



MesoVICT and other news

21TH COSMO General Meeting, Rome 2019, WG5 Parallel Session



PP- C2I: Task 6.5 - Verification

Flora Gofa

Introduction

The purpose of the document is to provide verification guidelines that can be followed by the partners for priority project C2I purposes. The overall goal of the PP-C2I is to ensure a smooth transition from the COSMO model to ICON-LAM. At the end of the PP C2I, each participating institution is free to choose when ICON-LAM replaces the COSMO model in their operational forecasting system and a major role in this will play the relative performance between the two systems.

Proposed Verification Software

Proposed Evaluation Approach

http://www.cosmo-model.org/content/tasks/priorityProjects/c2i/PP-C2I-verification.pdf

Overview







Overview of MesoVICT activities and literature

Mesoscale Verification Inter-Comparison over Complex Terrain

Scientific committee: Marion P.Mittermaier (Met Office) Manfred Dorninger (Univ. Vienna) Eric Gilleland (NCAR) Barb G. Brown(NCAR)

Beth E. Ebert (BoM) Barbara Casati (Env. Canada) Laurence J. Wilson (Env. Canada)

Large parts of presented material are taken from Dorninger et al,. BAMS,2018







MesoVICT Participants



ISPRA, Italy, Stefano Mariani et al.: CRA, BOLAM, MOLOCH reruns



ARPA-ER, Italy, Andrea Montani et al.: DIST, COSMO-LEPS reruns.



COSMO Priority project: INSPECT, A . Bundel, F. Gofa et al.



CETEMPS, Italy, R. Ferretti et al.: WRF-CETEMPS reruns



UK MetOffice, UK, M. Mittermaier et al.: model re-runs, neighbourhood method, FSS

University of Bonn, Germany, P. Friederichs et al.: probabilistic forecasts and observation uncertainty, image warping and wavelet analysis



NCAR, USA, E Gilleland et al.: testing and refining the software SpatialVx; website, geometric case studies.



Environment Canada, Canada, B. Casati: model re-runs, intensity-scale skill score,



University of Ljubljana, G. Skok: FSS adapted for wind



t University of Vienna, M. Dorninger, Simon Kloiber: VERA and JDC data, VERA ensemble, observation uncertainty

MesoVICT final meeting

Retrieve presentations: https://mesovict.univie.ac.at/

MesoVICT final meeting

Programme

Monday, 8 July 2019			
Registration			
Welcome note (including aims of the workshop)	Dorninger Manfred		
Session 1: MesoVICT - review and recent studies			
Overview of MesoVICT activities and literature	Dorninger Manfred		
Impact of the variation of model domain size and native	Mariani Stefano		
resolution on the applicability of the CRA analysis on QPF			
verification: A MesoVICT study			
Putting the location-oriented measures to the test: New	Dorninger Manfred on behalf		
abstract cases for MesoVICT	of E. Gilleland		
Poster intro: INSPECT: MesoVICT experience in COSMO	Gofa Flora and Bundel		
consortium	Anastasia		
Coffee break and poster viewing	all		
Discussion: What have we gained from MesoVICT?	all		
Session 2:Recent, ongoing and new verification studies			
Spatial verification of COSMO forecasts for ICE-POP2018	Bundel Anastasia		
Using the high-resolution observations for the precipitation	Shatunova Marina , Bundel		
forecast assessment: benefits and difficulties	Anastasia		
Spatial forecast verification with wavelets	Buschow Sebastian		
End of Day 1			
Departure to Heuriger (self-paying)			
	y, 8 July 2019 Registration Welcome note (including aims of the workshop) 1: MesoVICT - review and recent studies Overview of MesoVICT activities and literature Impact of the variation of model domain size and native resolution on the applicability of the CRA analysis on QPF verification: A MesoVICT study Putting the location-oriented measures to the test: New abstract cases for MesoVICT Poster intro: INSPECT: MesoVICT experience in COSMO consortium Coffee break and poster viewing Discussion: What have we gained from MesoVICT? 2:Recent, ongoing and new verification studies Spatial verification of COSMO forecasts for ICE-POP2018 Using the high-resolution observations for the precipitation forecast assessment: benefits and difficulties Spatial forecast verification with wavelets End of Day 1 Departure to Heuriger (self-paying)		

Tuesday, 9 July 2019 Session 2: continued		
09:20	Object-based ensemble verification of radar reflectivities on	Hoff Michael
09:40	Poster intro: AROME and Meso-NH performance to retrieve fine scale low level wind under stable conditions during two recent mountain field experiments	Paci Alexandre
09:40	Poster intro: Verification of wind speed ensemble predictions in complex terrain using an analog-based approach	Odak Plenković Iris
09:40	Coffee break and poster viewing	all
10:20	TEAMx, a research programme investigating transport and exchange processes in the atmosphere over mountains	Serafin Stefano
10:40	Present your new (future) verification activities (few slides)	Weusthoff Tanja, Dominger Manfred, others??
11:10	Discussion: New issues and challenges for verification (in complex terrain): data, parameters, ensemble forecast,	all
12:10	Closing the workshop	Dorninger Manfred

MesoVICT Literature

Special collection ...

...still open for Journals of AMS

White literature:

Dorninger, M., E.Gilleland, B. Casati, M.P. Mittermaier, E.E. Ebert, B.G. Brown, and L.J. Wilson, 2018: <u>The Setup of the MesoVICT Project.</u> *Bull. Amer. Meteor. Soc.*, **99**, 1887–1906, <u>https://doi.org/10.1175/BAMS-D-17-0164.1</u>

Gilleland, E., 2017: <u>ANew Characterization within the Spatial Verification Framework for False</u> <u>Alarms, Misses, and Overall Patterns.</u> *Wea. Forecasting*, **32**, 187–198, <u>https://doi.org/10.1175/WAF-D-16-</u> 0134.1

Skok, G. and V.Hladnik, 2018: <u>Verification of Gridded Wind Forecasts in</u> <u>Complex Alpine Terrain: A</u> <u>New Wind Verification Methodology Based on the Neighborhood Approach.</u> *Mon. Wea. Rev.*, **146**, 63–75, <u>https://doi.org/10.1175/MW/_MRestoDvc-r1r6atmQe47/mg1.1</u>

MesoVICT Literature

Radanovics, S., J. Vidal, and E. Sauquet, 2018: <u>Spatial Verification of</u> <u>Ensemble Precipitation: An</u> <u>Ensemble Version of SAL</u> Wea. Forecasting **33**, 1001–1020, <u>https://doi.org/10.1175/WAF-D-17-0162.1</u>

Mariani S., and M. Casaioli, 2018: Effects of model domain extent and horizontal grid size on contiguous rain area (CRA) analysis: AMesoVICT study. <u>Meteorol. Z., 27, 481-502, DOI:</u> 10.1127/metz/2018/0897

Han, F.and I. Szunyogh, 2018: <u>ATechnique for the Verification of Precipitation Forecasts and Its</u> <u>Application to a Problem of Predictabilit</u> *Mon. Wea. Rev.*, **146**, 1303–1318, <u>https://doi.org/10.1175/MWR-D-17-</u> 0040.1

F. Gofa et al., 2017: Identifying the skill of higher resolution forecasts precipitation forecasts with neighborhood verification techniques. In: Perspective of Atmo. Scince s, E_Ccs: Karacose et al., Springer.

MesoVICT Literature

Grey literature:

Dorninger, M., M. P.Mittermaier, E.Gilleland, E.E.Ebert, B.G.Brown, and L.J.Wilson, 2013: *MesoVICT: Mesoscale Verification Inter-Comparison over Complex Terrain*. NCARTechnical Note NCAR/TN-505+STR,23 pp, doi:10.5065/D6416V21.

Bachelor Thesis:

Geiß S., 2015: Comparison of spatial verification forecasts. Bach. Thesis, LMU Munich, 43pp.

Master Thesis:

Kloiber S., 2017: Verification in complex terrain with ensemble analysis. Master Thesis, Univ. Vienna, 66pp.

D'Alessandro, Daniele, 2016: From the traditional verification approach to the spatial methods: a study of applicability of the SAL metric in the framework of the WMO project MesoVICT. *University of Bologna*.

Lots of presentations at EMS 2015, 2016 and 2018, 7th Internat'l Verification Methods workshop in Berlin, 1st and 2nd MesoVICT workshops in Vienna and Bologna. **Other (planned) publications and presentations ?**

Performance of NWP models in complex terrain

Dorninger M (1), S. Serafin (2) and V. Hutter (1)

- 1) University of Vienna
- 2) University of Innsbruck

Question: Do NWP models perform better or worse in mountainous terrain ?

Only very few papers are dealing with model performance in complex terrain specifically.

Hypothesis: E.g., mountain ranges help to "fix" precipitation areas "in place" and NWP models perform better.

Verify NWP-model at station locations in and around Alpine Region

Start with 55 SYNOP stations:

- 13 Mountain stations
- 10 Foreland stations
- 32 Valley stations



Including inner-alpine dry valley stations Including close-by mountain and valley stations

NWP-Model: ECMWF in the current version

Data period: 8 March 2016 – 28 February 2019

- Extension of time period possible
- Inclusion of additional NWP-model results possible
- Rather simple verification scores
- Stratify verification according to
 - Foreland vs. Mountain stations
 - Inneralpine dry valley stations
 - Close-by mountains and valley stations
 - Weather situation

Overcome two problems of MesoVICT

- Course resolution of VERA
- Old cases
- Contact M.Dorninger if you wish to participate or follow the results of this study

Process-oriented verification

Thomas Haiden, Barbara Casati, Caio Coelho, Eric Gilleland, Raghavendra Ashrit, Manfred Dorninger, and Chiara Marsigli Joint Working Group for Forecast Verification Research, 28 March 2019

1. What is process-oriented verification?

2. Model inter-comparison

2.1 Coupled Model Intercomparison Project (CMIP)

2.2 WMO Commission for Basic Systems (CBS) exchange of NWP scores

2.3 The Common Verification of the COSMO consortium

2.4 Major model intercomparison activities -Ongoing NWP intercomparisons:

a. Precipitation Diurnal Cycle

http://www.gewex.org/panels/global-atmospheric-system-studies-panel/gass-projects

b. Surface Drag and Momentum Transport (COORDE)

http://www.gewex.org/panels/global-atmospheric-system-studies-panel/gass-projects 7

c. Greyzone EUREC4A -this pertains the representation of clouds at intermediate resolution, between explicit and implicit- https://www.metoffice.gov.uk/research/collaboration/grey-zone-project/grey-zone-second-phase

d.WGNE Surface Flux Interomparison (no url at the moment)

e. Demistify: An LES and NWP Fog Modeling Intercomparison

http://www.gewex.org/panels/global-atmospheric-system-studies-panel/gass-projects

f. GEWEX Upper Tropospheric Clouds and Convection Process Evaluation Study

http://www.gewex.org/panels/global-atmospheric-system-studies-panel/gass-projects

4. Multi-dataset verification and up-scaling



Thank you for the participation and contributions

Don't miss

WG4 session: 15:30 NWP Test suite session: 16:30

<u>Tuesday</u> PPAWARE project kick-off meeting: 15:00