Consortium for Small-Scale Modelling

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Consortia presentations
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Outline

- **COSMO Governance**
- **COSMO Model and Source Code Management**
- **COSMO Activities**

COSMO Governance: Strategy (1/3)

- Recent meeting of COSMO Directors (Helsinki, 16 September 2013) approved the new strategy of the consortium
- The document reviews the current status of the consortium and modelling system, stressing, e.g.:

  → light governance of the consortium

  → strong link with climate modelling community (CLM)

  → cooperation with Karlsruhe Institute of Technolgy for modules for Aerosols and Reactive Trace gases (ART)

  → collaboration with universities and research institutions

COSMO Governance: Strategy (2/3)

- The strategy for the *modelling system* builds on DWD cooperation with Max Planck Institute for Meteorology (MPI-M) on development of ICON (ICOsahedral Nonhydrostatic general circulation model)
- It calls for harmonization of COSMO and ICON development with following steps:

  → unification of physics package

  → development of ICON regional mode

  → if successful, a slow transition process to ICON modelling framework until 2020

  → COSMO will take responsibility for regional ICON development, using COSMO governance mechanisms

COSMO Governance: Strategy (2a/3)

→ extension of COSMO experiences with new HPC architectures to ICON

→ LETKF assimilation methods will form another strong link between COSMO and ICON

→ see the presentation of Detlev Majewski on ICON on Tuesday

COSMO Governance: Strategy (3/3)

- The strategy for *the consortium* is based on the following principles:

  → COSMO development focuses on convective scale NWP, including data assimilation, physics and EPS

  → COSMO mechanisms including priority projects/tasks and source code management rules are kept in force

  → restricted policy for prospective enlargement of the consortium (concerns only RA VI countries)

  → updated consortium governance should be formalized by a new COSMO agreement

COSMO Governance: New agreement (1/1)

- The new COSMO Agreement was prepared by the Steering Committee and approved by the Directors (16 September 2013)
- It has a flexible structure (the Steering Committee right to amend the annexes) and addresses, in between:

  → formalization of relations with special development partners: ART, CLM and ICON

  → regulation of IPR rules

  → enlargement procedure with rights and obligations of the applicant

  → model licencing rules and contracts

  → updated governance procedures

COSMO Governance: Updated Science Plan (1/2)

- Work started to update the COSMO Science Plan to reflect the strategy requirements and substitute for the current edition (valid to 2014)
- The new Plan will be valid to 2020; its main goals are:

  → COSMO is the model system for operational and research purposes for the short to very short range with a convective-scale resolution, with EPS at its core

  → to keep strong links and cooperation with academia

  → to keep high quality of the model

  → to respond to requirements of main model users (including civil protection, aviation, environmental issues, …)

COSMO Governance: Updated Science Plan (2/2)

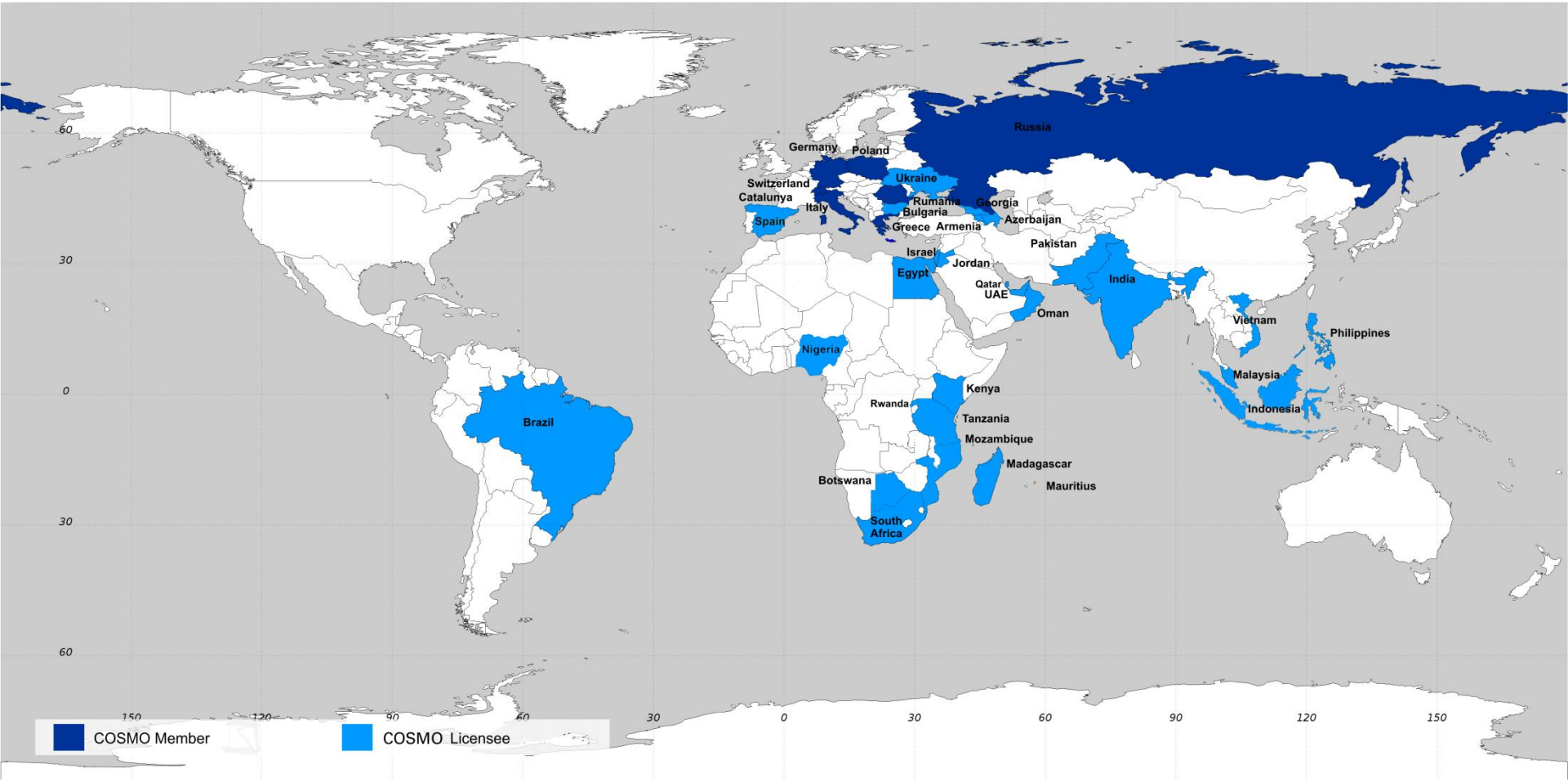
- The Plan will formulate goals for main strategic areas as defined by the Steering Committee:
  - → robust dynamical core
  - → convection-permitting regional ensemble forecasting
  - → data assimilation for convective-scale EPS
  - → physical parameterizations for convection-permitting forecast system (atmosphere + surface)
  - → efficient use of future computer systems
  - → model validation and verification

COSMO Governance: Licences (1/2)

- Five COSMO licences are in use (United Arab Emirates, Brazil (INMET), Oman, Servei Meteorològic de Catalunya, Brazil (DHN)
- Three more licences expected to commence in January 2014 (Botswana, Namibia, Qatar)
  → Licence fees earned are spent for workshops / short-term missions / conferences / travelling.

- Free COSMO licence are available for low- and lower-middle-income economies (up to $4’086 GNI per capita)

COSMO users in 2013



COSMO Model: Version 5.0 (1/2)

- The diverse applications of the COSMO model (ART, CLM, NWP) cause that its development is performed by different developers groups
- There is a need that every some time all the developments are brought to the same trunk: the common reference model version
- The new common reference COSMO V5.0 was recently (September 2013) approved by the Steering Committee (together with auxiliary software INT2LM V2.0)

  → the source code management rules together with web-based magement pages allow for efficient approval of the new model versions and necessary coordination

COSMO Model: Version 5.0 (2/2)

- COSMO V5.0 is based on COSMO V4.29 and includes, in between:

  → implementation of grib_api library

  → implementation of COSMO-MESSy (Modular Earth Submodel System) interfaces

  → implementation of new tracer module

  → processing of satellite radiances for assimilation purposes

  → updated quality control procedures for assimilation purposes

Source Code Management Issues: Official COSMO Software (1/1)

- This year, there are already 5 classes of the official COSMO software:

  → COSMO Model with Source Code Administrator (SCA) Uli Schättler

  → VERSUS with Adriano Raspanti as the SCA

  → fieldextra with Jean-Marie Bettems as the SCA

  → extpar with Daniel Lüthi as the SCA

  → INT2LM with Uli Blahak as the SCA
- All the SCAs, together with WG6 Coordinator Massimo Milelli, form the Technical Advisory Group (TAG)

COSMO Activities

ET on data assimilation

- **Priority Project on Km-Scale Ensemble-Based Data Assimilation (KENDA)**
  PL: Christoph Schraff (christoph.schraff [at] dwd.de)

  → LETKF system already tested in CNMCA (Italy) and MeteoSwiss

  → see talk by Christoph Schraff on Tuesday

COSMO Activities

ET on dynamics

- **Priority Project Operationalization of COSMO-EULAG (CELO)**
  PL: Zbigniew Piotrowski (zbigniew.piotrowski [at] imgw.pl)

  → project started in 2012 with the aim to develop a fully operational COSMO model employing anelastic dynamical core of EULAG

  → Alpine NWP-type simulations with horizontal resolution of 280 m

  → see talk by Michael Baldauf on Tuesday

COSMO Activities

ET on physics

- **Priority Project Calibration of COSMO Model (CALMO)**
  PL: Antigoni Voudouri (voudouri [at] hnms.gr)

  → project started in 2013 and aims at automatic, multivariate, objective calibration of unconfined model parameters

  → based on Bellprat and Schär method for COSMO-CLM using a quadratic meta model in parameter space from Neelin et al. (2010)

COSMO Activities

ET on physics

- **Priority Task Consolidation of Surface to Atmosphere Transfer (ConSAT)**
  PL: Matthias Raschendorfer (matthias.raschendorfer [at] dwd.de)

  → project starts in 2013 with the aim to improve surface to atmosphere transfer

  → see talks by Matthias Raschendorfer today and on Tuesday

COSMO Activities

ET on verification

- **Priority Project Verification System Unified Survey (VERSUS 2)**
  PL: Angela Celozzi (celozzi [at] meteoam.it)

→ the project implemented e.g. EPS verification methods and aims at full operationalization of the VERSUS software

→ see talk by Flora Gofa on Wednesday

COSMO Activities

ET on verification

- **Priority Task NWP Meteorological Test Suite**
  PL: Amalia Iriza (celozzi [at] meteoromania.iro)

→ the task starts in 2013 and aims at practical implementation of the NWP test suite required by the source code management rules

COSMO Activities

ET on predictability and EPS

- **Priority Project COsmo Towards Ensembles at the Km-scale IN Our Countries (COTEKINO)**
  PL: Chiara Marsigli (cmarsigli [at] arpa.emr.it)

→ the project starts in 2013 and aims at derivation of IC perturbations, model perturbations and soil/surface perturbations for convective-scale ensembles

→ see talk by Chiara Marsigli on Wednesday

COSMO Activities

ET on link with application

- **Priority Project Consolidation of Operations and Research results for the Sochi Olympic Games (CORSO)**
  PLs: Gdaly Rivin (gdaly.rivin [at] mecom.ru) and Inna Rozinkina (inna [at] mecom.ru)

  → successful implementation and development of tools for deterministic and EPS modeling, and postprocessing

  → see the talk by Pierre Eckert on ideas on postprocessing in the next COSMO Science Plan on Wednesday

COSMO Activities

ET on system aspects

- **Priority Project on Performance on Massively Parallel Architectures (POMPA)**
  PL: Oliver Fuhrer (oliver.fuhrer [at] meteoswiss.ch)

  → aims at preparation of the COSMO model allowing for flexible computer architectures (including GPU)

  → operational version of COSMO model for GPU already under testing

  → see the talk by Philippe Steiner on Thursday

Thank you