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ATKINS

Member of the SNC-Lavalin Group

Nationwide (USA) Pluvial Flood Modeling via Telemac2D

Finalist in Digital Excellence category of UK Environment
Agency's Flood & Coast Excellence Awards 2020

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Need for Pluvial Models

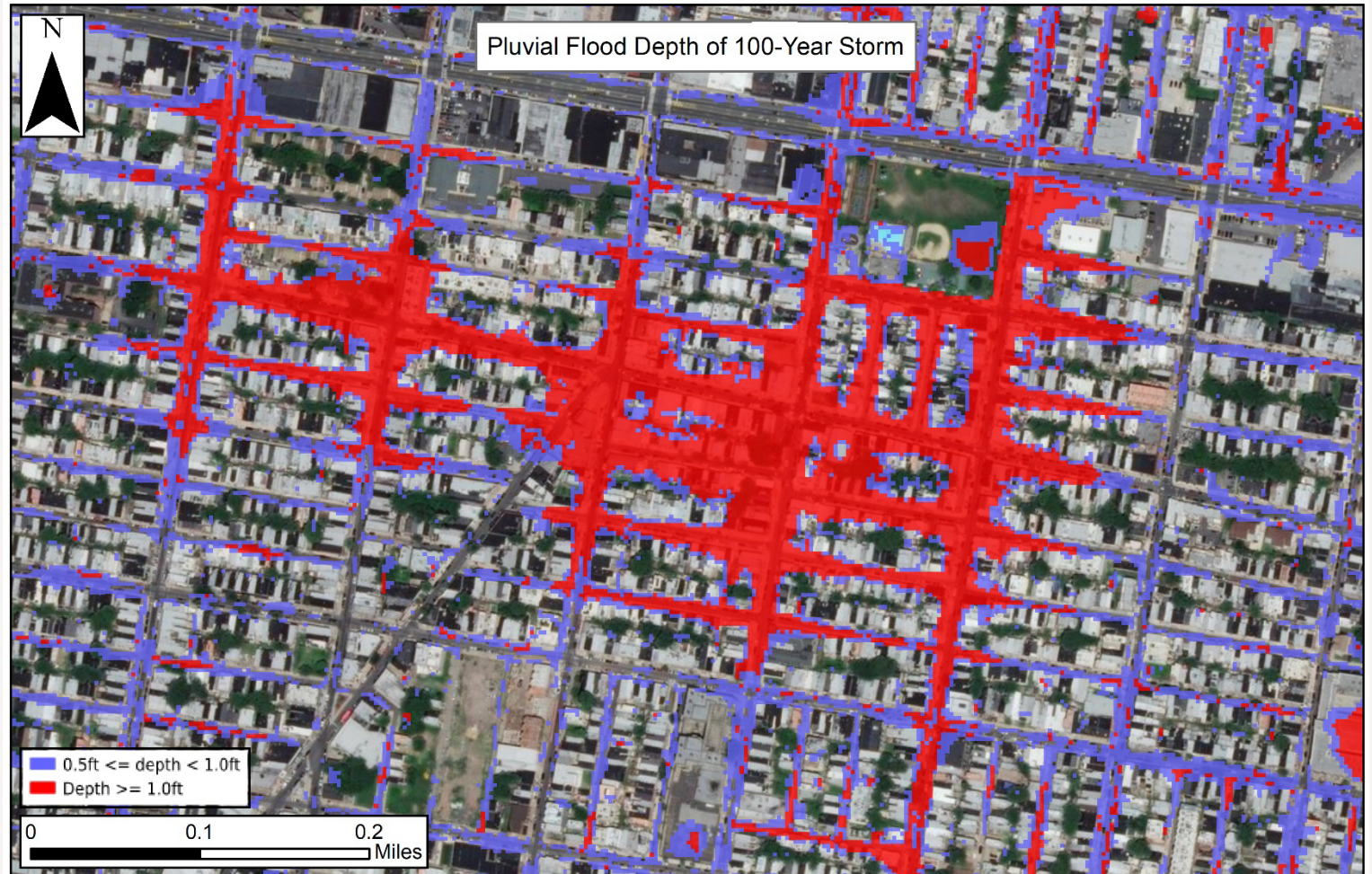
A key component of comprehensive risk.

Pluvial flooding occurs when small subbasins experience excessive accumulation of direct rainfall runoff.

~40% of flood damages in the USA are due to pluvial sources.

Most flood studies and related mapping activities have focused on riverine and ocean activity.

The map image at right shows results of Atkins' mass pluvial modeling routine, which runs the Telemac2D engine in Linux, leveraging cloud computing to scale nationwide.

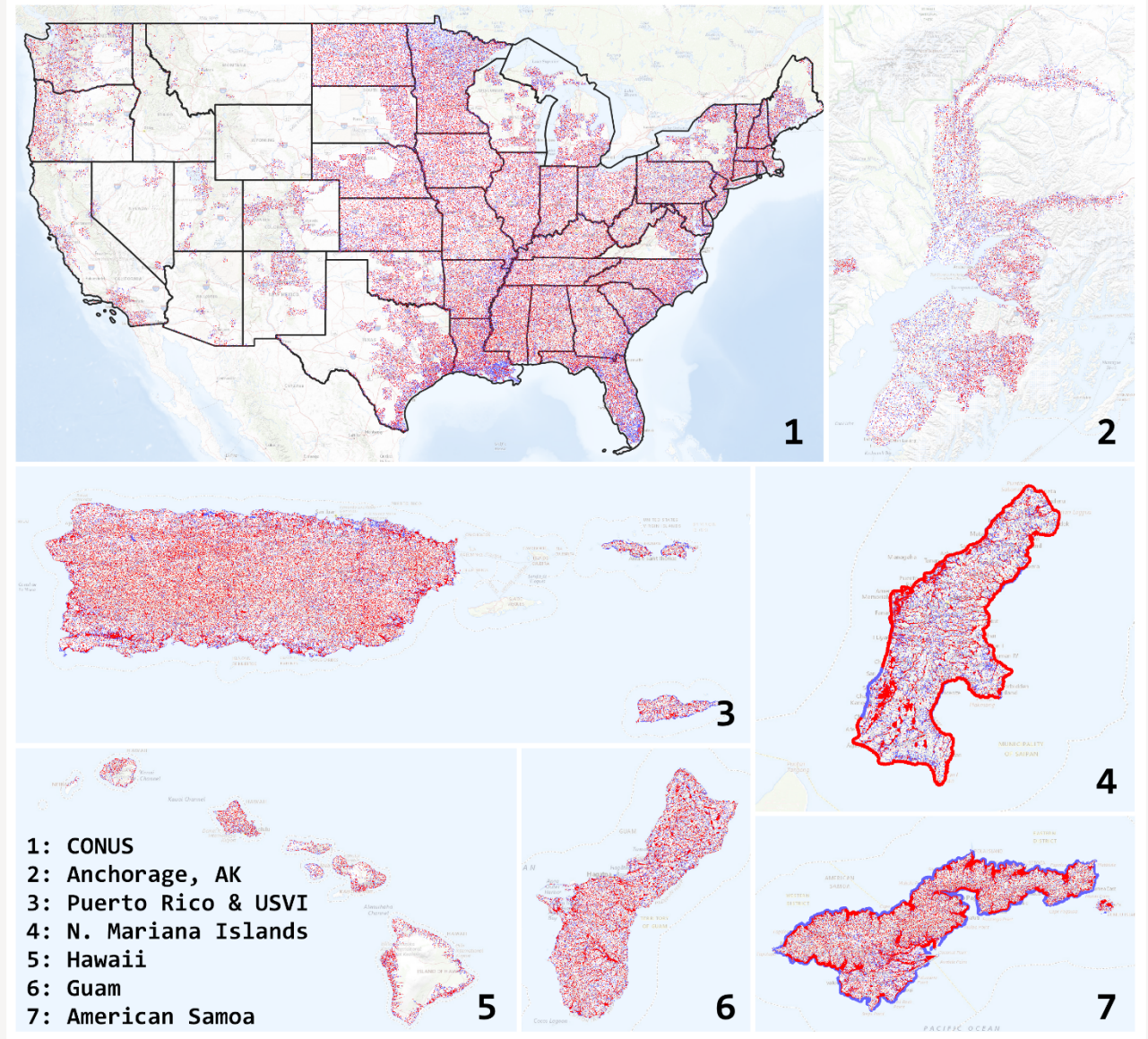


Modeling Scope

Everywhere in USA (+ territories) where high-resolution DTMs available

As of 2020:

- › Over 80% of USA population covered
- › Approximately 1.7 million square miles
- › Four rain events
 - › 2-year
 - › 10-year
 - › 100-year
 - › 1000-year
- › Resulting 3-meter depth rasters composed of about 8 terabytes, compressed

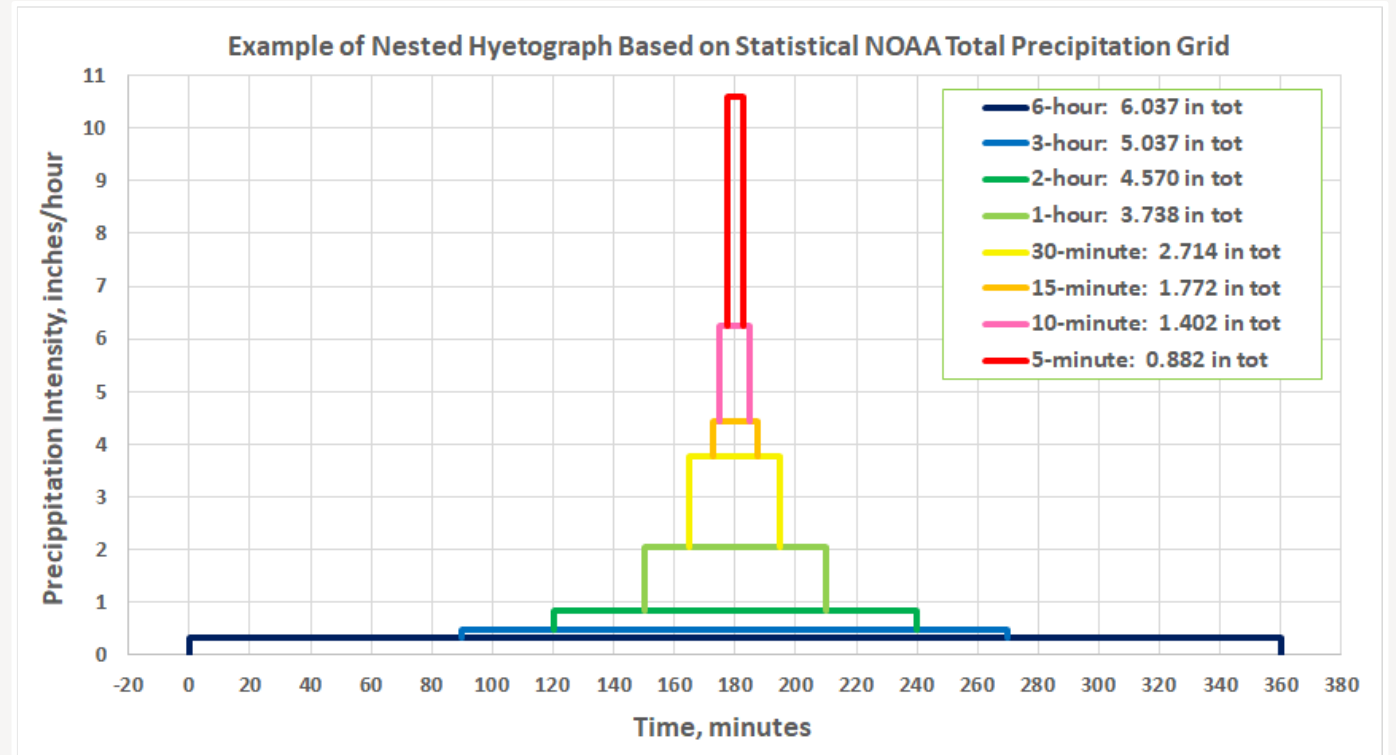


Process Details



Custom triangulated mesh

- › Early models at 15-meter node spacing
- › Later models improved to 11-meter node spacing
- › 3-meter pixels for input DTM and output depth rasters.



Custom Nested Hyetograph Derived For Each Node

- › At each node, NOAA Atlas 14 total volume sampled for several storm durations, up to 6-hour duration
- › Volumes converted into rates and nested into a 6-hour hyetograph, such that the volume under any time-width (from center) agrees with the corresponding NOAA total volume of that duration.





Thank You!

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