

Foreword

This User's Guide describes the Advanced Research WRF (ARW) Version 4.3 modeling system, released in May 2021. As the WRF/ARW is developed further, this document will be continuously enhanced and updated. Please post feedback to the [WRF & MPAS-A Support Forum](#).

This document is complementary to the ARW Tech Note (<https://opensky.ucar.edu/islandora/object/opensky:2898>), which describes the equations, numerics, boundary conditions, and nesting etc. in greater detail.

Highlights of updates to WRFV4.3 include:

- WRF model:
 - Dynamics and solver:*
 - Added an Implicit Explicit Vertical Advection (IEVA) option, which could help with model stability in convection resolving scales.
 - Physics:*
 - National Taiwan University microphysics scheme (contributed by Tsai and Chen of NTU);
 - P3 microphysics one ice, 3-moment (contributed by Morrison and Milbrandt);
 - A turbulent kinetic energy (TKE) and TKE dissipation rate (ϵ) based 1.5-order closure PBL parameterization (E- ϵ , EEPS) is added (contributed by Zhang and Wang of University of Hawaii);
 - A new suite of gravity wave drag scheme (contributed by Mike Toy of NOAA/GSL);
 - Added urban physics to work with YSU PBL (contributed by Hendricks of NCAR);
 - Capability to use Local Climate Zone data from WUDAPT (contributed by Zonato of University of Trento, Italy);
 - Green roof, solar panel, and new building drag coefficient for BEB+BEM (contributed by Zonato);
 - Dynamic irrigation management for NoahMP (Valayamkunnath of NCAR)
 - Added eclipse effect for some radiation physics (contributed by Montornes of University of Barcelona, Spain, and Rowe of University of Kentucky).
- WPS:
 - New fields for gravity wave drag option 3 are added (Mike Toy of NOAA);
 - Irrigation data for NoahMP are added (Valayamkunnath of NCAR)
- WRF-DA updates:
 - Multi-Resolution Incremental 4DVAR (Liu, Ban, Bresch, Wu, X. Zhang and J. Liu of NCAR)
 - WRFDA extension for surface chemical data assimilation (Sun, Liu of NCAR, Chen of IUM/CMA, China)
- WRF-Chemistry

- Updated CLM land model to be consistent with the MEGAv2.1 biogenic emission model (Gaudet of PNNL).

For the latest version of this document, please visit the ARW Users' Web site at <http://www2.mmm.ucar.edu/wrf/users/>.

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