

Simulation of wind damages associated with the PRIMAVERA European windstorm event set



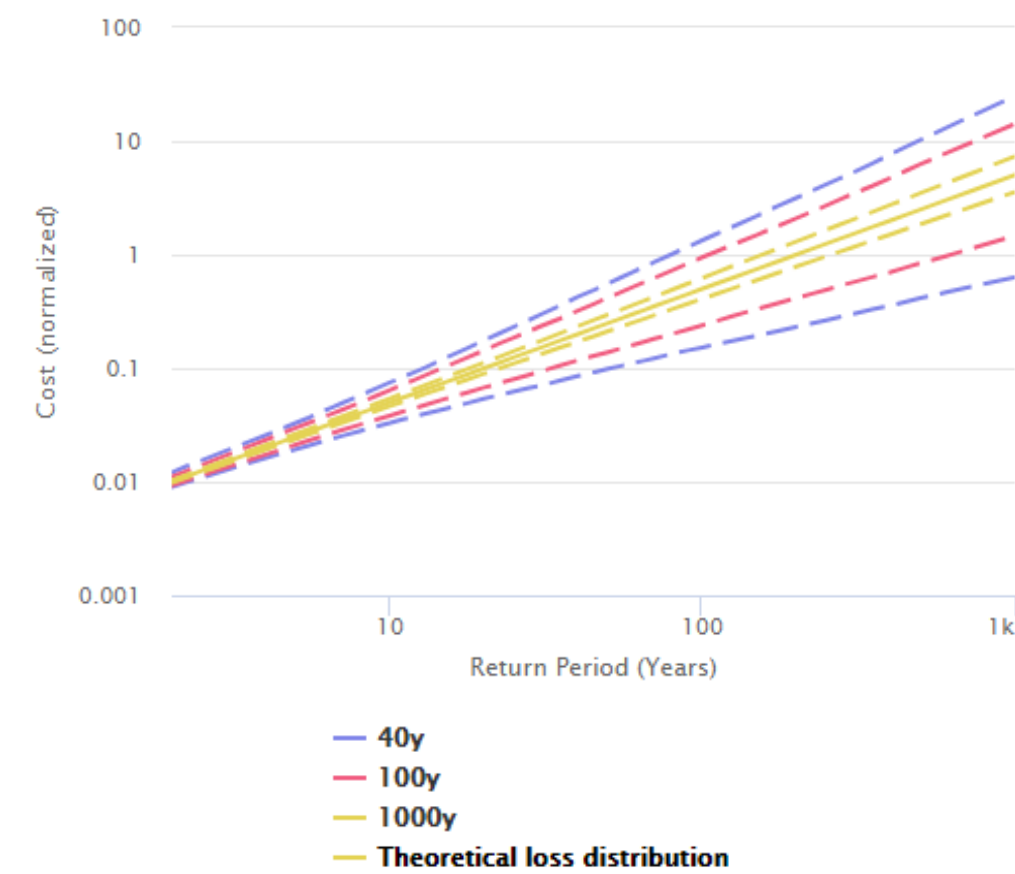
Motivation

- ➔ Natural hazards are key perils for the AXA Group
 - ➔ **Solvency** issue: how damaging can catastrophic events be?
 - ➔ **Event response** issue: how to respond to events impacting hundreds of thousands of clients?
 - ➔ **Profitability** issue: are we pricing catastrophe risks correctly?
 - ➔ **Corporate responsibility** issue: how can we contribute to the risk modeling community?
- ➔ Long and physically realistic simulations are necessary to build reliable views of meteorological risks



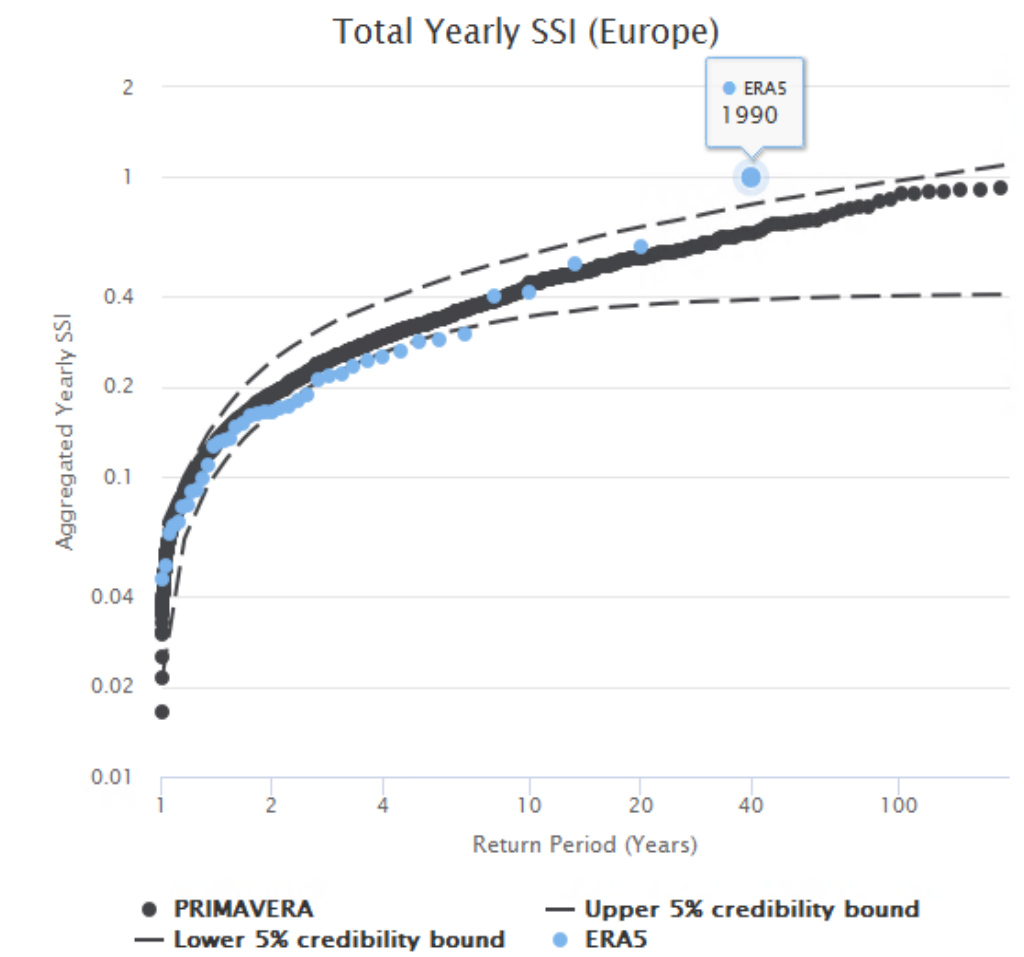
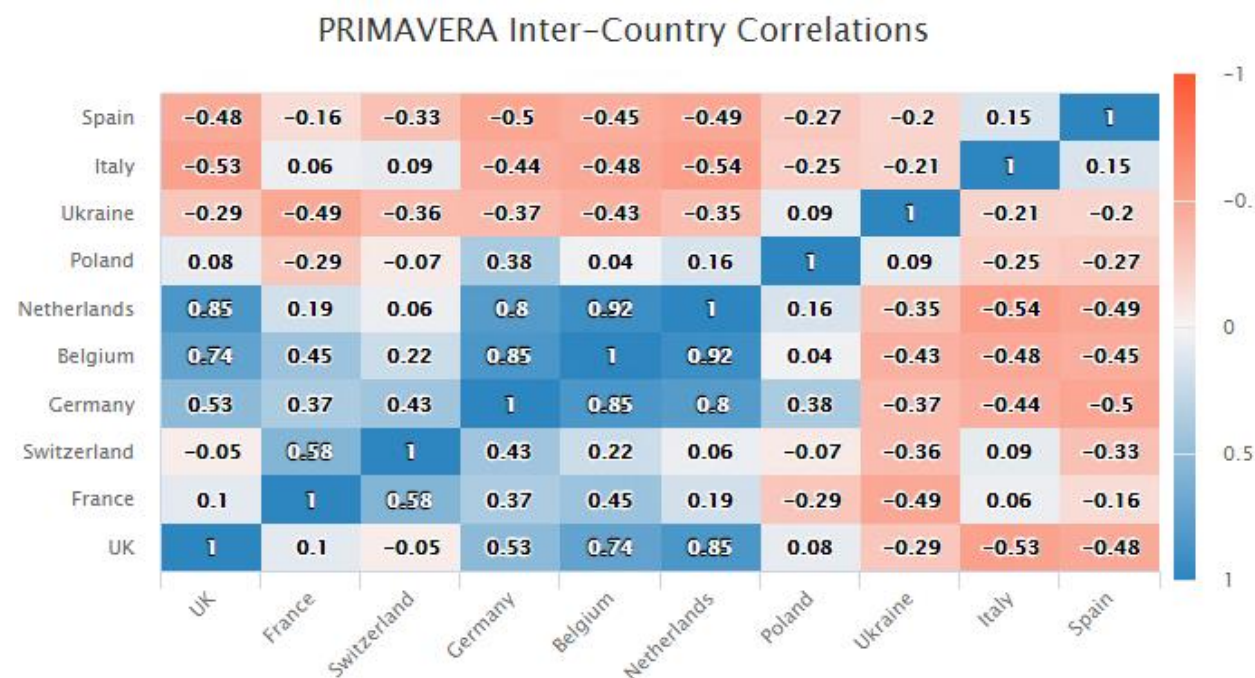
100 Millions of customers
8 Trillions \$ of insured properties

70% CI for estimates of a Pareto distribution based on 40-, 100- and 1000-year samples



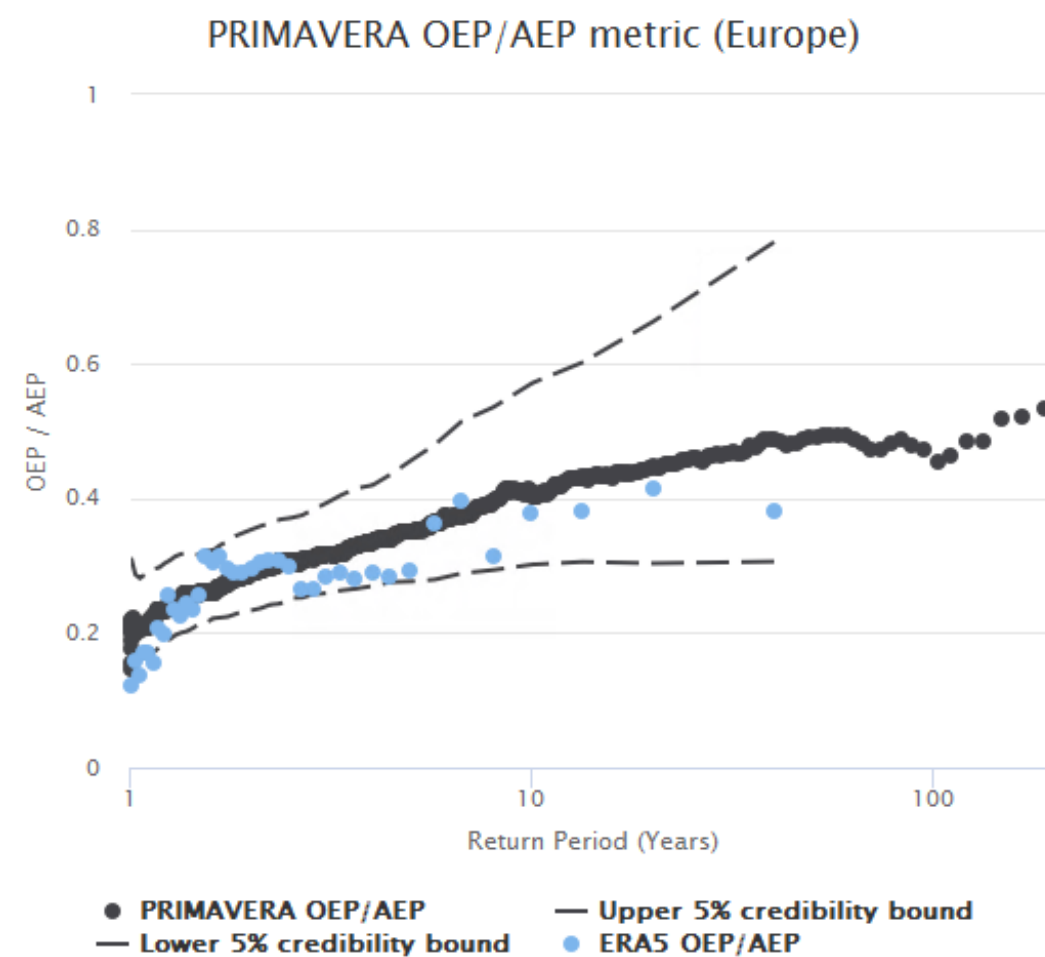
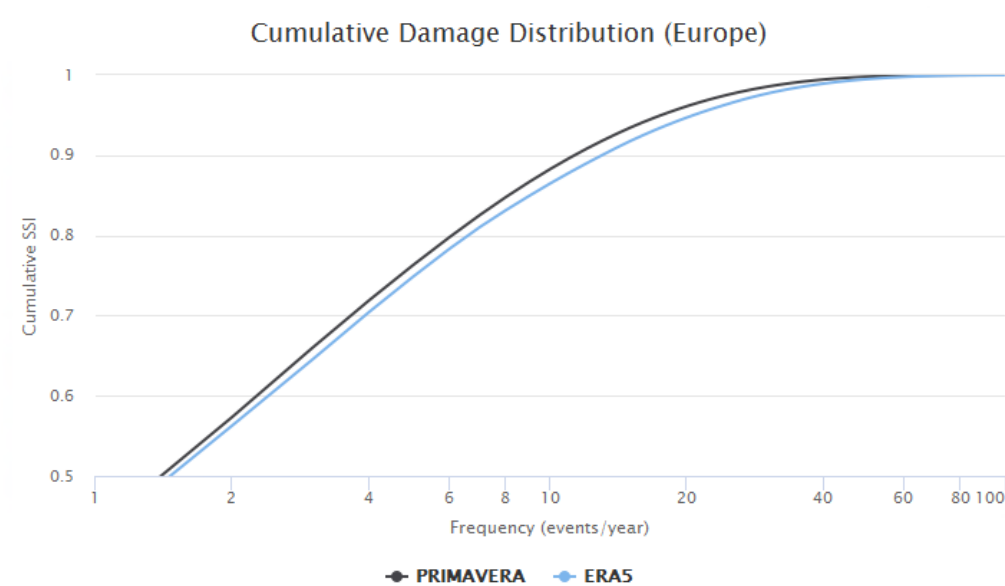
Analysis of inter-country correlations and storm severities

- ➔ Comparison of storm severities (*Klawa and Ulbrich 2003*) show consistency between the ERA5 reanalysis and the PRIMAVERA eventset
- ➔ Storm seasonality and inter-country correlations appear to be well represented



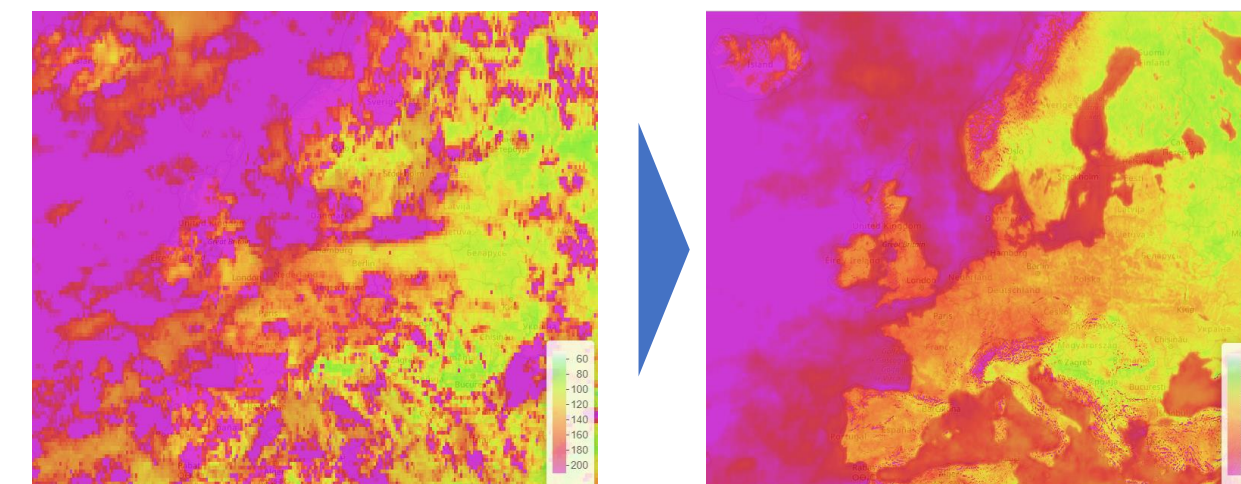
Analysis of storm clustering and importance of attritional events

- ➔ The representation of clustering in the PRIMAVERA eventset is consistent with historical and published figures (*Priestley 2008*)
- ➔ Attritional (high-frequency) events represent a very significant part of total potential damages



Application in an operational catastrophe risk model

- ➔ AXA's new European windstorm internal model:
 - ➔ **Hazard**: based on the PRIMAVERA eventset with additional resampling (to 10,000 years), calibration and statistical downscaling (using station observations)
 - ➔ **Vulnerability**: logistic regression model based on historical loss data (PERILS & AXA)



Impact of the calibration, downscaling and resampling steps on 200-year gusts (km/h):

