

# ADCIRC Storm Surge Model on GENI

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**renci**

RESEARCH ▾ ENGAGEMENT ▾ INNOVATION

# ADCIRC Storm Surge Model on GENI

- Demo
  - Describe ADCIRC
  - Create the slice live
  - Start the application
  - Show results of a previous run



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# ADCIRC Storm Surge Model on GENI

- **Slice attributes**
  - 38 VMs (152 compute cores)
  - 6 GENI racks plus ION
  - Custom image replicated across testbeds
  - ExoGENI
    - Groups
    - Storage
  - InstaGENI
    - Shared VLANs
    - Xen VMs (4 core, 4 GB memory, 30 GB storage)
  - Inter-domain
    - GENI Stitching
    - ExoGENI Stitching



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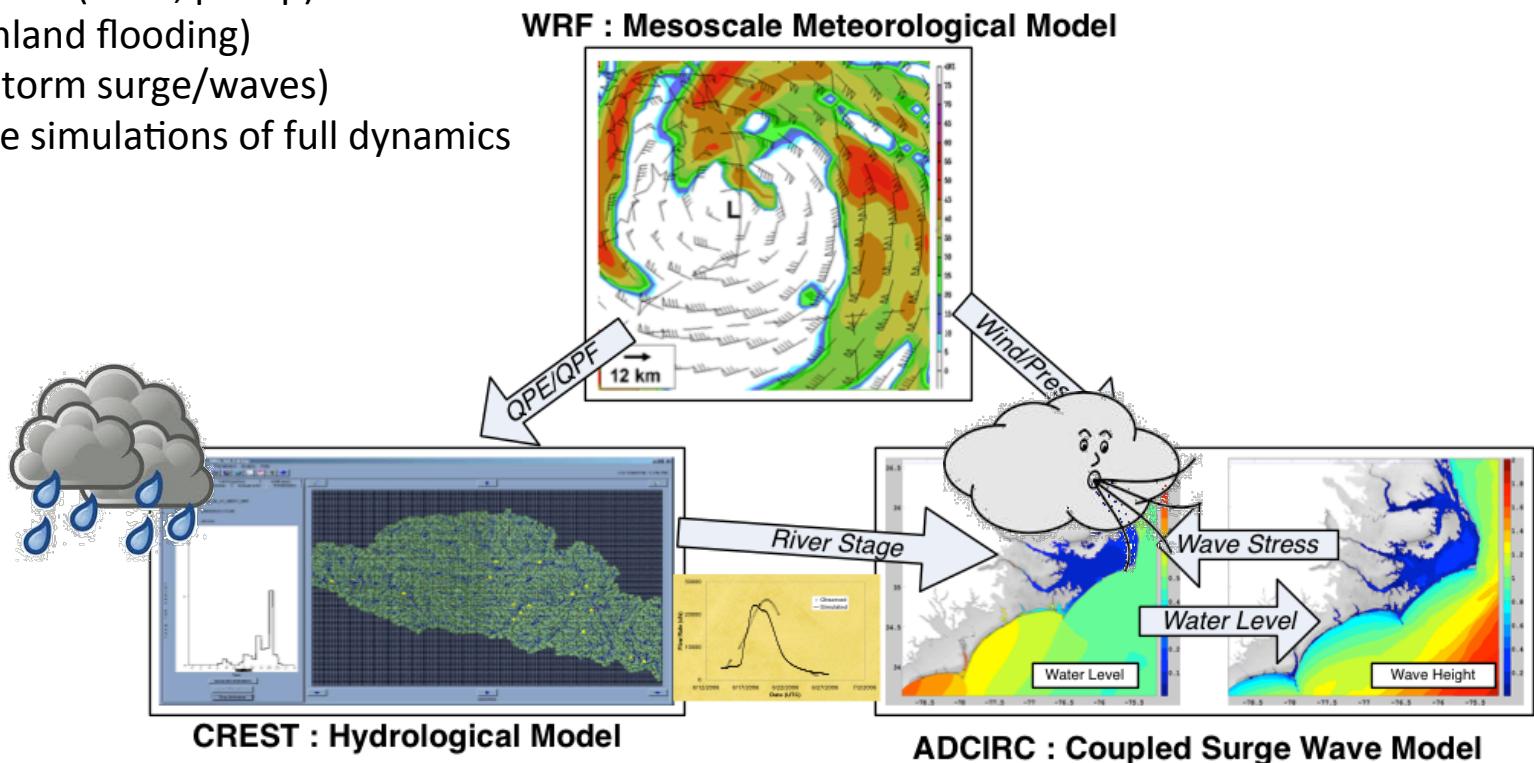
# NSF Hazards SEES Project

Risk-based hurricane evacuation route planning

- R. Davidson (UDEL), B. Blanton (RENCI/UNC), B. Colle (SUNY-StonyBrook)

Integrated Hurricane Hazard Model

- Atmosphere (wind, precip)
- Rivers (inland flooding)
- Ocean (storm surge/waves)
- Ensemble simulations of full dynamics



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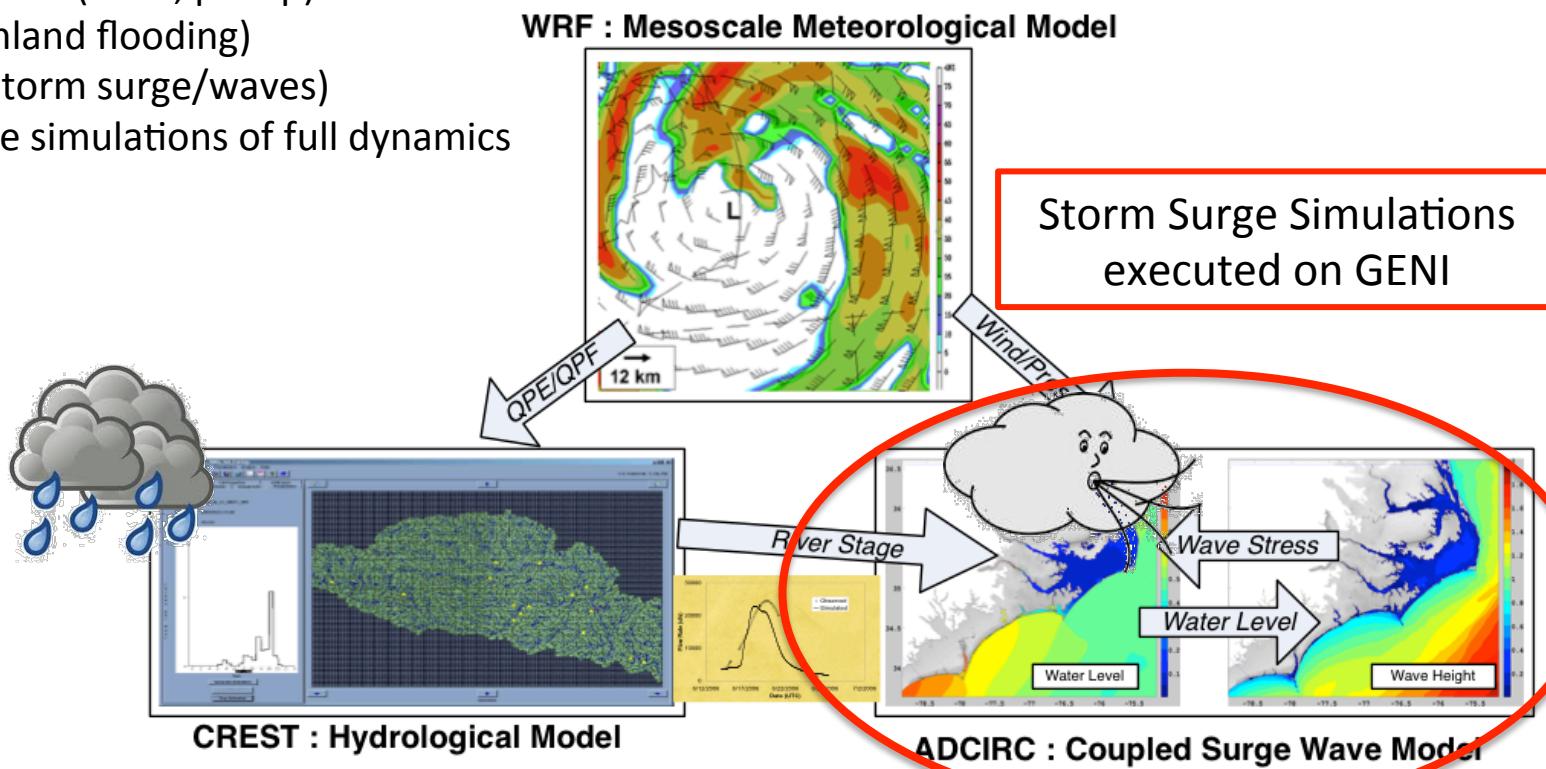
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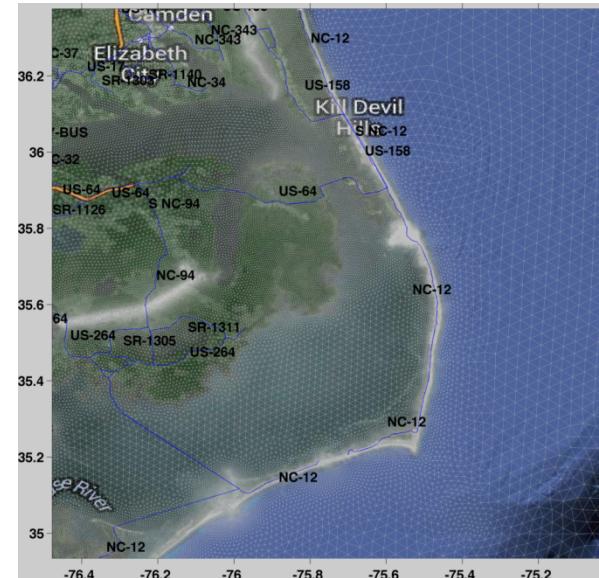
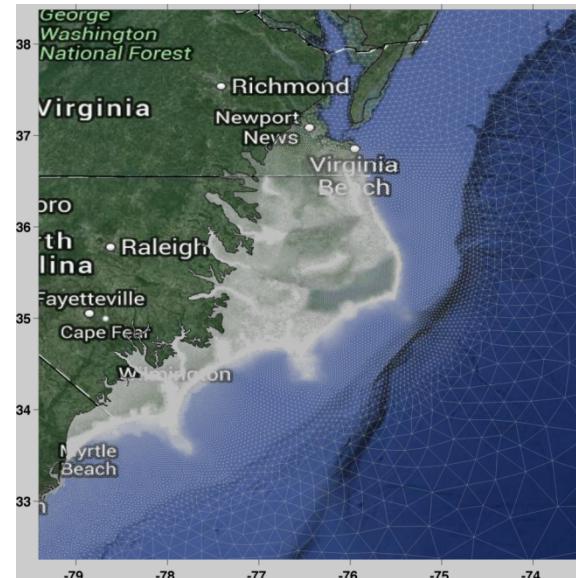
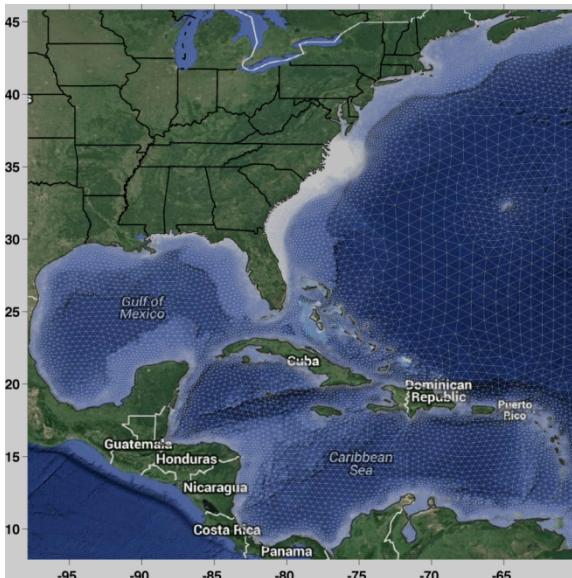
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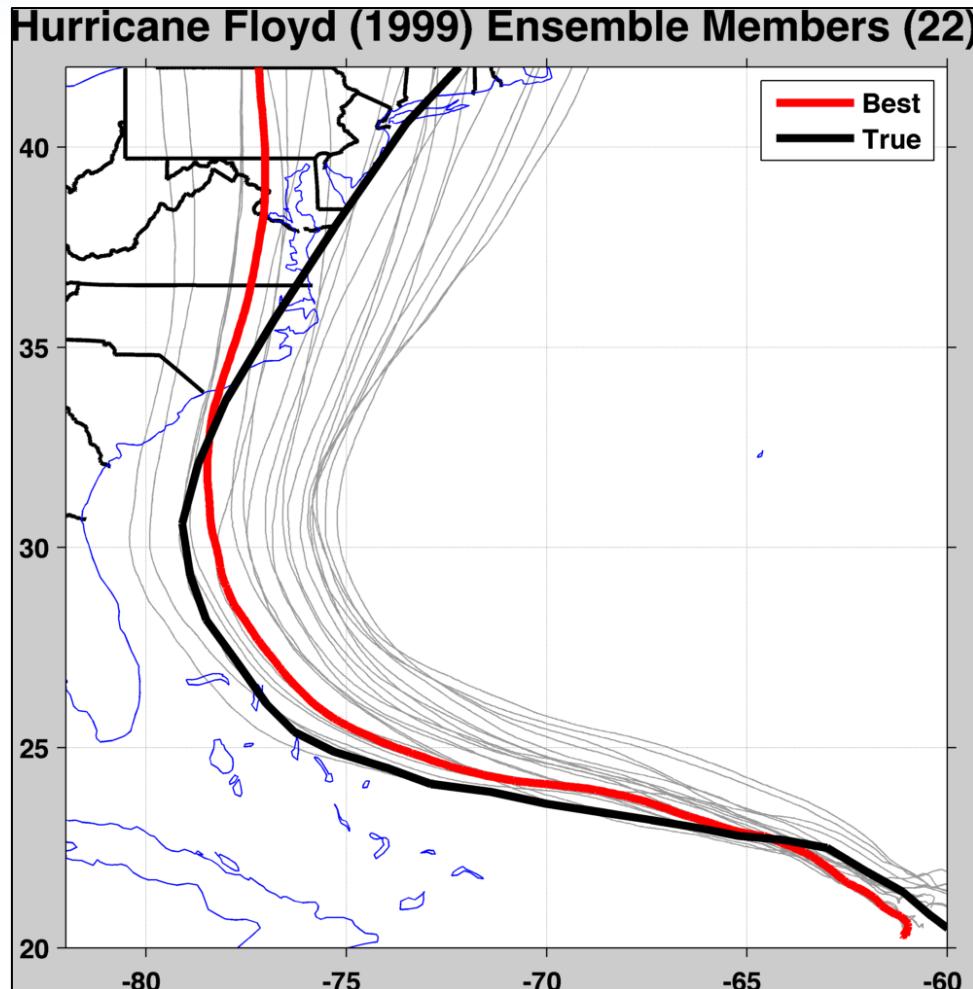


# ADCIRC Storm Surge Model

- Finite Element
- Very high spatial resolution (~1.2M triangles)
- Efficient MPI implementation, scales to thousands of cores
- Typically use 256-1024 cores for forecasting applications
- Used for coastal flooding simulations
  - FEMA flood insurance studies
  - Forecasting systems
  - Research applications



# WRF Ensemble Members for Floyd (1999)

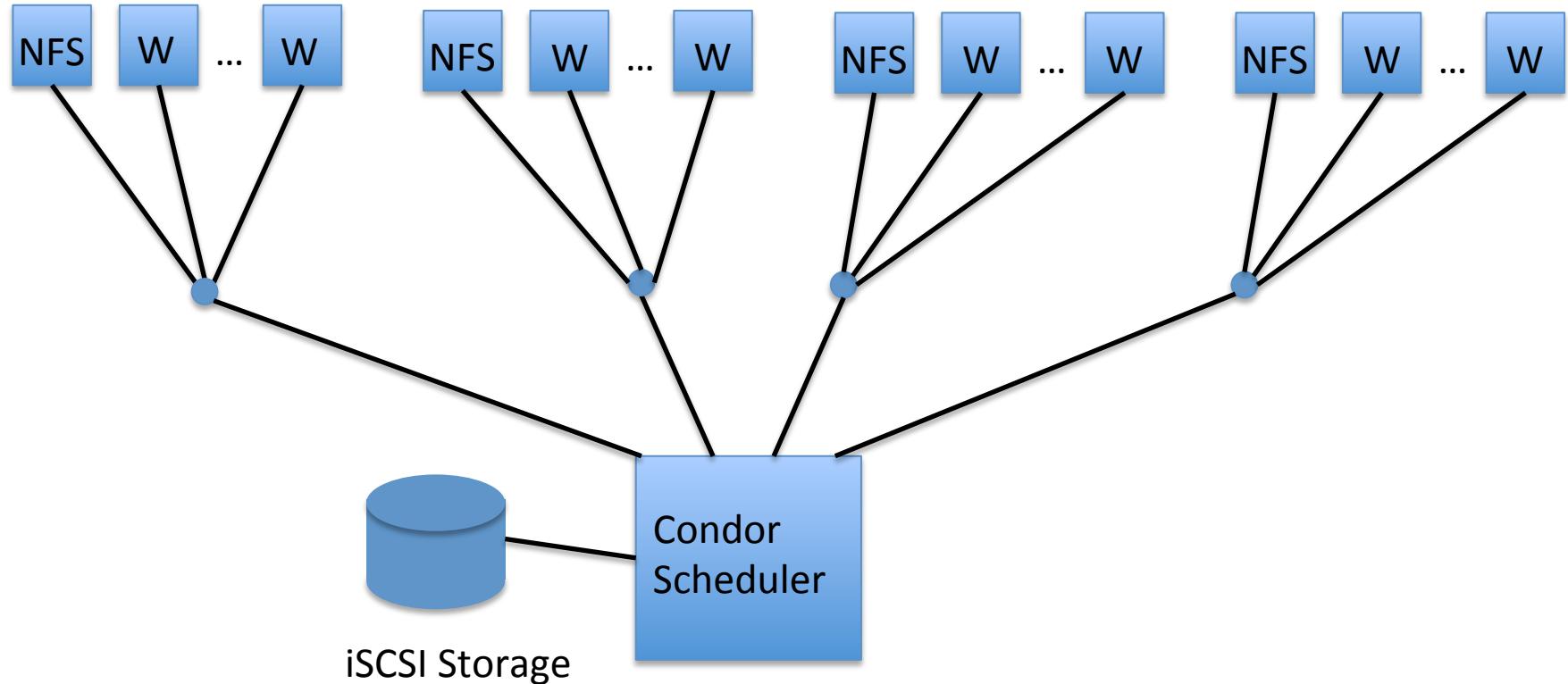


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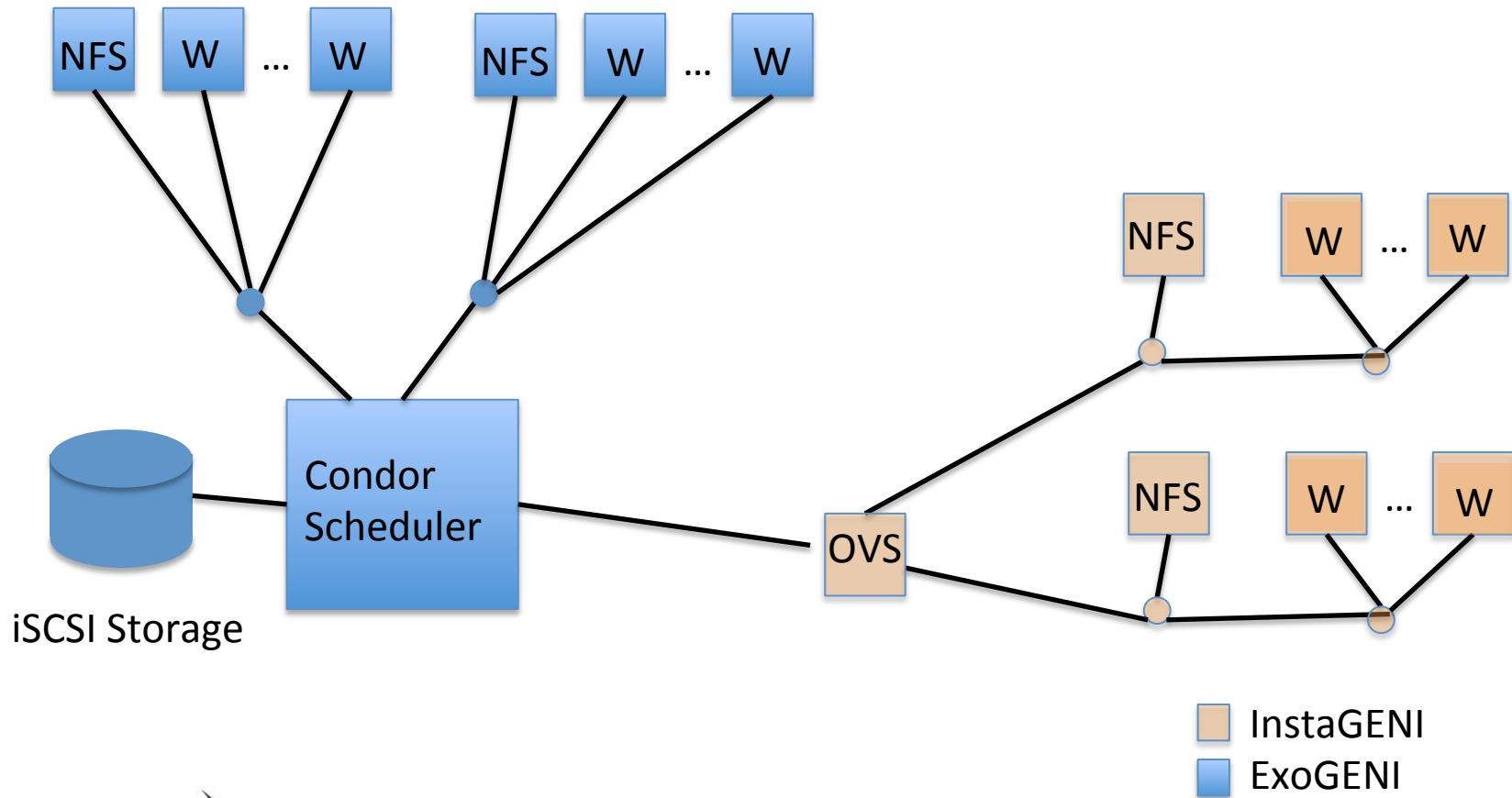


Courtesy of Brian Colle, SUNY-Stony Brook

# Demo GENI Slice



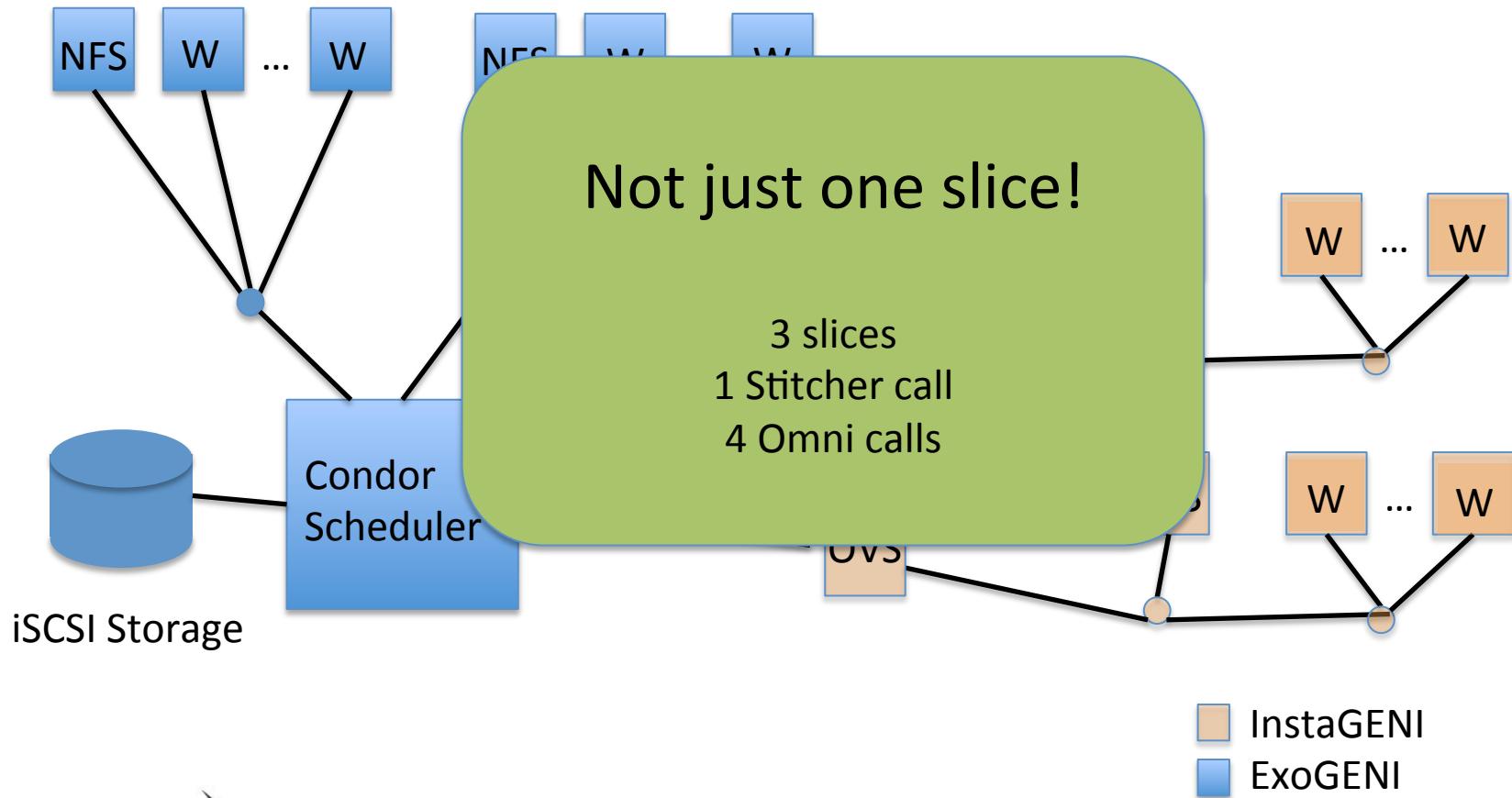
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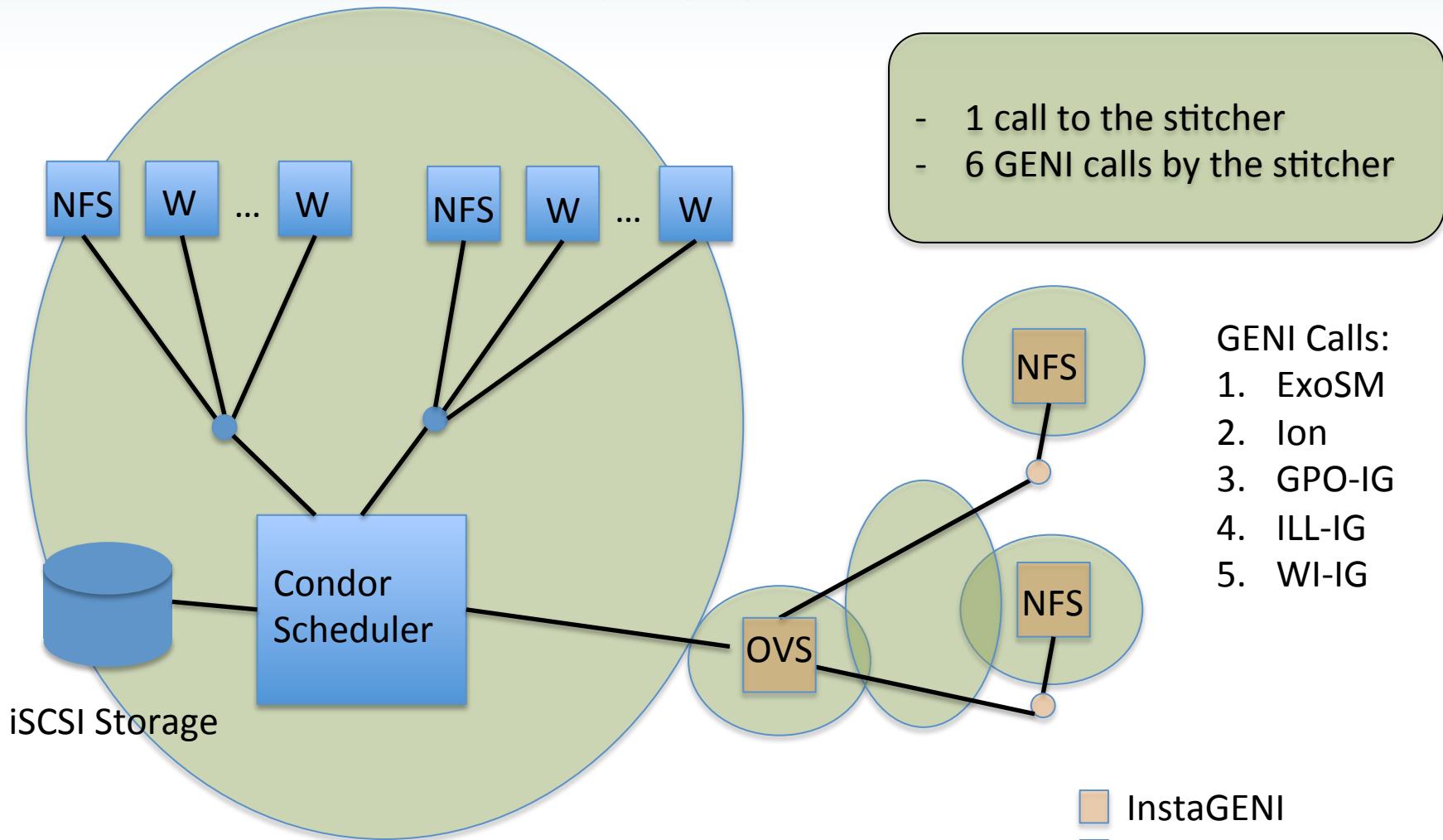


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- InstaGENI
- ExoGENI



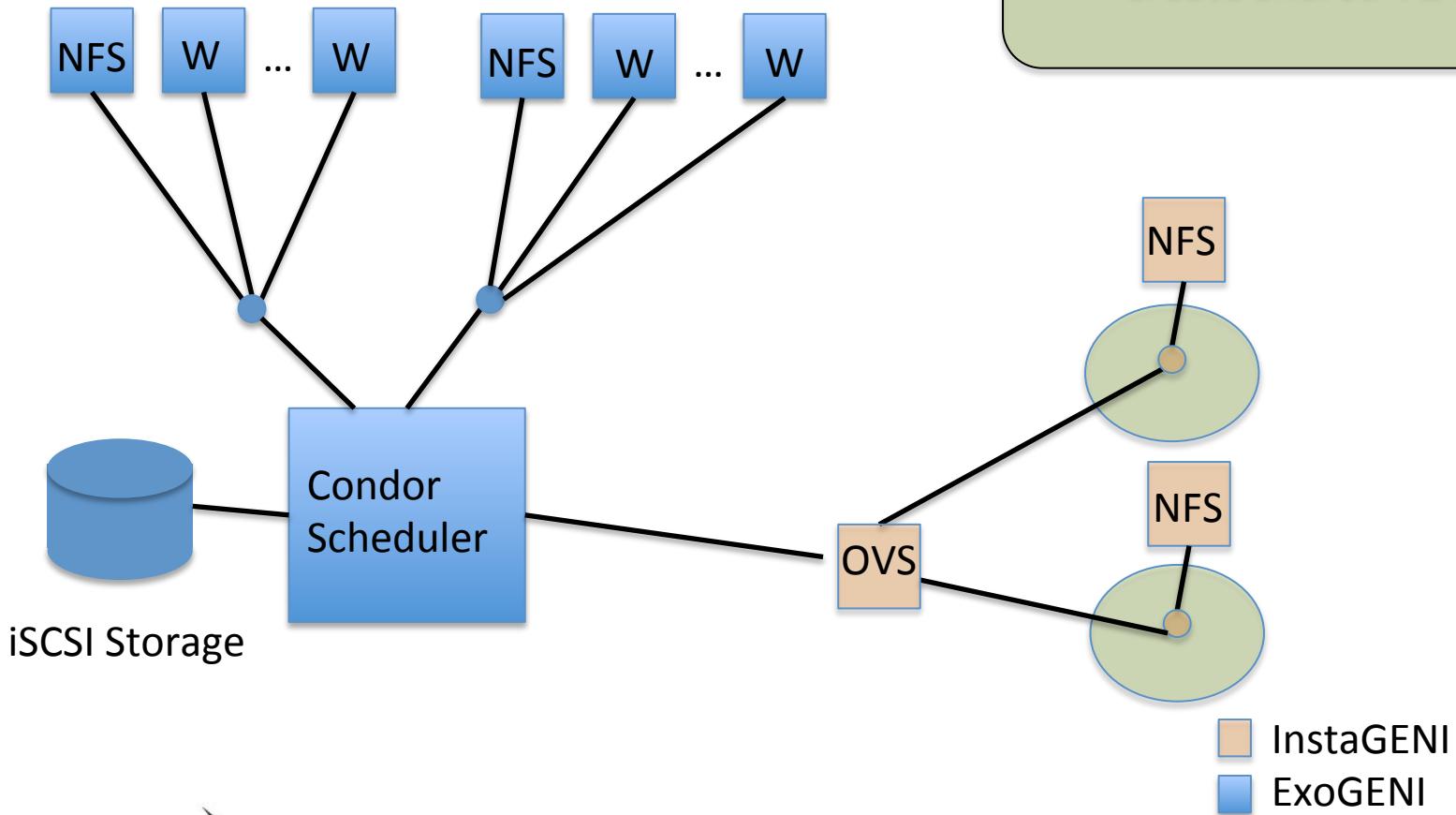
# Slice 1: ADCIRC-CORE



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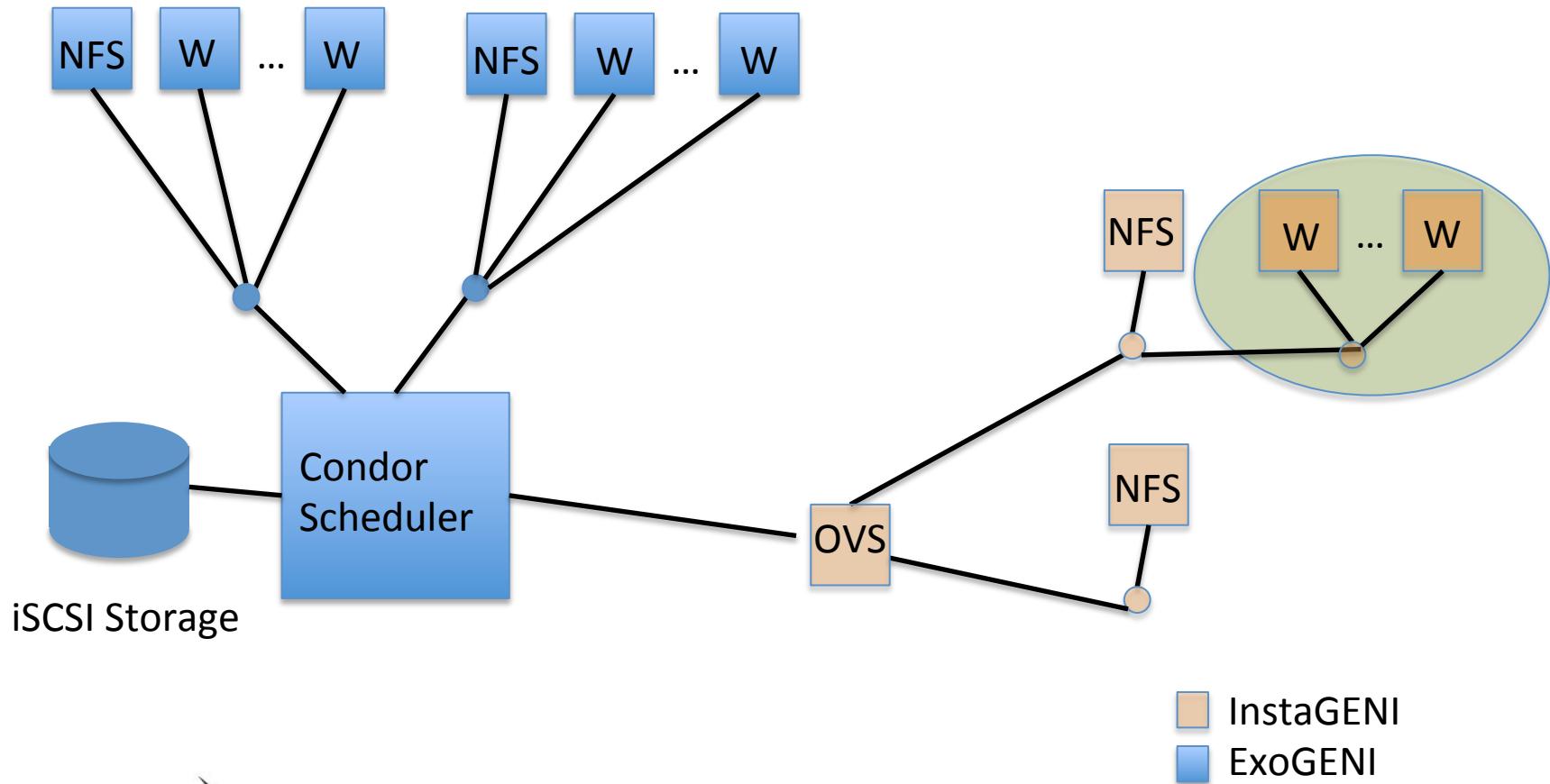
# Shared VLANs



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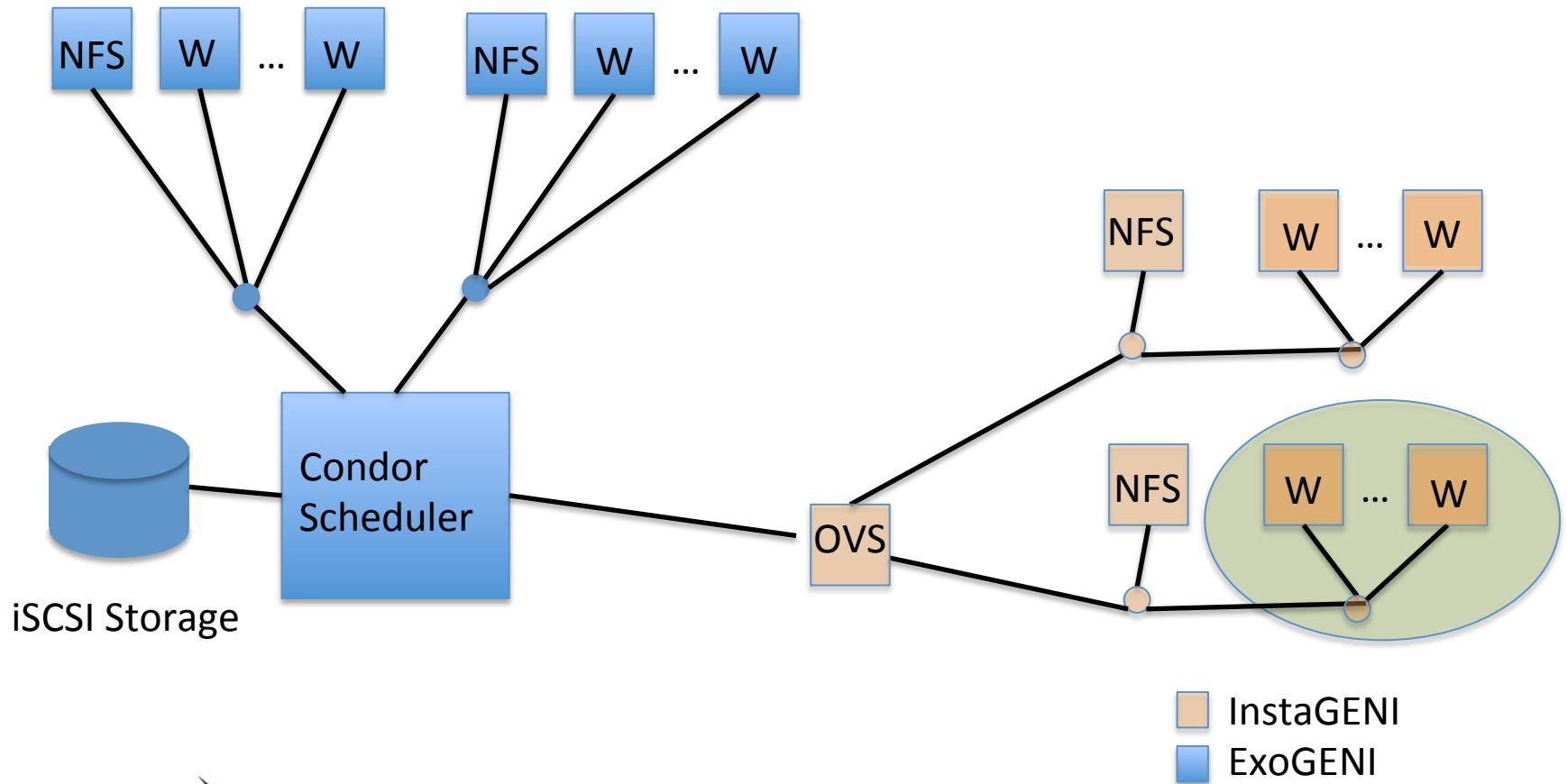


# Slice 2: Wisconsin Group



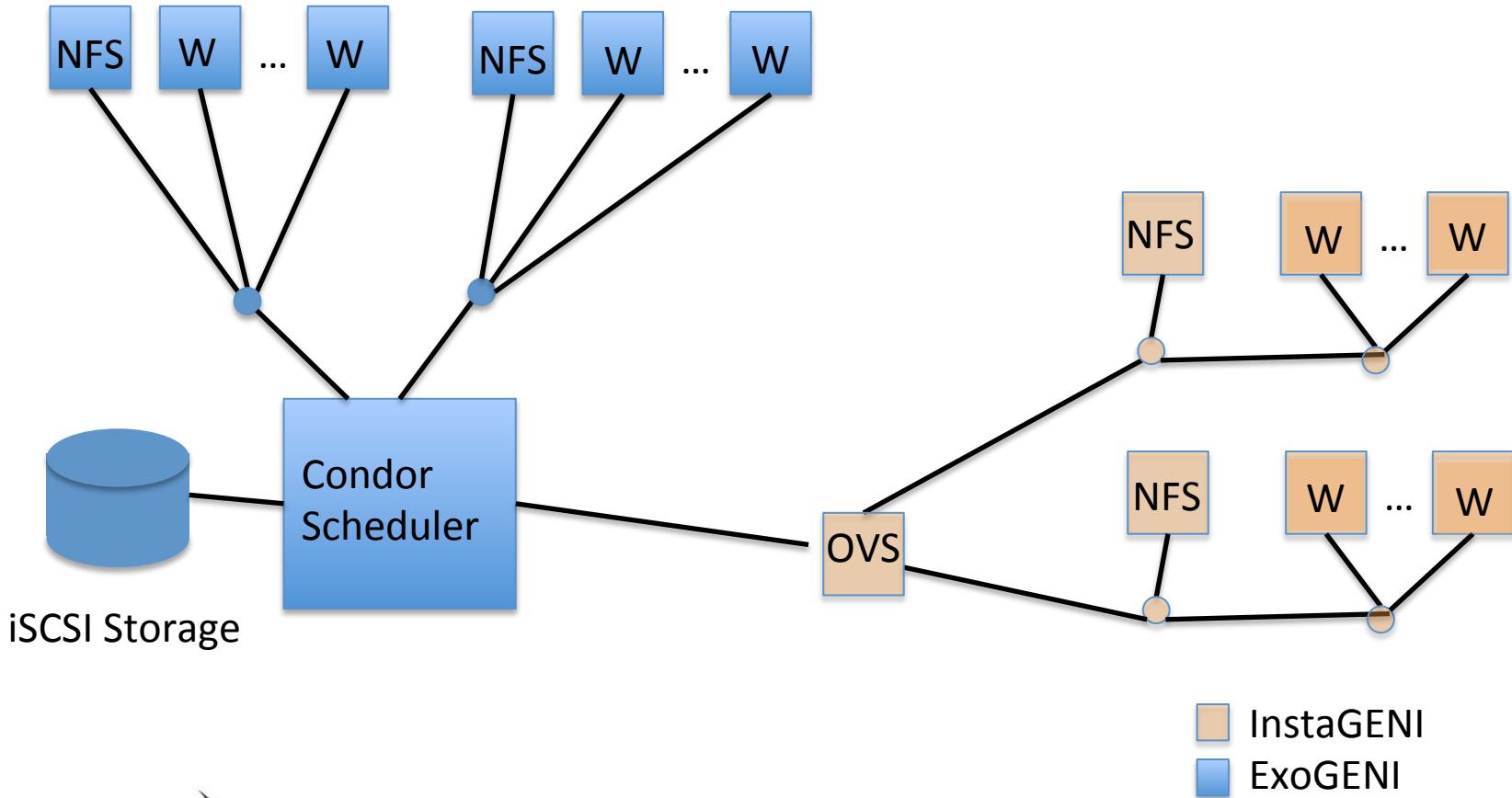
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# Slice 2: Illinois Group



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# Complete Slice(s)

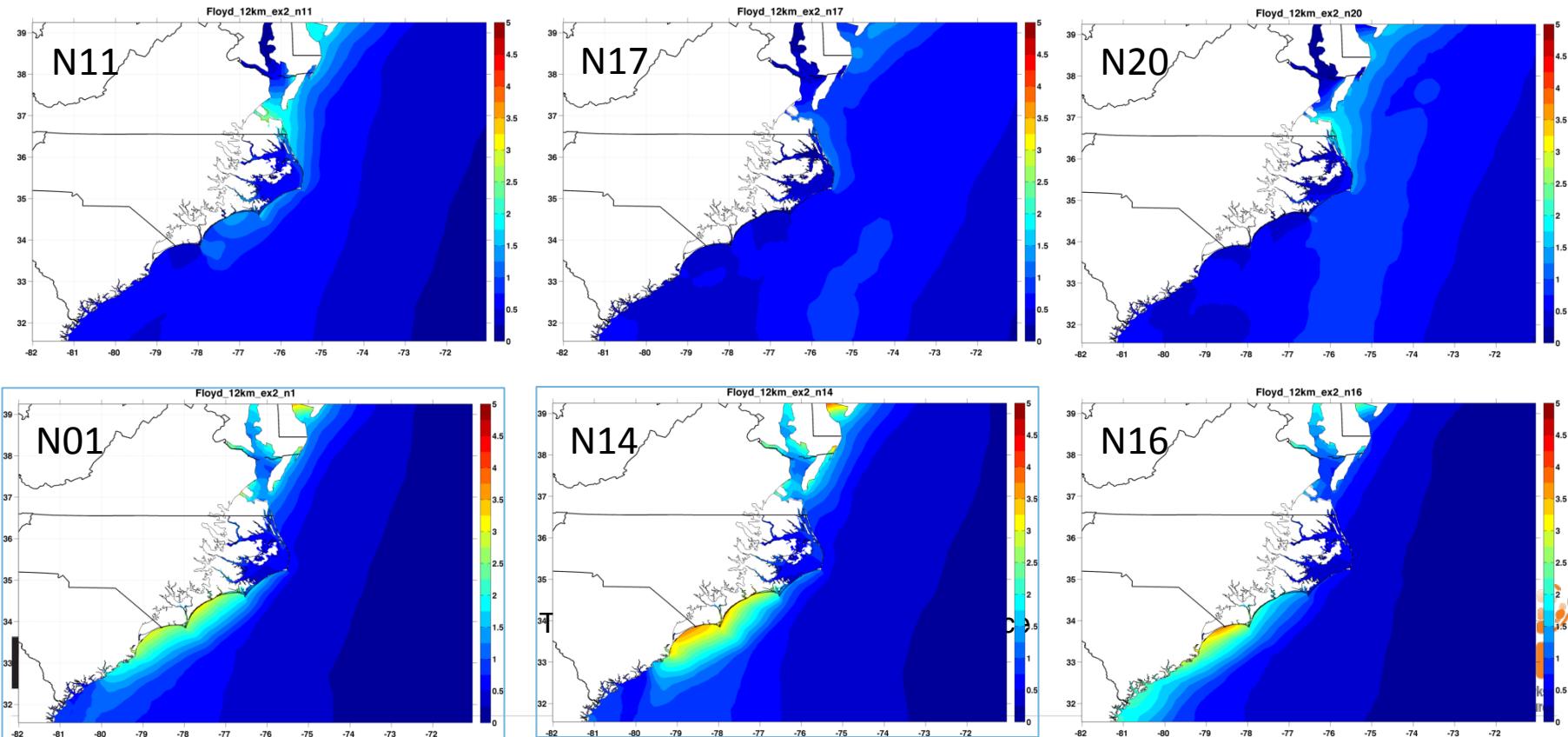
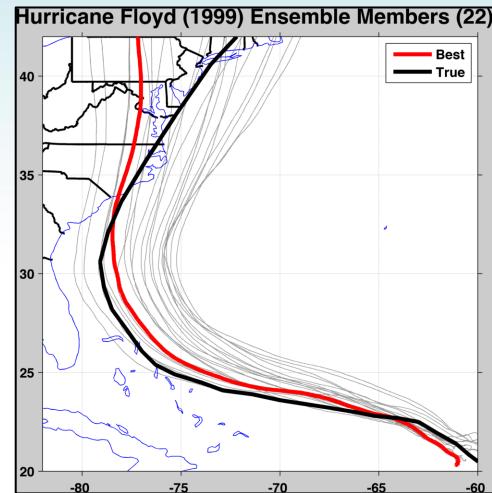


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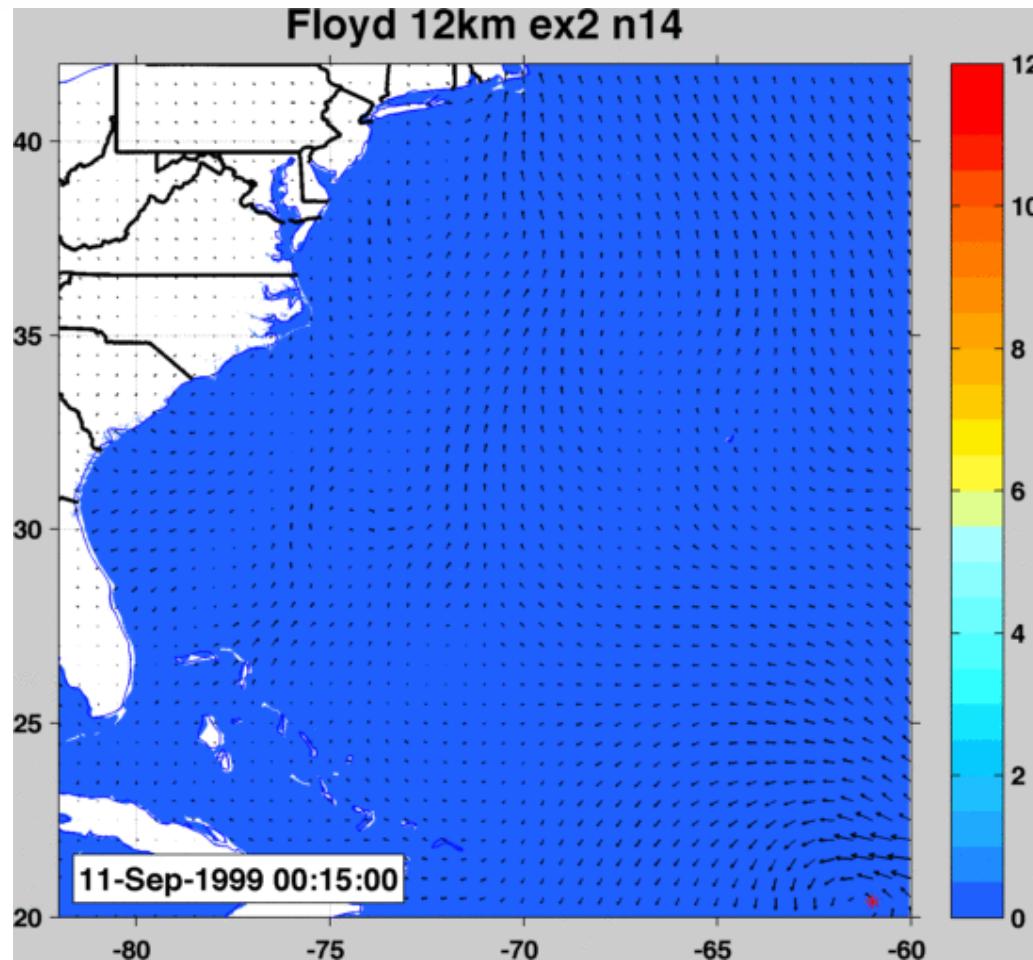


# ADCIRC Results from GENI

- 22-member ADCIRC ensemble; equal probability
- Max water level (meters above Mean Sea Level) for 6 members



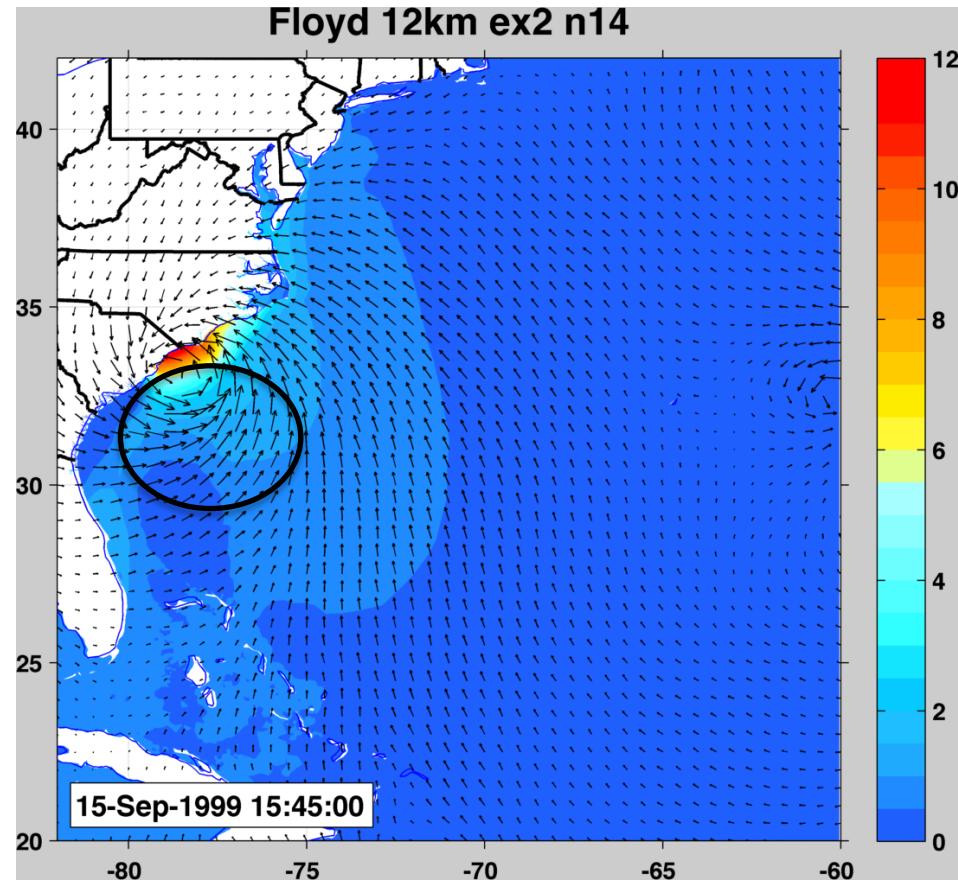
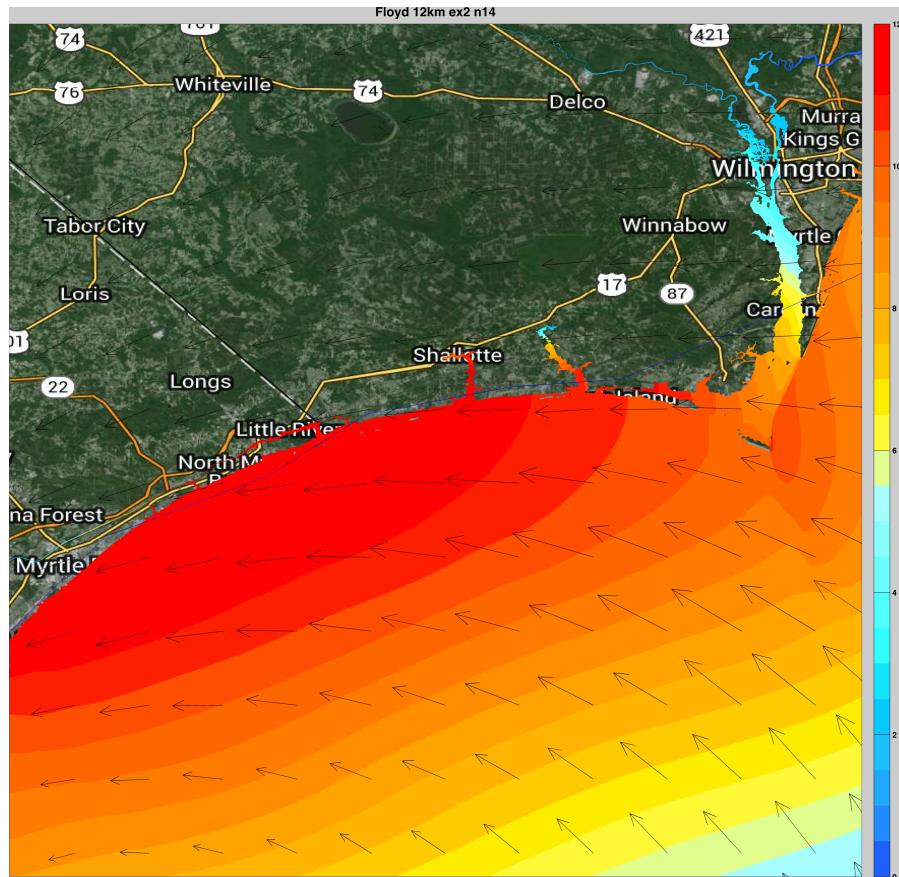
# Ensemble Member #14



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of the Future

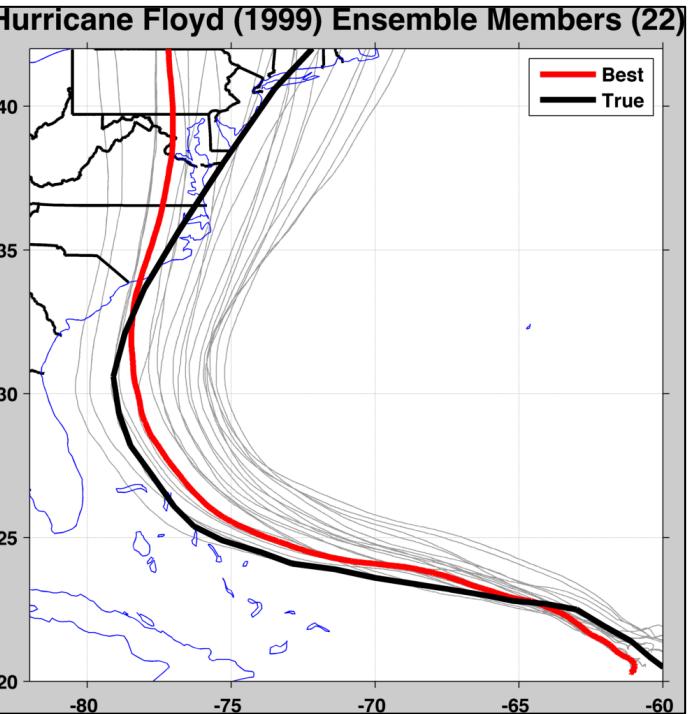
# WRF ensemble members for Floyd (1999)

Ensemble Members

Member	GEFS	Cumulus	PBL	Microphysics	Radiation
1	P1	KF	MYJ	WSM6	RRTM/Dudhia
2	P2	KF	YSU	Thompson	RRTMG
3	P3	KF	MYNN3	Goddard (3 ice)	RRTM/Dudhia
4	P4	KF	BouLac	Morrison	RRTM/Dudhia
5	P5	BMJ	MYNN3	Thompson	RRTM/Dudhia
6	P6	BMJ	MYNN3	Morrison	RRTMG
7	P7	BMJ	BouLac	WSM6	RRTMG
8	P8	GD	BouLac	Goddard (3 ice)	RRTMG
9	P9	GD	YSU	WSM6	RRTM/Dudhia
10	P10	GD	MYNN3	Thompson	RRTMG
11	P11	GD	MYJ	Morrison	RRTMG
12	P1	GD	MYNN3	Thompson	RRTMG
13	P1	BMJ	MYNN3	Morrison	RRTMG
14	P1	GD	YSU	Goddard (3 ice)	RRTM/Dudhia
15	P1	BMJ	MYJ	WSM6	RRTM/Dudhia
16	P1	BMJ	MYNN3	Goddard (3 ice)	RRTM/Dudhia
17	P2	KF	YSU	WSM6	RRTM/Dudhia
18	P4	KF	YSU	WSM6	RRTM/Dudhia
19	P5	KF	YSU	WSM6	RRTM/Dudhia
20	P7	KF	YSU	WSM6	RRTM/Dudhia
21	Engineering Conference	YSU	WSM6	RRTM/Dudhia	
22	er10-23r2014	YSU	WSM6	RRTM/Dudhia	

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Courtesy of Brian Colle, SUNY-Stony Brook



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# Thanks



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