



How to validate a Cat model?

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Definitions

- **VALIDATION** - does the model adequately represent the system being modelled? [check fit of model and its components against historic data likely to have been used to build/ calibrate it]
 - **EVALUATION** - how well does it predict using unrelated data not used to build/calibrate the model or its components? [e.g., our own property portfolios]
 - **VERIFICATION** – does it functionally do what it is supposed to do? (e.g., do policy conditions, hours or radius clauses work as intended, or are they buggy?)
 - In practice I have seen all 3 included in model validation/ model evaluation reports. Validation and evaluation should be the client's responsibility, and verification the vendor's responsibility, in my view.
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- What do others say?
 - Validation is ... the process by which you determine whether the external catastrophe model provides a valid representation of the catastrophe risk for your portfolio [LMA (2012) - [Validating external catastrophe models under Solvency II](#)]
 - This wide umbrella definition covers both validation and evaluation aspects above.

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Example Modules

- **Background** - model metadata, completeness, analysis settings, business use cases, portfolios to be analyzed
 - **Loss validation (industry portfolio) & evaluation (own portfolios)** - backtesting, scenario testing, historic modelled scenario loss comparison vs actual loss
 - **Hazard validation** – e.g., benchmarking event rates and hazard footprints against hazard datasets (PGA, 50year design windspeed, etc.) likely to have been used to inform development/ calibration
 - **Vulnerability validation** – e.g., benchmarking vulnerability functions, regionalization, sensitivities and the impact of inter-location correlation against data sources likely to have been used to inform development/ calibration
 - **Propose model bias corrections** – to allow for systematic differences found between model and expectation; and for missing sub-perils
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- Important to ‘cut cloth to fit’ - a first pass might be just the background & loss validation modules. This treats the model as a black box – all are wrong, some are useful, many ways to get to the same EP curve
 - Should be able to tell from loss validation alone whether a model appears a reasonable fit against likely build/ calibration data [validation] and for our own portfolios [evaluation] – if so, consider diving deeper ...