CONSORTIUM FOR SMALL SCALE MODELING

COSMO

Deutscher Wetterdienst

Wetter und Klima aus einer Hand

DWD

SCA Reports for the

COSMO-Model and INT2LM

Ulrich Schättler, Daniel Rieger

Source Code Administrators

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Versions Implemented since September 2018

Version	Date	Contents (Highlights)	Results Changes
5.05a	13.07.18	• Bug fix in turb_transfer (see 5.05_1) • Porting additional COSMO parts to GPU (output, diagnostics) • Bott advection scheme with deformational correction method (BOTTDC2) • Changes for Radar Forward Operator EMVORADO	yes no no if used no

Version	Date	Contents (Highlights)	Results Changes
5.05b	14.12.18	• Finalize port to GPU (LHN, Nudging, climate mode, FLake) • Writing radar composites to restart files	no no

Version	Date	Contents (Highlights)	Results Changes
5.06	27.02.19	• Running in single precision (fixes in TERRA; interfaces to RTTOV) • Implementation of mire parameterization • Modifications to GNSS STD operator • New features for Latent Heat Nudging • New wind gust tuning • Implementation of lockfile mechanism	no if used if used if used if used no

Version	Date	Contents (Highlights)	Results Changes
5.06a	21.05.19	• Implementation of skin temperature formulation in TERRA • Modifications to turbulence scheme due to unification with ICON	if used no

Version	Date	Contents (Highlights)	Results Changes
5.06b	to be expected 20.09.19	• Implementation of radar forward operator • Revised cloud radiation coupling (T^2RC^2) • GPU optimizations (CLAW for graupel scheme; asynchronous copy to and from block structure; moved GPU transfer in lgetai (data assimilation)) • Running COSMO-LEPS in GRIB 2 (new local section 28) • Interpolation to z-levels above ground • output of wind speed and direction on model-, z- and p-levels • Additional packing for GRIB 2 fields (grid_ccsds, grid_jpeg, grid_png)	no no no no no no no

Version	Date	Contents (Highlights)	Results Changes
5.06b	20.09.19	• Option to write restart files in NetCDF • Spectral Nudging (CLM): possibility of grid nudging	no no
		• (ongoing work) Data Assimilation (new observation types: tower, temphirs; Superobbing of high-resolution profiles; and many more)	yes (nudging; Feedback Files)
		• Soil and surface schemes: alignment with ICON	slightly

INT2LM 2.06

Version	Date	Contents (Highlights)	Results Changes
2.06	24.05.19	• New external parameter fields for slope of orography (S_ORO) and skin conductivity (SKC)	no
		• Refactoring lockfile mechanism	no
		• Interpolation of hhl_in to hhl_gl (instead of recomputing)	slightly
		• Deactivate computation of control geopotential (with lcontrol_fi=.FALSE.)	no
		• Introduced NetCDF4 as optional output format (ylm_form_write = 'nc-4')	no

Version	Date	Contents (Highlights)	Results Changes
2.06a	coming soon	• Running COSMO-LEPS in GRIB 2 • Modifications for MESSy	no no

Distribution of new INT2LM and COSMO

- ➔ The new versions have not yet been distributed!
- ➔ A first (not yet complete) report from the NWP Test Suite has been provided last Thursday (Sept. 5th)
- ➔ Impact of COSMO 5.06 seems to be neutral in double precision.
- ➔ Comparing double and single precision, only in few cases differences were noticeable.
- ➔ But no results from precipitation so far.

Nevertheless:

- ➔ Good indication, that COSMO 5.06 can be accepted as new official version.

COSMO-ICON Physics

Please see Axels Presentation

- I just have to be careful what I am saying, or what people are understanding.
- Regarding the unification of the common source code for the COSMO-ICON Physics, I think I did not say

Promised

but

We try to do our best!

We aim at:

Scheme	COSMO	ICON
Microphysics	gscp_hydor	
	gscp_kessler, gscp_cloudice, gscp_graupel	
Subgrid scale orography	sso_lottmiller	
		mo_sso_ifs
Turbulence	turb_[data|diffusion|transfer|utilities|vertdiff]	
Surface Schemes	sfc_terra_data, sfc_terra_init, sfc_terra sfc_flake_data, sfc_flake, sfc_seaice	
Convection (Tiedtke-Bechtold)	conv_[many files]	

Status of COSMO-ICON Physics

Advantages of this unification:

- ➔ GPU code is brought to ICON
- ➔ Developers have the same modules in COSMO and ICON

Note:

- ➔ There still are (will be) small differences between COSMO and ICON (you can view with a "diff")
- ➔ A further unification and/or synchronization is NOT planned.
- ➔ Code can diverge now, when developments within ICON are going on

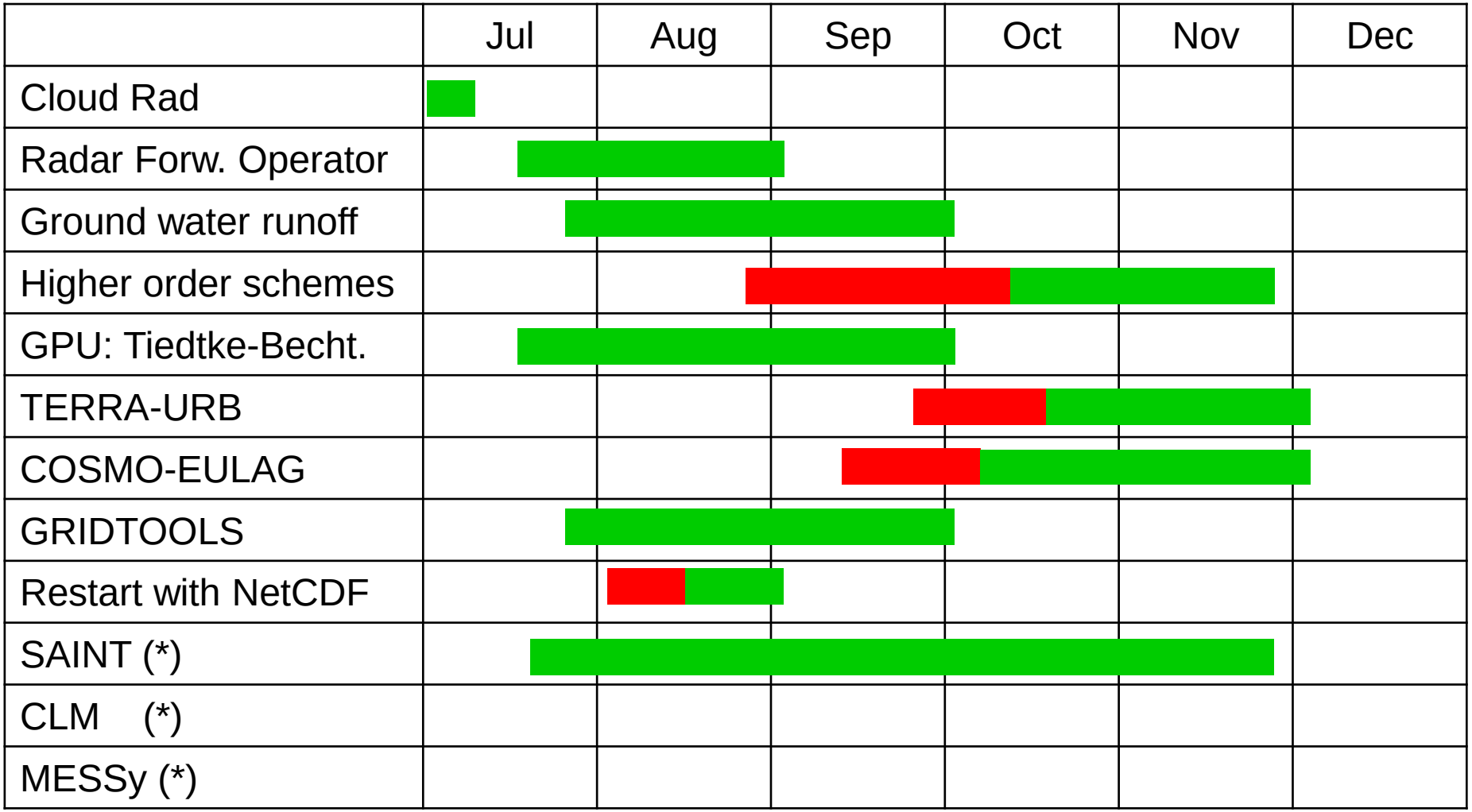
Documentation

Update of Documentation

- Part V: Preprocessing: Update for 2.06
- Part VI: Postprocessing: A first draft is available on the web:

  Model Output and Data Formats for I/O
- Part VII: User Guide: Update for 5.06a

Plans for the Next Versions


Jul
Aug
Sep
Oct
Nov
Dec
Cloud Rad
Radar Forw. Operator
Ground water runoff
Higher order schemes
GPU: Tiedtke-Becht.
TERRA-URB
COSMO-EULAG
GRIDTOOLS
Restart with NetCDF
SAINT (*)
CLM (*)
MESSy (*)

(*) Some Comments

- SAINT:
  - First implementation is using a TERRA version modified by Matthias Raschendorfer for implicit treatment of heat conduction equation
  - This version has been updated lately by Matthias for treatment of multi snow levels
  - Pitfall: Do not know when Matthias version of TERRA will be implemented operationally
- CLM: Unification has started:
  - Restart Files in NetCDF: already implemented
  - Discussions about additional diagnostics started (new GRIB fields, but also new "leveltypes")
  - Several bug fixes and technical modifications already implemented earlier
- MESSy: there will also be an update from the MESSy Community


Thank you
very much
for your
attention!