GC FloodShield℠
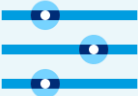# PARAMETRIC FLOOD COVERAGE

GC FloodShield provides customized flood coverage based on hazard footprints obtained in near real time.

Key Features & Benefits

Fast
Payments within weeks, not months or years.

Transparent
Coverage is clear and understood by buyer and seller

Flexible
Recoveries can be applied to holistic event economic losses.

Customizable
Offers a range of coverage triggers to fit within a wide array of budgetary situations.

Broad Application
Available to insurers, reinsurers, corporations and public entities globally.

Efficient Design, Monitoring, and Response

Structure Design

We aggregate client's exposures using a high-resolution grid, where every cell is assigned a limit, commensurate with the risks contained within.

Event Tracking

During a potentially damaging event, Guy Carpenter will coordinate with the agreed reporting agent the retrieval of the flood footprint data, which is used to monitor potential impacts to the transaction.

Parametric Response

The parametric loss for each cell is equal to the product of the exposure times the proportion of flooding in the cell. These cell-level parametric losses will evolve as the flood footprints evolve. The total parametric loss for the transaction is equal to the sum of the maximum parametric losses in each cell at the time of computation.

Key Properties

COVER TYPE: Parametric flood
PERILS COVERED: Flood extent
COVERED LOSSES: Any loss, including property, business interruption, etc.*
CLAIM PERIOD: Pays within weeks and provides one year for loss reconciliation*
LIMITS: Indicatively, up to $100 million via (re)insurance, higher limits via ILS
(*) Contingent on specific contract conditions

MARKETS: Global insurance and reinsurance companies, and capital markets funds
MECHANISM: High-resolution cat-in-a-grid
GEOGRAPHIC AVAILABILITY: Global
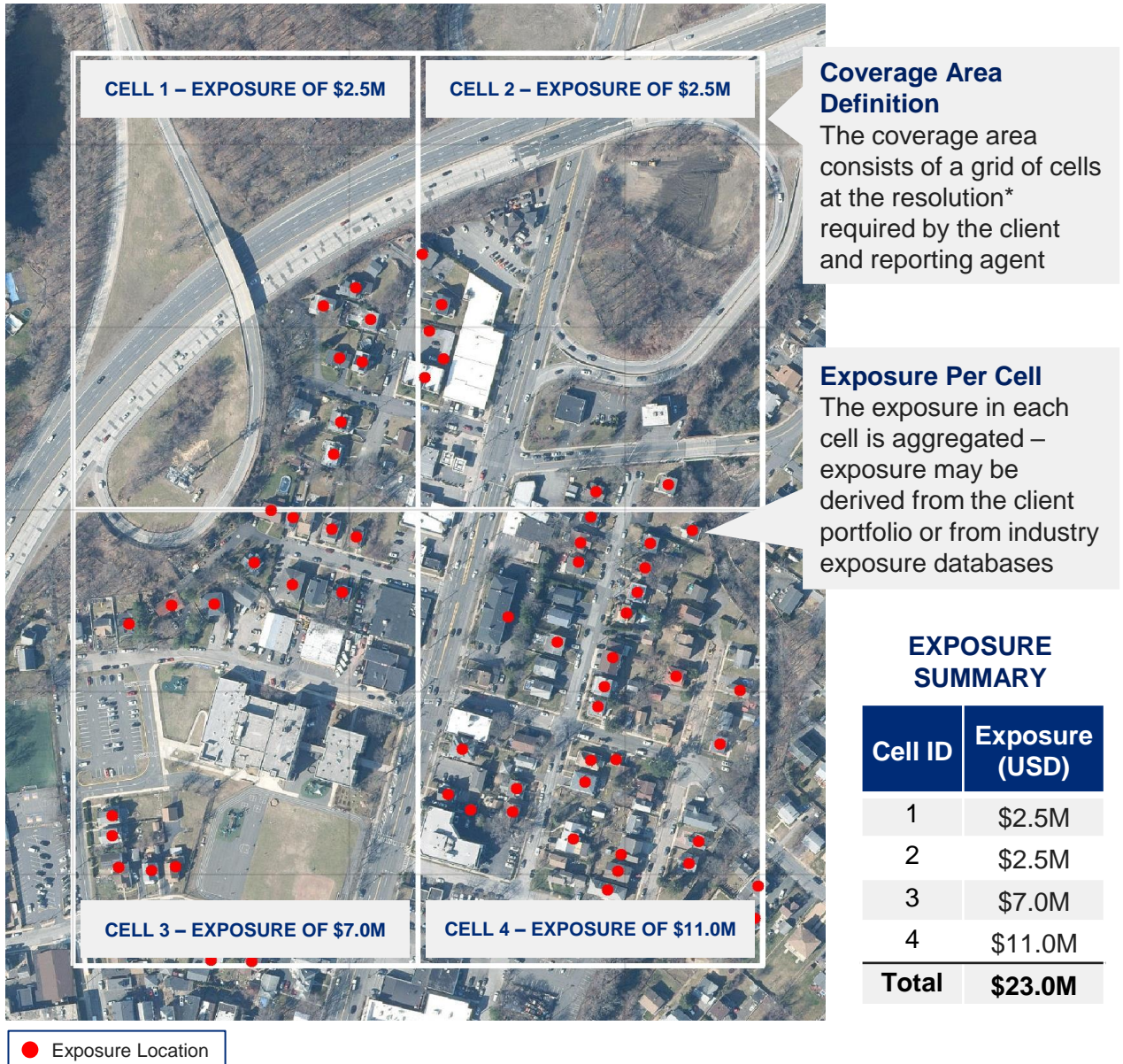**REPORTING AGENT**: Flood footprint provider selected in coordination with client
REPORTING PARAMETERS: Inundation area percentage of each cell in the grid
CUSTOMIZATION: Any portfolio

Structuring a GC FloodShield Example Coverage

Structure Design

We define the coverage area using a regular grid of customizable resolution, with values assigned to each grid cell according to the value of the underlying exposures. In this example, we use a regular grid of 4 cells of about 250m x 250m in resolution.

CELL 1 – EXPOSURE OF $2.5M

CELL 2 – EXPOSURE OF $2.5M

CELL 3 – EXPOSURE OF $7.0M

CELL 4 – EXPOSURE OF $11.0M

● Exposure Location

Coverage Area Definition
The coverage area consists of a grid of cells at the resolution* required by the client and reporting agent

Exposure Per Cell
The exposure in each cell is aggregated – exposure may be derived from the client portfolio or from industry exposure databases

EXPOSURE SUMMARY

Cell ID	Exposure (USD)
1	$2.5M
2	$2.5M
3	$7.0M
4	$11.0M
Total	**$23.0M**

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* Resolution will be selected to fit the objective of the coverage and may vary dependent on the capabilities of the selected reporting agent, the exposure, and the region.
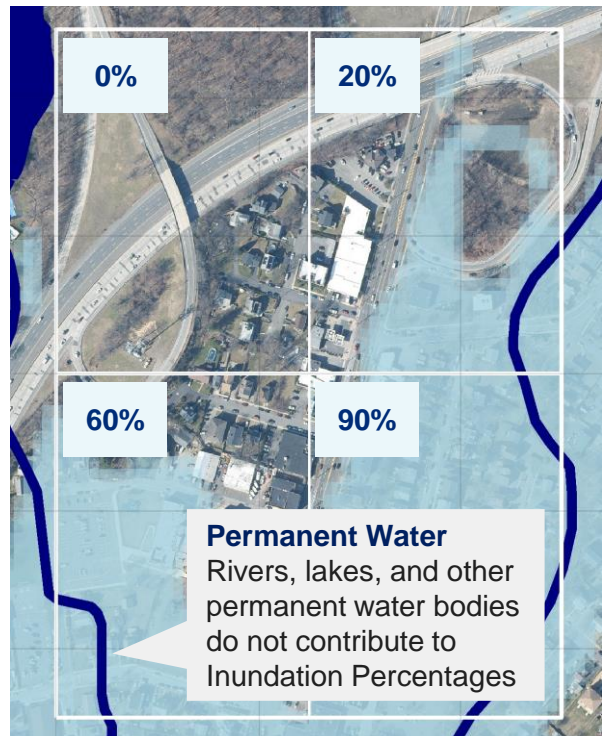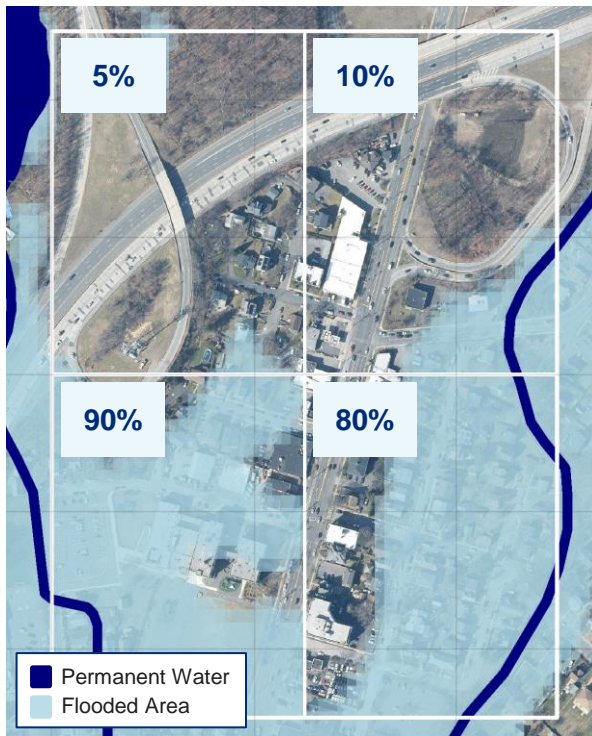
GC FloodShield Response Mechanism

Event Tracking & Reporting

During a flood event, the reporting agent provides the flooded area percentage in each cell at appropriate time steps*. The Inundation Percentage is the ratio of flooded area to the total area of that cell excluding permanent water bodies such as rivers or lakes.

INUNDATION PERCENTAGE – TIME STEP 1

5%   10%

90%   80%

Permanent Water
Flooded Area

INUNDATION PERCENTAGE – TIME STEP 2

0%   20%

60%   90%

Permanent Water
Rivers, lakes, and other permanent water bodies do not contribute to Inundation Percentages

Parametric Loss

For each time step, the Parametric Loss of each cell is the product of its Inundation Percentage and Exposure. The Coverage Parametric Loss is the sum of each cell's **maximum Parametric Loss** across all time steps.

| Cell ID	Exposure (USD)	Time Step 1		Time Step 2		Coverage Parametric Loss (USD)
		Inundation Percentage	Parametric Loss (USD)	Inundation Percentage	Parametric Loss (USD)	
1	$2.5M	**5%**	**$125,000**	0%	$ 0	$125,000
2	$2.5M	10%	$250,000	**20%**	**$500,000**	$500,000
3	$7.0M	**90%**	**$6.3M**	60%	$4.2M	$6.3M
4	$11.0M	80%	$8.8M	**90%**	**$9.9M**	$9.9M
Total						**$16.825M**

* Frequency of time steps may vary based on the reporting capabilities and region.

Hurricane Ida Case Study

On September 1, 2021, Hurricane Ida Impacts New York as an Extratropical Cyclone
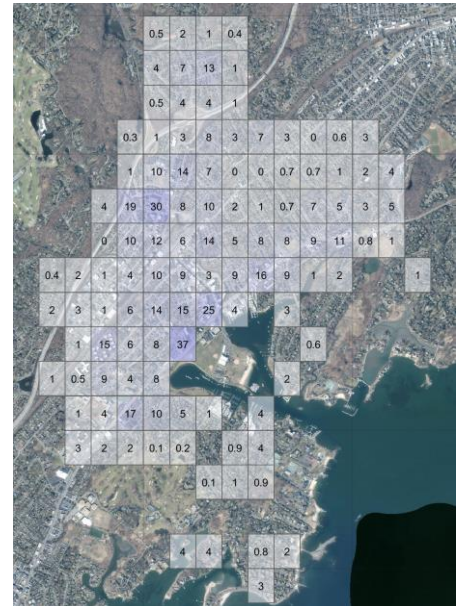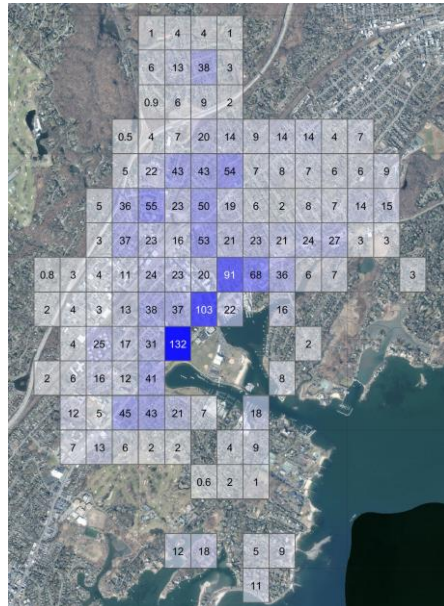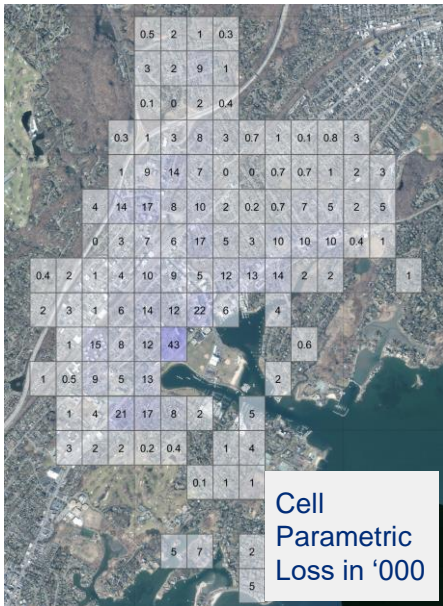
Parametric Response

We track the response of a flood coverage designed for a New York neighborhood during Hurricane Ida.

Coverage Parametric Loss is $2.2M

Evolving parametric loss at each time step
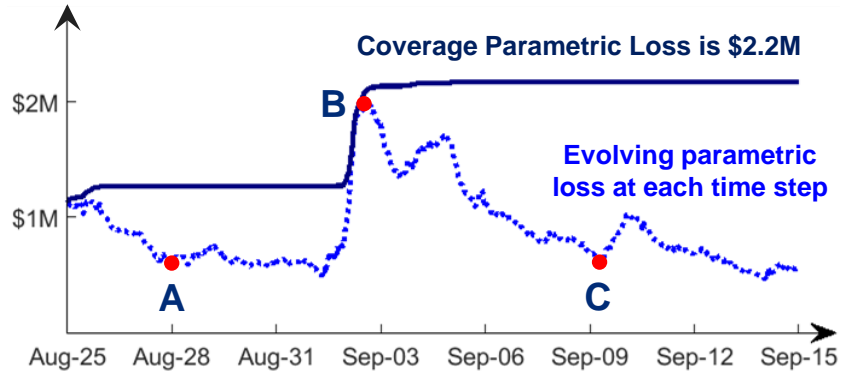
| A: August 27th at 23:00 | B: September 2nd at 12:00 | C: September 9th at 06:00 |

Cell Parametric Loss in '000

Flood footprint information courtesy of FloodBase

Payment

The Final Parametric Loss is 43.5% of the limit, once the coverage parametric loss is used as a proxy for actual losses in a reinsurance structure.
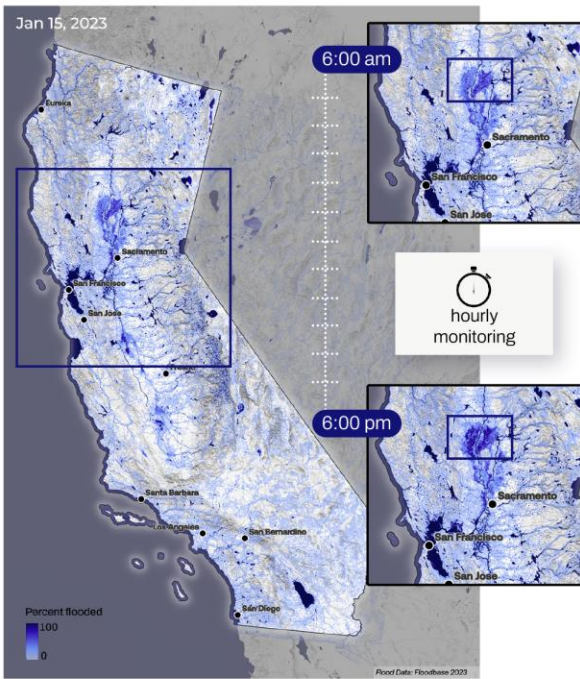

Exhaustion (set by client)

43.5% of LIMIT

Retention (set by client)

Payout (% of Limit)

Coverage Parametric Loss ($M)
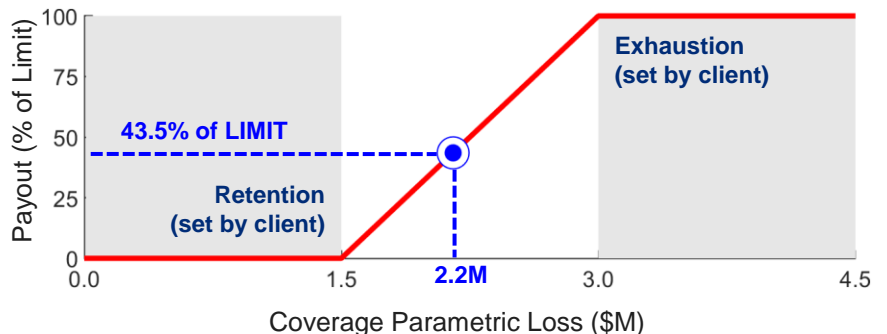
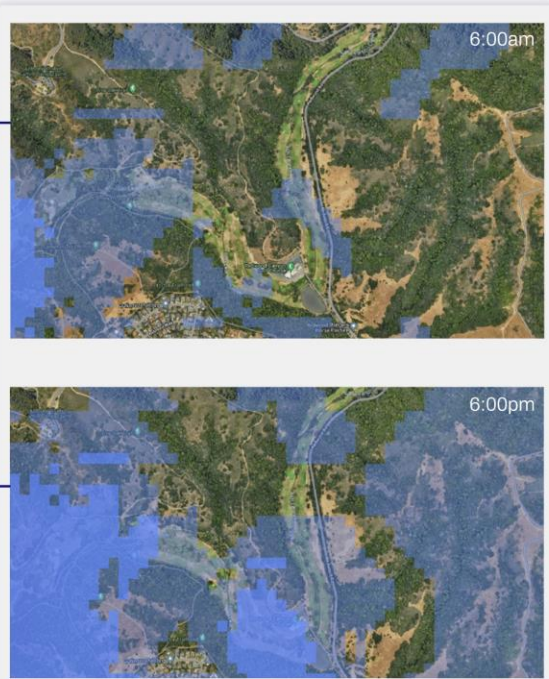# Flood Footprint Provider

FLOOD**BASE**

The end-to-end solution for parametric flood insurance

Continuous flood monitoring for any location or asset – 24 hours a day, 365 days a year

2023 flooding in California

Golf course client impacted by the event

Floodbase enables industry-leading flood cover across the globe for previously uninsurable, large-scale economic loss.

1 **Designed to cover your unique flood risk**, with tailor-made solutions for BI, agriculture, disaster response, and more.

2 **Capacity from leading insurers** certified to underwrite Floodbase-enabled policies.

3 **Continuous, year-round flood monitoring** across the globe, enabled by a fusion of high-quality ground sensors, optical, and SAR satellite data.

Transparent monitoring, timely alerts, and quick access to capital following a severe flood event.

Daily flood monitoring	Access observation data relevant to your policy like flood extent, duration, and depth.
Automatic alerts	Receive notifications if flooding exceeds predefined payout thresholds.
Rapid payouts	Receive payouts within weeks of certified flood events.

Selected to support FEMA to develop a national flood intelligence system.

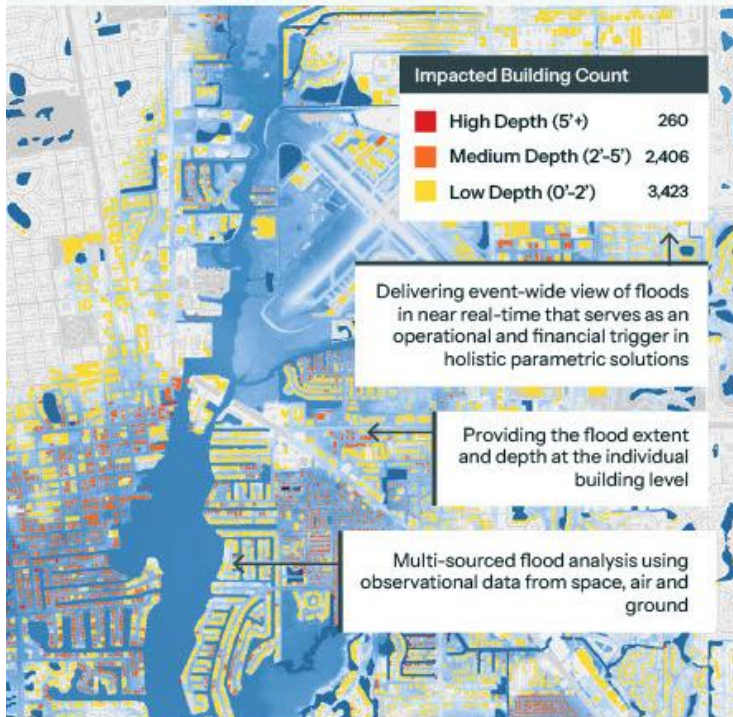Compliment indemnity insurance with deductible buy downs or wrap-around coverage.

Cover previously uninsurable loss like non-damage BI and crop / land loss.

Flood Footprint Provider

ICEYE

Flood Insights for Parametric Solutions

Get reliable and actionable insights into a flood's maximum extent & depth within hours of the flood peak

Impacted Building Count

🟥	High Depth (5'+)	260
🟧	Medium Depth (2'-5')	2,406
🟨	Low Depth (0'-2')	3,423

Delivering event-wide view of floods in near real-time that serves as an operational and financial trigger in holistic parametric solutions

Providing the flood extent and depth at the individual building level

Multi-sourced flood analysis using observational data from space, air and ground

Address new exposures and coverage gaps in existing flood indemnity policies

ICEYE's Flood Insights is the world's first consistent, near real-time source for observational flood data, allowing governmental and business decision-makers to understand the true impacts of disasters as they unfold, empowering officials to act quickly in response.

ICEYE's flood extent and depth data is used across a wide spectrum of operational and financial use cases, including rapid situational awareness, sizing of event losses, communicating with affected policyholders, allocating resources for event response, triaging of claims, and supporting the risk transfer of flood exposures.

Owning the world's largest Synthetic Aperture Radar (SAR) constellation, we empower better and timelier operational and financial decisions to manage and respond to natural and man-made disasters worldwide. ICEYE's satellites see the world under any conditions, including through darkness, clouds, smoke, and volcanic ash.

- Proactive stakeholder communication
- Faster assistance and relief
- More effective resource allocation

### Fine-tune detailed ICEYE data for a bespoke parametric trigger to suit your needs

✓ Unlock new opportunities for satellite-based flood risk management and parametric risk transfer to narrow the flood protection gap

✓ Promote holistic parametric flood solutions that offer operational insights based on the same hazard data source underpinning the financial trigger

✓ Improve operational and financial resilience for impacted communities through better recovery outcomes

Flood Footprint Provider

KatRisk

The trusted provider for probabilistic loss models

KatRisk's loss modeling platform SpatialKat is the market leader in probabilistic risk assessment for US inland flood, hurricane wind, and storm surge. Our simulation covers 50,000 years of globally correlated probabilistic flood and wind events with embedded climate variability and climate change scenarios up to 2100.

Hurricane Wind Fields

New Orleans Storm Surge

Detailed Flood (Harvey)
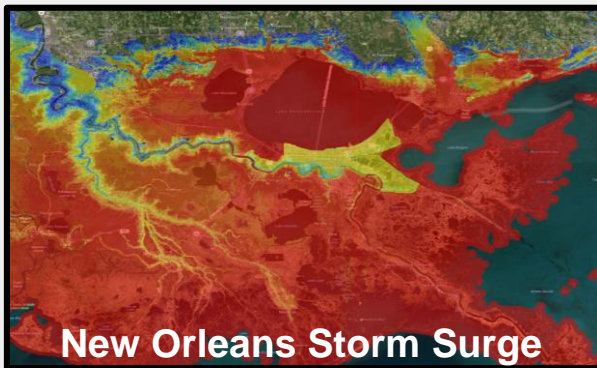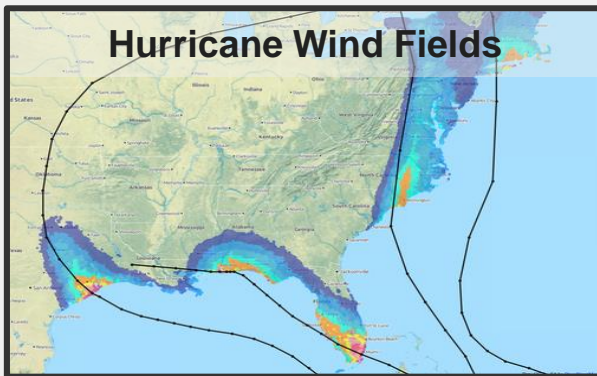
Key Features

✓ Inland flood footprints on 10m resolution with depth at individual building footprints

✓ Full 2D hydraulic models for pluvial and fluvial flooding

✓ Used as calculation agent for all FEMA NFIP ILS transactions

✓ Loss simulation with coherent measures of risk

✓ Full financial model for insurance contracts

✓ Open data infrastructure with ability to integrate all data

✓ Lowest model execution runtimes in the industry by far

✓ Global real-time flood event response: floodriskforecast.com

🔖 **Contact us**

If you are interested in learning more about GC FloodShield or would like to organize a live demonstration of the product, please contact any of the following specialists:

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About Guy Carpenter

Guy Carpenter & Company, LLC is a leading global risk and reinsurance specialist with 3,500 professionals in over 60 offices around the world. Guy Carpenter delivers a powerful combination of broking expertise, trusted strategic advisory services and industry-leading analytics to help clients adapt to emerging opportunities and achieve profitable growth. Guy Carpenter is a business of Marsh McLennan (NYSE: MMC), the world's leading professional services firm in the areas of risk, strategy and people. The Company's more than 85,000 colleagues advise clients in over 130 countries. With annual revenue of $23 billion, Marsh McLennan helps clients navigate an increasingly dynamic and complex environment through four market-leading businesses including Marsh, Mercer and Oliver Wyman. For more information, visit www.guycarp.com and follow us on LinkedIn and X.