Regional Cooperation for
Limited Area Modeling in Central Europe

LACE
nwp central europe

Applications and Verification

Doina-Simona Tascu with contributions of RC LACE partners

ZAMG DHMZ Czech Hydrometeorological Institute OMSZ IMGW METEO ROMANIA SHMU ARSO METEO Slovenia

Verification

- HARP implementation and verification for deterministic and probabilistic forecasts
- HARP linked to OPLACE database
- Fraction Skill Score tool
- Panelification
- Verification of global radiation and 100-meter wind speed

Applications

- Post-processing of model output
- Lightning diagnostics to ALARO model
- Databases of cases
- Trainings
- RC-LACE webpage

HARP linked with OPLACE (SHMU)

- a fully integrated interface
- no need of external program or scripts
- to read obsoul: function *read_obs_convert*
- arguments to be defined

```
start_date  = 2021061300,          # set start date
end_date    = 2021061307,          # set end date
by          = "1h",
obs_format = "obsoul",             # set obs format, options : obsoul, vobs
obs_path    = "/users/ext005/app/oplace/# set path to obsoul location
obsfile_template = "obsoul_1_xxxxxy_hu_{YYYY}{MM}# set template
sqlite_path = "/users/ext005/app/oplace/ # set place for exporting SQLite databaze
country = "hu",   # set country,  need to add this arg. because different SID stations names
return_data = TRUE
```

Fraction Skill Score tool (CHMI)

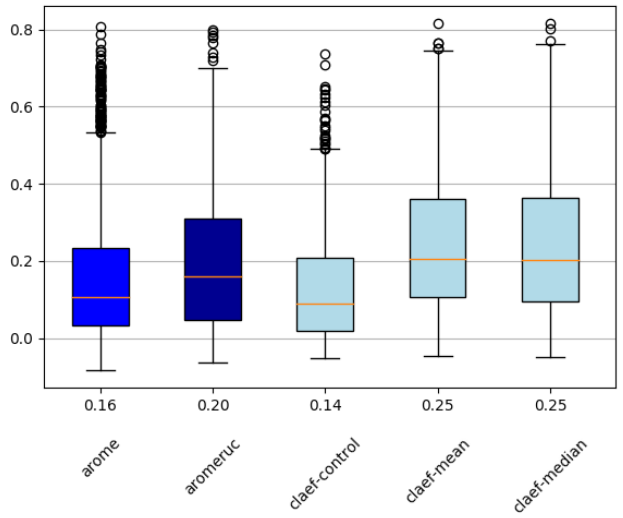
- verification tool for precipitations - ongoing
- motivation: the assimilation of radar observations

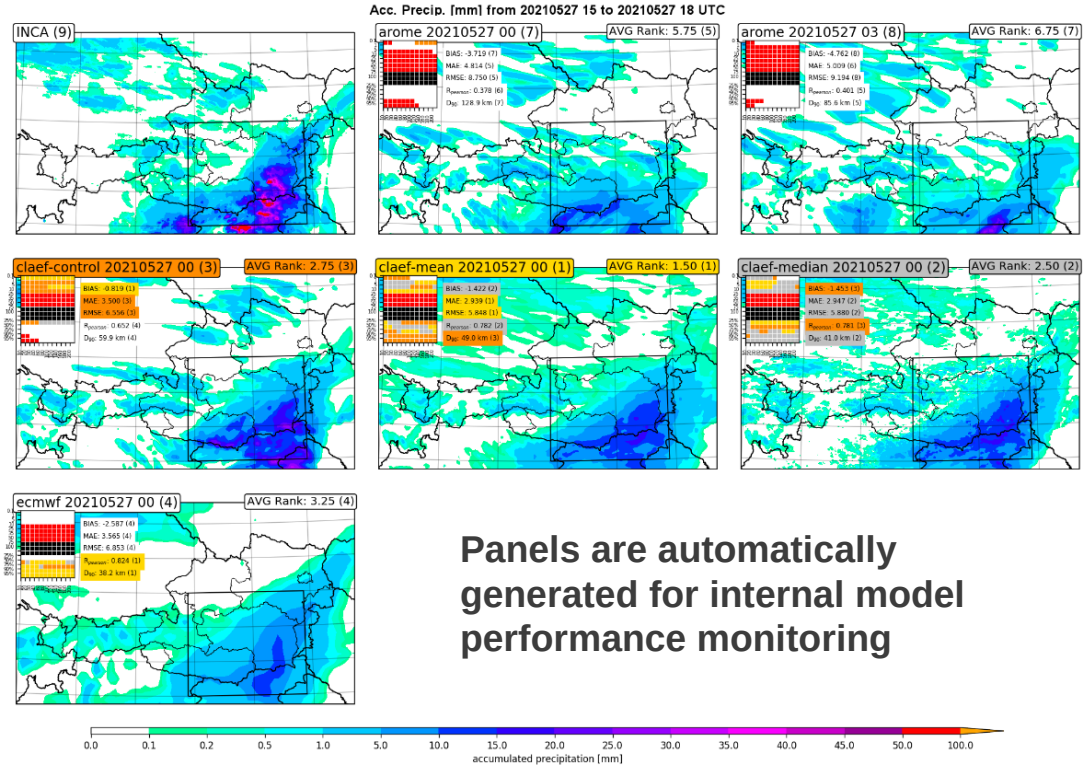
Panelification (ZAMG)

- Verification against the INCA analysis (1 km gridded product)
- Acceleration of the plotting routines
- Improved parallelization
- Added „fast mode“ that uses different contouring method for quick internal use
- New Version is Ported to Python 3 (currently limited to GRIB format)
- ASCII output can be used

Panelification (ZAMG)

Correlation for Entire Summer 2021
For the ZAMG Models
Nowcasts for 15-19 UTC



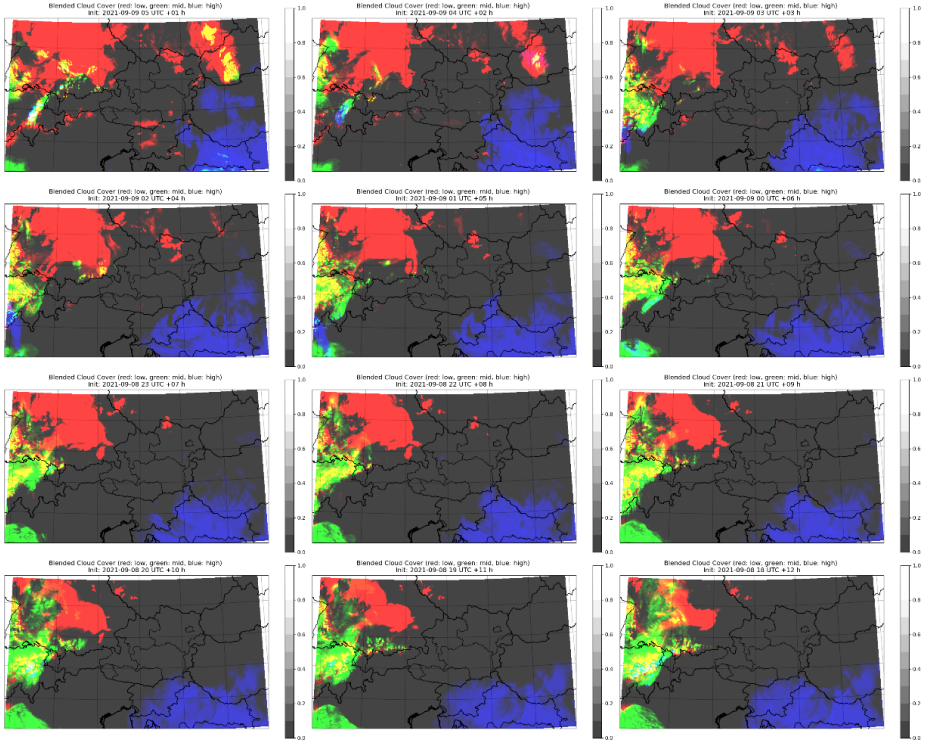


Panels are automatically generated for internal model performance monitoring

Panelification (ZAMG)

- A branch of Panelification is used to do quick visualizations of AROME-RUC for internal usage, the example shown is an RGB cloud composite (red low, green mid, blue high)

- In addition, the reading of new variables is also done in preparation for the verification of additional parameters



Panel shows output of 12 runs for a single output time for comparison

Panels with fewer images can be used to view it as time-lagged ensemble

Verification of global radiation and 100-meter wind speed (OMSZ)

- AROME
  - observations: wind and solar power plant farms
  - 2 points in case of global radiation
  - 3 points in case of 100-meter wind speed
  - 1-year period – starting from April 2020

- AROME-EPS
  - Observations: 40 synop stations
  -

- own verification tool was used

Post-processing of model output (OMSZ)

- improvement of global radiation and 100-meter wind speed forecasts
- observations and AROME forecasts for 100WS, SP and T parameters, based on different *machine learning techniques*
- for AROME-EPS, a calibration method combined with machine learning is developed using observations and forecasts for 100-meter wind speed and global radiation (*Baran and Baran, 2021*)
- both methods are based on R and python programs. They are currently under testing and their implementation into the operational suite is expected by the end of 2021

Baran, S. and Baran, Á., 2021: Calibration of wind speed ensemble forecasts for power generation. Időjárás 125, 4, accepted for publication.

Lightning diagnostics to ALARO (CHMI)

- lightning diagnostics work was started in order to adapt it to ALARO model
- the methods were validated with respect to lightning data available for the CZ territory
- the calculation was improved by considering the vertical velocity in the updraft
- this modified version (using 3MT mass flux) yields better results
- the experiments were done for 2.325 km horizontal resolution and 3MT is still used, still beneficial.

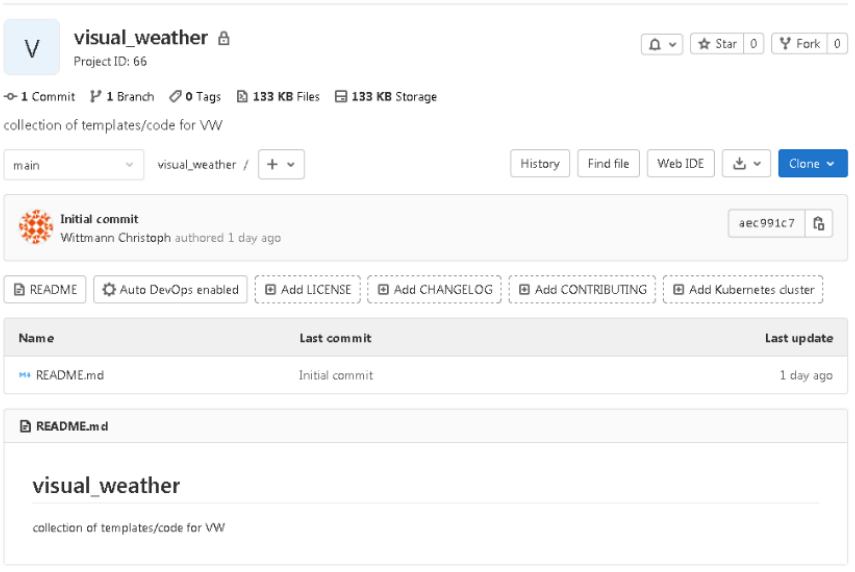
Database of cases

Data base of cases

Idea is to have Data base for Cases studies. All suggestions and new cases are welcome.

Short description	Event date	Category	Country	name	Forecast & Report
High spread and underestimation of 2m temperature over snow cover in case of the warm air advection	22 February 2021		SK	André Simon, Martin Belluš	Report
Temperature forecasts in very cold weather	12-13 February 2021		SK	André Simon	Report
False model advection of warm air over Bratislava	07 February 2021		SK	André Simon	Report
Forecasting fog and low cloudiness	24-11-2020		SK	NWP Team SHMÚ	Report
FACRAF tuning for the 4.5 km resolution ALARO SHMÚ	2020		SK	André Simon	Report
Odd outflows over water surfaces in non hydrostatic ALARO/AROME models ...	2019		SK, CZ	André Simon (Martin Dian, Radmila Brožková & others)	Report
Overestimation of minimum temperature during summer 2009	summer 2009		CZ, SI	Alena Trojakova	Report, A,B

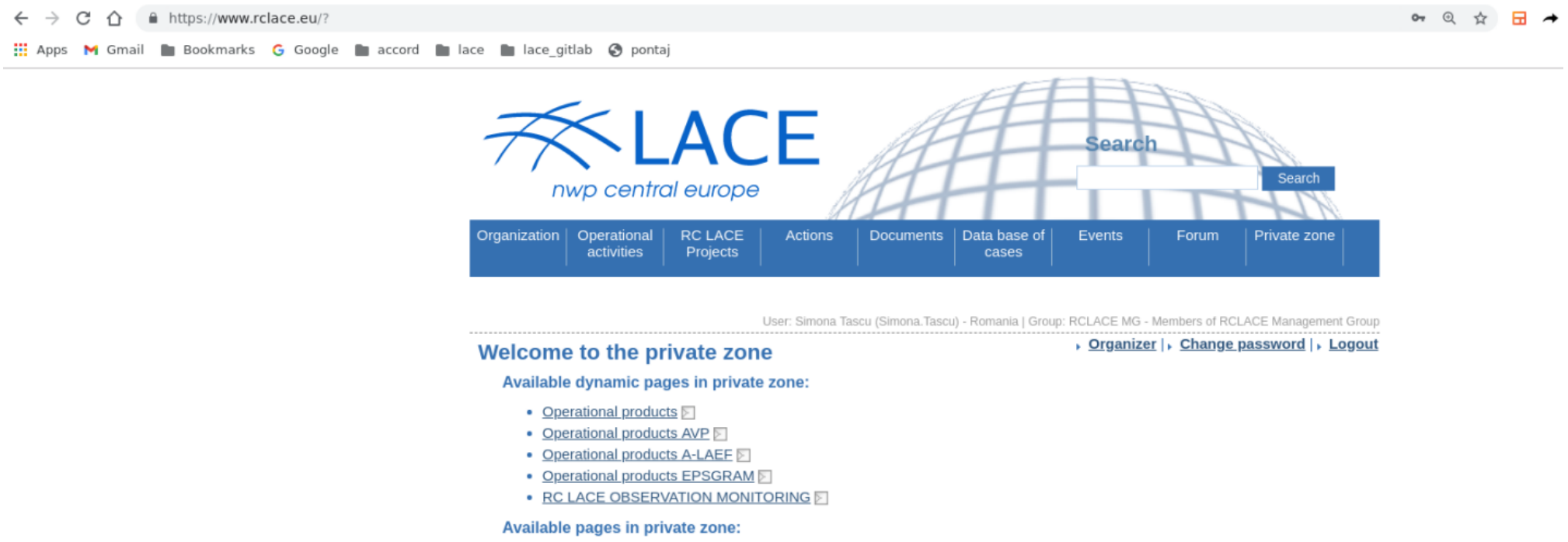
A gitlab platform (ZAMG)



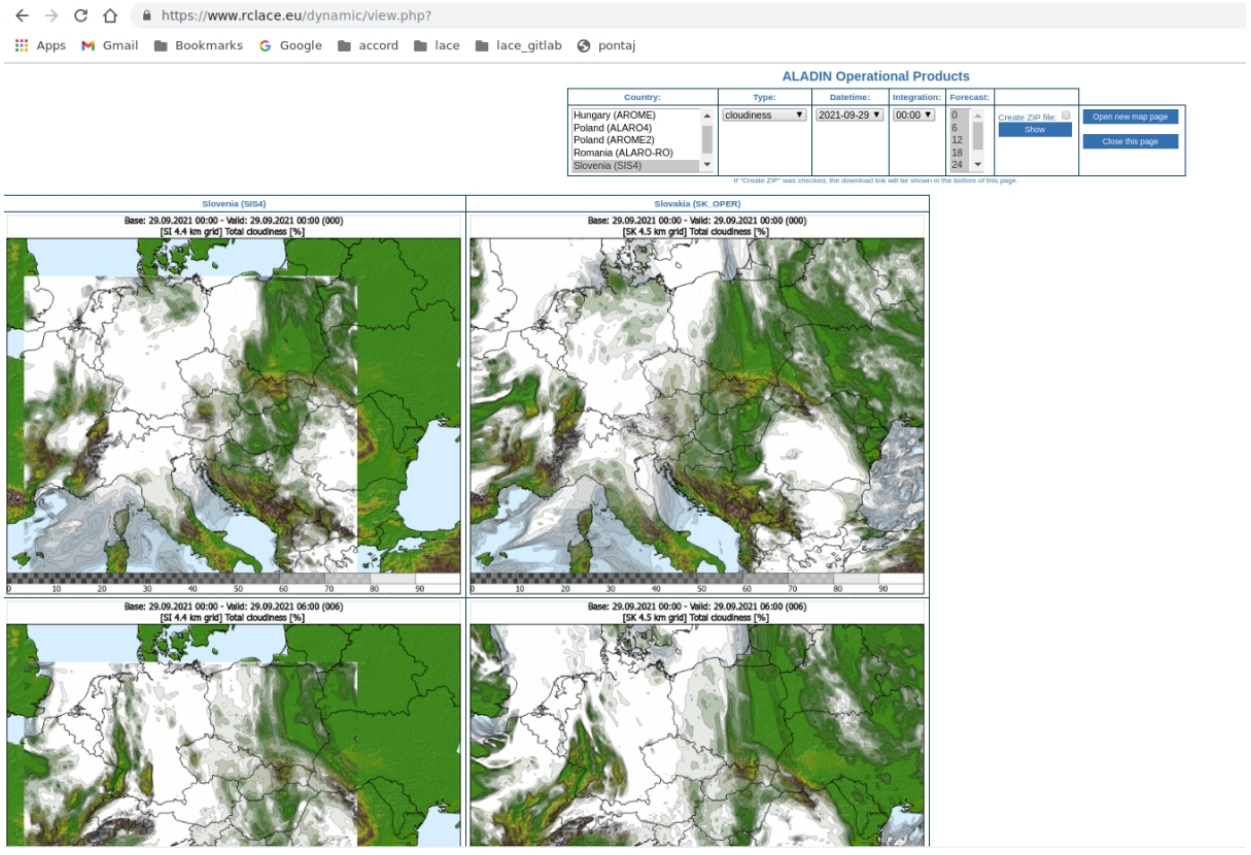
Training – Climake (OMSZ)

- Balazs Szintai - presentation on 20.04.2021

RC-LACE webpage (Oldrich Spaniel)



RC-LACE webpage



RC-LACE webpage

https://www.rclace.eu/dynamic/extra/monitor/

Apps Gmail Bookmarks Google accord lace lace_gitlab pontaj

monitor: Surface

Type: Fc length ver | Fc length var | Timeserie stat | Timeserie | Freq dist. | Dayvar

Parameter: Mslp

View: Graphics

Help

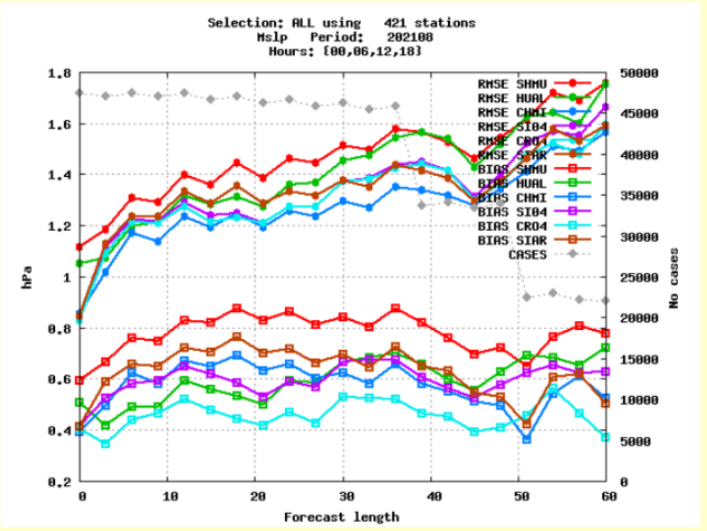
Resize

Send

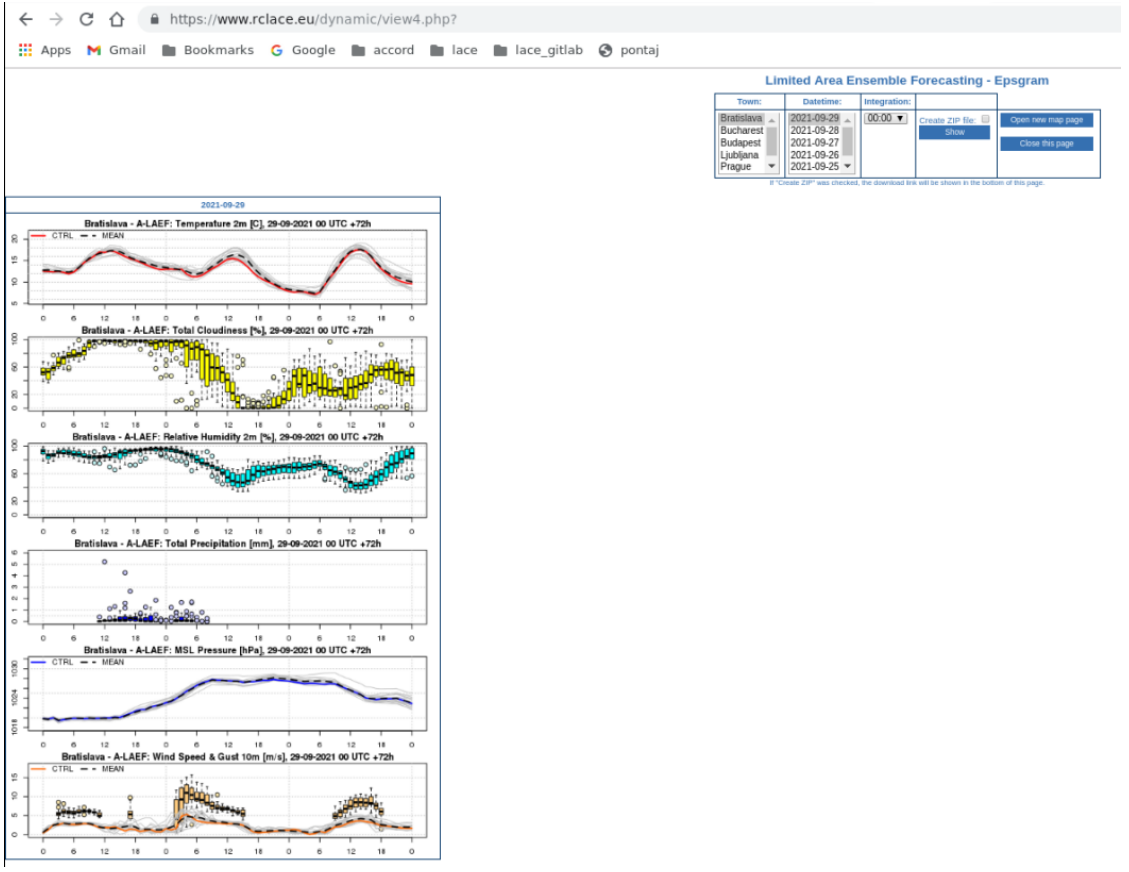
Surface verification

Period: 202108 | Selection: ALL | Initial time: ALL | All | Save | Clear | Fc length ver;202108;ALL;Mslp;ALL

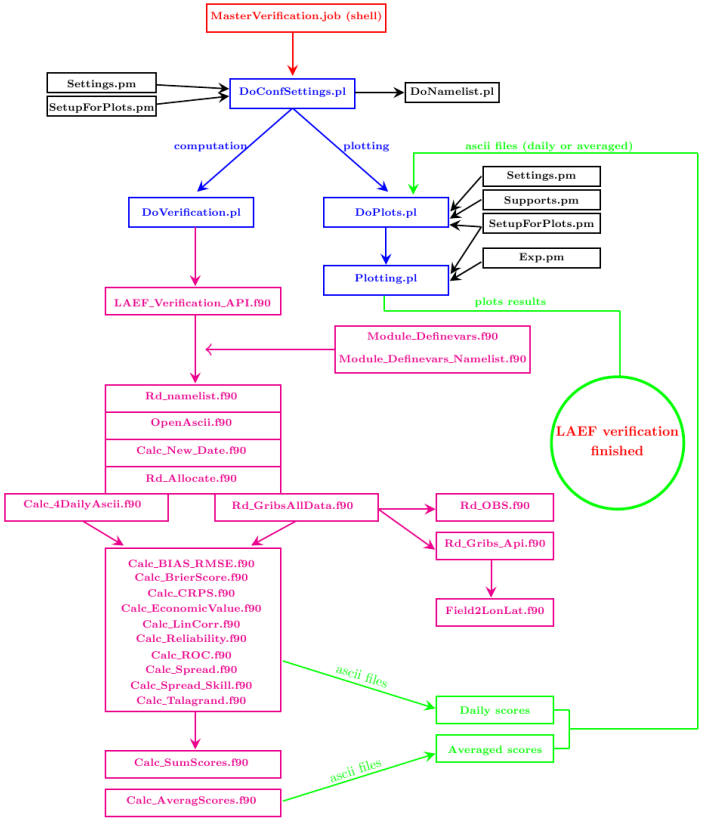
RC LACE
CHMI(CHMI) - ALARO 2.3km(from 5.3.2019), 87vl, cy43t2, DFI Blending+surface analysis, ARPEGE lbc
CRO4(DHMZ) - ALARO 4.0km, 73vl, cy38t1, data assimilation(3DVar+CANARI surface analysis, ECMWF lbc)
HUAL(OMSZ) - ALARO 8.0km, 49vl, cy38t1, ECMWF lbc
SHMU(SHMU) - ALARO 4.5km, 63vl, cy40t1, DFI Blending+surface analysis, ARPEGE lbc)
SI04(ARSO) - ALARO 4.4km, 87vl, cy40t1, data assimilation(3DVar+CANARI surface analysis), ECMWF lbc
SIAR(ARSO) - ALARO 4.4km, 87vl, cy40t1, data assimilation(3DVar+CANARI surface analysis), ARPEGE lbc



RC-LACE webpage



LAEF verification



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Thank you for your attention.

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