

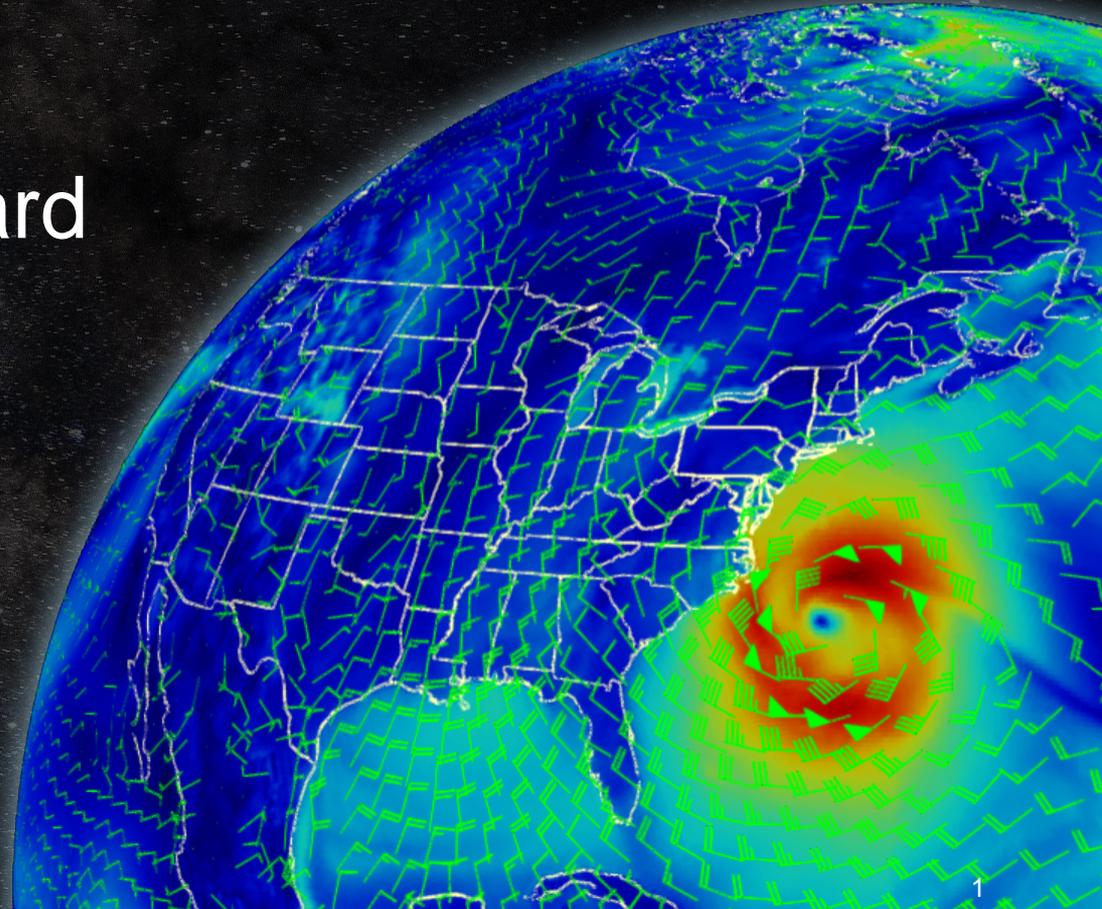
NWP: GSD's Path Forward

Tim Schneider

NOAA/ESRL/GSD



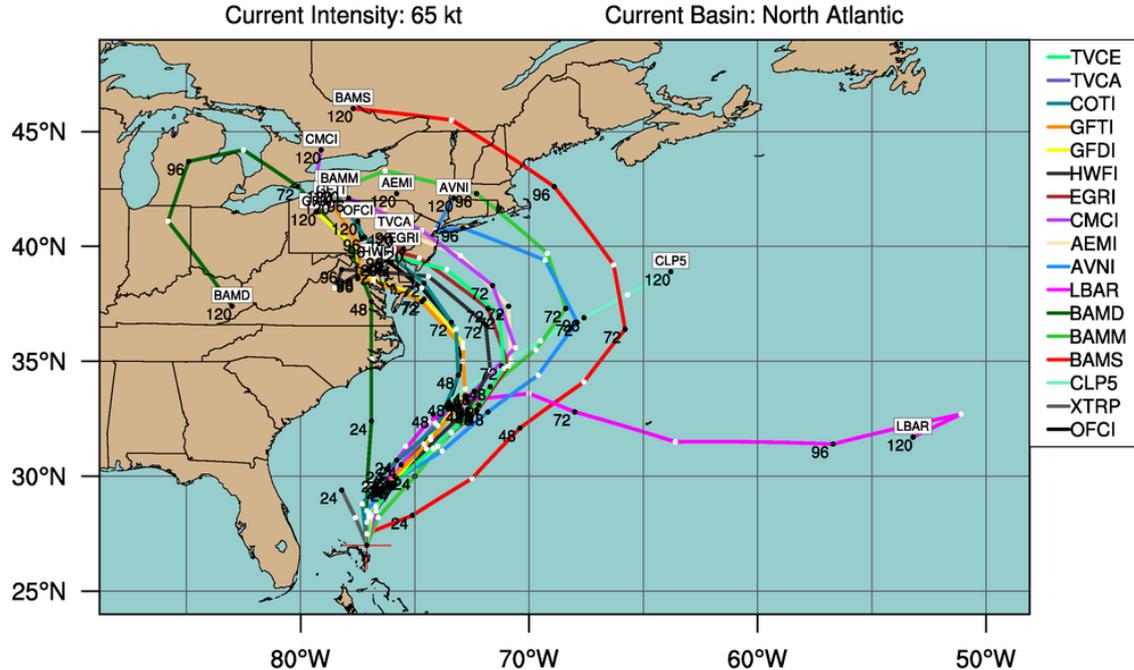
GSD Science Review
3-5 Nov 2015



The Lessons of Superstorm Sandy

HURRICANE SANDY (AL18)

Early-cycle track guidance initialized at 1800 UTC, 26 October 2012



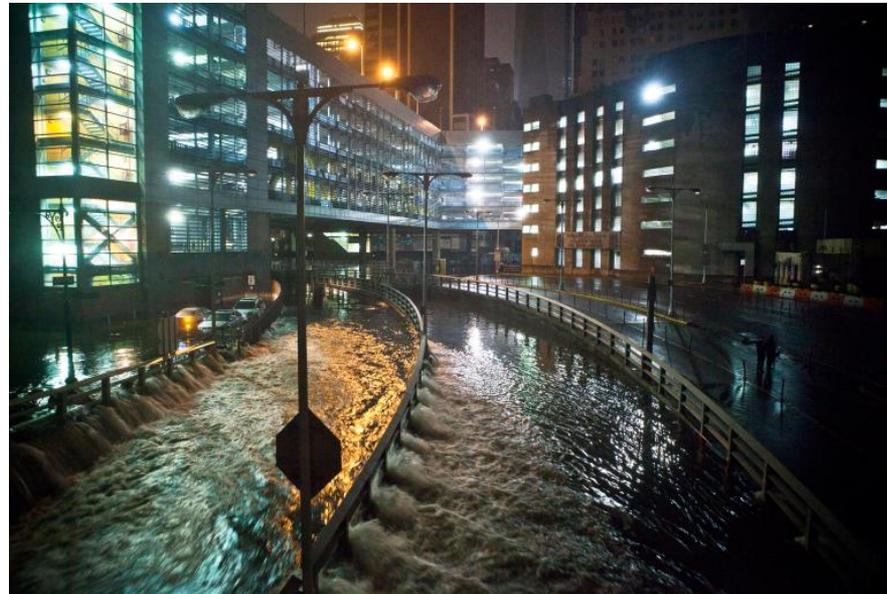
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Plot generated at 1949 UTC 26 October 2012



The High Impact Weather Prediction Project (HIWIPP):

- GSD-led: “We make forecasts better”
- OAR “Sandy Supplemental” Project
 - \$12.905M
 - 3-Year ‘Accelerator’
- HIWPP engages:
 - 3 NOAA Labs; 4 Cooperative Institutes; 2 NCEP Centers; Navy; NCAR
- HIWPP is comprised of:
 - 5 Subprojects
 - 19 Tasks



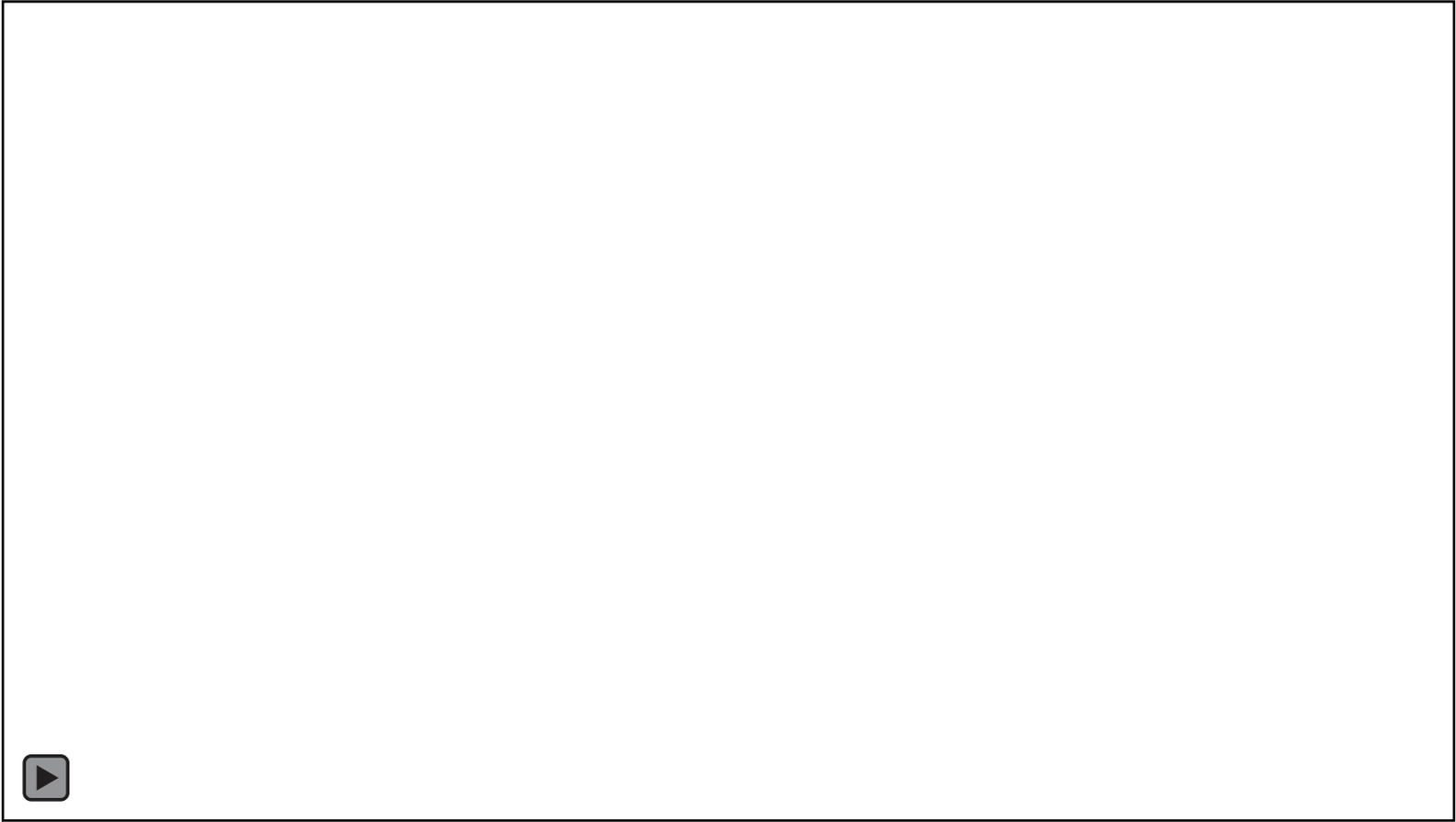
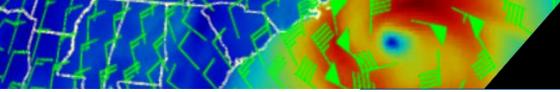
How are we doing it?

- Partnerships & collaboration
 - HIWPP funding has unified and focused the NWP community
- Building on existing effort
- Enhance & accelerating science
 - Drive the science to a higher technical readiness level
- Research to operations:
 - Hand-off to the Next Generation Global Prediction System (NGGPS)

Hurricane Sandy, 28 October, 2012

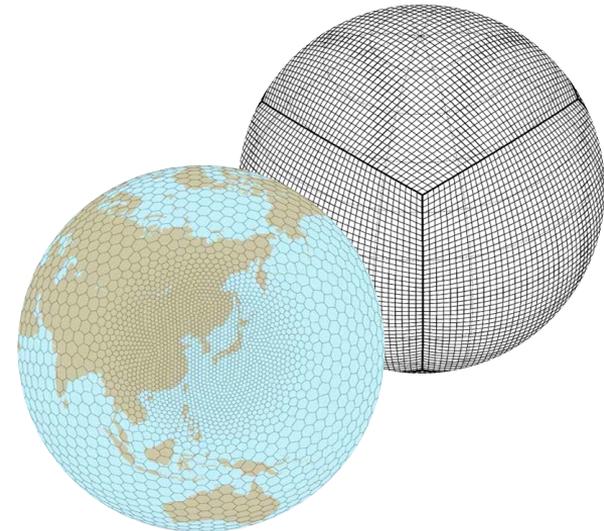


Hurricane Sandy Yesterday and Today

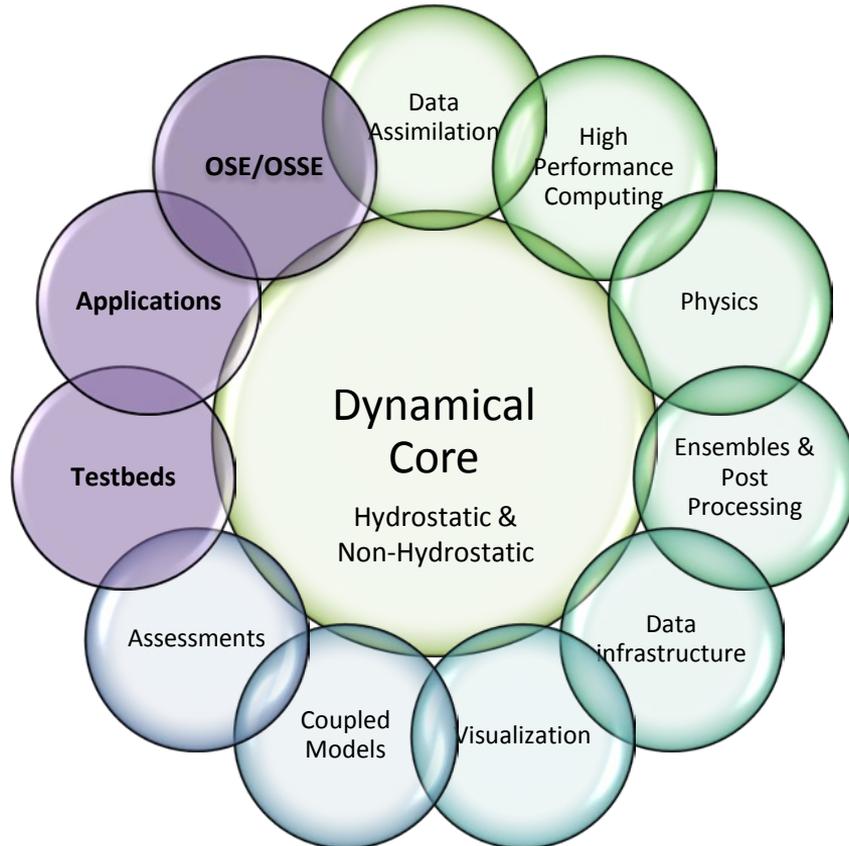


Next Generation Global Prediction System (NGGPS)

- An R2O initiative to
 - Implement a cloud-permitting, fully-coupled NWP system
- Through accelerated development and implementation of
 - Current global weather prediction models and physics
 - Improved data assimilation techniques, and
 - Improved software architecture and system engineering
- Extend forecast skill at two weeks and beyond
- Improve high-impact weather forecasts including hurricane track and intensity
- Built upon HIWPP successes
- Why GSD? This is in our wheel house

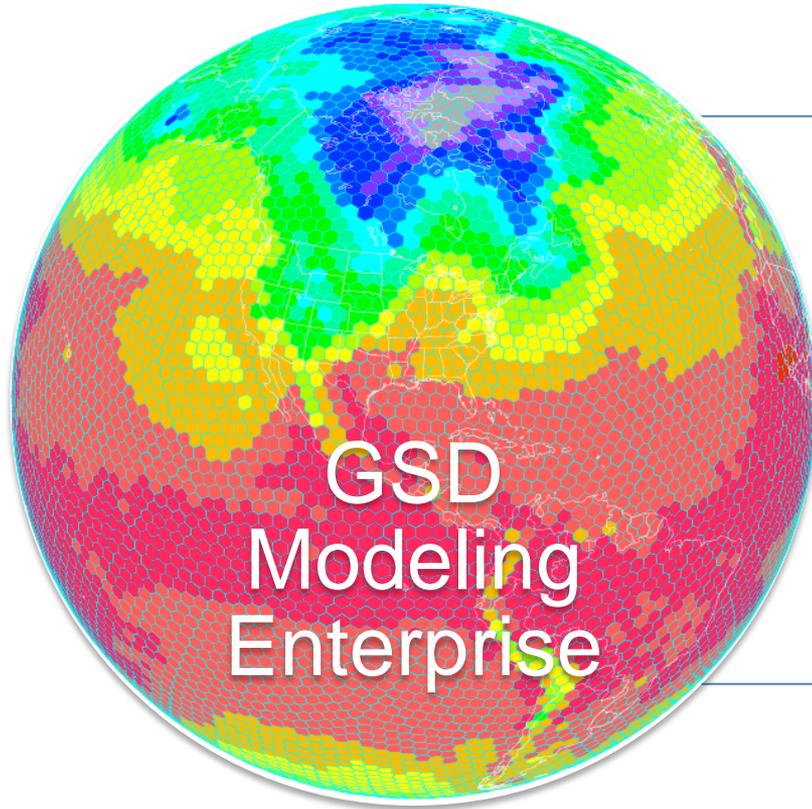


Better Models for Better Forecasts



- Next generation global modeling: GSD is at the forefront of model development & transitions
- Our research supports the enterprise and helps NOAA better use infrastructure and more efficiently use our Nations resources
- Session 3: A glimpse into three fascinating worlds... key aspects of these challenges

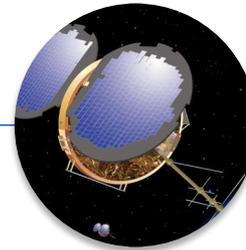
New Paths Forward: Cross-Cutting Themes



GSD
Modeling
Enterprise



Developmental
Testbed Center



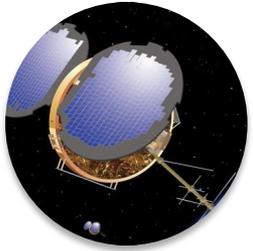
Global
Observing
Systems
Analysis



Renewable
Energy



- **Developmental Testbed Center**
 - Community Support, Community Tools
 - GSD partners with NCAR to support NOAA numerical weather prediction
 - Global Model Test Bed recently established to support NGGPS
 - **GC1:** Continuous global, storm-scale ($\leq 3\text{km}$) ensemble data assimilation and ensemble forecasting for global situational awareness
 - **GC2:** A fully coupled earth system modeling prediction capability



- **Better use of current observations and plan for future observations**
 - Global Observing Systems Analysis (GOSA) Group
 - **GC5:** Provide the Nation the ability to efficiently determine the best environmental observing systems it needs to improve earth system predictions



- **Using forecasts to help produce and use energy more efficiently**
 - GSD-led Renewable Energy Program
 - **GC4:** Provide the most accurate environmental information, including uncertainty and probabilities, to the right people at the right time and in the right form for optimal understanding and decision-making

Developmental Testbed Center

Global Model Test Bed of the Developmental Testbed Center (DTC)

Leader: Ligia Bernardet:

Quality:

- 2014 CIRES Outstanding Performance Award in Science and Engineering – Ligia Bernardet
- Lead: NGGPS Workflow and launcher subcommittee

Relevance:

- ***NOAA Administrator priorities***
 - Evolve NWS
 - Achieve organizational excellence

Performance:

- Hurricane Weather Research Forecast (HWRF) code management contributed to DOC Gold Medal Award to V.T. and NOAA HWRF Team
- R2O for HWRF surface flux improvement, HWRF radiation and partial cloudiness, Short-Range Ensemble Forecast (SREF) downscaling
- Yearly code releases, tutorials and workshops on five NOAA operational NWP codes



Global Observing Systems Analysis

Global Observing Systems Analysis (GOSA) Group

Chief: Lidia Cucurull

Quality:

Cucurull

- AMS Fellow
- 2011 NOAA David Johnson Award
- NOAA COSMIC-2 Program Scientist
- Chair, Expert Team on New Remote-Sensing Technologies of WMO
- NOAA OAR Technical Liaison for the JCSDA
- Quantitative Observing System Assessment Program (QOSAP)
OAR Representative

Relevance: NOAA Priorities

- Evolve the NWS, invest in observational infrastructure, Achieve organizational excellence

Performance:

- MOU with NESDIS/NWS to lead R&D and R2O for Radio Occultation technology
- Global OSE/OSSEs for NOAA UAS Program and Radio Occultation observations
- GPS-Met



Team:

Jason English
Tanya Peevey
Hongli Wang
Kirk Holub
Andrew Kren
Ruifang Li
Guoqing Ge

Renewable Energy Program

Renewable Energy Program

Program Manager: Melinda Marquis

Quality:

- **Utility Variable-Generation Integration Group Annual Achievement Award**
 - **2014** – Melinda Marquis for leadership at NOAA for wind energy forecasting
 - **2015** – Group award for WFIP-1
- **2015 Department of Commerce Gold Medal** “For the success of HRRR, the first storm-scale model to give forecasters and decision-makers fast, local weather guidance”
- **2015 Colorado Governor’s Award for High Impact Research: Sustainability**

Relevance: NOAA Priorities

- NOAA Next Generation Strategic Plan (NGSP) – “Production gains in renewable energy through better information”
- Support NGSP goal about climate adaptation and mitigation
- Evolve the weather service

Performance

- Improved wind forecast skill at turbine height
- Leveraged RAP and HRRR (developed for aviation and severe weather)
- SFIP results transitioned to NCEP early 2016 HRRR and RAP
- WFIP-1 improvements were transitioned to NCEP Feb 2014
- WFIP-2 (Oct 2015-March 2017)



Presenter	Title	Station
Ligia Bernardet	Developmental Testbed Center	1
Lidia Cucurull	Global Observing Systems Analysis	2
Jason English	GOSA project: Improving Winter Storm Forecasts with Dropsonde Data	3
Melinda Marquis	NOAA Renewable Energy Program	4