Overview
on the new Release 5.0
of the COSMO-Model

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Current Versions

Current Versions of COSMO-Model and INT2LM

- Officially released versions:
  - COSMO: 4.22 since 31. January 2012
  - INT2LM: 1.18 since 30. June 2011
- Versions used at DWD:
  - COSMO: 4.26 since 16. January 2013
  - INT2LM: 1.20 since 16. January 2013
- Different versions used at different COSMO-partners
- Not much effort put into informing other partners (at universities, research-institutes) about new versions recently (SORRY!)

- What is new in these versions? And what is coming up next?

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Highlights from the Latest COSMO-Model Developments (from Version 4.18; May 2011)

Physical Parameterizations

- Microphysics:
  - Correction of size distribution for rain droplets and bug fix in the density correction of fall speeds 4.20
  - Introduction of a tuning factor `rain_n0_factor` to modify the intercept parameter `n0`; 4.21
  - Implementation of interfaces to use the 2-moment scheme 4.25
- Radiation:
  - Introduced a zenith angle dependency for the solar radiation for each timestep 4.22
  - Re-tuned the empirical relation using Lindenberg data to reduce the cover of ice clouds in the upper troposphere 4.23
- Soil Model:
  - Removed dependency of prognostic simulation on 2m temperature, by replacing it with lowest atmospheric temperature 4.20

Runge-Kutta Dynamics

- Advection: more stable handling of confluent flow situations 4.19
- Runge-Kutta sub-stepping: an additional small step is done in the third Runge-Kutta to improve stability 4.20
- Introduction of nonlinear Smagorinsky diffusion to reduce too strong horizontal shear 4.21
- Introduction of additional advection variants (Strang-splitting only at the bottom of the atmosphere to save computation time) 4.23
- Introduction of a new fast-waves solver with improvement of accuracy of vertical derivatives, divergence operator in strong conservation form and isotropic treatment of artificial divergence damping 4.24

Changes in the Nudging Scheme

- New modular nudging code 4.22
- Adaptations for sub-hourly analysis update: an optional notation for the initial files in the form `lafyyyymmddhhmmss` was introduced: 4.24

Technical Modifications

- Conditional Compilation for external libraries 4.19
- Removal of dead code 4.23
  - `irunge_kutta=0`: old 2 time level scheme `src_2timelevel.f90`
  - NL switches `lprogprec`, `ltrans_prec`: now all simulations are with prognostic precipitation and transport of precipitation
  - `itype_conv=1`: Kain-Fritsch convection: this was never working properly
- Implementation of a tracer module for generic handling of all tracers (as humidities, aerosols, pollen, etc) 4.25
  - see presentation by Anne Roches
  - see COSMO Technical Report No. 20
- Implementation of interfaces for the Modular Earth Submodel System MESSy 4.27
- Implementation of grib_api for reading / writing GRIB1 and GRIB2 4.28

Latest CLM Contributions

- Implemented an interface to the OASIS coupler (Version 3) 4.19
- Introduction of prescribed surface albedo based on MODIS 4.23
- Introduction of new GHG concentration scenarios 4.23
- Introduction of time-dependent aerosol optical depths 4.23
- Implementation of an asynchronous NetCDF Strategy 4.25

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Highlights from the Latest INT2LM Developments (from Version 1.18; June 2011)

These were only technical changes!

- Conditional compilation for external libraries 4.19
- CLM extensions: 4.19
  - Introduction of prescribed soil albedo
- Adaptations for sub-hourly analysis update: `lafyyyymmddhhmmss` 4.20
- Implementation of grib_api 4.21

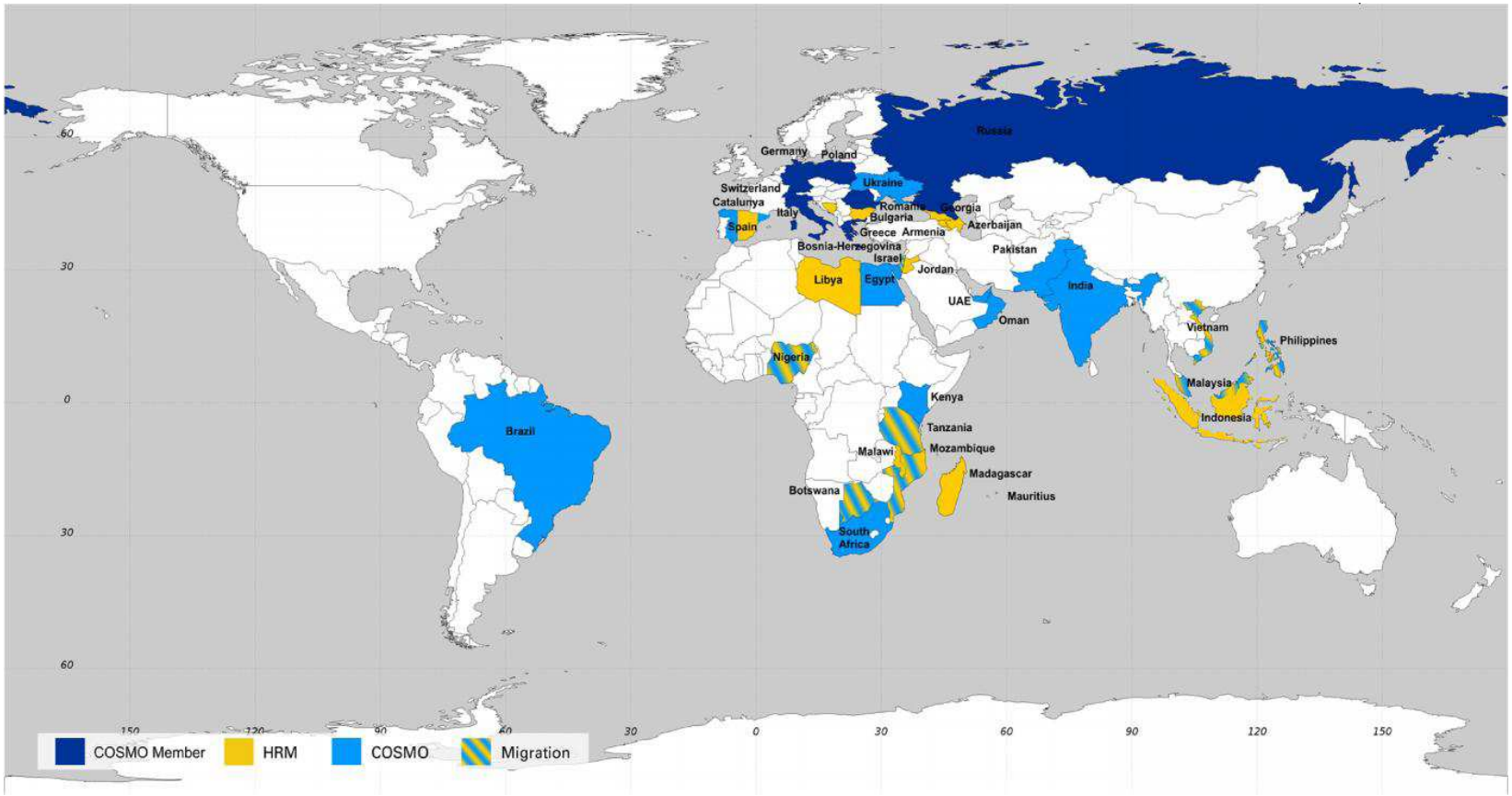
BEWARE!

There were quite some changes of Namelist variables in the COSMO-Model and in the INT2LM

About Scource Code Management

Why Source Code Management

➔ There are more and more users of the COSMO-Model System



Why Source Code Management (II)

- The users of the COSMO-Model system need a transparent release management
- The developers of the COSMO-Model system need clear coding standards
- The whole community needs to know about ongoing (and planned) developments

Source Code Management: Past and Future

- Past: Source Code Management done at DWD
  - implementation of DWD- and external contributions into official code
  - provision of new versions to special COSMO test users
  - testing within DWD NUMEX and parallel suite, including verification
  - release of new versions, if all (DWD) tests were successful
- Future: more and more external contributions
  - by COSMO-partners, CLM, ART, other partners,…
  - contributions have to conform to the Coding Standards: www.cosmo-model.org/content/model/documentation/standards/default.htm
  - decision on future developments and releases by COSMO Scientific Management Committee (SMC)
  - decision on future *Reference Versions* by the COSMO Steering Committee (STC)

Source Code Management: Past and Future (II)

- Therefore: Future Source Code Management done within COSMO
  - implementation of all contributions, which are accepted by SMC, into official code by the Source Code Administrator
  - provision of new versions to special COSMO test users, who test their special applications
  - For example within DWD: testing in NUMEX and in the parallel suite, including verification
  - release of new versions, if all tests were successful
- Some practical comments:
  - There might be several development- or test-versions, which are not released
  - We try to inform all COSMO-Users outside the consortium in due time!

Source Code Management: Practical Issues

- There are (new) Source Code Management Web Pages:
  - http://www.cosmo-model.org/content/model/releases/default.htm
- They provide information on
  - upcoming releases
  - ongoing developments
  - problems and bug reports

But careful: The problems and bug reports page is not fully installed at the moment.

Schedule for the New Releases

When will the new version finally come?

Actions in the last Months

- COSMO-Model 4.25 and INT2LM 1.20 have been distributed to the consortium partners end of September 2012
- Feedback has already been incorporated in COSMO-Model 4.26 (test version) and in INT2LM 1.21 (under preparation)

A (rather tight) Schedule for March

- COSMO 4.27: planned for 12. March 2013
  - consolidation work for the new fast-waves solver
  - interfaces for: Modular Earth Submodel System: MESSY
- INT2LM 1.21: planned for 12. March 2013
  - implementation of grib_api

- COSMO 4.28: planned for 31. March 2013
  - implementation of grib_api

- During April / May: More intensive testing of the new versions

Release of COSMO 5.0 and INT2LM 2.0

```
testing_complete = .FALSE.
test: While (.NOT. testing_complete) DO
    test the latest COSMO and INT2LM versions
    IF (tests_are_ok) THEN
        testing_complete = .TRUE.
        release latest COSMO version as COSMO 5.0
        release latest INT2LM version as INT2LM 2.0
    ELSE
        plan, implement and test new version(s)
    ENDIF
ENDDO test
```

Conclusion

- The final release of COSMO-Model 5.0 and INT2LM 2.0 can be expected in 2Q2013. They are delayed for about a year now.
- This is due to
  - many developments going on
  - necessary coordination, implementation and testing
  - introduction of updated Coding Standards and a COSMO Source Code Management
  - lack of (human) resources

- Information will be given through the COSMO-Web Page, the DWD ftp-server and our COSMO User Mailing lists.
- But now there are only few more weeks of waiting. We are working hard…


Thank you
very much
for your
attention