



# 9th NOAA TBPG Workshop

## Kansas City, MO

### April 10-11, 2018

Roundup Presentation

**Developmental Testbed Center**

Louisa Nance and Kevin Kelleher



# AOP 2017

1 April 2017 - 31 March 2018

Developmental Testbed Center



Data  
Assimilation  
• Hui Shao



Regional  
Ensembles  
• Isidora Jankov



Hurricanes  
• Kathryn  
Newman



Global  
Model Test  
Bed  
• Ligia  
Bernardet



Verification  
Tara Jensen

Software management/user support + community outreach + T&E



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## Software

- WRF & UPP support & community engagement
- DA code management & user support
- HWRF user & developer support
- MET development & community support
- NOAA-DTC verification unification
- Enhancing community collaborations through DTC-supported software containers
- Common Community Physics Package (CCPP)/Interoperable Physics Driver (IPD) – including Physics Testbed

## Community Outreach

- WRF Users Workshop
- DTC Visitor Program

## Tutorials

- GSI/EnKF
- HWRF
- MET
- UPP (as part of WRF)

## AMS Short Course

- Simplifying end-to-end numerical modeling using software containers



Includes WPS, WRF,  
UPP, MET & METViewer



# Advancing Capabilities

## Developmental Testbed Center



### WRF

- SPP options for PBL MYNN & RUC LSM

### UPP

- GRIB2 support

### HWRF

- Physics
  - Scale-aware relative humidity based partial cloudiness (on-going improvements)
  - **Alternate cloud overlap methodology for RRTMG radiation**
  - **Grell-Freitas cumulus**
- Host hwrf-contrib repository for inter-developer exchange of codes
  - **Scripts for GOES satellite verification**

**Contributions from visitors or supported developers**

### GSI/EnKF

- Added functions to enhance 4DVar for ARW w/RAP/HRRR sfc DA configurations
- Capability to use sub-hourly obs, ensemble & background
- Capability to use ARW hybrid vertical coordinate
- Unified multi-platform build system
- Improved diagnostic & display utilities, such as new utility function to generate ensemble initial files for regional ARW
- **Improved forward observation operator for coastline observations**

### MET

- Numerous enhancements to meet needs of research and EMC
- Python wrappers to make set-up and running easier



# AOP 2017 T & E

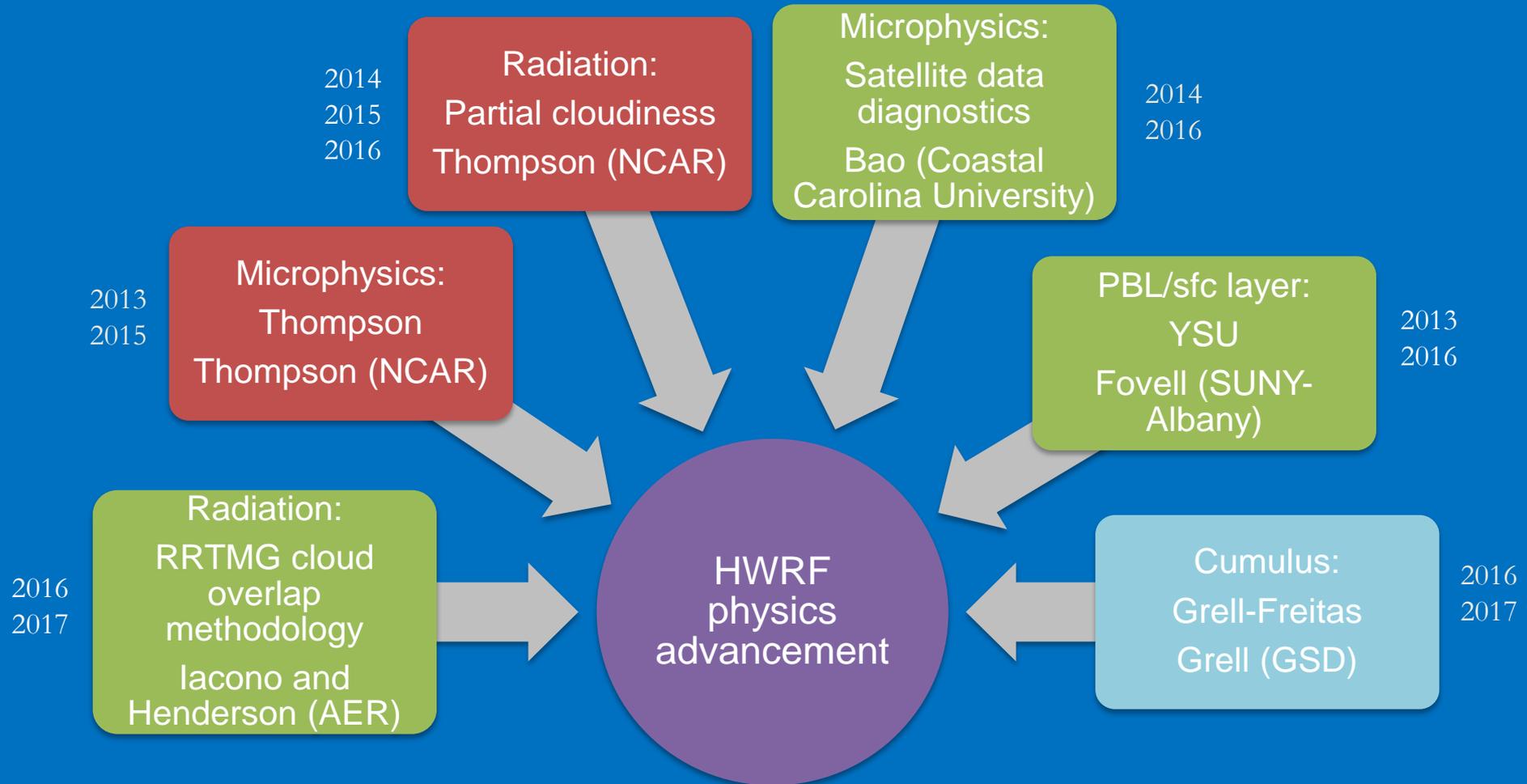
## Developmental Testbed Center

Activity	Status	Impact	Transition metric
<b>Data Assimilation</b>			
High resolution (3 km) EnVar	Complete	Limited impact – config needs further investigation	RL4
High resolution EnVar – radar data	May 2018	TBD	-
<b>Regional Ensembles</b>			
Stochastic physics - HRRRE – PBL & LSM	Complete	Showed promise – recommended for further testing	RL5/6
WRF smoothed terrain-following coordinate	Complete	Improvements at upper levels	RL8
Air Force WRF configuration	Complete	Positive impacts	RL8
Stochastic physics – HRRRE – Microphysics	May 2018	TBD	-
Testbed collaborations w/ HWT	Complete	Skill single / multi-physics comparable – cont'd testing	RL6
<b>Hurricanes – HWRF physics</b>			
Radiation – RRTMG cloud overlap method	Complete	Showed promise – further code development	RL5
Partial cloudiness scheme adjustments	Complete	Positive impacts – adopted for 2017 implementation	RL8
Grell-Freitas cumulus parameterization	Complete	Showed promised – further code development	RL6
Physics advances: Grell-Freitas & RRTMG cloud overlap	May 2018	TBD	-
<b>GMTB</b>			
Grell-Freitas cumulus parameterization – cold start & cycled	Complete	Mixed–recommended for further development & testing	RL4
<b>Air Force</b>			
GALWEM/GPP validation	Complete	Confirmed proper implementation	RL8



# HWRF Physics

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Multi-year testing approach proven for R2O success



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Data Assimilation  
•Ming Hu



Regional Ensembles  
•Jamie Wolff



Hurricanes  
•Kathryn Newman



Global Model Test Bed  
•Ligia Bernardet



Verification  
Tara Jensen

Software management/user support + community outreach + T&E



# AOP 2018

## Developmental Testbed Center



### Software

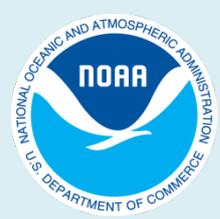
- **UFS-CAM user support**
- WRF & UPP support & community engagement
- DA code management & user support
- HWRF user & developer support
- MET+ development & community support
- **Enhancing community collaborations through DTC-supported software containers**
- Common Community Physics Package (CCPP)/Interoperable Physics Driver (IPD) – including Physics Testbed

### Community Outreach

- WRF Users Workshop
- **Workshop on test plans and metrics for assessing model improvements**

### Testing and Evaluation

- Model Evaluation for Research Innovation Transition (MERIT)
- Testbed collaborations with HWT
- Testing and evaluation of new ARW development for use in RAP/HRRR
- Building operational storm-scale DA testing system and test DA advancement for convective forecast
- HWRF physics advancement and diagnostic tool development for hurricanes
- Validation/verification for AF applications ranging from global to regional and deterministic to ensemble
- Physics testing for global applications



# AOP 2018 Highlight

## Developmental Testbed Center



## Engaging the research community

### UFS-CAM user support

- Work with UFS-CAM developers to establish a code management plan, documentation, preliminary users guide and helpdesk support
- Collect information on various community code efforts and approaches to users support and develop longer term plan for more effective framework for UFS user support.

### Enhancing community collaborations through DTC-supported software containers

- Add GSI to the NWP components available in containers
- Offer 2<sup>nd</sup> AMS Short Course
- Continue to explore and gain more knowledge about available container technology

### Workshop on test plans and metrics for assessing model improvements

- Gather/refine community input on test plans and key metrics for identifying model improvements ready for R2O
- Key to setting up open and transparent R2O process and evidence-based decision making process



# Questions

## Developmental Testbed Center



- **Additional Information**

- **Contacts**

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- **Website:**

- <http://www.dtcenter.org/>**