JBA risk management THE FLOOD PEOPLE.

ARA

A Collaborative Approach to Wind and Flood Modelling

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Oasis Insight Conference, London

May 4, 2023

Overview

- Maximum intensity observations from some recent mainland U.S. tropical cyclones
- TC event set challenges
- TC rainfall
- Inland flood challenges
- Implementation on Oasis and NRMC
- Summary and next steps

Maximum Intensity Observations from Some Recent U.S. TCs

Event	U.S. Landfall Category	CPI-Adjusted Economic Loss ($B)	Peak Gust (kt)	Peak Storm Tide (ft)	Total Rainfall (in)
2001-Allison	0	14	55	3	37
2004-Charley	4	25	139	13	5
2004-Ivan	3	32	93	15	17
2005-Katrina	3	191	117	28	15
2005-Wilma	3	29	102	7	11
2008-Ike	2	41	97	14	18
2012-Sandy	0	85	78	16	8
2017-Harvey	4, 0	153	122	9	48
2017-Irma	4, 3	61	104	8	22
2018-Florence	1	29	91	11	34
2018-Michael	5	30	121	16	12
2020-Laura	4	27	116	10	12
2021-Ida	4	81	106	13	13
2022-Ian	4	114	122	13	27

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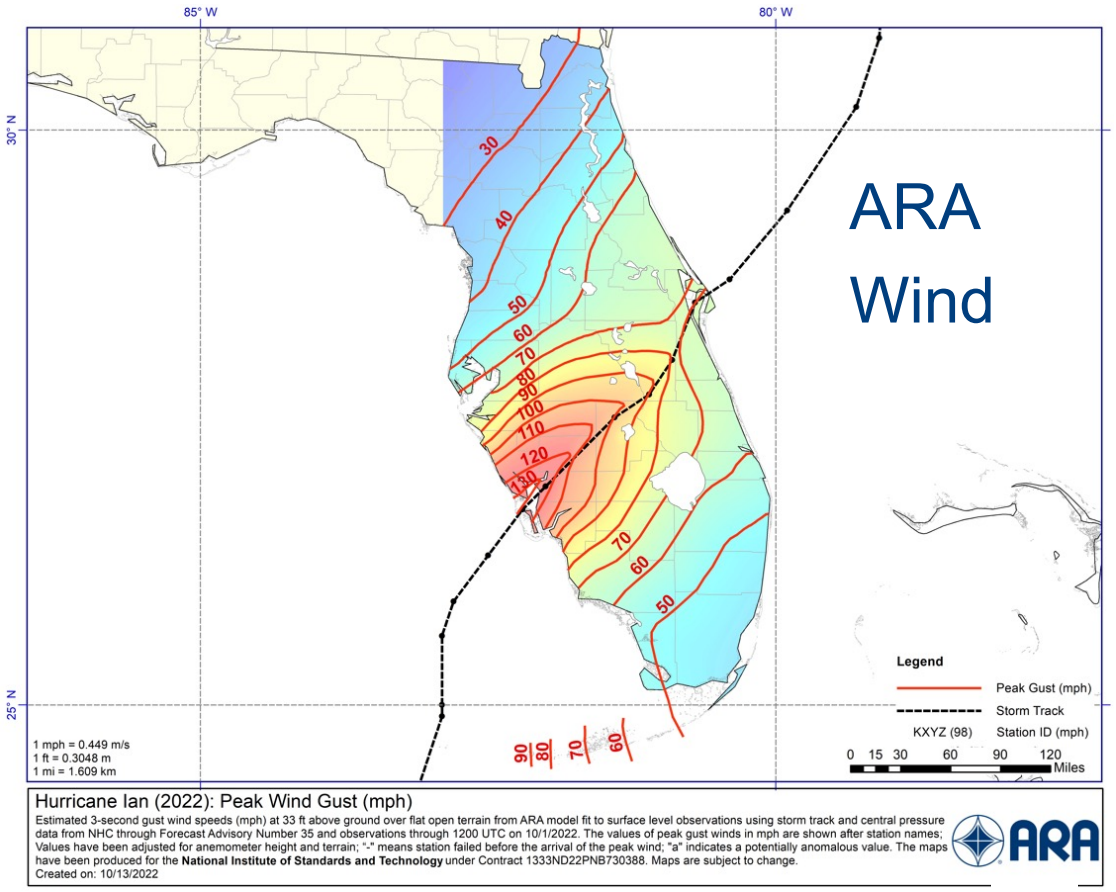
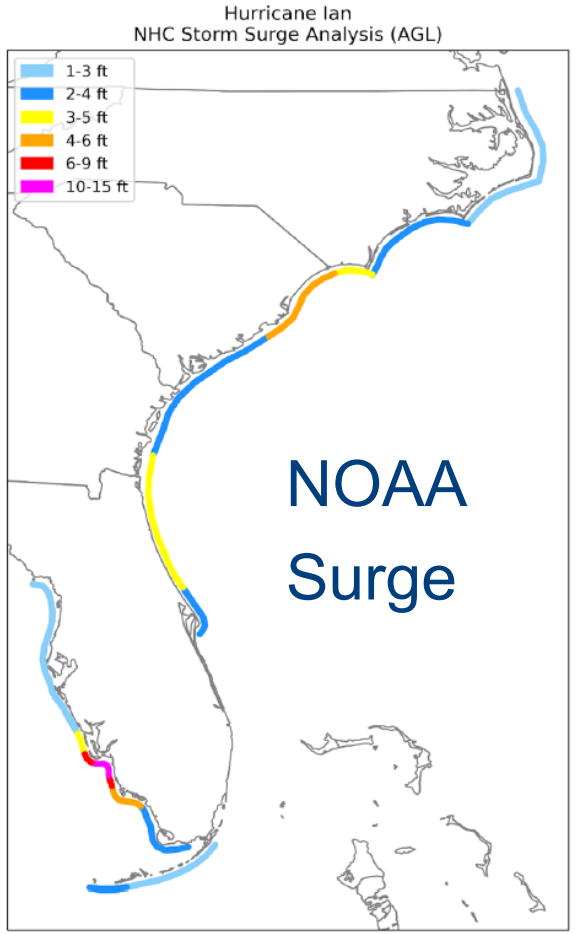
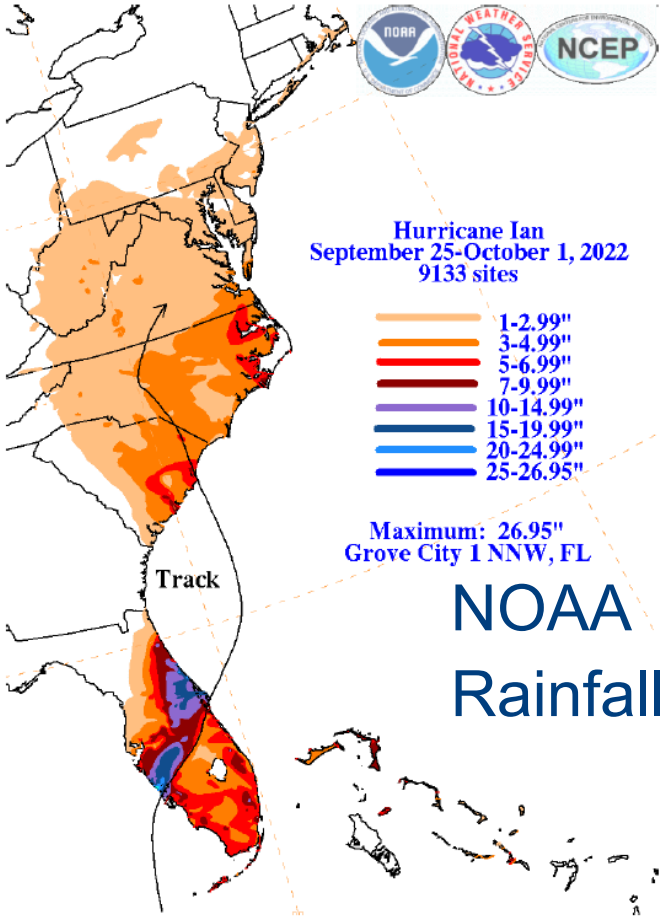
Hurricane Ian Hazard Footprints





Analyzed storm surge inundation (feet above ground level) along the coasts of Georgia, South Carolina, and North Carolina from Hurricane Ian.



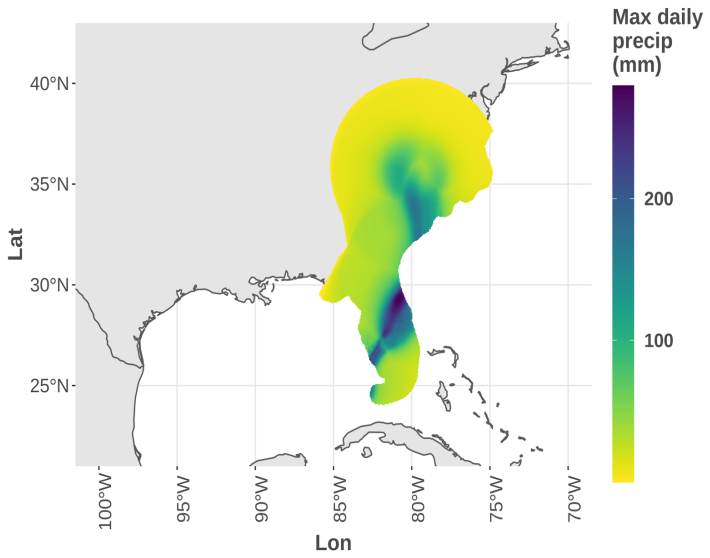
nalysis of storm total rainfall (inches) for Hurricane Ian courtesy of David Roth of the Weather Prediction Center.

Stochastic Tropical Cyclone Event Set Challenges

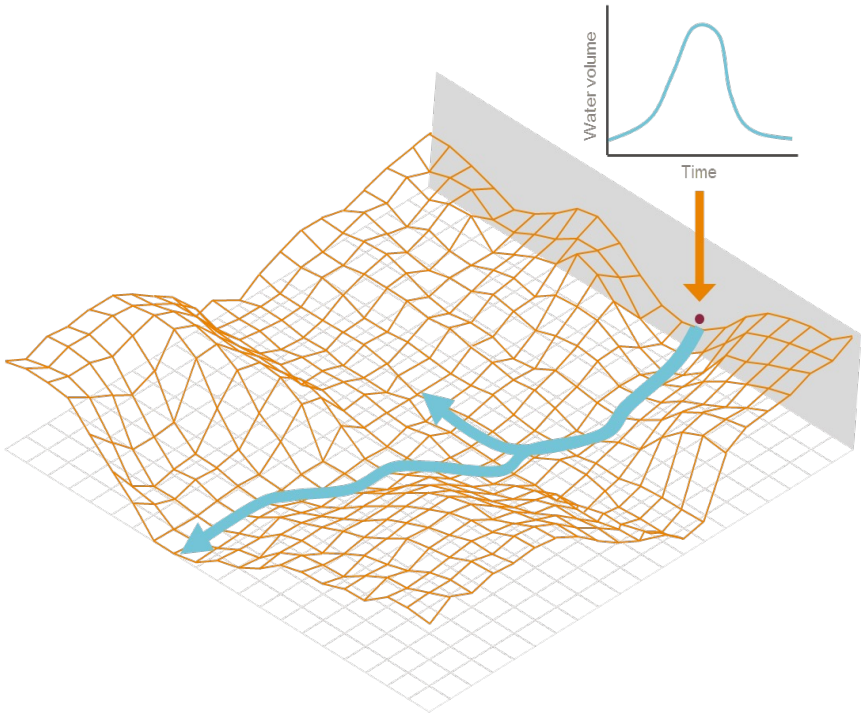
Ability to:

- Model TC tracks from genesis to lysis
- Produce properly correlated wind, surge, rainfall, and inland flood footprints
- Fit historical TC frequencies, intensities, and seasonality
- Adjust for current and future climatology using gridded environmental parameter outputs from a validated and bias-corrected General Circulation Model (GCM)
- Account for sea-level rise and other important pre-event conditions

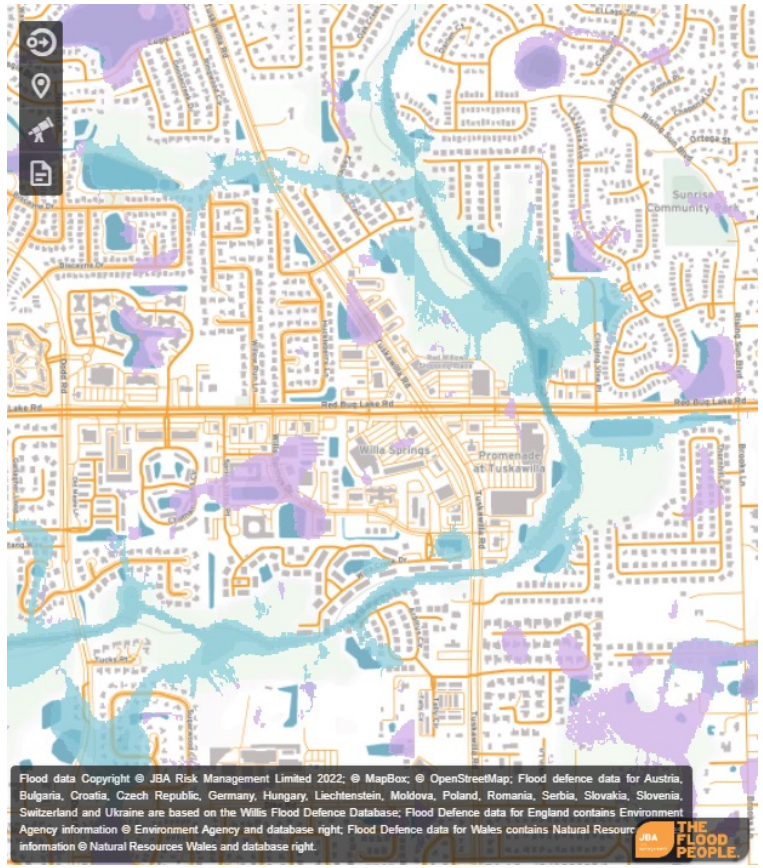
INLAND FLOOD CHALLENGES



Maintain data integrity



Simulation of catchment response



Data granularity

IMPLEMENTATION ON OASIS & NRMC

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oasis LOSS MODELLING FRAMEWORK

Nasdaq

ODS Open Data Standards

Portfolio Import → Calculation of GU Loss → Pass to Oasis Financial Engine

Currently two independent workflows with consistent Event Set allowing combination of event loss at PLT

ODS Open Data Standards

Portfolio Import → Calculation of GU Loss → Pass to Oasis Financial Engine

Event ID	ARA Output	JBA Output	Event Type
Event_1	$1,374,202		TC Wind
Event_2	$901,690	$1,203,376	TC Wind & Flood
Event_3		$1,111,107	NTC Flood
Event_4	$615,545		TC Wind
Event_5	$875,431		TC Wind
Event_6		$136,414	NTC Flood
Event_7		$814,061	NTC Flood
Event_8	$1,749,189	$147,149	TC Wind & Flood
Event_9	$1,600,854	$1,284,078	TC Wind & Flood

IMPLEMENTATION ON OASIS & NRMC

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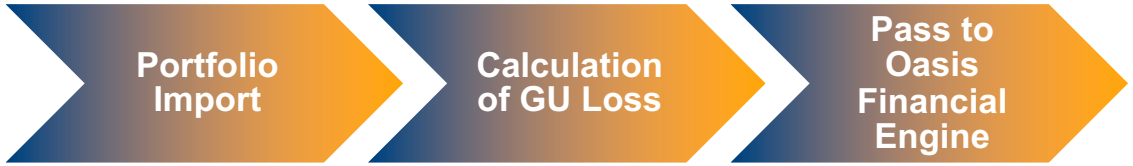
Aiming for single workflow

ODS
Open Data Standards



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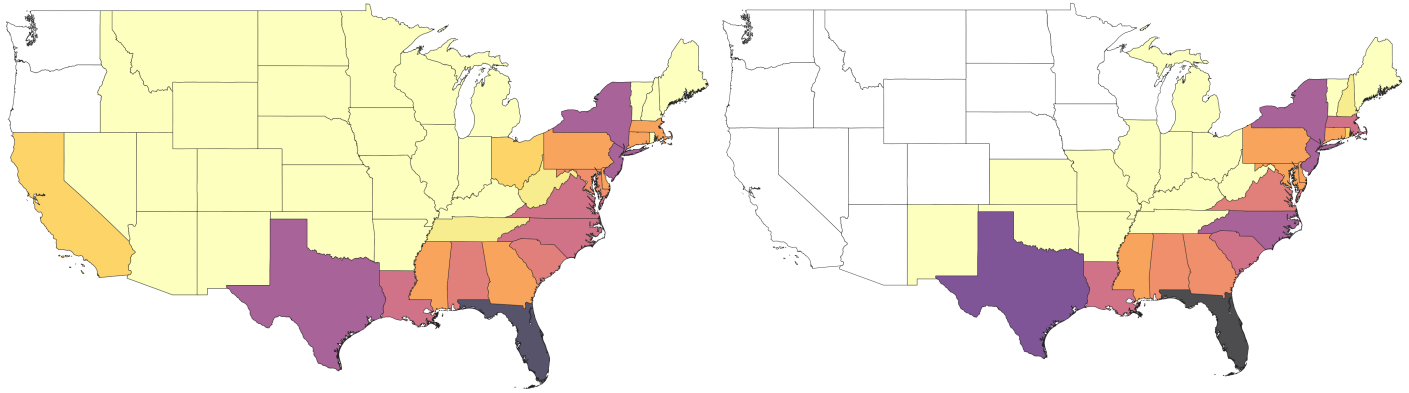
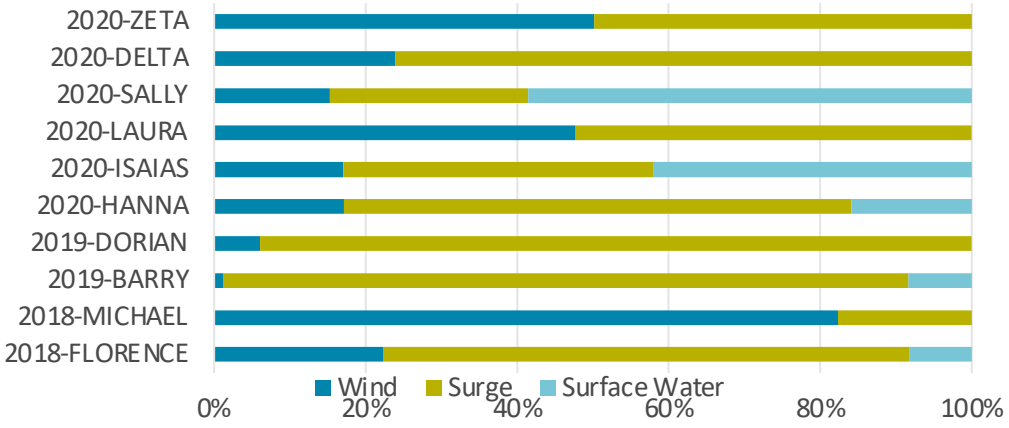
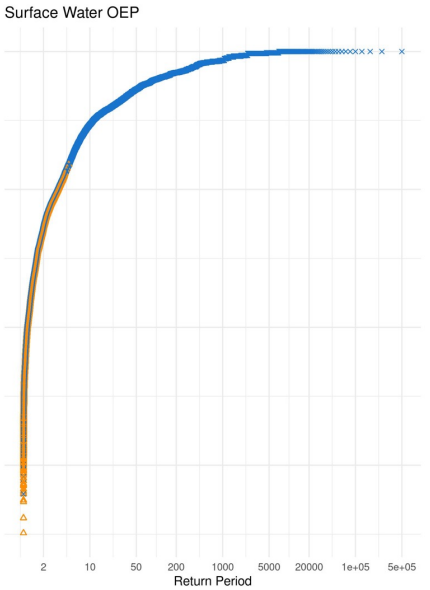
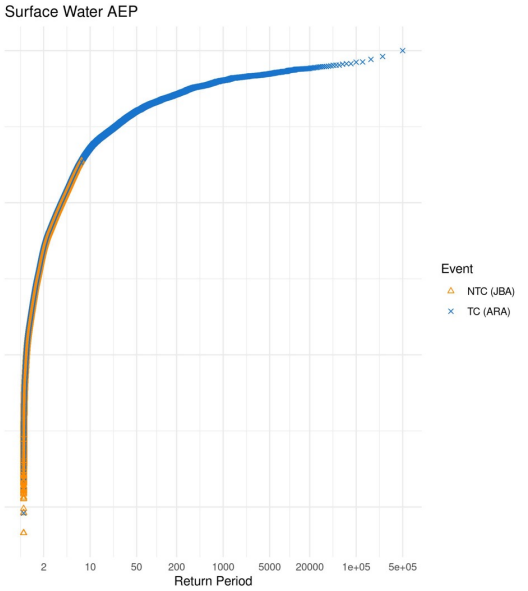
STATUS & NEXT STEPS









THANK YOU

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THE SMALL PRINT

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Flood defences data used in the maps in this presentation are based in part on: The Willis Flood Defence Database; FEMA National Flood Hazard Layer; US Army Corps National Levee Database (USA); Flood Protection Works (British Columbia, Canada); visual information from Google Earth and Google Street View