

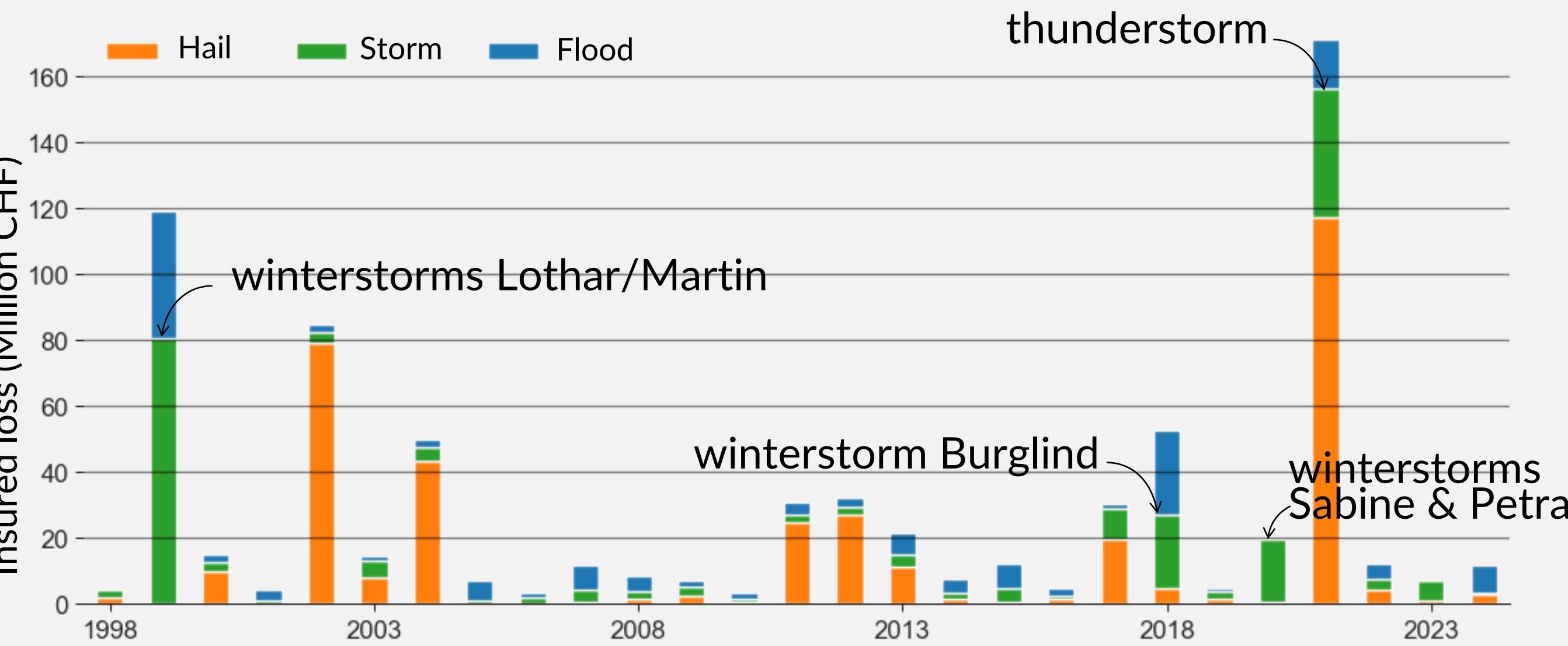
Windstorm Risk Model for the Canton of Zurich – Impact Forecasting and Probabilistic Risk Assessment

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BACKGROUND

GVZ is a public sector safety institution of the Canton of Zurich, providing mandatory insurance for all buildings in the canton against fire and natural hazards.
→ Three key roles: prevention, intervention, and insurance.



On average, 15 million CHF in insured losses occur annually due to natural hazards.

DATA & METHODS

Hazard

- ICON Model (MeteoSwiss)¹: High-resolution wind gust forecasts with 11 ensemble members and analysis used for impact forecasting.
- WISC Synthetic Winterstorms using CLIMADA²: Probabilistic event set with ~4'300 events over a 2000-year timespan for long-term risk analysis.

Exposure and Claims

Detailed building inventory for the Canton of Zurich, covering all 300'000 buildings. Historical losses used to calibrate loss functions and validate the model.

Uncertainty Estimation using Spatial Occurrence Probability

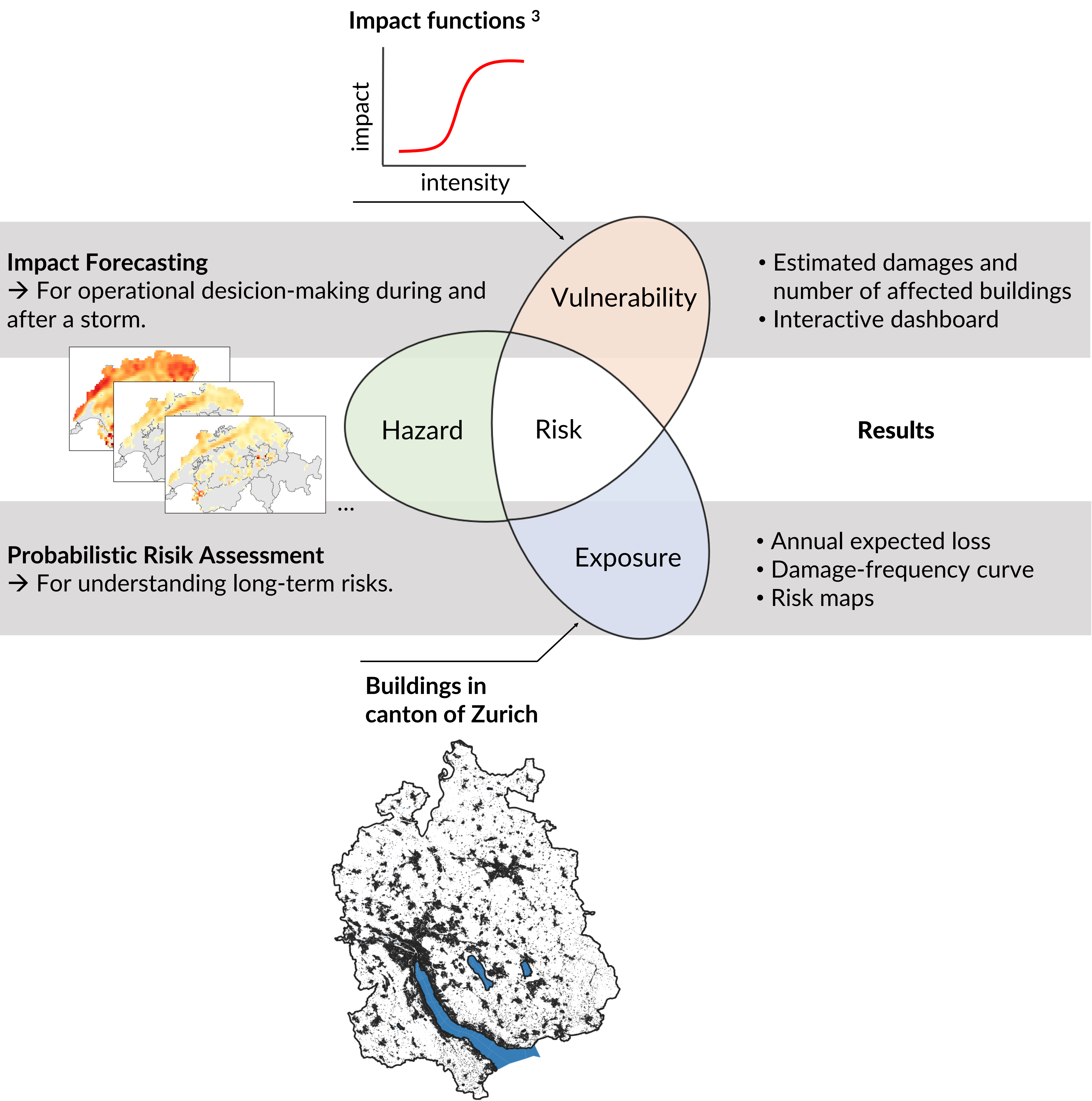
- SOP = the likelihood of a building being damaged given wind intensity.
- Monte Carlo simulations sample buildings based on SOP to estimate total damages and affected buildings.
- Uncertainty is captured by aggregating results across 1'000 simulated realizations per event.

Reference

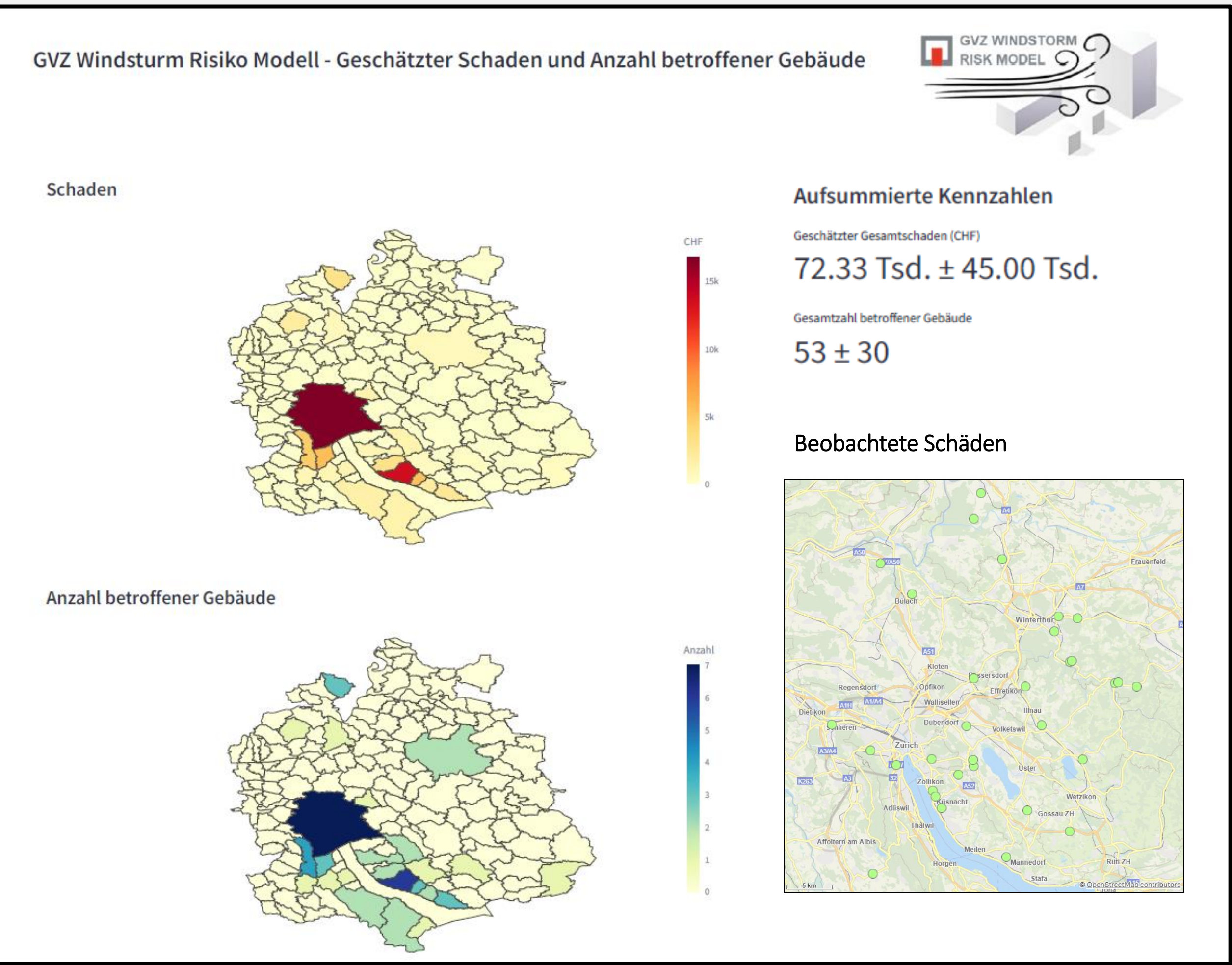
¹ ICON-CH1-EPS with 11 ensemble members, MeteoSwiss
² Schwier et al (2010), Aznar-Siguan and Bresch (2019), Copernicus WISC (2022)
³ Schwier et al. (2010), Feuerstein et al. (2011), Welker et al. (2021)



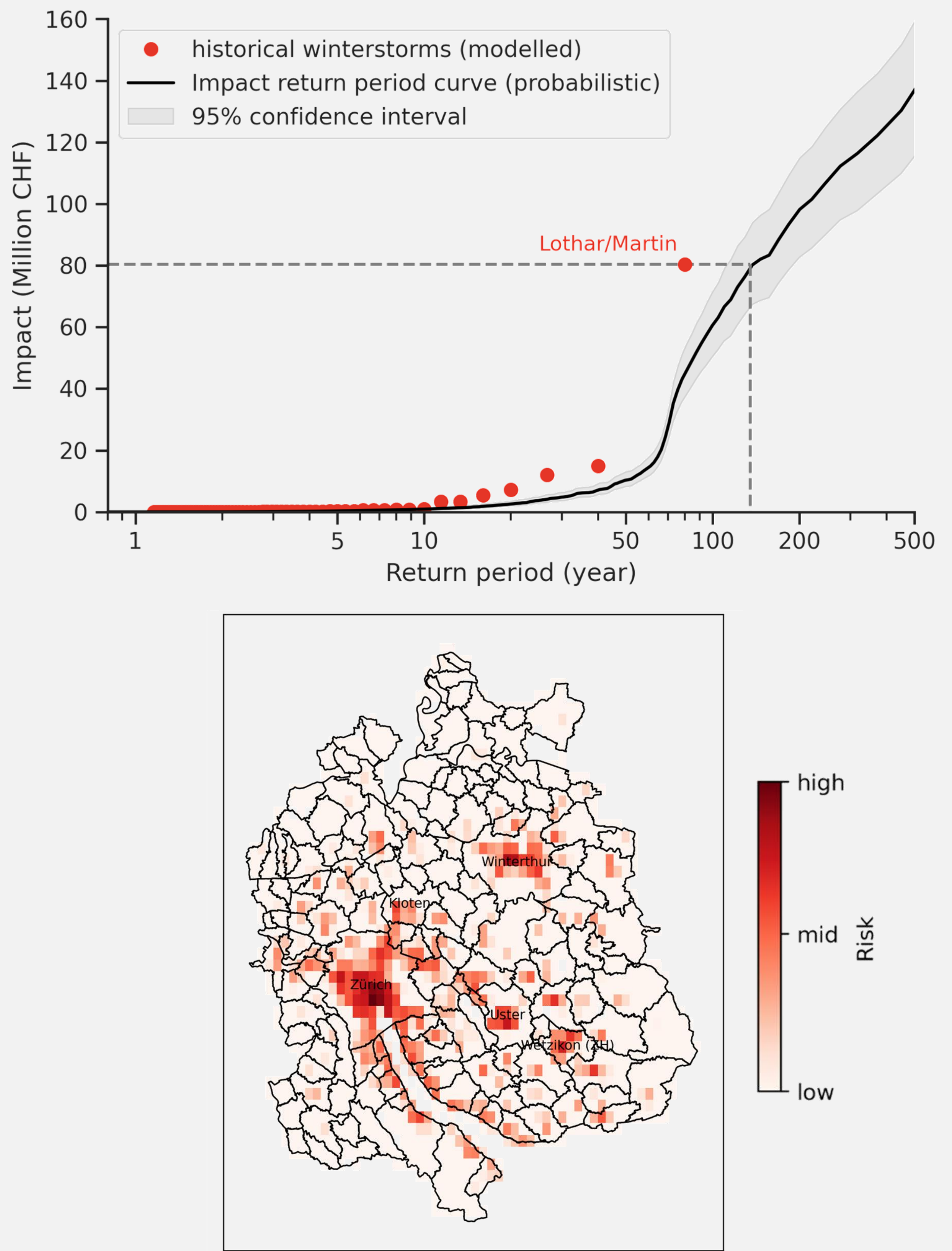
Are we prepared for the next winterstorm Lothar?



RESULTS – IMPACT FORECASTING



RESULTS – WINTERSTORM RISK



TAKE-AWAY

- The model accurately estimates damages and affected buildings, validated against claims.
- Lothar corresponds to a ~135-year event, rather than 75 years based on short records.