



Reanalysis & AXA Global Re

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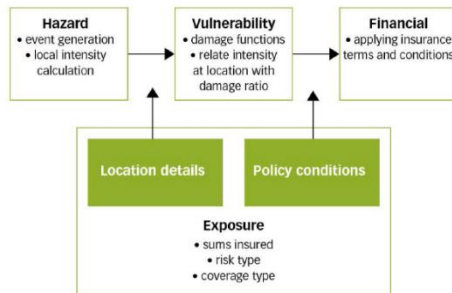
11/30/2017 - Tarragone

AXA Global Re

- ➔ Internal reinsurer for AXA
- ➔ Actuarial and cat modelling team
 - ➔ A team of 15 persons
 - ➔ 8 cat modelers: floods, earthquakes and atmospheric related events (hurricanes, extra-tropical windstorms, hail)
- ➔ Reanalysis is of great interest for AXA to have a better view on its own risks
- ➔ Interested in wind speed (gust ideally), precipitation, temperature at fine resolution
- ➔ Interested in extreme events
- ➔ Main activities using reanalysis products
 - ➔ (1) Development of CAT models
 - ➔ (2) Historical reanalysis of AXA losses
 - ➔ (3) Development of statistical models for tarification

(1) Development of CAT models

- CAT model: Estimations of losses that could be sustained by a portfolio of properties due to a catastrophic event such as a hurricane or extra-tropical cyclones



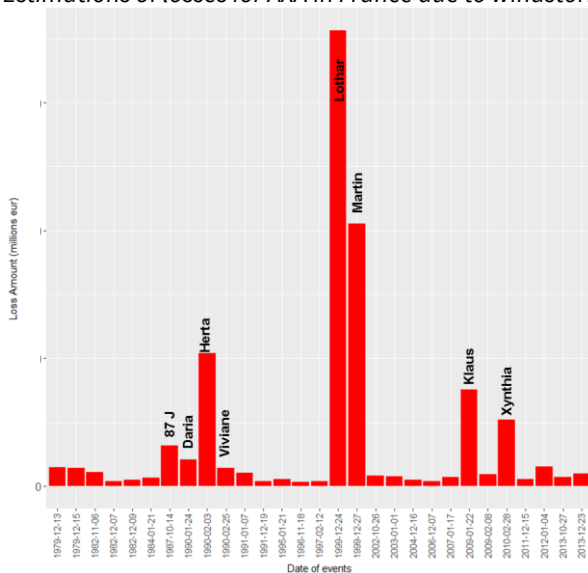
- Building a stochastic catalogue of catastrophic events
- Flood: hydrological model (GR4J) and statistical methods (SAFRAN - Météo-France)
 - Extra-Tropical Cyclones: mix of statistical and dynamical methods (WRF) based on reanalysis (ERA-I, ERA-5, ERA-20C) and simulations (climate simulations, ensemble models)
 - Hurricanes: IBtracs database
- Validation of stochastic catalogues based on climatic indexes based on reanalysis

(2) Historical reanalysis of AXA losses

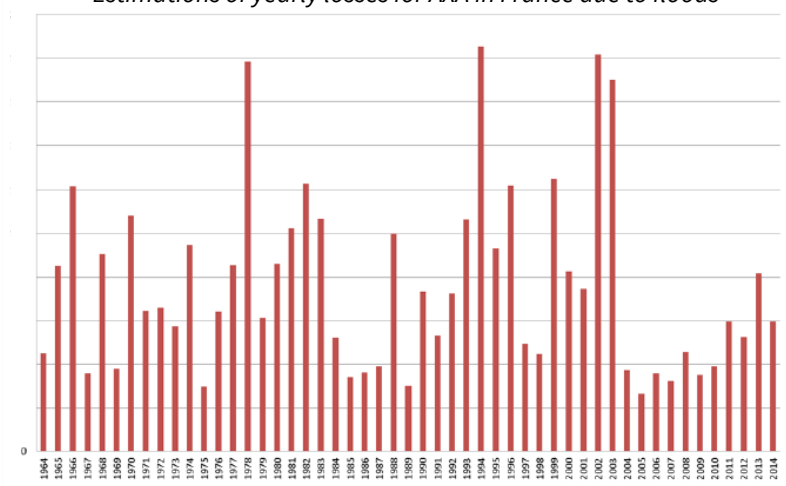
➔ What are AXA losses caused by historical events on current portfolios ?

- ➔ Based directly on reanalysis or outputs from downscaling forced by reanalysis
- ➔ Management of portfolios (evaluation of changes in insurance conditions)
- ➔ Compare directly an event with historical events (post-event loss estimations)

Estimations of losses for AXA in France due to windstorm events

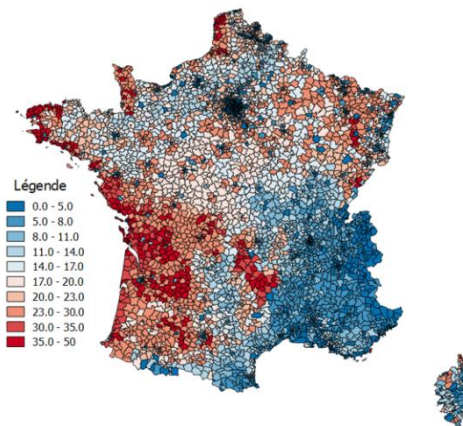


Estimations of yearly losses for AXA in France due to floods



(3) Development of statistical models for tarification

- ➔ Statistical model is designed to predict insurance premium based on different explanatory variables
 - ➔ Mix of portfolios characteristics and physical variables
 - ➔ Physical variables: water level, rainfall accumulation, wind speed or peak ground acceleration
 - ➔ Characteristics of the portfolio: type of business, building height, structure type, roof type, etc.
 - ➔ Models are trained on AXA claims database





Thank you