Leveraging Catastrophe Modelling Insights for Bottom-Up Assessments of Climate Change Physical Risk: The 'Climate on Demand Pro' Platform

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As our knowledge of the physical impacts associated with climate change develops, translating those insights into accurate estimates of societal and financial repercussions has become a key concern for a variety of decision-makers, including policymakers, insurance specialists, investors and regulators. Although this task is daunting, it can leverage the deep knowledge of the financial impacts of extreme natural events amassed over the past decades in the (re)insurance industry, where detailed assessments of location-level and portfolio-level risk are now commonly used.

In particular, Moody's RMS has been at the forefront of catastrophe modelling for over 30 years, developing and supporting models for the US$2.5 trillion global (re)insurance market. These granular, bottom-up models bring together carefully calibrated stochastic simulations of extreme events, together with detailed regional assessments of the vulnerability of a wide range of building and infrastructure types, which are then converted into loss distributions that incorporate local market considerations, such as repair/replacement costs and business interruption costs. Those models have been validated not only against extensive geophysical observations, but also against hundreds of billions of dollars of granular damage and building-specific claims data.

In this context, Moody's RMS has developed a novel bottom-up approach to assess the financial impacts of climate change, which leverages the respective strengths of catastrophe models and general circulation models. The 'Climate on Demand Pro' platform provides damage estimates at both location- and portfolio-levels, and incorporates an aggregation methodology that reflects the impacts of portfolio concentration or diversification. Those metrics are provided globally across the 21st century for various climate scenarios, across a suite of six acute and chronic climate perils (tropical cyclones, wildfires, inland floods, coastal floods, heat stress and water stress), as well as earthquake risk.

This presentation will include an overview of the models, showcase some key results and discuss various use cases across the financial sector. The importance of such detailed loss-based climate risk metrics for present and future regulatory requirements will be emphasized, together with the need for increased collaboration between academia, industry and regulators in addressing the challenges ahead.