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Estimation of the damage linked to clusters of storms; a case study over the French insurer Generali

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Storms represent a significant natural hazard, particularly when they occur in rapid succession. In this study, we define storm clusters as sequences of multiple storms occurring within a short temporal window and over a limited spatial extent. Using a Lagrangian framework based on storm tracks, we identify clusters with a 96-hour time window, aligning with common reinsurance contract specifications. The example of storms Lothar and Martin, which struck France successively within 36h in December 1999, illustrates the severe consequences of clustering. Together, they remain the costliest storm-related event recorded in France, with an estimated loss of €6.8 billion [FFA, 2000].

To assess the broader relevance of such events, we analyze the historical loss records of Generali, a major Italian insurance company holding approximately 4% of the French market share. The loss dataset spans from 1998 to 2024. To disentangle overlapping impacts of consecutive storms, we implement a method that associates insured losses with specific storm tracks. Our analysis reveals that approximately 85% of historical storm-related losses are linked to storm clusters, underscoring the amplified risk posed by such sequences.

We then evaluate how clustering affects damage estimation. Traditional vulnerability curves are shown to underestimate losses when storms occur in clusters. We propose new vulnerability curves conditioned on compounded storm events. These improved curves should better capture the nonlinear accumulation of damage and highlight the need for cluster-aware risk models in insurance and reinsurance frameworks.