Item 4: Common Plot Reports 2015-2016

CONSORTIUM FOR SMALL SCALE MODELING

COSMO

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Common Verification Reports

Last updated: at most recent report

EDIT

In the framework of COSMO verification activities, statistical scores extracted from CVS (common verification suite) or other packages, are presented for all COSMO countries with the use of a common graphic package.

See the guidelines of the verification reports (pdf, since Oct 2014)

year	Dec-Jan-Feb	Mar-Apr-May	Jun-Jul-Aug	Sep-Oct-Nov
2015	get pdf	N/A	N/A	N/A
2014	get pdf	get pdf	get pdf	get pdf
2013	get pdf	get pdf	get pdf	get pdf
2012	get pdf	get pdf	get pdf	get pdf
2011	N/A	N/A	get pdf (for both seasons)	

FTE attribution

STC was in favor of the proposition for FTE attribution for common plots and conditional verification activities (requested by WG5 in August 2014), provided that its additional conditions are imposed, as formulated in the minutes of the STC meeting from September 2014:

- STC suggests to restrict the task to the plots on the **common area**, which are the ones bringing a benefit since really comparable. STC requests for a **deeper analysis** in the report
- STC suggests that FTE should be required to perform some **additional explanation** of results which will help to detect and improve outdated installations and correct model setups.
- STC decides to keep **conditional verification** in the task, but requests that **the conditions should be decided every year new by the WG3a/b**.

STC agrees to the WG5 coordinator proposition to attribute formal FTE to these activities in the requested amount with the modifications stated above.

Contributions

4	Common Plot Activity	
4.1	0.2	Reporting

Assigned	FTEs	Name	Detail
Ge	0.1	Damrath	Report Production
Gr	0.1	Boukouvala	Report Production

4.2	0.35	Score Production

Assigned	FTEs	Name	Detail
Ge	0.05	Damrath	Score Production
Sw	0.05	Schubiger (qrt4: Lapillonne)	Score Production
It	0.05	Vocino	Score Production
It	0.05	Tesini	Score Production
Gr	0.05	Gofa	Score Production
Po	0.05	Linkowska	Score Production
Ru	0.05	Kirsanov	Score Production

4.1 Reporting

0.2 FTEs for report preparation

- 0.1FTEs D. Boukouvala, HNMS: graphics preparation, report writing
- 0.1FTEs U.Damrath, DWD: web graphics preparation, long term trends

4.2 Score Production

0.05 FTEs per participating service/model

Task description

Score Production (4.2)

Preparation of input data and calculation of seasonal statistics over a common area according to the guidelines derived on an annual basis from WG5 (http://www.cosmo-model.org/content/tasks /verification.priv/common/guidelines.pdf) for each participating model. This Task includes conditional verification tests performed over this area. IFS driving model statistics has also been added this year.

Seasons: JJA 2014, SON 2014, DJF 2015, MAM 2015

Reporting (4.1)

Processing of data from all models for each parameter and conditional verification test in appropriate format

R scripting for production of graphs (cross model representation)

Preparation of report for each season

Commenting of significant errors or discrepancies between models

Preparation of web graphics based on DWD representation regime

Long term trend calculations

Main Issues to be considered

- Choice of model resolution to be used (7km resolution soon will not be the operational in some services). ***IFS driving model at 9km resolution from Jan 2016***
- Introduction of higher resolution models does not seem to provide any common domain (to be investigated)
- Communication of CP-derived information to COSMO management and other WGs (Conditional Verification) – Preparation of short report to be distributed to WG3a,b
- Common Verification Software concept to be decided by STC – *Can we continue these reports when based on variable verification software?*
- No upper air verification is included (Feedback File use)

Secondary points

- Important to have precise application of the guidelines prepared
- Only the 00UTC run is verified in all cases
- Effort to eliminate delay in the preparation of the reports due to multi-naming of files (strictly use the naming definition given in the last table), errors in their format, not checked verification results prior to sending, delayed delivery (set dates), define clear procedure in the commenting/revision of reports

Additional Common Plot Report Applications

COSMO operational EPS system verification (LEPS) using ECMWF resources

- available through NWP test suite special project

Comparisons with driving models (IFS, ICON) for same Specifications

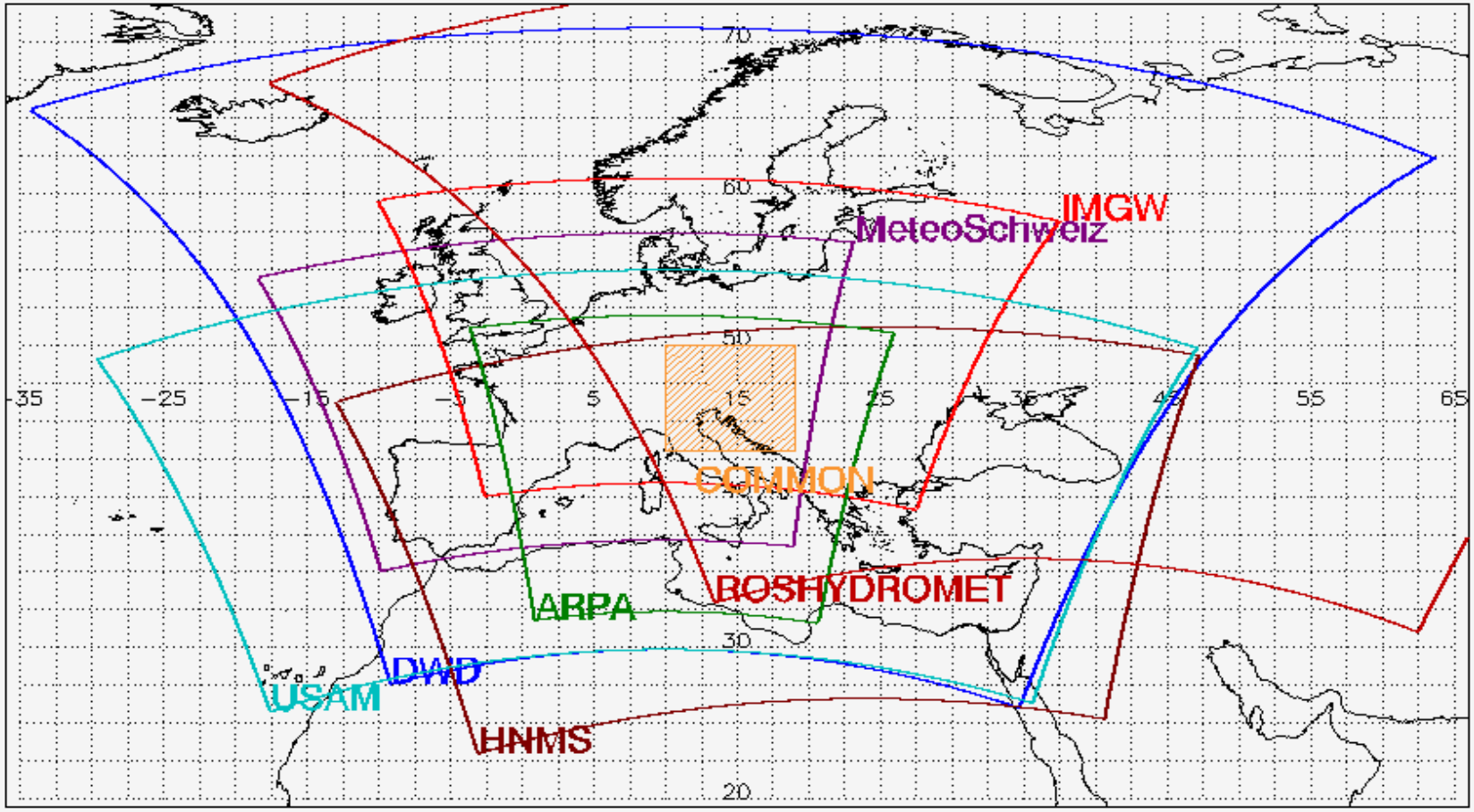
- Problems reported with VERSUS → ICON

Based on the questionnaire filled by all participants, Common Plot reports is a "useful" activity of WG5 – Important to be tailored to NWS and COSMO needs

DWD
MCH
CNMCA
HNMS
IMGW
NMA
RHM
ARPA-SIMC
ARPA-PT

[Decision|: Responsible member for the preparation of annual reports for 2015/2016 – (U. Damrath retirement)

Standard Verification on Common Area



Common Verification Plots for Common Area (2014-2015)

Standard Verification

- Continuous parameters **over all stations** - T2m, Td, Wspeed, MSLP

Method: 3D method-height optimized

Scores: ME, RMSE. Forecast Step: every 3 hours

- Continuous parameters **over all stations** – TCC

Method: 30km radius method

Scores: ME, RMSE. Forecast Step: every 3 hours

- Dichotomic parameters **over all stations** – Precipitation (15 km radius method).

Method: 15km radius method

Scores: FBI, ETS, Performance Diagrams

Accumulation: 6h and 24h

Thresholds: 0.2, 0.4, 0.6, 0.8, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20 mm/6h and mm/24h

Definition of content for 2015-2016 report

Common Verification Plots

Conditional Verification experiments

Common Verification Plots for Common Area

Conditional Verification

- 2mT verification with the following criteria (one condition):
  - Soil water content ≥4 (condition based on **forecasts**)
  - Soil water content <2 (condition based on **forecasts**)
- Wind Speed verification with the following criteria (one condition):
  - Roughness length <0.2 m(condition based on **forecasts**)
  - Roughness length >1m (condition based on **forecasts**)

✓**Need to report the sample size or percentage of cases in each category**
✓**Easier to draw conclusions when difference from unconditioned errors on parameters are plotted**

Cooperation with WG3a (2014-2015): Processing of verification feedback on model development

Scope: Direct and Indirect effects of the option of COSMO model that considers the interaction between the turbulence scheme and the wind tendency due to the presence of subgrid scale variability **(LTKESSO)** will be evaluated.

2mT, Wind speed and MSLP verification with the following criteria (one condition):

subgrid scale orography variance (SSO_STDH) ≤25m (condition based on **forecasts**)
subgrid scale orography variance (SSO_STDH) ≥100m (condition based on **forecasts**)

Conditional Verification experiments: 2015-2016

With Communication with WG3b Coordinator

Study: Impact of soil type and vegetation height on the performance of various weather parameters in the lower atmosphere

Reasoning: The soil-vegetation representation in the model involves the fluxes of energy and water at the surface and determines the exchange of heat, moisture and momentum between the surface and the atmosphere. This has consequently an impact on near surface weather parameters (**temperature, dewpoint, wind**)

Scope: Evaluate the relevant effect in bias of modeled weather elements due to the variability on terrain characteristics

Physical Concept

Through the External Parameters (climatological values on a coarse resolution) COSMO model receives as boundary condition information on surface characteristics as the type of surface (land,water), type and amount of vegetation and type of soil (porosity and thermal properties).

Soil type <u>Impacts</u>:

- How the model's incoming solar energy absorbed at the earth's surface (skin) is partitioned into surface heating and evaporation of moisture
- The amount of water available for evaporation through model vegetation (evapotranspiration) and from the surface soil layer
- Incoming solar energy (Albedo, Cloudiness, Solar Angle
- Albedo of the surface, which affects the amount of solar energy available for use at the surface
- Heat conductivity of the surface, which determines the amount of surface heating that can be transported down into the deep soil layers

CV Application Steps

- Decide on a common area of interest for this application
- Analysis of soil types and vegetation heights around each observation station as derived from model (constant model output fields at 00 step)
- Create a stratification of stations with a statistically significant sample from each category (easier for soil types, not very promising for vegetation)
- Perform verification of weather parameters (2mT, DewP, WindSp) for main categories for all seasons (dry and wet conditions)
- Present unconditioned and conditioned performance of forecasted weather elements

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List of Conditional Verification tests as was proposed by Model Developers

Conditions imposed both in fcst and obs space

2m Temperature	
1st condition: 2nd condition:	Total cloud cover >= 75% (overcast condition) a. THICK using TQC (Total column cloud water) b. THIN using TQC - Reference value TQC<5 g/m2
1st condition: 2nd condition:	Total cloud cover <= 25% (clear sky condition) a. THICK using TQC - Reference value TQC>5 g/m2 b. THIN using TQC - Reference value TQC<5 g/m2
1st condition:	2m Temp for various thresholds 2mT with wind in selected stations 2mT with snow cover **2mT/Td with soil moisture**
1st condition: 2nd condition:	**Total cloud cover <= 25% (overcast condition)** Wind speed <= 2,5 m/s
Precipitation	
1st condition:	Convective precipitation (unstable atmosphere) Reference value of CAPE 50 J/Kg Precipitation for various weather classes Check pressure tendency availability
1st condition:	Large scale precipitation (LSP) using non convective CAPE values
Cloud cover with stability index	
Wind Speed	
WS with roughness length	
Wind gust	
1st condition:	Convective (unstable atmosphere) Wind gust for convective precipitation cases
1st condition:	non convective atmosphere, using non convective CAPE