10 Collaboration and External Users of LM

All national weather services of COSMO are members of EUMETNET, the network of meteorological services within Europe. EUMETNET provides a framework to organize co-operative programmes between the Members in the various fields of basic meteorological activities such as observing systems, data processing, basic forecasting products, research and development, and training (*www.eumetnet.eu.org*). COSMO's activities are embedded in this network and are especially related to EUMETNET programmes such as MAP-NWS (Mesoscale Alpine Programme - National Weather Services) and EUCOS (EUMETNET Composite Observing System).

Since the 1st of January 2000, EUMETNET provides a Coordinator for the SRNWP (Short Range Numerical Weather Prediction) Group. Representatives of the NWP branches of European National Meteorological Services meet in this group on a yearly basis to organize co-operative activities in development of numerical atmospheric models. The present SRNWP-coordinator is J. Quiby from MeteoSwiss. Within the SRNWP Group, Lead Centres have been selected for different topics. The Lead Centres have the responsibility to organize intercomparisons, workshops and to ensure the flow of information between participants. DWD has taken the role as the Lead Centre for Nonhydrostatic Modelling (responsible for this LC is Jürgen Steppeler from DWD). For more information on SRNWP and its Lead Centres see *http://srnwp.cscs.ch*.

All COSMO partners are also members of EWGLAM (European Working Group on Limited Area Modelling). This group meets once a year to exchange information on the current status and on recent developments in high-resolution numerical weather prediction.

Another type of collaboration with other European meteorological services is via COST, an intergovernmental framework for European *Co-operation in the field of Scientific and Technical Research*, allowing the co-ordination of nationally funded research on an European level (for more information about COST see *www.netmaniacs.com/cost*).

10.1 International Projects

This section lists the current participation of COSMO partners in international research projects which are related to LM. This list will be updated in the forthcoming issues.

- **CLIWA-NET** *Cloud Liquid Water Network.*
  Type: EU-project with funding.
  DWD contribution: *Supply of special LM-output for intercomparison with observations and other models.*
  Information: www.knmi.nl/samenw/cliwa-net (with online results from LM)

- **COST 717** *Use of Radar Observations in Hydrological and NWP models.*
  Type: COST concerted research action
  MeteoSwiss contribution: *Chairmanship of COST 717 Action (A. Rossa).*
  DWD contribution: *Chairmanship of COST 717 Working Group 2: Using radar observations in parameterization and validation of atmospheric models (D. Frühwald).*
  MeteoSwiss contribution: *Assimilation of three-dimensional radar reflectivities into a nonhydrostatic NWP model.*
  DWD contribution: *Development of an on-line adjustment scheme.*
  Information: www.smhi.se/cost717

- **COST 716** *Exploitation of Ground-Based GPS for Climate and Numerical Weather Prediction Applications.*
  Type: COST concerted research action
  DWD contribution: *Validation of integrated water vapour from ground-based GPS observations and their assimilation in the LM of DWD.*
  Information: www.oso.chalmers.se/geo/cost716.html

- **CLOUDMAP 2** *Validation and assimilation of cloud properties derived from ground based and satellite observations in NWP and climate models.*
  Type: EU project with funding
  MeteoSwiss contribution: *Use of cloud water content derived from 3-dim cloud observations in very high resolution LM runs.*
  Information: www.photogrammetry.ethz.ch/research/cloudmap/cloudmap.html

- **EFFS** *An European Flood Forecasting System.*
  Type: EU-project with funding.
  DWD contribution: *Hindcasting of flood events, input to flood forecasting models, analysis of precipitation (24-h totals) based on rain gauge data and radar estimates.*
  Information: http://effs.wldelft.nl

- **ELDAS** *Development of an European Land Assimilation System to Predict Floods and Droughts.*
  Type: EU-project with funding.
  DWD contribution: *Design and application of a variational assimilation scheme.*
  Information: http://www.knmi.nl/samenw/eldas

- **EUROGRID** *Application Testbed for European GRID Computing.*
  Type: EU-project with funding.
  DWD contribution: *Implementation of a relocatable LM using the EUROGRID environment.*
  Information: www.eurogrid.org

- **SEAROUTES** *Advanced Decision Support for Shiprouting Based on Full-Scale Ship Specific Responses as well as Improved Sea and Weather Forecasts Including Synoptic, High Precision and Realtime Satellite Data*
  Type: EU-project with funding.
  DWD contribution: *a) Supply of LM-data over the Baltic Sea for the development of a high-resolution sea wave model at GKSS (Geesthacht); b) Supply of sea-state information of the Mediterranean sea wave model (MSM) for verification against Altimeter data and for driving ship response models.*
  Information: www.tu-berlin.de/fb10/MAT/searoutes

- **EUCOS** *EUMETNET composite observing system.*
  MeteoSwiss contribution: *Impact studies (OSE) with aLMo for SYNOP data.*
  Type: EUMETNET project
  Information: www.eucos.net

Furthermore, a number of activities of COSMO members are related to the *Mesoscale Alpine Project* (MAP). For more information, see the MAP homepage at *www.map.ethz.ch.*

10.2 National Projects and Collaboration

This section lists LM-related projects and collaboration of COSMO members on a national level. At present, the list is by no means complete. Please inform the editors on such activities, especially those with national funding, in order to get a more complete list in the next COSMO newsletter.

- **DWD/University of Bonn**
  Special Investigations in Statistical Model Interpretation
  This is bilateral project which is partly funded by DWD.

- **MeteoSwiss/NCCR Climate**
  National Centre of Competence in Research - Climate.
  This is a nationally funded research project. Information: *www.meteoswiss.ch/nccr*

- **MeteoSwiss/University of Berne**
  Extraction of snow-cover, lake-temperature, NDVI, LAI, land surface temperature and albedo from NOAA satellites, primarily for the data assimilation suite.
  This is a bilateral project, partially funded by MeteoSwiss.

- **MeteoSwiss/EMPA**
  Determination of typical source regions of air pollutants for stations of the national air quality observing network.
  This is a BUWAL project with partial funding (EMPA only)
  Information: *www.empa.ch > Organisation > Mobilität und Umwelt > Luftfremdstoffe / Umwelttechnik > Ausbreitungsmodellierung*

- **MeteoSwiss/PMOD-WRC**
  Longwave radiation measurements compared to radiative transfer model and aLMo.
  This project is part of the Swiss National Science Foundation Project "Greenhouse-effect in the Alps: by models and observations".
  Information: *www.pmodwrc.ch/pmod.php?topic=asrb*

- **CLM**
  In autumn 2001, the German community on regional climate modelling decided to use the Lokal-Modell as a basis for a new regional climate model. The CLM (Climate Version of the LM) has been derived from the release 2.14 of LM. You find information on this modelling group and the related model developments at the CLM web-site *http://w3.gkss.de/CLM/index.html.*

- **ICON**
  The Max Planck Institute for Meteorology in Hamburg (MPI) and DWD have started a joint research project to develop ICON (ICOsahedral Nonhydrostatic), a unified global model to be used both for climate studies and operational short range weather forecasting. The model will employ finite volume numerical techniques to discretize the fully compressible nonhydrostatic equations on a geodesic, icosahedral grid. More information is available at the ICON web site *http://icon.enes.org.*

- **AFO2000**
  The German Atmospheric Research Programme 2000-2006 (AFO200) is funded by the Federal Ministry for Education and Research. It aims to improve the understanding of the atmospheric system including earth-surface interactions, chemistry, dynamics, radiation and their interactions, multiphase processes, and atmosphere-system analysis.

DWD contributes with LM-based studies in various subprojects. More information is available at the web site *http://www.afo-2000.de.*

10.3 External Users of LM

The source code of the LM-package is available free of charge for scientific and educational purposes to third parties outside COSMO. Such external users, however, must register and sign a special agreement with a COSMO meteorological service. For questions about the request and the agreement, please contact M. Capaldo (massimo.capaldo@iol.it) or D. Frühwald (dieter.fruehwald@dwd.de) from the COSMO Steering Committee.

Meanwhile, a number of universities and research institutes have received the model software. Once a year, there is a *User Workshop on Scientific Applications of the LM* organized by J. Steppeler at DWD (contact: juergen.steppeler@dwd.de, see also Section 7.4). There is, however, not always a feedback on the activities or on results and problems. Table 1 lists the current registered users of the LM (outside the COSMO group).

Table 1: Registered Scientific Users of LM outside COSMO

Institution	**Country**	**Research Activities**
Academy of Science, Hydrometeorological Institute	Bulgaria	unknown
Academy of Science, Institute for Physics of the Atmosphere, Prague	Czech Republic	Clouds and precipitation at high resolution
Alfred Wegener Institut, Bremerhaven	Germany	Cloud physics
Frontier Research, Institute for Global Change Research	Japan	Tests on time-splitting methods
German Aerospace Centre, Institute of Atmospheric Physics, Oberpfaffenhofen	Germany	Turbulence studies, model intercomparison
GKSS Research Centre Geesthacht	Germany	Regional climate simulations,
Institute for Tropospheric Research (IFT), Leipzig	Germany	Z-coordinate model version, turbulence studies
Konrad-Zuse Institut, Berlin	Germany	Scientific visualization
Massachusetts Institute of Technology, Cambridge MA	USA	unknown
Meteorological Research Institute	Japan	Model intercomparison
Meteorological Research Institute	Korea	unknown
National Center for Atmospheric Research, Boulder CO	USA	unknown
National Institute of Meteorology and Hydrology	Romania	Test simulations

Institution	Country	Research Activities
Norwegian Meteorological Institute (DNMI), Oslo	Norway	Model intercomparison
Potsdam Institute for Climate Impact Research (PIK), Potsdam	Germany	Regional climate studies, low Mach-number dynamics
Swiss Institute of Technology (ETH), Zürich	Switzerland	Regional climate studies
Turkish State Meteorological Service	Turkey	Coastal wind simulations
University of Berlin	Germany	unknown
University of Bern	Switzerland	Land use and regional climate
University of Bonn	Germany	Physical initialization, statistical postprocessing, regional evaporation and water resource management
University of Bremen	Germany	unknown
University of Cologne	Germany	unknown
University of Dresden	Germany	unknown
University of Frankfurt	Germany	Numerics and cloud physics
University of Hamburg	Germany	unknown
University of Hannover	Germany	Aircraft icing
University of Hohenheim	Germany	Assimilation of LIDAR data
University of Karlsruhe	Germany	Soil modelling, case studies
University of Leipzig	Germany	Cloud physics, hydrology
University of Ljubljana	Slovenia	Latent heat nudging
University of Munich	Germany	Model comparison, case studies
University of Trento	Italy	Numerics, shaved elements

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