, having advised on the first European weather derivative transaction. His practice covers structuring, documentation and regulation of weather risk management instruments. He advises on weather related structures involving derivatives, securities, insurance and alternative risk transfer instruments and their regulation. He is currently a WRMA board member since 2013.

Paul Ramiz
ACII, Director
Aon UK Limited, trading as Aon Benfield, Innovation and Solutions
T: +44 (0)20 7522 3868
E: paul.ramiz@aonbenfield.com

Paul Ramiz is a director for Aon's Innovation and Solutions team, primarily focusing on weather risk management. With over 10 years London market experience in reinsurance in various roles, he works directly with Aon's Global Head of weather, specialising in parametric index-based solutions, alternative risk transfer and bespoke non-standard transactions. Mr Ramiz currently serves as a member of the Weather Risk Management Association (WRMA) board of directors.

R&C: Could you outline the types of risk that parametric insurance is used to cover?

Wilkinson: Mother Nature continues to challenge us with record-breaking extremes of weather, changing seasons, continuing increases in temperature and greater volatility globally. In response, the insurance and wider financial services sector offers increasingly tailored solutions which allow governments, municipalities, corporations and even individuals to manage the financial impact of adverse weather on revenues and costs. There is a wide misconception that traditional insurance policies cover 'weather' risks. It is true in a sense, in that the direct physical damage to public, commercial and private sector assets from events, such as hurricanes and floods, can be covered by property damage policies. However, there is typically no financial recovery for the wide area impact of such catastrophic events on communities, transportation networks and commercial organisations, or the long-term loss of attraction of a region. Neither do traditional property damage policies cover the impact of season to season variations in temperature, rainfall or snow on a corporation's financial performance, yet this cost is often far greater than the cost of reinstating a building following flood or wind damage. Severe droughts or freeze events can have a catastrophic impact on crop yields affecting farmers, aggregators, distributors and the wider supply chain. Low wind, rain or sunshine can reduce the output from renewable energy facilities below levels required to service debt. Periods of unexpected rainfall can delay construction projects, resulting in penalty payments for delays to completion. Weather variations can, of course, have a positive impact. The recent record breaking warm dry summer of 2018 has benefitted the UK retail and leisure sectors, but the same extremes of heat have caused widespread damage from wildfires and put significant pressure on emergency services and hospitals in more southern areas of Europe. Similarly, heavy winter snowfall may mean valuable extra revenue for ski

"Mother Nature continues to challenge us with record-breaking extremes of weather, changing seasons, continuing increases in temperature and greater volatility globally."

Claire Wilkinson, Willis Towers Watson

resorts, but can cause costly disruption to transport companies and retailers that face additional costs or reduced customer numbers. Although weather in the physical sense cannot be controlled, parametric solutions provide an efficient mechanism for the financial impact of weather uncertainty to be insured.

R&C: How does parametric insurance function?

Brown: Parametric solutions respond to movements in an agreed weather-denominated index or the occurrence of a pre-defined event – usually a natural catastrophe – of a pre-specified magnitude during the policy period. No proof of physical loss or damage is required to trigger a policy, simply the occurrence of the covered event or a movement in the reference index above or below a pre-agreed threshold. The claim value is calculated according to a pre-agreed formula applied to the value of the index, and claims payments are made very quickly once the policy has been triggered and the value of the index is confirmed. The reference index is typically constructed from weather data – temperature, rainfall, sunshine, snow or wind, for example – and these parameters can be included individually or in combination. Each policy is tailored to the precise exposures of the risk protection buyer, ensuring that it covers the weather scenarios that can negatively impact the business. These will vary according to the location and period of concern, the business sector in which the risk protection buyer operates and the motivation for buying protection. For example, a contractor worried about excessive rain during a construction project could purchase a policy that triggers if rainfall exceeds a pre-agreed number of millimetres during the project. There could be a single, one-off payment if the index threshold is exceeded, or alternatively the payout could increase per additional millimetre once the initial index threshold is breached.

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Claude Brown, Reed Smith

R&C: In what ways does parametric insurance offer a more advantageous method of risk management? How does

it compare to conventional indemnity insurance, for example?

Ramiz: Traditional insurance operates on the basis that the policy will provide reinstatement and indemnity. With this comes the requirement for local loss adjustment and the inevitable delays in claims being paid. Parametric solutions, on the other hand, respond to clearly defined triggers underpinned by auditable, high quality data with policies, typically, having no exclusions. As such, risk protection buyers – and sellers – can understand exactly how and when a policy will respond and there are very rarely any disputes or differing interpretations regarding the operation of the cover or the validity of a claim. This clarity and transparency of cover and the rapid availability of settlement data means that claims payments can be made very quickly, usually within a few days of the final settlement data being available. The immediacy of claims payments can allow businesses and communities to recover quickly, which in the long run saves time, money and sometimes lives.

R&C: Could you provide any recent, high-profile examples of parametric insurance being utilised? How important were the defined parameters in these cases?

Wilkinson: Parametric solutions have been used to cover a very wide range of weather risks for organisations across many industry sectors and geographies. From short period rainfall covers for sporting events to 10-year programmes for renewable energy corporations, the variety in the application of parametric solutions is enormous. High-profile applications include the use of parametric solutions to cover humanitarian disasters. Multi-sovereign programmes currently exist for the Caribbean, Africa and the Pacific. In each case, the covered countries are included in a risk pool which is protected by reinsurance from the

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> *Paul Ramiz, Aon UK Limited*

parametric insurance market. The policies respond to highly tailored indices designed to provide rapid emergency funding to alleviate the humanitarian impact of natural disasters, such as droughts, earthquakes, floods and windstorms. There have been a number of large claims payments from these policies following African drought, Caribbean windstorm and Pacific cyclones. These claims payments were made within a couple of weeks of the disaster striking, providing much-needed relief to affected populations. In 2013, the World Bank arranged a $450m weather and oil price hedge for UTE, the Uruguayan state-owned electricity company, protecting UTE against drought and high oil prices. More than 80 percent of Uruguay's power is hydroelectric and so, when there is insufficient rainfall and water levels at the hydroelectric dams drop, UTE has to generate electricity using fossil fuels, principally oil. Therefore, if there is a drought and high oil prices, the costs of generation increase dramatically. The World Bank hedge used daily rainfall data from 39 weather stations spread over the two main river basins. If the rainfall was less than the trigger level, the contract would pay up to $450m, with the exact amount payable determined by the extent of the drought and the price of oil.

R&C: What types of information and data processing methods are being utilised to build custom-made insurance coverage?

Hoggatt: The relationship between weather and economic data forms the cornerstone of the parametric insurance industry. The key question a risk manager must ask and answer is: "What specific weather scenarios negatively impact my industry or business?" To answer this question, correlation and causation studies are performed to align weather variables – such as temperature, rainfall, sunshine, snow and wind – with underlying business metrics – such as units sold, costs and margin. The goal in developing a weather index as the reference for a parametric solution is to ensure that it provides a

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> *Bradley D. Hoggatt, MSI GuaranteedWeather*

good proxy for the risk protection buyer's financial exposures and goals. This is not always a trivial exercise and may require multiple iterations until a suitable index is agreed. Key to the development of the index is data. Both historical data for policy structuring, as well as real-time data for settlement, are required – and these data must be sourced from objective third parties. In the past, data were typically only available from governmental agency-owned weather stations, which limited the flexibility of index design. Recent technological advancements in the earth observing system mean that global data are now available by leveraging surface-based platforms (including private stations), satellites, radar and 4D model-based estimation and re-analysis. These observational improvements coupled with increased computing power and the availability of machine learning techniques have opened up new opportunities for organisations to become more climate-resilient and economically efficient.

R&C: To what extent is customisation key in constructing a parametric policy to minimise the disparity between the loss incurred and the payout provided by a policy?

Renner: Parametric solutions respond to the value of an index, not to the actual loss suffered by the risk protection buyer. The variable input in deriving the value of a claim is a weather parameter, so the performance of the policy will only be an approximation of the loss. It is therefore very important that care is taken when designing the policy to minimise this basis risk – the risk that the index under or over-performs the actual loss. Parametric solutions are very flexible and there is a high degree of tailoring to ensure that the policy best matches the needs of the buyer. Policies can be tailored to include multiple locations, multiple time periods and multiple indices – for example wind-speed, power demand, temperature and energy price can all be combined under a single policy. This high degree of tailoring reduces basis risk and allows

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cost-effective policies to be constructed to cover risks that would otherwise remain uninsured.

R&C: How would you describe the level of interest being shown in parametric insurance? What are your expectations for its future uptake in managing weather uncertainty?

Renner: In recent years, there has been a significant growth in the uptake of parametric solutions, which has been driven by a number of factors, including awareness of the solutions and increasing concerns over our changing climate. The key enablers are the increase in data granularity and improved technology. In the past, covering rainfall for farmers or low wind for a renewable energy developer were close to impossible as the likelihood of a weather station being sufficiently close to the area of interest was small. Today, gridded satellite datasets are available that offer wind, rain and even ocean wave data in high resolution almost everywhere in the world. This data availability, coupled with online platforms that enable easy access to this data, as well as modelling and instantaneous pricing of weather risks, facilitates this growth. The numerous advantages of parametric solutions over traditional insurance, such as fast payment without the need for and cost of loss adjusting, or the risk of disputes arising from convoluted contract language, further contribute to this rising interest. The growth trajectory of the industry is strongly upwards, with over $12bn in public deals alone completed in 2017, and we expect significant future uptake from both the public and private sectors. Key industry segments include energy, construction, agriculture, retail and hospitality. R&C