

Table of Contents

1	Introduction	5
2	The COSMO Consortium	7
2.1	General	7
2.2	Agreement	8
2.3	Organizational Structure	8
3	Model System Overview	9
3.1	Lokal-Modell (LM)	9
3.2	Data Assimilation	16
3.3	Boundary Conditions from Driving Models	20
3.4	Postprocessing	21
3.5	Data Flow of the LM Package	22
3.6	Documentation	23
4	Operational Applications	24
4.1	ARPA-SMR	25
4.2	DWD	26
4.3	HNMS	28
4.4	IMGW	29
4.5	MeteoSwiss	30
4.6	COSMO Limited-Area Ensemble Prediction System	34
5	Changes to the Model System	36
5.1	Major Changes to LM	37
5.2	Major Changes to GME2LM	46
6	Working Groups	47
6.1	WG 1: Data Assimilation	47
6.2	WG 2: Numerical Aspects	48
6.3	WG 3: Physical Aspects	49
6.4	WG 4: Interpretation and Applications	51
6.5	WG 5: Verification and Case Studies	52
6.6	WG 6: Reference Version and Implementation	53
7	COSMO Meetings and Events	55
7.1	Meetings in 2003	55
7.2	Guest Scientists	58
7.3	Internal Visits	58

7.4 Upcoming COSMO Meetings	58
7.5 Announcements	59
8 Results and Methods of Model Verification	61
High Resolution Verification of Daily Cycle over Switzerland <i>Francis Schubiger</i>	63
Verification of aLMo Runs with European SYNOP and GPS Data <i>Pirmin Kaufmann</i>	67
Verification of Surface Weather Parameters at DWD <i>Ulrich Damrath</i>	72
Verification of LAMI at Synop Stations <i>Patrizio Emiliani, M. Ferri, A. Galliani and E. Veccia</i>	79
Examples of Verification of the LM Results Vs. Synoptic Observations and Vertical Soundings <i>Andrzej Mazur and Katarzyna Starosta</i>	86
Operational Verification of Vertical Profiles at DWD <i>Ulrich Pflüger</i>	95
Operational Verification of Vertical Profiles at MeteoSwiss <i>Marco Arpagaus</i>	104
Verification of Vertical Profiles at UGM <i>Patrizio Emiliani, M. Ferri, A. Galliani and E. Veccia</i>	107
Verification of Lokal-Modell Operational Suites at ARPA-SIM: Impact of the Nudging-based Assimilation Scheme <i>F. Bocanera, C. Marsigli, T. Paccagnella and P. Patruno</i>	113
The COSMO_LM_PL Precipitation Forecasts are Verified on Daily Rainfall Data Averaged over Selected River Basin <i>Malgorzata Mierkiewicz and Jan Parfiniewicz</i>	119
Quasi Real-Time Verification of aLMo Radiation Budget Forecast with Payerne Measurements <i>Marjorie Perroud and Dominique Ruffieux</i>	122
COSMO-LEPS Verification: First Results <i>C. Marsigli, F. Bocanera, A. Montani, F. Nerozzi and T. Paccagnella</i>	125
9 Model Development and Application	136
Impact of a Bias Correction Scheme for Vaisala RS80 Radiosonde Relative Humidity Observations <i>Christoph Schraff</i>	137
Assimilation of Radar Data in the LM at DWD <i>Stefan Klink and Klaus Stephan</i>	143
The Z-coordinate LM <i>Jürgen Steppeler, S. Janjic, H.-W. Bitzer, P. Prohl and U. Schättler</i>	151
Formulation of the LM's Dynamical Lower Boundary Condition <i>Almut Gassmann</i>	155
Development of a Kilometer-Scale NWP-System: LMK <i>Günther Doms and Jochen Förstner</i>	159

Runge-Kutta Time Integration and High-Order Spatial Diskretization of Advection – A New Dynamical Core for the LMK <i>Jochen Förstner and Günther Doms</i>	168
Prognostic Precipitation in the Lokal Modell (LM) of DWD <i>Michael Baldauf and Jan-Peter Schulz</i>	177
Recent Changes to the Cloud-Ice Scheme <i>Günther Doms, Detlev Majewski, Aurelia Müller and Bodo Ritter</i>	181
Numerical Simulation of Tropical Cyclogenesis with the Lokal-Modell <i>Thomas Frisiaus</i>	189
Evaluation of the Two-Way Nesting Version of LM at HNMS <i>Euripides Avgoustoglou and Iannis Papageorgiou</i>	197
Real-Time Direct Link Between Meteorological- and Dispersion Models <i>Andrzej Mazur</i>	203
10 Collaboration and External Users of LM	210
10.1 International Projects	210
10.2 National Projects and Collaboration	211
10.3 External Users of LM	213
References	215
Appendix A: The GRIB Binary Data Format used for LM I/O	218
Appendix B: Available LM Output Fields	224
Appendix C: List of COSMO Newsletters and Technical Reports	230