Work Group 5 - VERSUS Meeting

Date: 02-04.04.2012

Place: Pratica di Mare, USAM, Italy

Participants:
Flora Gofa (HNMS), Adriano Raspanti (USAM), Angela Celozzi (USAM), Filodea Pastorelli (Elsag), Maria Stefania Tesini (ARPA-SIM), Elena Oberto (ARPA-PT), Amalia Iriza (NMA), Francis Schubiger (Meteo Swiss), Joanna Linkowska (IMGW), Uli Damrath (DWD), Vanessa Stauch (Meteo Swiss).

Day 1, 02.04.2012: Work Group 5 Meeting

Agenda Item 1: Review of the WG5 Task list:

A review of one by one the Tasks was performed in order to discuss the status and the possibility to change/reform some of them.

- 5.1.1 SYNOP verification discussion about introducing more variables like solar radiation and wind gusts verification. Verification of wind direction needs new approach also its graphical representation. One possibility could be scatter plots, wind roses or multi-categorical contingency tables
- 5.1.3 Common plots. Old plots are going to be removed from COSMO pages and be replaced by a short summary of the common plots for each season. From this year on, the COSMO year starts with summer (at the COSMO GM spring is the last presented season). *Task for ALL*: send details of common plots to Flora: domain, global driving model, number of stations verified
- 5.1.4 Dissemination of grib output. Reformation to include not the dissemination which is now performed from all services except RHM but to include the monitoring of precipitation model forecasts for overlapping areas
- 5.3.2 to be deleted and be replaced by 5.3.3 Task. ASCII format of the non-GTS data needs to be defined by Uli in order to prepare the VERSUS acquisition accordingly.
- 5.3.4 PBL parameters verification. There are no resources at the moment, but item is kept for the future.
- 5.3.6 WTD verification. In order to increase the sample size for weather type dependent verification, an extension of VERSUS could be to combine seasons from several years.
- 5.4.1 and 5.4.2 are tasks for all participants, progress is expected.
- 5.5 Focus on the operational aspects of EPS verification
- Motivation for contributions to the COSMO newsletter and to the biannual verification methods conference

[Action] Reviewed Task list has to be prepared by the WGC and communicated to all. Also requirements and reminders for the status of the Tasks have to be sent also via email or posted in the Forum.

Agenda Item 2: Discussion about common plots for JJA2011 and SON2011

- AR presented the common plots that were prepared by the Italian colleagues for the first two seasons for both standard and conditional verification. Still DWD and RHM have not sent their data due to problems in Versus installation but expected soon.
- 2m temperature: no obvious differences, the models with different global driving models seem to behave differently, 10m wind speed: models including an Alpine domain show negative bias. 2m temperature with cloud cover condition: all models show the same increased RMSE for clear sky conditions. Precipitation: need to reduce the number of plots (performance diagram).

[Action] Report will be prepared and sent by the WGC with the help of the Italian team that has taken up this Task of the common plots creation every season.

Agenda Item 3: Issues from SMC meeting

An overview of the main outcomes from the last SMC meeting was given by FG to the participants. Special focus on the testing of new wind gust parameterization.

3.1 Source code management

AR gave a presentation on SCM concept and the changes that need to be performed to VERSUS software in the future in order to comply to the standards.

3.2 NWP test suite

Short discussion on the experiment design and recommendations from the group for the verification procedure that needs to be followed.

Agenda Item 4: Wind gust parameterization - 2009 study

Presentation by FS on the wind gust verification study performed in 2009. Possibility to continue of the comparisons on more parameterizations. The need to distinguish between convective and turbulent part of the wind gust parameterization was demonstrated.

Agenda Item 5: Conditional Verification results at MCH

VS presented the results of her CV analysis. Some of the suggested conditions from the WG3-WG5 meeting in Langen, did not prove useful. Important outcome from the 2mT with respect to cloudiness comparison in both obs and fcs space.

Agenda Item 6: New Issues in WG5 and VERSUS

6.1 Suggestions for CV

A new list with possible CV tests was compiled from all the participants based on the results of the tests that are performed already.

2mT: The use of TQC did not exhibit any clear connection with the performance of the model for this parameter. Apart from the percentage of cloudiness, CV tests need to be performed for various thresholds of temperature, with connection to wind speed on selected stations, with snow cover and soil moisture.

Wind speed: CV with roughness length
Wind gust: CV for convective precipitation cases.
Precipitation: The use of CAPE index was a NOT very good choice. Need to focus on different weather classes. Possibility of CV with pressure tendency for connection with frontal passage.
Cloud Cover: CV with the use of stability index.

[Action] A discussion through email needs to be initiated with WG3 scientists in order to expand the tests of CV on more weather parameters that could exhibit interdependencies. A revised document will be prepared by the WGC with a list of possible CV tests and will be posted on the Forum.

6.2 Import/use of precipitation data from high density observation network

UD gave an overview of the work that it is done for homogenizing these data.
Priority: loading data with defined ASCII format into VERSUS in order to make them more usable
Priority: implement “simple upscaling” technique
Priority: check impact of orography

6.3 Use of gridded observations (radar data) within VERSUS

VERSUS developers need example files for radar data in grib on the model grid. FS will provide example files in grib format for the correct preparation of such information from the other users too. Techniques for handling of high resolution gridded data are still not in VERSUS, but data can be handled in the same format that is done now with the comparison of forecasts with the gridded analysis fields.

6.4 Different steps to use COSI index

Presentation of UD and the use of COSI index for long term comparison of the model performance. All participants shall test this functionality. Maybe extend VERSUS to an annual moving window for averaging the scores (see UK MetOffice).

6.5 New verification techniques

Short overview from AR on new techniques for high resolution models. Report of SAL method that was implemented in USAM (not in VERSUS) will be disseminated.

Day 2, 03.04.2012: VERSUS meeting

Agenda Item 7: Project overview

AC gave an overview of VERSUS2 project plan focusing on the different Tasks, being Task0 (Help Desk, bug fixing and patches release) recognized as fundamental and a permanent one all along the project.

Task1: CONSOLIDATION OF THE SYSTEM

- It was stressed that definition of the stress test, to identify possibilities and limitation of VERSUS, is still pending. Suggestions should be further elaborated (e.g. data of all European stations, several models, several model runs), in particular, the execution of a number batch jobs will be part of the test.
- Some helpful posts are available on the forum already about the DB tuning and the php tuning. For the VERSUS versions that are installed with a mysql version > 5.0, DB tables partitioning will increase the performance, the project team will provide help on the forum.
- An essential part of patches release is the test of the new developments. As the system became quite complex, a standard test procedure shall be defined and carried out by the VERSUS group in order to share the work load of the VERSUS PL team and Flora Gofa among the users.

[Action] Explore the possibility to perform the test on a public test machine (Internet) with the standard installation and a test data set. CNMCA IT department gave its availability and it will be implemented soon.

Task2: DATA FORMATS GRIB2 AND WMO BUFR

- For grib2 usage a change in the DB tables would be necessary. Short discussion about coding EPS forecasts in grib2 (as COSMO-DE EPS output is in grib2) was introduced by UD.

[Action] As at the moment the plans of COSMO related to the implementation of grib2 are not clear, the participants decided to postpone the subtask. EPS issue is also related to TASK4 (see below)

- As a side issue coding of the experimental version of a model in grib has been tackled for the need to have one common solution. UD will provide the DWD solution on the forum.
- Implementation of WMO-BUFR is seen as more important and crucial by the users.

[Action] Implementation of WMO BUFR is a top priority for this COSMO year

Task3: IMPLEMENTATION OF FEEDBACK FILES

- VERSUS DB is ready for the FF
- Task is pending waiting for DWD code/decode software for FF
- The users recognized the importance of FF implementation for a better exploitation of upper air verification. Nevertheless upper air verification are

already implemented through TEMP observation and upper air gridded analysis.

[Action] Implementation of FF has to be carried on, but with a lower priority for this COSMO year

Task4: IMPLEMENTATION OF EPS/PROBABILISTIC VERIFICATION

- Recognized the importance and the urgency for such implementation by the users (see also CORSO project)
- Discussion about the calculation of probabilities inside VERSUS or with fieldextra has been done.

[Action] In order to optimize user's activity and for a more flexible calculation, probabilities will be done within VERSUS, also because some verification scores or diagrams (e.g. Talagrand diagram) need the information of the entire ensemble and the treatment of EPS members has been already implemented in the system. This activity has **top priority for implementation** after the release of Patch07 (end of April).

Agenda item 8: Global installation situation

AC gave an overview on the global installation situation that sees VERSUS operational in Italy, Greece, Poland, Romania, Russia and pre-operational in Germany and Switzerland. It has been pointed out that one of the main problems has been the habit to have "custom installations" that usually give many problems in updating the system with the delivered patches.

Agenda item 9: Forum and Help Desk

The use of the forum is very well under way and the users showed their appreciation. Several topics have been added in this last period and all the VERSUS users are very active in posting problems as well as in giving suggestions and feedback.

Agenda item 10: Requirements from GM 2011 – status and priorities

AC reported, based on Appendix 1 of the VERSUS2 Project plan, the status and priorities of requirements from the users as from GM2011 parallel sessions. In particular have discussed:

1. Computing of continuous scores for precipitation. (implemented)
2. The "Batch Execution" extended to Yearly interval.
3. The Batch Execution" will have the functionality to be restricted to fewer activities at a time (partially implemented)
4. Improvement of suspect observation menu. (implemented)
5. Configuring cross-model graphics as monthly or seasonal and consequently their batch execution (implemented)
6. Creation of a Force Execution: with this activity it's possible to re-run the verifications also if the score results are already present in the DB (to be implemented)
7. Choice of scores on a plot (to be implemented)
8. Bug fixing template (to be implemented)
9. Inclusion of "Yearly" as a new periodicity in the Standard, WTD and Conditional Verifications (to be implemented)

These functionalities will be delivered in Patch07 (expected end of April)

[Action] Not all the requirements from GM2011 will be implemented in Patch07 to give the highest priority to the implementation of TASK4 and in order to start as soon as possible. A meeting will be organized the sooner with ARPA-SMR to share experience and plan the implementation of probabilistic verification.

Agenda Item 11: "We groped into a trap set – VERSUS helped to leave the trap"

UD gave a presentation on how the use of VERSUS for wind speed verification as conditional helped him to investigate the connection between the wind error and its dependence from the speed itself.

Agenda Item 12: Open Issue: COSI Calculation, Scatter Plots, Cross Model Graphs, Hourly verification

Open discussion about these issues and the best way to use these functionalities. In particular:

- COSI calculation: need to be performed a final test
- Scatter plots: FG stressed for a wider use of scatter plots during verification presentation mainly in order to have a closer look to outliers and as an easier way to show verification results to a non-expert audience
- The use of Cross model graphics has been improved in time and how probably it will become one of the main features of VERSUS system. For this reason the implementation of new functionalities related to Cross model graphics plays a crucial role in the project
- Hourly verification of observation is already available in VERSUS for weather parameters except precipitation, that is mainly related to the implementation of new WMO BUFR (see above)

Agenda items 13-14: New implementations in PATCH06 – Practical problems

FP showed to users the new functionalities delivered in the new Patch06. Patch06 has been delivered in December 2011 and installed by all the users except DWD and Romania that will install it as soon as possible. Some problems in the installation are still pending for Poland.

The main areas of development can be summarized as:

1) Standard and weather type verification based on analysis of models
2) Geographical distributions of scores and several graphical improvements
3) Implementation of a method useful for sea model and related BUOY ingestion;
4) Generic improvements such as new scores implementation.

Day 3, 04.04.2012: WG5 – VERSUS2 issues

Agenda items 15: New directions of WG5

FG as new work group coordinator chaired a discussion on new research directions of the group for the future. A short presentation was given on the most important outcomes from the 5th International Verifications Methods Workshop in Melbourne that she had participated. Next, ideas were exchanged for the future work of the group that could be summarized to the following:

- *Standard Verification:* Implementation of new parameters for verification like solar radiation, wind gusts, low, medium and high clouds, cloudiness with thresholds, Tmax, Tmin.
- *Conditional verification:* Implementation of recommended CV from Langen joint WG3/WG5 Workshop, use of solar radiation in connection with 2mT, use also of CV in both obs forecast space and study of the results – Feedback to modelers, search for more suitable CV for precipitation, that are usually poorly sensitive to the conditions imposed until now.
- *Scores:* Exploration of new scores like ROC, OR (and its skill scores ORSS), EDS (important for rare events) and also use of Skill Scores for MAE, RMSE, exploration of multi-category contingency table verification, use of other global scores like Anomaly Correlation Coefficient (ACC) for geopotential or temperature, study of scores aimed to extreme events
- *Presentation of scores:* Use of summary plots for scores like Performance Diagram, in order to summarize in fewer graphs results from different scores, heavier use of scatter plots and time series to detect outliers searching for some recurrence.
- *Research:* explore the extension of high density rain gauges network verification to more COSMO-Models if possible, WP on evaluation of model in lower PBL should be activated, use of gridded data for precipitation: radar, satellite, raingauges or their composition (need of software), implementation and use of object oriented verification: SAL, CRA and MODE tool (useful to give another point of view closer to the forecasters one). Start of a study phase.

The need of more meetings through web-conference for exchange of ideas and results was also highlighted. With the conclusion of PP VERSUS, a discussion should start about the possibility of a new project that will reflect the current needs and advances needed in the verification field.
Finally, FG requested from the group to send their ideas for presentations and posters for the upcoming GM2012 in Lugano.

Agenda item 16: STC requirements from Moscow 2010

During this session, FG presented the list of requirements given to the VERSUS PL during the Moscow GM and their status. As clear actions have been done for each of these points in the last two years (Forum, provision of Data set for system performance, Functionalities Document, organization of seminars/workshop), the participants considered the STC requirements fulfilled. The PL will send an explanatory communication to the SPM in the next days in order to inform him directly about the outcome of this item discussion and the implementation of requirements themselves.

Agenda item 17: Versus priorities for this Cosmo year

AC introduced the discussion based on what already said and decided the previous days of the meeting. Here a short summary of the outcome of discussion.

17.1 Consolidation of the system

Activities planned in TASK1 for the current COSMO year will be supported and the requirements (see list item 10) from GM2011 will be implemented in the next PATCH07 expected for the end of April.
In this item discussion has been noted by FP on how some problems connected to VERSUS web-page time-out and slowness of the system when it is busy with heavy verification activities, could be solved with a change in the architecture of Scores Front-End. The participants agreed that it is worthwhile to explore such a possibility and include it in the next development phase in order to have a more efficient system.

17.2 EPS verification

Top priority for the current COSMO year. Implementation will start as soon as Patch07 will be delivered. Decision has been taken for implementation of probabilities calculation in VERSUS system. The implementation of this verification activity is seen crucial in the short period for Italy, Greece and Switzerland mainly and CORCO project, but it has the support from all the VERSUS users.

17.3 WMO-BUFR and GRIB2 implementation

GRIB2 implementation in VERSUS system has been stopped for the moment waiting for a more clear plan and schedule for the transition of COSMO model from GRIB1 to GRIB2.
WMO-BUFR implementation is, after EPS verification implementation, is the next priorities fro this COSMO year as it is going to solve problems of compliance and also observation availability (hourly observation also for precipitation)

17.4 Feedback Files implementation

This activity is connected to the delivery of DWD software for code/decode FF that should be ready for June this year. Nevertheless this activity has been set to a lower priority for this COSMO year.

Agenda item 18: Definition if VERSUS priorities for next COSMO year and after the project

AC the new PL and AR the former one described chaired the discussion about this item. It has been noted that still some priorities, defined in past document and reviewed lately in “VERSUS current features” document, have to be implemented. Among them: Confidence Interval software (developed by Russia), Fuzzy toolbox (partially implemented by Romania), object-oriented verification and some other generic functionalities like the ability to perform CV in both observation and forecast space at the same time.
These should be the priorities for the next COSMO year, if any other stronger requirements will come up from VERSUS community in the meanwhile.

Nevertheless one of the main priorities is to think how to train VERSUS users to take part in the development of future functionalities once the project will be concluded.

Already some of the users have gone deeper in the knowledge of the software, like Russia and Germany, but more should be done in order to be self-sufficient in the next developments.
The delivery of updated User Manual, Technical Manual and a Manual for the Developers, as well as the description of implementation rules for VERSUS in the framework of SCM, will be important for the achievement of this goal.
It is understood that the Reference version of VERSUS will be maintain by USAM as well as the user support, that anyway can be shared among the members of VERSUS community.