# Development of a globally consistent severe hail risk quantification model from re/insurance perspectives

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To respond to the demands for comparing and assessing severe hail risks across the world, a globally consistent hail risk quantification model is developed in this endeavor using the 8-year (2003-2010) global satellite-based severe hail climatology and 36-year global reanalysis data. The 8-year satellite-based severe hail climatology was chosen as it was the best global severe hail observations available at the time of the model development. The 36-year (1979-2014) global reanalysis data developed by the US National Centers for Environmental Protection (NCEP) were used to compensate the short 8-year satellite data and to achieve more stable and robust global hail hazard results. The global hail hazard results were then calibrated and validated by the ground hail reports of varying quality and by various hail climatology studies from many countries including US, EU, China, and Australia, etc. By combining the respective strengths of 8-year satellite data, 36-year reanalysis data, and hail ground reports, this model offers globally consistent hail hazard quantification results in terms of frequency and severity at the spatial resolution of about 38 km by 38 km grid. Hail automobile vulnerability function was developed based on company proprietary automobile hail claims experience and data presented in scientific studies. Hail auto risk grade is produced for each grid using the hail hazard information and the auto vulnerability function. Furthermore, by applying insurance terms and conditions at location or policy level and through simulation, this global hail risk quantification model can generate ground-up and gross annual average losses (AALs) and loss exceedance probability (EP) curves at location or portfolio level for risk pricing and risk capital allocation.