The Common Community Physics Package (CCPP)

L. Bernardet1,2, T. Brown1,2, D. Gill1,3, L. Carson1,2, G. Firl1,3, J. Hacker1,3, L. Nance1,3, J. Dudhia1,3, V. Tallapragada4, and F. Toepfer5
1Developmental Testbed Center – Boulder, CO
2University of Colorado Cooperative Institute for Research in Environmental Sciences at the NOAA Earth System Research Laboratory Global Systems Division – Boulder, CO
3National Center for Atmospheric Research, Boulder, CO
4NOAA National Weather Service NCEP Environmental Modeling Center
5NOAA National Weather Service Office of Science and Technology Integration

Why do we need a CCPP?
NOAA is developing a next-generation prediction system with multiple component models.

The Finite Volume in the Cubed Sphere (FV3) dynamic core has been selected and an important next step is physics advancements.

A distributed group of scientists is working on the development of physical parameterizations, so infrastructure is needed to facilitate distributed development so physics can be tested in various models (including single column model).

Who is creating the CCPP?
The CCPP is being developed in the Global Model Test Bed (GMTB), a group within the Developmental Testbed Center.

GMTB is funded by the NWS to help improve its operational model through the transition of innovations developed in the broader scientific community.

Physics developers can contribute to the CCPP.

What is the CCPP?
CCPP is a collection of vetted, dycore-agnostic, physical parameterizations. There can be multiple of each type (PBL, cumulus etc.) to support various applications (high-res, seasonal etc.) and maturity level (operational, developmental).

• Vetted means that there is a governance process to determine what is included in CCPP.

• Dycore agnostic means that the parameterizations can be used with any dycore through an Interoperable Physics Driver (IPD).

Some properties of the CCPP
• Can be used with any dycore (interface needed).
• Allows selecting parameterizations/suite at runtime.
• Configurable order/frequency of physics calls.
• No changes required in the Physics Driver for connection with new dycores or physics.
• Parameterizations have structured in/out information, with metadata, making them straightforward to connect through auto-manufactured interfaces.

Parameterizations in CCPP are fully documented
This is one of the technical criteria for inclusion in supported CCPP.

Inclusion in the CCPP is contingent on a variety of tests, which can be conducted using the GMTB test harness.

Testing hierarchy
Physics Testing Hierarchy

- Demonstrated merit as a mature development (through peer-reviewed literature or use in NWP applications).
- Sufficiently different from other schemes in CCPP.

Get involved!
- Contact: Ligia.Bernardet@noaa.gov.
- DTC has a Visitor Program that funds collaborators, see http://www.dtcenter.org/visitors.

Goverance
Scientific and technical criteria are used to determine contents of the CCPP. GMTB collects and synthesizes information, but the ultimate decision of what is included in CCPP rests with the funding agency and its core partners.

Code Ecosystem
Git and web-based Git-hosting services are being utilized to support the easier sharing of physical parameterization software. Users, developers, and operational centers can both and download and contribute code.

Community Involvement
Priorities for physics development were discussed in the November 2016 workshop at the NWS. Examples were scale aware and stochastic schemes, as well as inter-parameterization connections.

The November 2016 workshop at the NWS.

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