



Consortium for Small-Scale Modelling

Marco Arpagaus

Consortia presentations
32nd EWGLAM and 17th SRNWP meeting
4 October 2010, Exeter

Outline

- COSMO Organisation: News
- COSMO Model: Changes since last meeting
- COSMO Operational Applications
- COSMO Activities

COSMO Organisation: News

- Established **new Working Group 'Predictability and Ensemble Methods'** (WG 7; formerly covered in WG 4).
Chair: **Chiara Marsigli**.
- **Detlev Majewski** is new chairman of the COSMO Steering Committee.
- New **DWD COSMO Coordinator (Ulrich Blahak)** coordinating COSMO with academia in Germany.
- First **two COSMO licences** sold to United Arab Emirates and Brazil. Two to three more licences expected next year.

COSMO Model:

Changes since last meeting (1/2)

- Version 4.11
 - **Corrected use of cloud ice tendency from Tiedtke convection scheme in Runge-Kutta scheme**
 - Option for setting an upper limit on the advection of theta; helps preventing cold pools in steep valleys
 - **New multi-layer snow model**
 - Various new / updated external parameter sets
 - ...

COSMO Model:

Changes since last meeting (2/2)

- Version 4.13
 - **Modifications to bottom boundary condition**
 - ...
- Version 4.14
 - Introduced density-dependence of terminal fall velocity for raindrops and snowflakes. This leads to an increase of the sedimentation velocity (and hence more precipitation at the surface ...).
 - ...

COSMO Operational Applications

→ www.cosmo-model.org/content/tasks/operational/default.htm

→ posters!

Deterministic:

- DWD: EU (7) and DE (2.8)
- MeteoSwiss: 7 (6.6) and 2 (2.2)
- USAM: ME (7) and IT (2.8)
- ARPA-SIMC: I7 (7) and I2 (2.8)
- HNMS: GR (7); 2.5km soon
- IMGW: PL (7); 2.8km soon
- NMA: RO (7 and 2.8)
- Roshydromet: RU (7); 2.8km soon (Moscow & Sochi)

COSMO Operational Applications

→ www.cosmo-model.org/content/tasks/operational/default.htm

→ posters!

Ensembles:

- DWD: *DE-EPS (2.8) pre-operational very soon*
→ talk by Susanne Theis
- COSMO ('shared service'): *LEPS (7)*

COSMO Activities: Science Plan

What has been done in the last year:

- submitted Science Plan for an **external review** (SRNWP ETs and COSMO-CLM; 7 reviews obtained)
- addressed (most of the) questions, comments and feedback by reviewers; did some structural and many editorial changes

Thank you very much!

- **approved** the **Science Plan 2010-2014** at the COSMO General Meeting in September 2010; will soon be published on COSMO web-site and distributed to interested parties

feedback to reviewers will be done asap

Science Plan 2010-2014: Summary

Goal: Operational forecasting of mesoscale weather

Strategy

Ensemble prediction system for the convective scale

Data assimilation system for the convective scale

Extension of environmental prediction capabilities

Verification and validation tool for the convective scale

Intermediate resolution COSMO version for BCs

Usage of massively parallel computer platforms

Intensified collaboration

COSMO Activities: Science Plan

**Ready to review again
in two years?**

What is planned for the future:

- update / next revision of Science Plan in roughly two years → Science Plan 2012-2016

COSMO Activities

ET on system aspects

- **New: Performance on Massively Parallel Architectures (POMPA)**

PL: Oliver Fuhrer (oliver.fuhrer [at] meteoswiss.ch)

→ talk by Ulrich Schättler

→ review talk on system aspects by Ulrich Schättler

COSMO Activities

ET on data assimilation

- **Km-Scale Ensemble-Based Data Assimilation (KENDA)**

PL: Christoph Schraff ([christoph.schraff \[at\] dwd.de](mailto:christoph.schraff@dwd.de))

→ talk by Christoph Schraff

→ talk by Mikhail Tsyruльников on data assimilation issues for Sochi-2014

COSMO Activities

ET on dynamics

- **Conservative dynamical core (CDC)**

PL: Michael Baldauf ([michael.baldauf \[at\] dwd.de](mailto:michael.baldauf@dwd.de))

→ no talk this year

Mini-summary:

- good results for idealised tests for anelastic as well as fully compressible versions
- excellent workshops in Sopot (COSMO, strategic) and Sopot (EULAG, scientific)
- EULAG dynamical core to be implemented (experimental) into the COSMO framework

COSMO Activities

ET on physics

- **Towards Unified Turbulence-Shallow Convection Scheme (UTCS)**

PL: Dmitrii Mironov ([dmitrii.mironov \[at\] dwd.de](mailto:dmitrii.mironov@dwd.de))

→ talk by Federico Grazzini on physics developments within COSMO

COSMO Activities

ET on surface

- **Consolidation of Lower Boundary Conditions (COLOBOC)**

PL: Jean-Marie Bettems ([jean-marie.bettems \[at\] meteoswiss.ch](mailto:jean-marie.bettems@meteoswiss.ch))

→ talk presented by Christoph Schraff

COSMO Activities

ET on predictability and EPS

- **COSMO-DE-EPS**

PL: Susanne Theis (susanne.theis [at] dwd.de)

- **Consolidation of COSMO Ensemble (CONSENS)**

PL: Chiara Marsigli (cmarsigli [at] arpa.emr.it)

→ talk by Susanne Theis on COSMO-DE-EPS

→ review talk on predictability and EPS by Chiara Marsigli

COSMO Activities

ET on link with application

→ talk by Pierre Eckert on forecaster issues

→ talk by Detlev Majewski on Eyjafjallajökull event

COSMO Activities

ET on verification

- **Verification System Unified Survey (VERSUS 2)**
PL: Adriano Raspanti ([a.raspanti \[at\] meteoam.it](mailto:a.raspanti@meteoam.it))

→ talk on verification developments within COSMO
presented by Marco Arpagaus

COSMO Activities: COSMO-ART

- ART: Aerosols and Reactive Trace Gases
- pollen
- volcanic ash → talk by Detlev Majewski
- Saharan dust
- aerosols and clouds
- sea salt and clouds

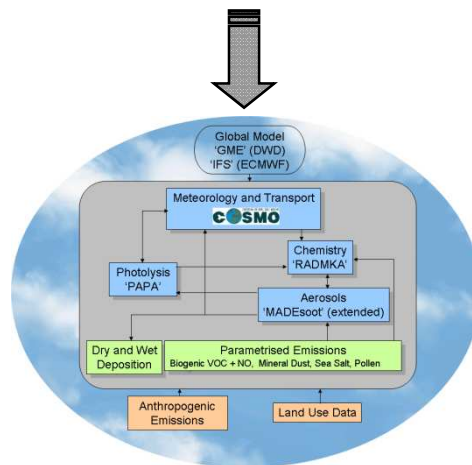
PoIDACH Initiative



cooperation of **DWD - ZAMG - MeteoSwiss** with **KIT**:



Development of a pre-operational model system for pollen dispersion using the concepts of air pollution modelling based on COSMO-ART (**ART = Aerosols and Reactive Trace Gases**)

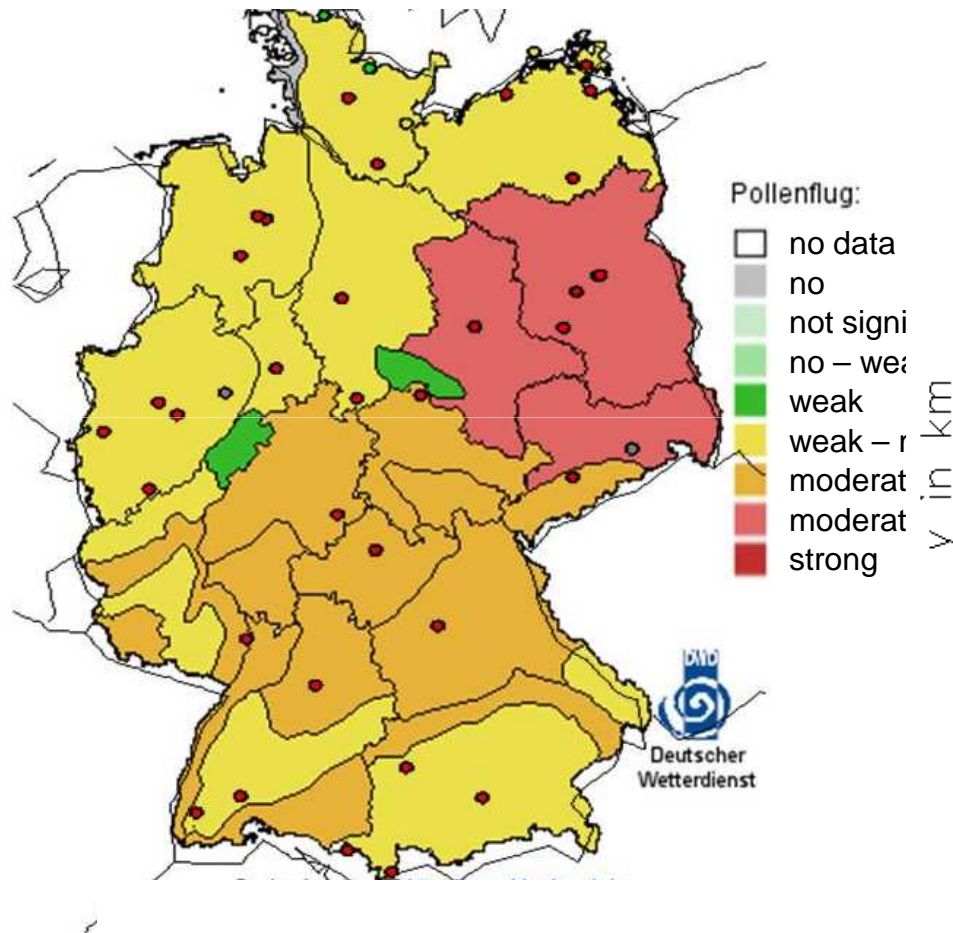


= operational weather forecast model

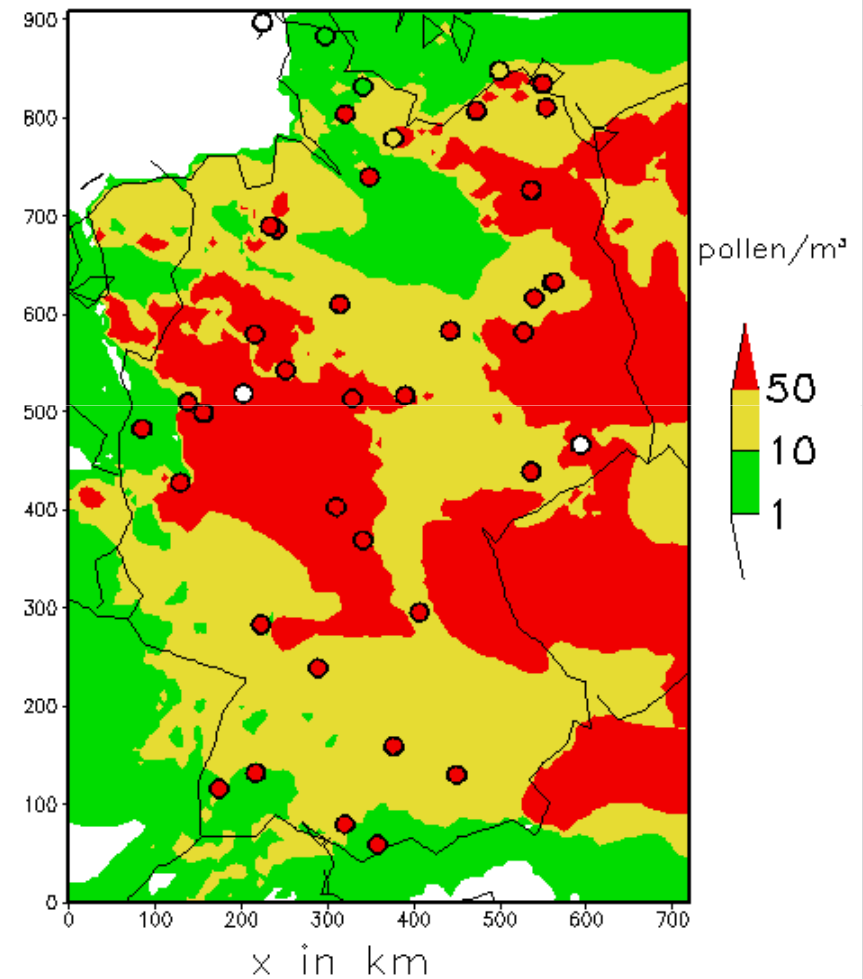
Vogel et al., 2009, ACP

Comparison: forecast & observation

“traditional” forecast, 20.04.2010

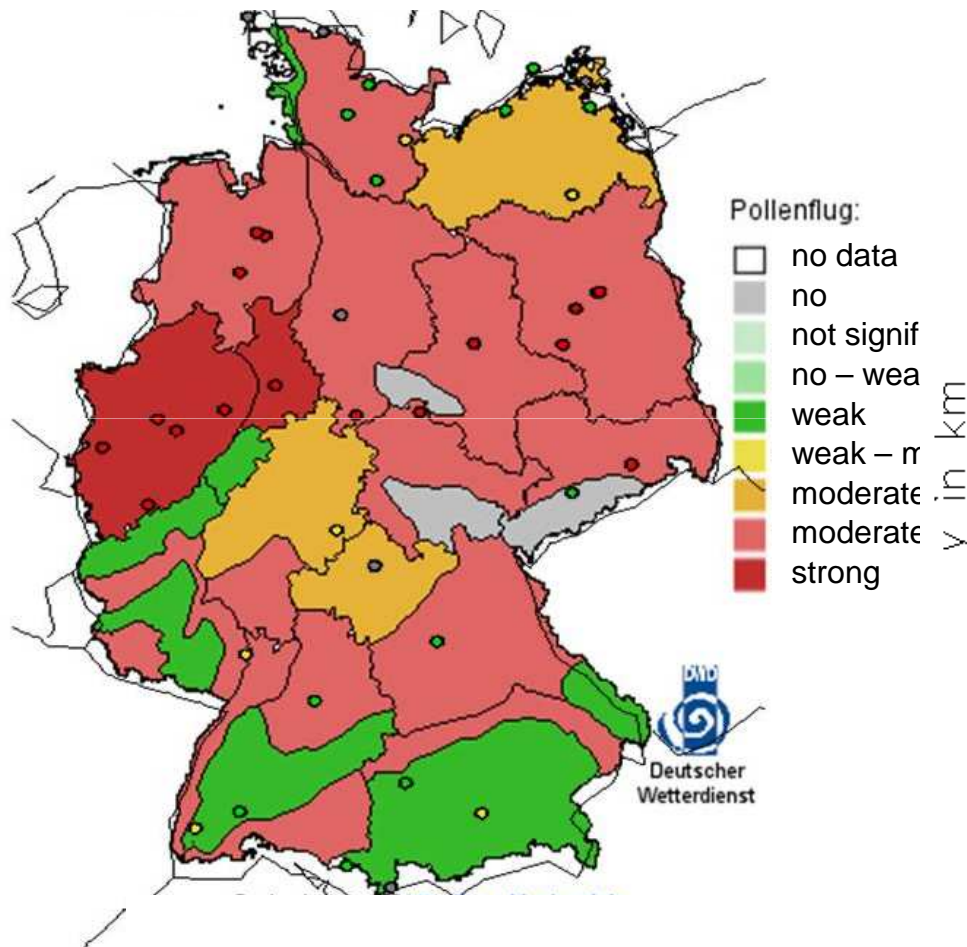


model forecast, 20.04.2010

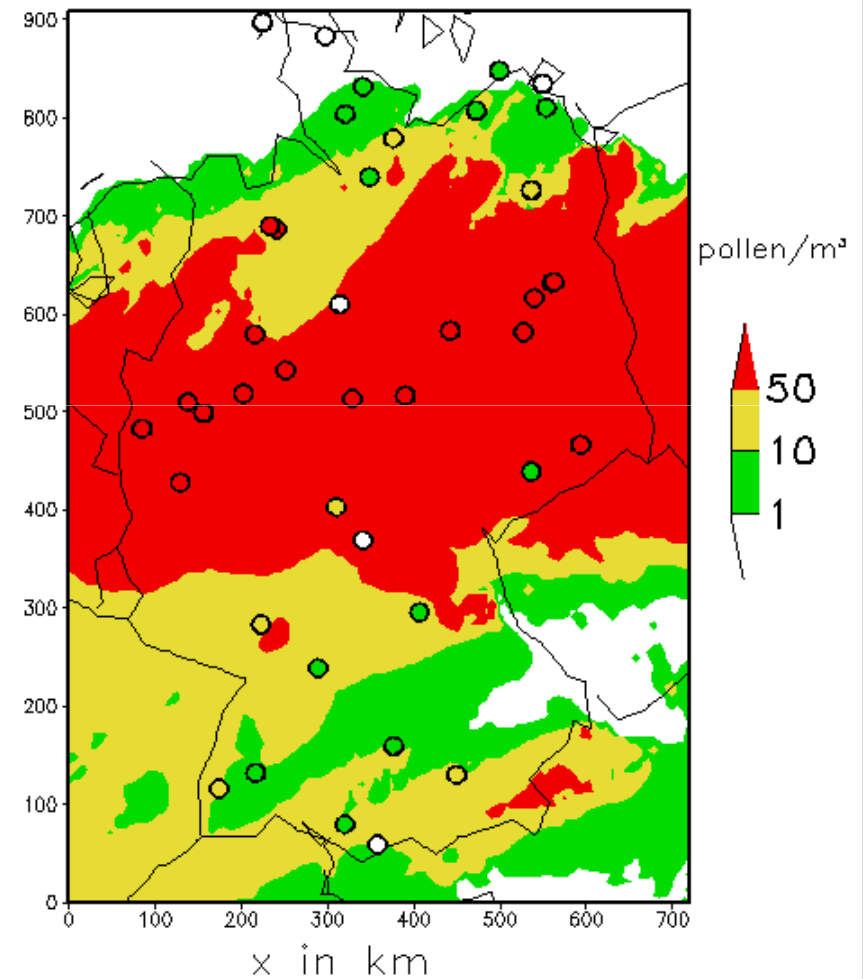


Comparison: forecast & observation

“traditional” forecast, 12.04.2010



model forecast, 12.04.2010



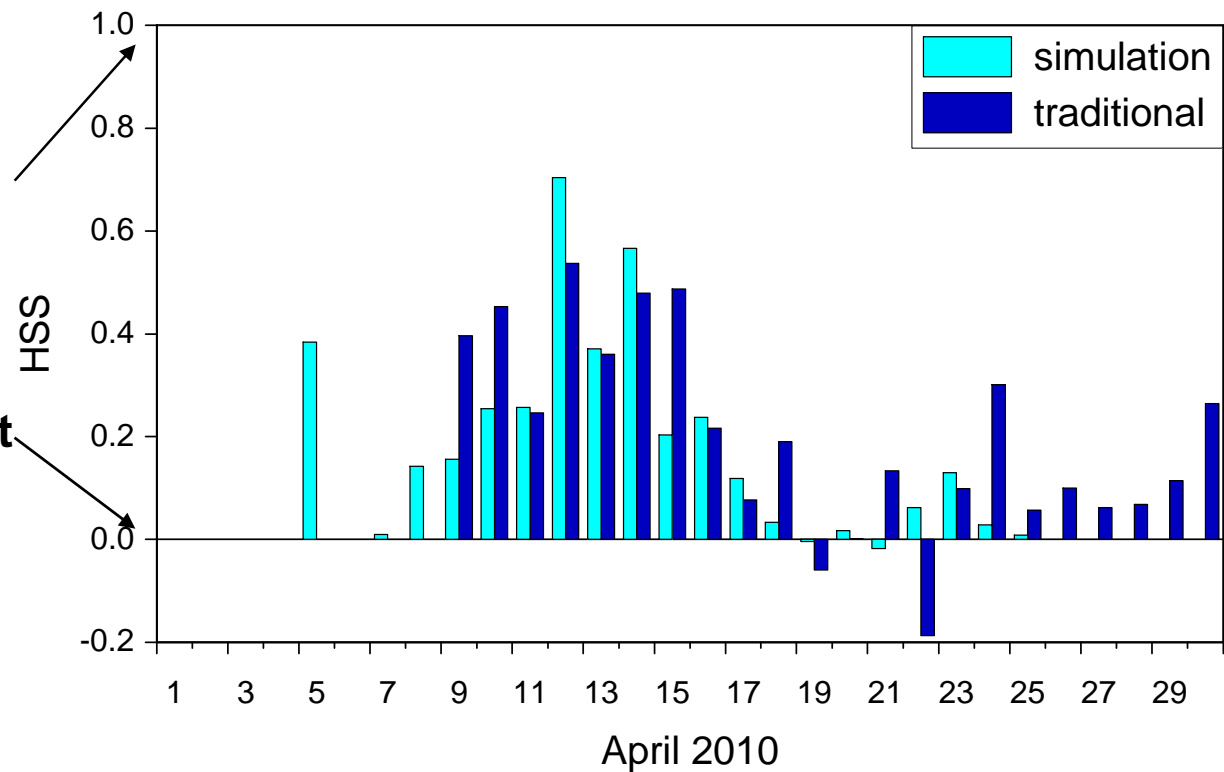
Heidke Skill Score (HSS) for $c > 50 \text{ \# m}^{-3}$

		measurement	
		yes	no
simulation	yes	a	b
	no	c	d

$$\text{HSS} = \frac{2(ad-bc)}{(a+c)(c+d)+(a+b)(b+d)}$$

HSS = 1: **perfect** forecast

HSS = 0: **random** forecast

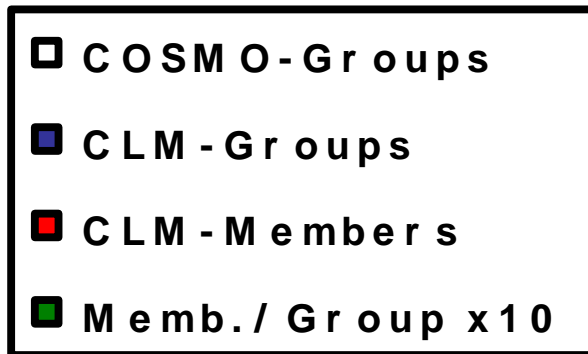
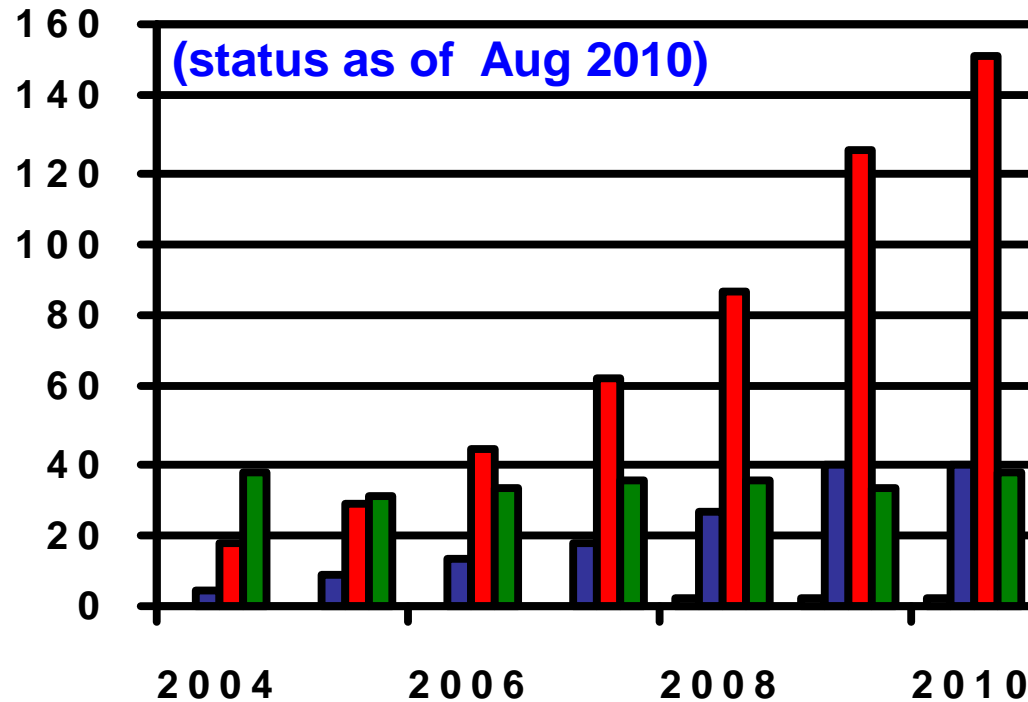


COSMO-ART Users





Development of the COSMO-CLM Community



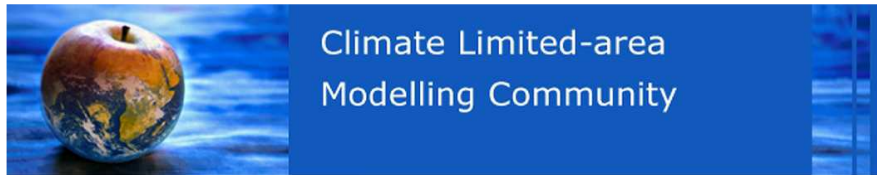
**40 institutions with
151 individuals**

New Partner Institutions since Sep 2009:



Leibniz-Centre for
Agricultural Landscape Research (ZALF)





Africa:



Tanzania Meteorol. Agency

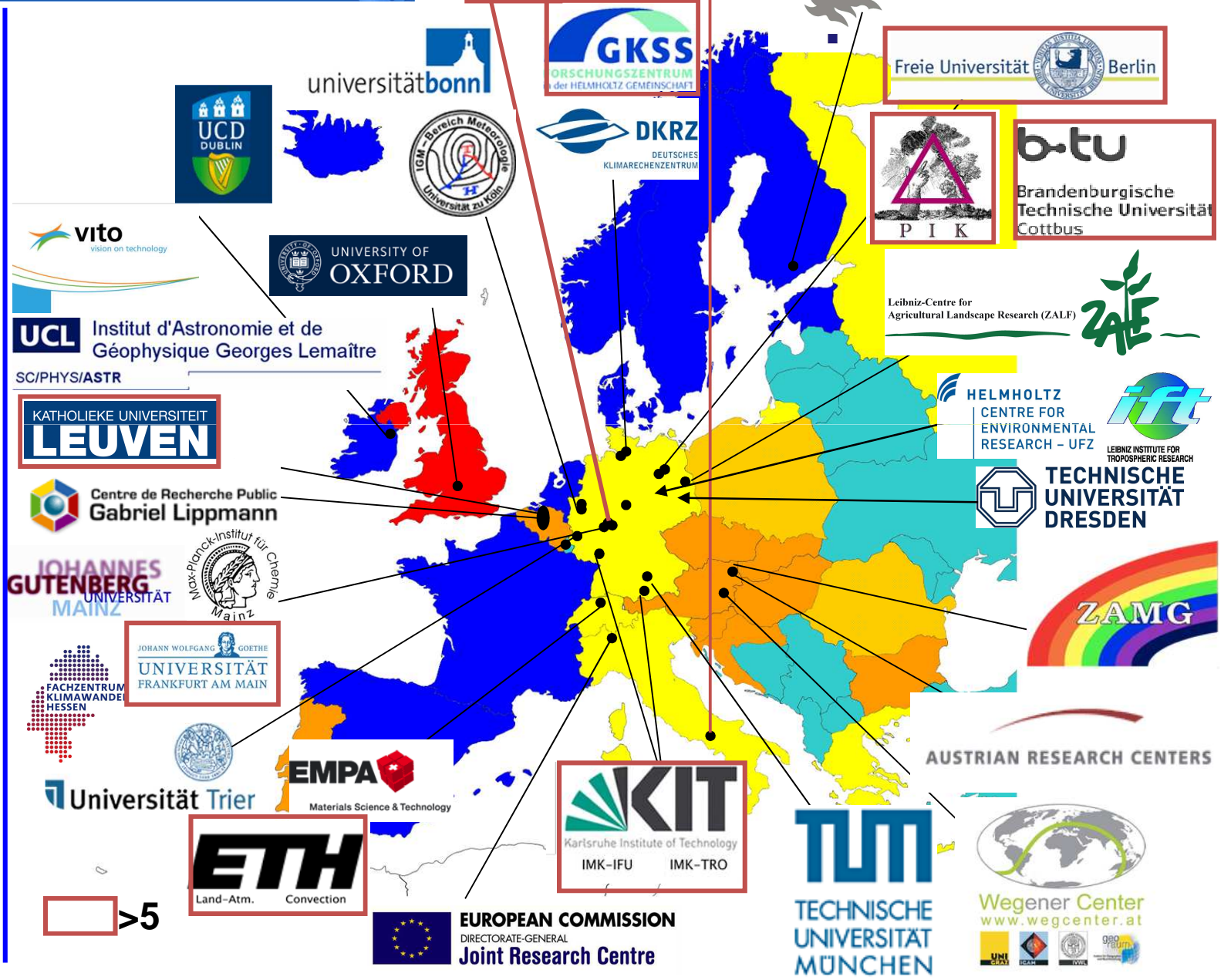


National Meteorol. Agency of Senegal

America:



Universidad Nacional Autonoma de Mexico





Thank you.

additional (hidden) slides ...

COSMO members (chronological order)

DWD

Deutscher Wetterdienst
Germany

MeteoSwiss

MeteoSwiss
Switzerland

USAM

Ufficio Generale Spazio Aereo e Meteorologia
Italy

HNMS

Hellenic National Meteorological Service
Greece

IMGW

Institute for Meteorology and Water Management
Poland

NMA

National Meteorological Administration
Romania

Roshydromet

Federal Service for Hydrometeorology and Environmental Monitoring
Russia

COSMO Governance: Steering Committee

- Detlev Majewski (DWD; current Chairman)
- Philippe Steiner (MeteoSwiss)
- Massimo Ferri (USAM)
- Theagenis Charantonis (HNMS)
- Michał Ziemiański (IMGW)
- Gheorghe Stancalie (NMA)
- Dmitry Kiktev (Roshydromet)

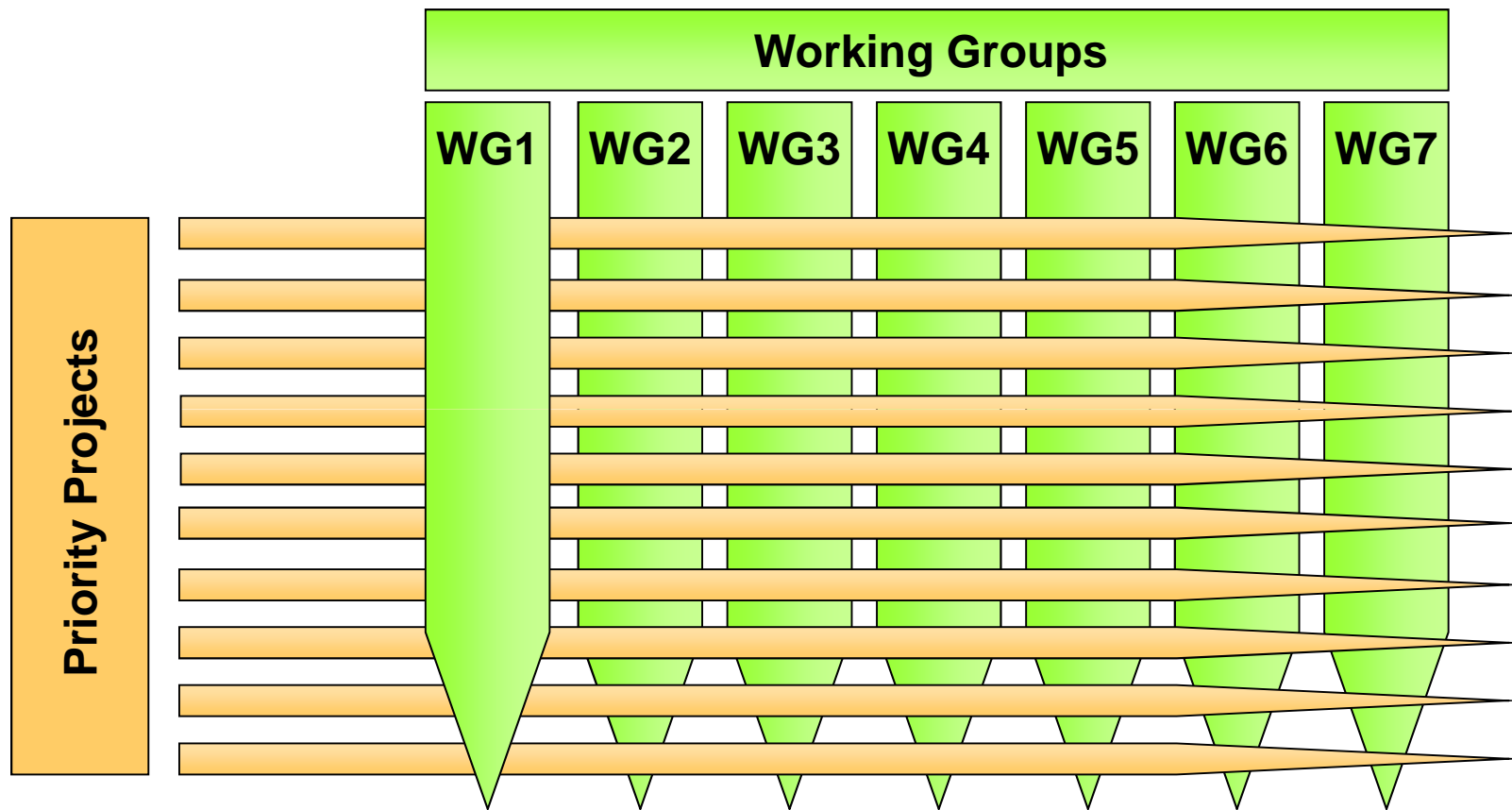
Note: There is no (formal) meeting of the directors.

COSMO Governance:

Working Groups & WG Coordinators

- **Data Assimilation (WG 1)**
[Christoph Schraff \(christoph.schraff \[at\] dwd.de\)](mailto:christoph.schraff@dwd.de)
- **Numerical Aspects (WG 2)**
[Michael Baldauf \(michael.baldauf \[at\] dwd.de\)](mailto:michael.baldauf@dwd.de)
- **Physical Aspects (WG 3)**
[Federico Grazzini \(fgrazzini \[at\] arpa.emr.it\)](mailto:fgrazzini@arpa.emr.it)
- **Interpretation and Applications (WG 4)**
[Pierre Eckert \(pierre.eckert \[at\] meteoswiss.ch\)](mailto:pierre.eckert@meteoswiss.ch)
- **Verification and Case Studies (WG 5)**
[Adriano Raspanti \(a.raspanti \[at\] meteoam.it\)](mailto:a.raspanti@meteoam.it)
- **Reference Version and Implementation (WG 6)**
[Ulrich Schättler \(ulrich.schaettler \[at\] dwd.de\)](mailto:ulrich.schaettler@dwd.de)
- **Predictability and Ensemble Methods (WG 7)**
[Chiara Marsigli \(cmarsigli \[at\] arpa.emr.it\)](mailto:cmarsigli@arpa.emr.it)

COSMO Governance: Working Groups & Priority Projects



Every COSMO member needs to provide a minimum of 2 FTEs per year for the Priority Projects or Priority Tasks.

COSMO Governance:

Priority Projects & PP Leaders

- **Conservative dynamical core (CDC)**
[Michael Baldauf \(michael.baldauf \[at\] dwd.de\)](mailto:michael.baldauf@dwd.de)
- **Consolidation of Lower Boundary Conditions (COLOBOC)**
[Jean-Marie Bettems \(jean-marie.bettems \[at\] meteoswiss.ch\)](mailto:jean-marie.bettems@meteoswiss.ch)
- **Consolidation of COSMO Ensemble (CONSENS)**
[Chiara Marsigli \(cmarsigli \[at\] arpa.emr.it\)](mailto:cmarsigli@arpa.emr.it)
- **Performance On Massively Parallel Architectures (POMPA)**
[Oliver Fuhrer \(oliver.fuhrer \[at\] meteoswiss.ch\)](mailto:oliver.fuhrer@meteoswiss.ch)
- **Km-Scale Ensemble-Based Data Assimilation (KENDA)**
[Christoph Schraff \(christoph.schraff \[at\] dwd.de\)](mailto:christoph.schraff@dwd.de)
- **Towards Unified Turbulence-Shallow Convection Scheme (UTCS)**
[Dmitrii Mironov \(dmitrii.mironov \[at\] dwd.de\)](mailto:dmitrii.mironov@dwd.de)
- **Verification System Unified Survey (VERSUS 2)**
[Adriano Raspanti \(a.raspanti \[at\] meteoam.it\)](mailto:a.raspanti@meteoam.it)

COSMO Governance: Priority Tasks & PT Leaders

- **Post-processing**
[Jean-Marie Bettems \(jean-marie.bettems \[at\] meteoswiss.ch\)](mailto:jean-marie.bettems@meteoswiss.ch)
- **Support Activities**
[Ulrich Schättler \(ulrich.schaettler \[at\] dwd.de\)](mailto:ulrich.schaettler@dwd.de)

COSMO Governance: Scientific Management Committee

Members:

- Working Group Coordinators
- Priority Project Leaders
- Priority Task Leaders
- Scientific Project Manager
- Chairman of the Steering Committee
- *One representative for each otherwise not represented member as observer*
- *COSMO-CLM and COSMO-ART representatives as observers*
- *DWD COSMO Coordinator as observer*

COSMO Staff and Budget (2009)

- Staff:
 - Approximately 125 subscribers to COSMO mailing lists.
 - 20-25 FTEs / year used for Priority Projects and Priority Tasks.
- Budget:
 - None.
 - However: Half of licence fees earned will be spent for travelling / short-term missions.

SRNWP Expert Team members

see above, plus

- Jürgen Helmert (juergen.helmert [at] dwd.de)
- Flora Gofa (fgofa [at] hnms.gr)
- Francis Schubiger (francis.schubiger [at] meteoswiss.ch)
- Susanne Theis (susanne.theis [at] dwd.de)
- Lucio Torrisi (torrisi [at] meteoam.it)
- Mikhail Tsyruльников (tsyruльников [at] mecom.ru)