The Weather Research and Forecasting Model: 2024 Annual Update

Since WRF Version 4.5 in April 2023, there have been minor releases 4.5.1 and 4.5.2 in July
and December 2023, and a new major release in May 2024. The talk will outline the major updates in
the last year and show some verification test results.

In this release we have some major developments:
(i) Shared physics: We have placed a suite of our physics into a shared repository with MPAS. In WRF this is the tropical suite and in MPAS it is the mesoscale reference suite. It consists of YSU PBL, revised MM5 surface layer, WSM6 microphysics, new Tiedtke cumulus.
Also in this repository is the orographic gravity-wave drag option.
Not moved are the Noah LSM and RRTMG radiation. The suite is also CCPP compatible and is being tested in the DTC's CCPP single-column model to make sure of its compliance to CCPP.
(ii) A new windfarm wake suite of models has been provided by University of Delaware collaborators.
(iii) Compilation with cmake is now an option which we plan to make the default in the future.
(iv) A 3-moment option has been added to the NSSL microphysics set. NSSL multiple options are being replaced with namelist options using the mp_physics=18 choice to access all the previous options.
(v) The single-layer urban canopy model (SLUCM) has been extended to enable use of more
detailed building morphology maps.

Minor changes include using salinity in the MM5 and revised MM5 surface layer schemes to allow for lower saturation vapor pressure over oceans. MYNN PBL and RUC LSM have been substantially updated to maintain similarity with NOAA versions. Other changes and bug-fixes will also be described. WRF-Fire, WRF-Chem, NoahMP, WRF-DA, and WRF-Hydro have also had updates that will not be described here.

We have also transitioned to the new compilers on NCAR's new supercomputer, Derecho that has replaced Cheyenne in this year.