UK Flood and Storm Catastrophe Modelling

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Agenda

- Introduction to the model – David Sanders
- Description of the Process – Neil Fleming
- Conclusions, Discussion and Questions
Introduction

What we are going to describe is not just a Cat model
It is not a stand alone model which is an add on to the business
It is a model which is integrated with the risk management and underwriting process of the business
It is therefore not like other cat models
How does it differ

Cat models tend to have the following processes

- The **Stochastic Module** which is used to randomly generate the catastrophic events.
- The **Hazard Module** which is used to determine the geographical effect of a catastrophic event brought about by variations in topography. E.g. regional flood depths, lower wind speeds in sheltered areas etc.
- The **Vulnerability Module** which is used to calculate damage to buildings, contents and business turnover based on a number of factors including, for example:
  - Building Type: Residential, Commercial or Agricultural,
  - Building Design and Construction Quality,
  - Building Height/number of floors,
  - Occupancy Type, and so on.
- The **Financial Module** which quantifies the financial loss to the insurer.
The Components of the new Model

- Location
- Aggregation
- Scenario
- Portfolio

We will deal with these elements within the presentation.
Location

Post code is no good as it is
- Not unique
- May not exist
- May give wrong location
- May be coded incorrectly
- Changes
- Close post codes does not imply close locality
Post code – My home

- BBC weather codes think I live in Sharpness – a flood area 20 miles away
- Sat nav thinks I live 2 miles away in a valley
- I live nearly 1,000 feet up. So flood is unlikely!
- The local authority has a different post code for the property on the electoral register
- The post still gets delivered!
How do you solve this Post Code issue

- Geographic location using spatial coordinates
- Now have topographic details
- Can assess for flood
- Can now aggregate risks in zones
- Can use Flood boundaries (1 in 100 years) but
- No 1 in 100 year storm boundary!
System Principles

- Single data repository
- Unified View of Risk
- Portfolio specific risk profiles
System Principles

Policy Information

- Underwriters
- Underwriting Management
- Claims Handling
- Marketing
- Management
- Reinsurance
- Actuaries
Information Held

- Who – the policy holder is (not of interest to us)
- Where – the property is (Location)
- What – the property is (Construction)
- What – is insured (Risk)
- How Much – the property is insured for (Value)
What do Users Want to Know

- Where ..... Location
- How much ..... Aggregation
- What if ..... Scenario
- How bad can it get? Portfolio
Query Types

- Location & Aggregation
  - What is where and its Sum Insured
- Scenario and Portfolio
  - Stochastic distribution of claims
Location

Small Picture

- Risk Examination
  - Individual items
Location

Example:
- Belle Isle
  - 100m from the Great Ouse
- Wigmore Farm
  - Built 2007/08
- Both EA “Low” risk
Location

- Belle Isle
  - No recorded flooding

- Wigmore Farm
  - Flooded 3 times in 50 years
Location

Clusters
- Managing aggregation through underwriting
Location

Big Picture

- Where properties are:
  - Shows clusters of risks
    - “All risks EML > £50 million?”
  - Shows nearby risks
  - Shows localised hazards
Aggregation

- Shows the Big Picture
  - Aggregate sum insured
    - Using EML
    - All perils
    - All classes
Scenario

- Covers 2 different types:
  - As if (Historic)
  - Defined Hypothetical (e.g. RDS)
- Results are distributions
- Can view extent through Location queries
Portfolio

- Stochastic distribution of “all” possible events
- Perils:
  - Storm (Windstorm)
  - Flood (Flood – including costal)
  - Wet Storm (Storm and/or Flood)
  - Fire
Uses

- Underwriting Support
- Underwriting Management
- Aggregation Control
- Portfolio Management
- Reinsurance Purchase
- Capital Allocation
- Claims Management
Conclusion

- Not a “Cat model”
- Understanding of current risks has improved
- Management of risks improving

- GIGO