Swiss Re

Parametric Risk Transfer
An Introduction

Swiss Re Public Sector Solutions, May 17th 2022

How

a payout is determined

is the main difference to traditional risk transfer

Parametric risk transfer: similar to traditional insurance, but not the same

Like traditional insurance…

- A policy governs contractual relationships, terms & conditions
- Covered perils/events are identified or excluded
- Attachment points and applicable limits of liability are set around the insurable interest of the client

UNlike traditional insurance…

- As part of the policy an index is defined, along with precise conditions and thresholds for payouts after a covered event
- The payout depends **only on the intensity** of the event as expressed **through the index**
- There is **no loss adjustment** after a covered event, giving rise to basis risk

*Parametric risk transfer is **not a substitute** for a traditional insurance program. It can be a useful **complement** in a growing number of applications.*

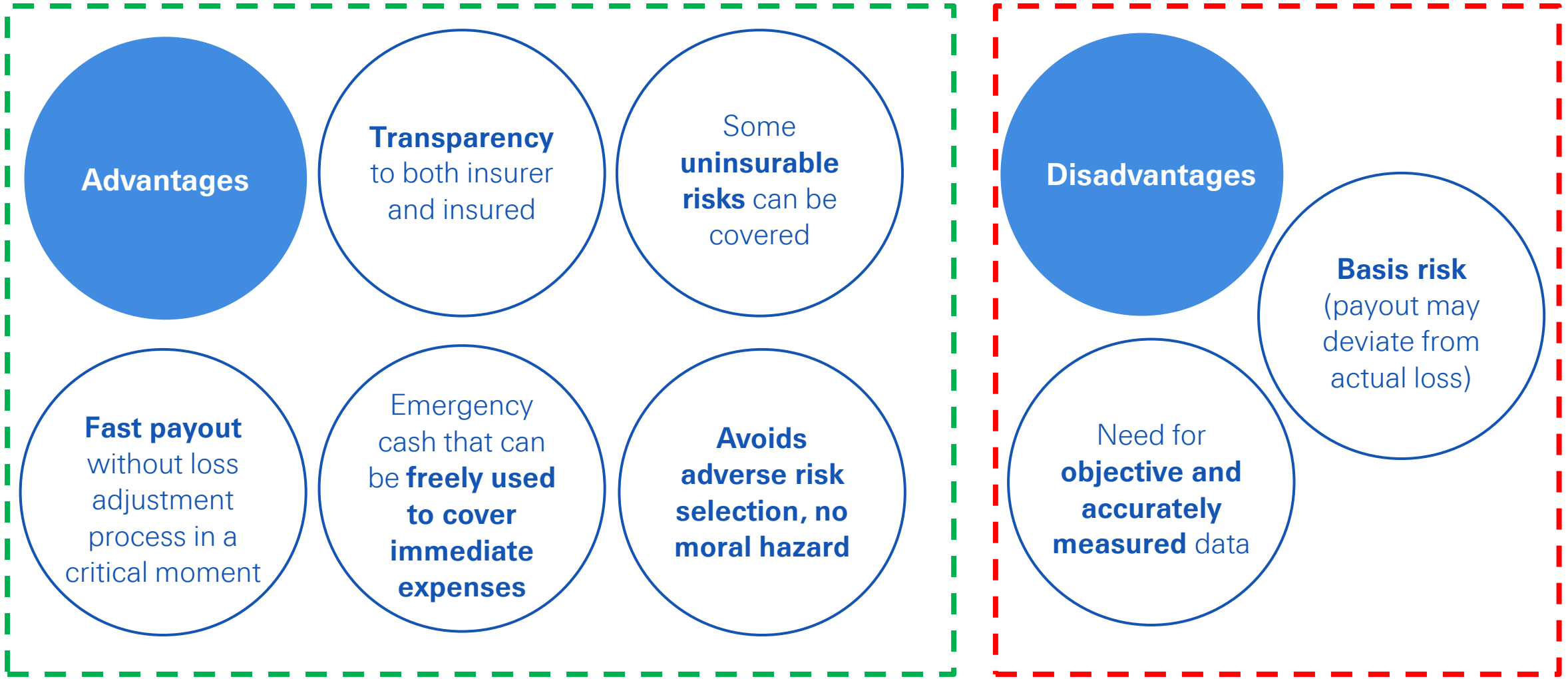
Conceptual examples of parametric risk transfer*

Peril	Index
Tropical Cyclone	▪ Wind speeds / cyclone categories ▪ Atmospheric pressure
Earthquake	▪ Magnitude ▪ Shaking intensity
Excess Rainfall / Drought	▪ Rain / Dry Days / Cumulative rainfall ▪ Soil moisture / NDVI
Flood	▪ Flooded area ▪ Flood depth
Lack of Sunshine	▪ Solar irradiation ▪ Daily sunshine hours
Wildfire	▪ Burnt area ▪ FFDI
Temperature Anomalies	▪ Heat Day / Frost Day ▪ Average temperatures (HDD, CDD)
Air Pollution	▪ PSI, $PM_{2.5}$, PM_{10} ▪ Visibility

This list is **by no means exhaustive**. The emergence of suitable **data sources** will only **expand the scope** of application for parametric risk transfer

*not representative of current Swiss Re risk appetite

Parametric risk transfer can address shortcomings of traditional insurance



Basis risk – a challenge for parametric risk transfer

Basis risk is defined as the risk that a payout under a parametric policy deviates from the actual losses incurred.

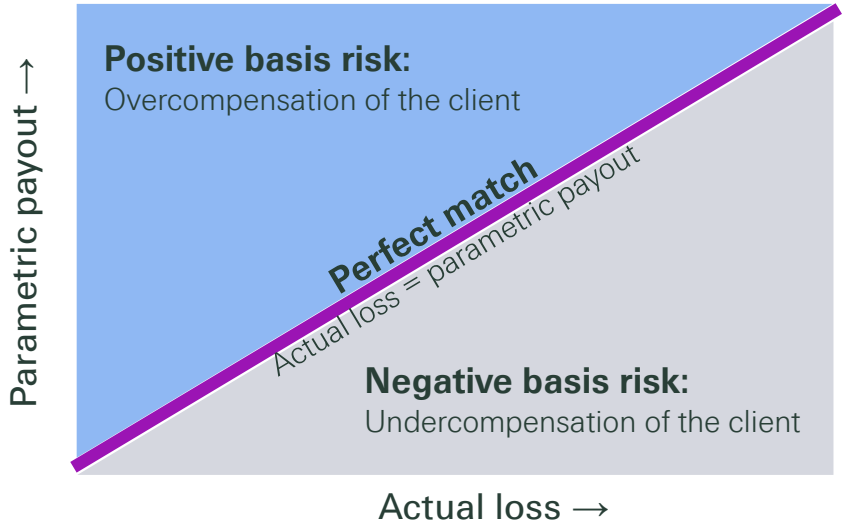
Possible **causes** of basis risk

- Modelling / measuring inaccuracies
- Design of index and/or payout structure
- Undetected trends/developments

Possible **mitigants** for basis risk

- In-depth risk and data analysis
- Tailored structuring to match client's exposure and risk appetite
- Combination of multiple triggers

Basis risk is bi-directional



A well-designed index is critical to the sustainability of any parametric product

To minimize basis risk

- The index must be calibrated to show significant correlation with historic losses
- The payout structure should match the policy holder's exposure and reflect applicable risk appetite
- The design should as be simple as possible, without compromising on functionality

To establish reliability and transparency

- Policy holders rely on the accuracy, consistency and impartiality of the index and the data used to calculate it
- Data sources should be independent and well-established
- "Black box" modelling components are to be avoided where possible
- Index and payout calculation should be replicable by the client

"Everything should be made as simple as possible, but no simpler." Albert Einstein

Is parametric risk transfer the right solution?

Parametric risk transfer can be suitable if

- Speed of and certainty around payment are crucial
- More flexibility in the use of the payout amount is desired
- The to-be-covered risk can be represented well by an index
- Basis risk can be managed adequately / loss adjustment is not practical and inefficient
- The client is already a buyer of traditional insurance

Parametric risk transfer may not be attractive if

- It is difficult to establish correlation between the losses and the (data underlying the) index
- Index and payout structure are untransparent, complicated, and/or not tailored to client's needs
- Potential buyers have little experience with insurance

To place a parametric risk transfer successfully and sustainably, a number of prerequisites need to be met.

Appendix A

- Swiss Re parametric process
- More detail on differences between traditional insurance and parametric risk transfer

Swiss Re Process for parametric risk transfer products

Clear understanding of client needs

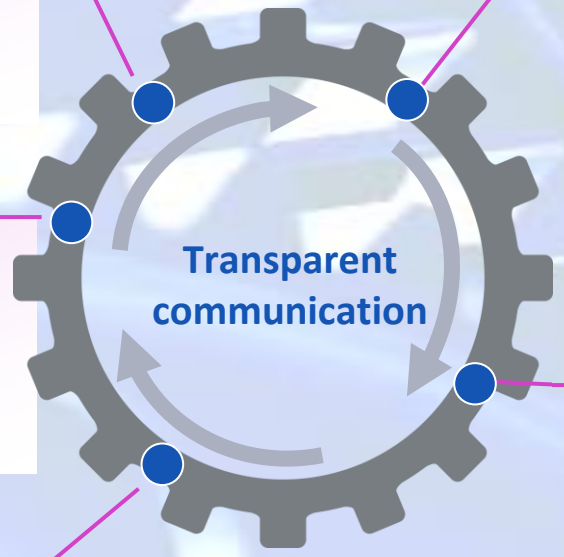
- A successful deal is supported by a clear understanding of client and underlying policyholder needs.

Experienced team

- Costing and structuring experts with parametric experience included in deal teams.

Client relationship

- Strong relationships and open communication to minimize basis risk and maximize alignment of interests.



Best practice compliance

- Due diligence must include an assessment of regulatory and accounting implications.
- Overarching process is consistent with traditional and structured P&C business.

Risk Management

- Clear assessment of risks including structure (basis risk) and reputational risk.
- Same overall framework and same monitoring of accumulation as traditional insurance.

Differences between traditional insurance and parametric risk transfer

Element	Traditional Insurance	Parametric Risk Transfer
Payout Trigger	Occurrence of insured loss	Exceedance of physical parameter threshold
Payout Amount (subject to limits and deductibles)	Loss amount	Predefined amount
Use of Pay-out	Intended to cover sustained losses	At customer's discretion
Payment speed	Subject to loss adjustment	Subject to data publication
Loss adjustment	Yes	No (little claims administration)
Loss settlement	Loss settlement is complex to explain	Parametric triggers are transparent and easily explained
Basis Risk	Mostly complete match between actual payout and indemnity loss	Potential mismatch between indemnity loss and payout
Budget	Price is related to the desired structure and type of risk	Structure is highly customizable to meet a pre-set budget

Appendix B

- A simple example of parametric risk transfer: A tropical cyclone “cat-in-the-circle” cover

Example of a Tropical Cyclone “cat-in-the-circle” parametric cover

A cyclone cat-in-circle pays out if:

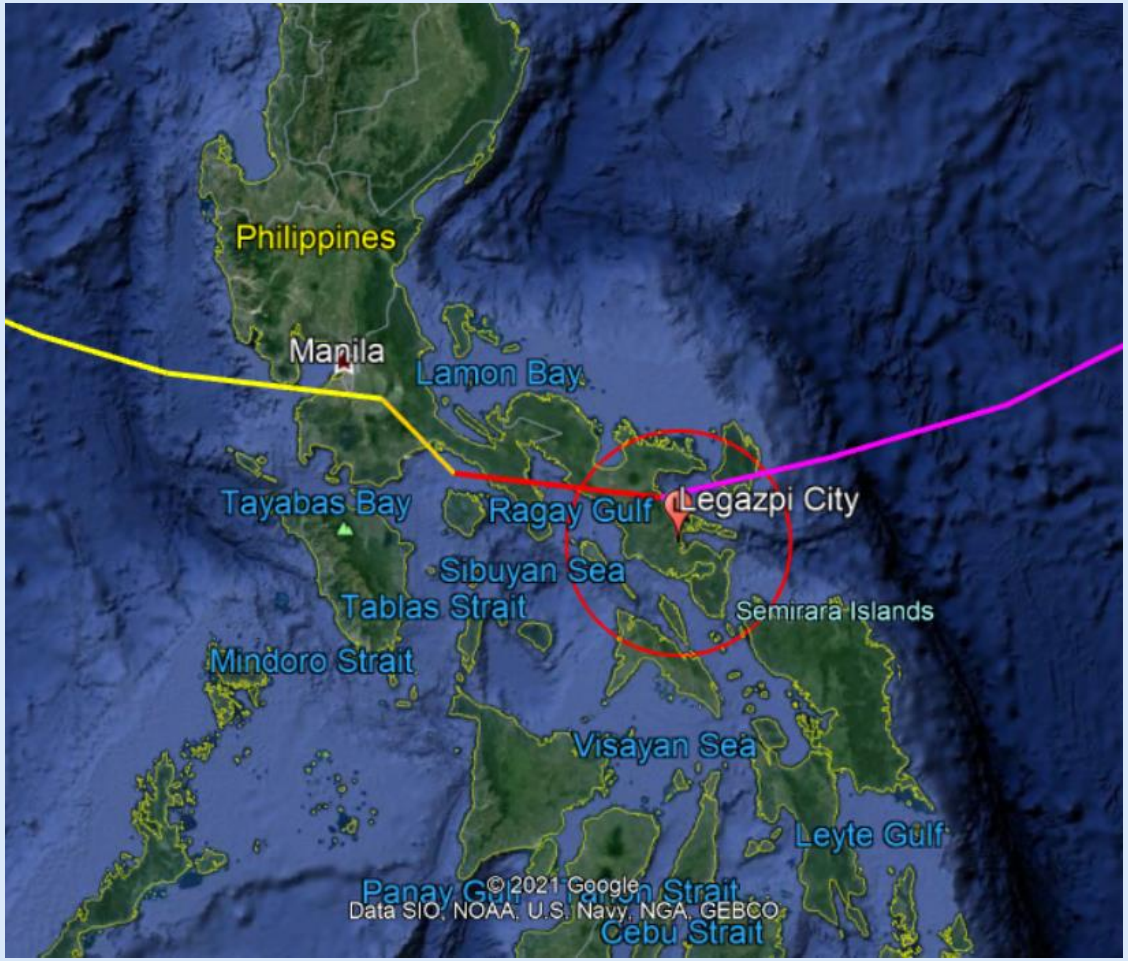
- Cyclone’s track crosses a predefined shape (here: a circle)
- Cyclone’s intensity inside this circle exceeds a pre-defined threshold

Structuring steps:

1. Define the triggering geometry:
   - For this example a circle with 100 km radius around the insured interest in Legazpi City.

2. Define the payout pattern (exemplary)
   - No payout for Category 3 Cyclones and below
   - Payout of 50% of the event limit for a Category 4 Cyclone
   - Payout of 100% of the event limit for a Category 5 Cyclone

3. Define the event limit, in line with the value of insured interest and risk appetite of client



Post-event settlement process for parametric “cat-in-the-circle” cover

Step 1

Appointed reporting agent publishes event data
- **Track location** (position of storm center in 6-hourly intervals)
- **Track intensity** (maximum sustained wind speed in knots)

Step 2

- Interpolate between the reported track points
- Check whether any of the **interpolated points is within the circle** (for Goni an easy “yes”)

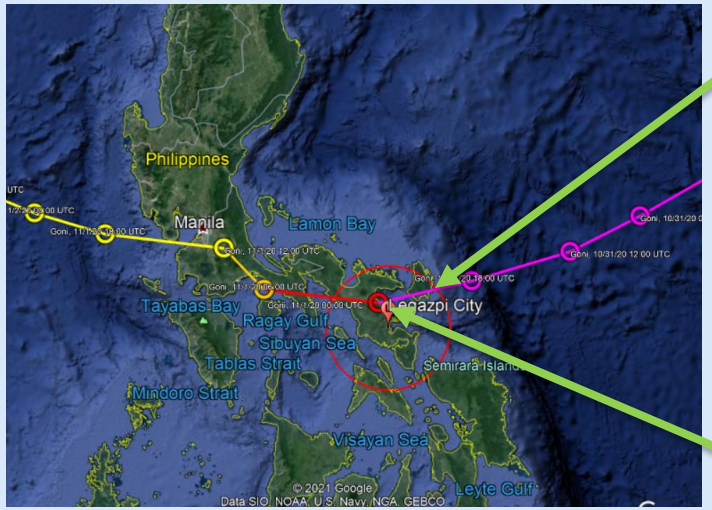
Step 3

Check for the **highest wind speed** of the interpolated track points in the circle
(~112kn at the eastern intersection of track and circle)

Step 4

Look up the **payout percentage for corresponding intensity** category
(100%, based on ~112kn corresponding to Category 5)

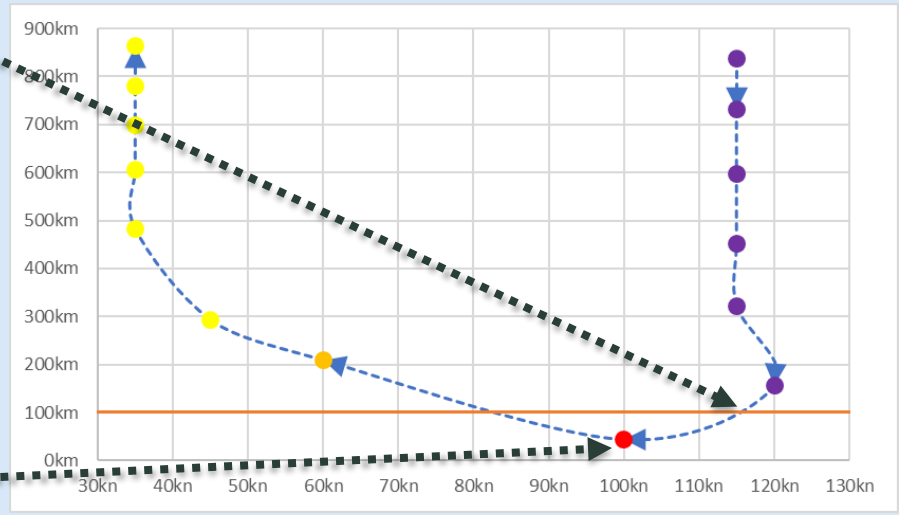
Track points as published by reporting agent



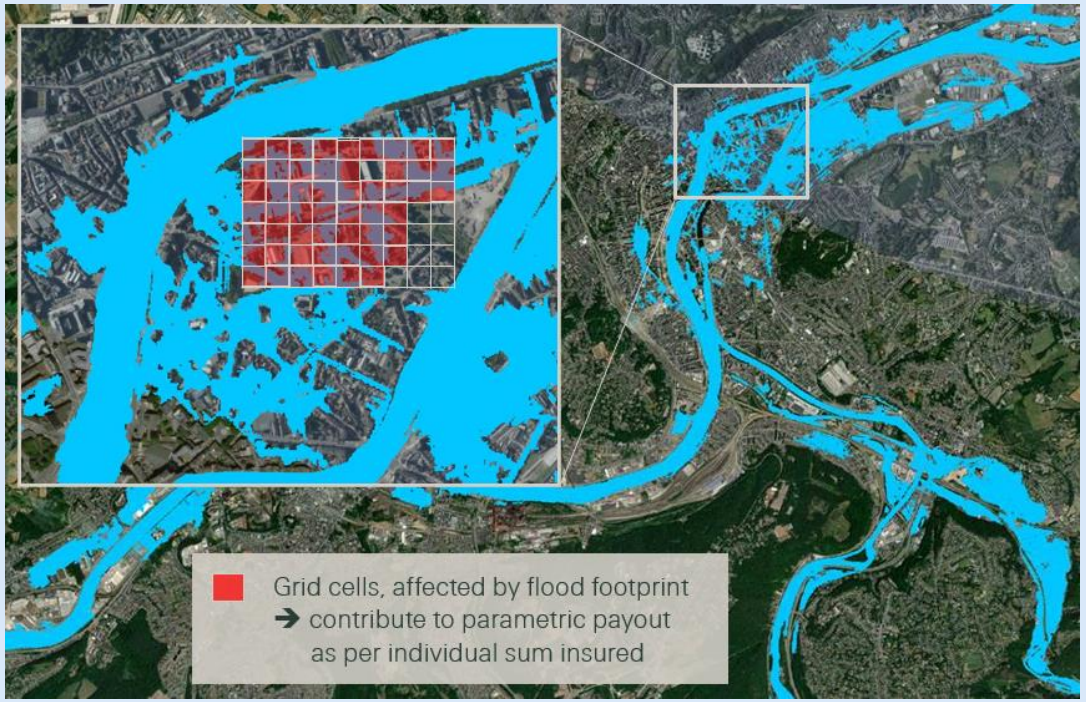
Highest interpolated wind speed inside the circle

Highest reported wind speed at a track point inside the circle

Typhoon Goni wind speeds and distance to circle center



Example of parametric covers based on flood extent



Each grid cell or site can be assigned an individual insured value representative of the loss costs expected to arise from a flood event affecting it.

These values are not limited to physical damages and can represent e.g. expenses for emergency relief, temporary accommodations, or any other costs conditional on the flood event.

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