



Latest activities in the PP PROPHECY at IMGW

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Contents

1.(Sub)tasks

2.Basic results, things done

3. Specific case study on lagged EPS

4.Basic conclusions, to-dos

(Sub)tasks

1. Subtask 1.1 – Development of the parameter perturbation.
2. Subtask 2.2 – Assessment of the influence of various methods of perturbation of initial field of soil temperature.
3. Subtask 3.5 – Modification of lagged-approach scheme (“weights with memory”)

A blue and yellow award ribbon is positioned in the top left corner of the slide.

Subtask 1.1

Activities focused on new parameters (to be perturbed) in TLE-MVE, mainly pertains to macro- and microscopic soil properties – a soil pore volume and capacity, moisture, hydraulic conductivity and diffusivity.

Also, many parameters are considered to be included in standard output set (wind-max/gusts, cloud top/base, reflectivity, visibility)

Preliminary assessment of necessary changes to be introduced to operational setup has been carried out. However, no conclusive decision was made so far.

In progress...



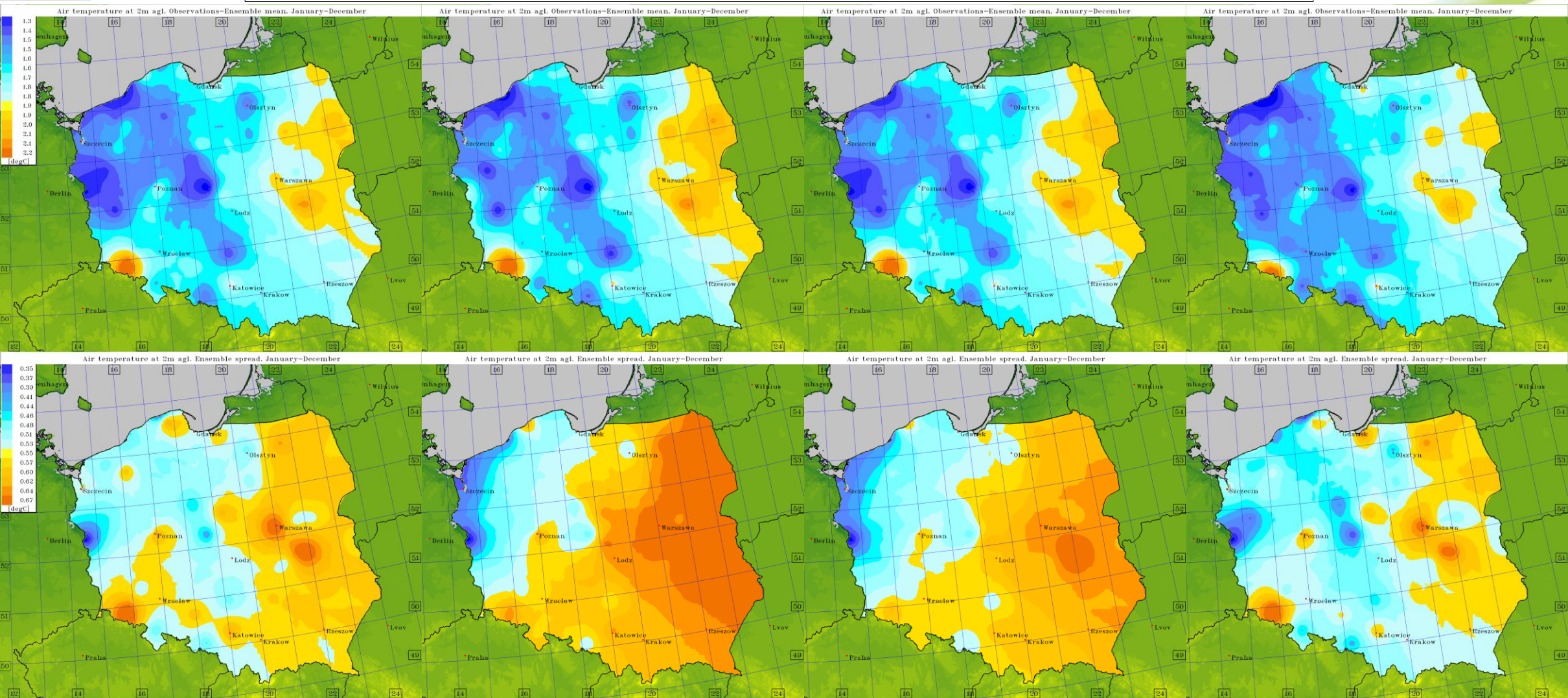
Subtask 2.2

Influence of various methods of perturbation of soil temperature's initial field.

Spotlight on how deep into the ground the temperature perturbation should be introduced for significant/positive impact.



Average skill/spread values, T2M [deg.] (2011-2021)



Operational

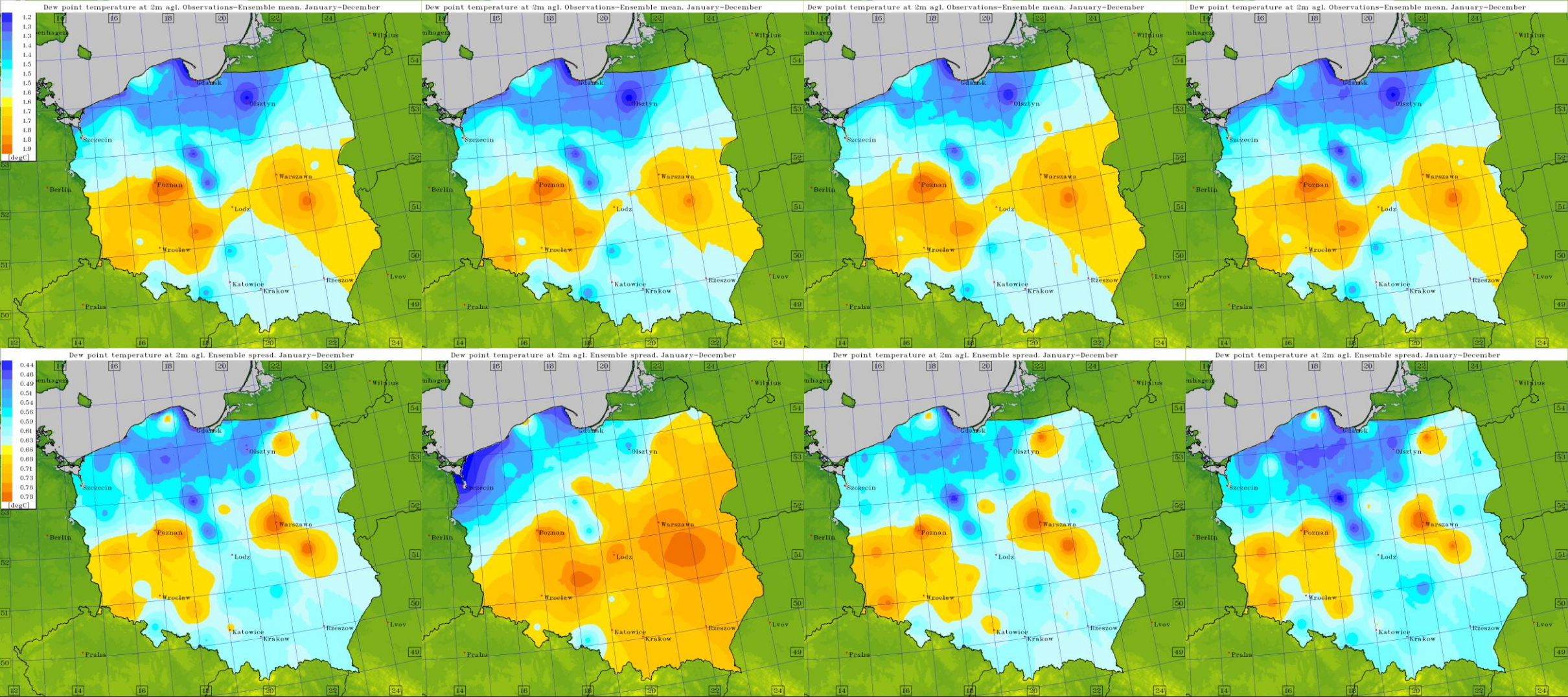
Surface pert.

Down to ~1.0m

Down to ~2.5m



Average skill/spread values, TD2M [deg.] (2011-2021)



Operational

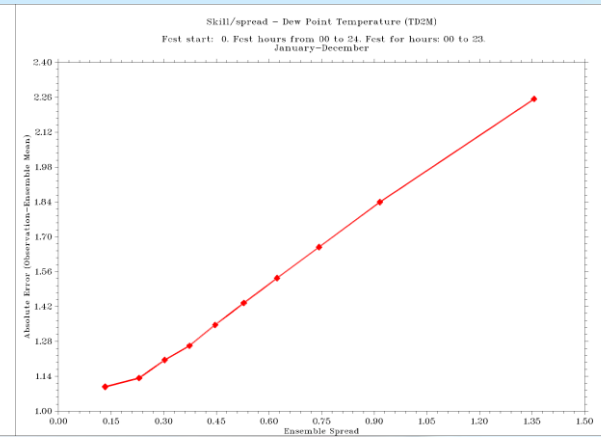
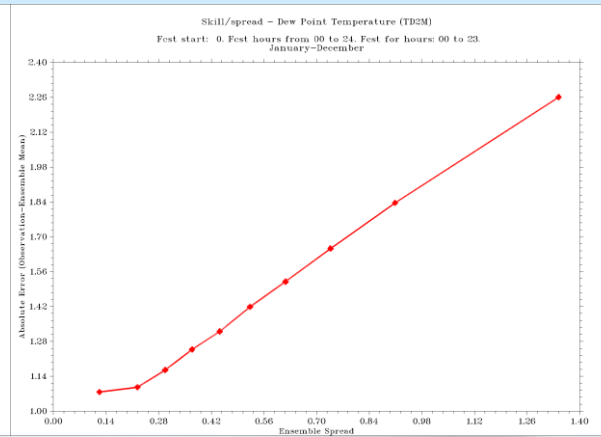
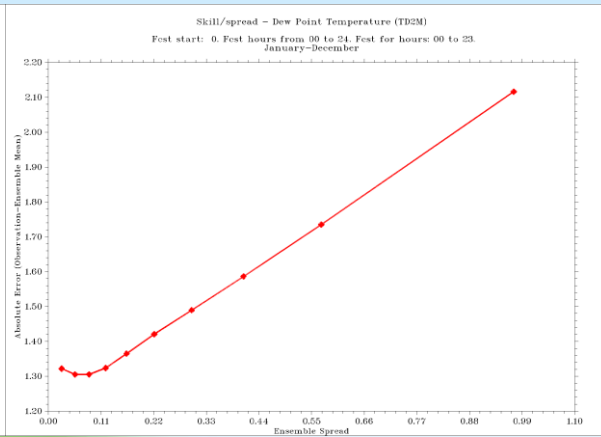
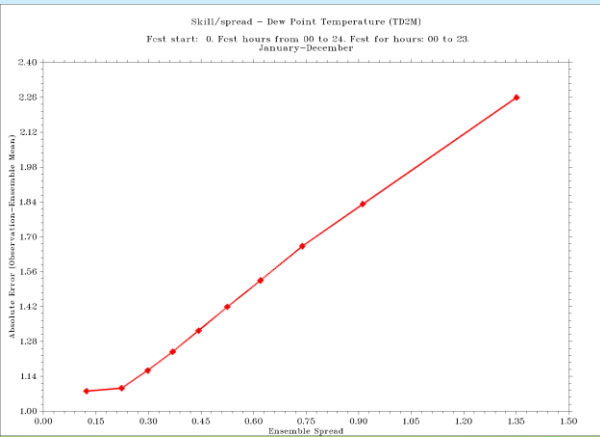
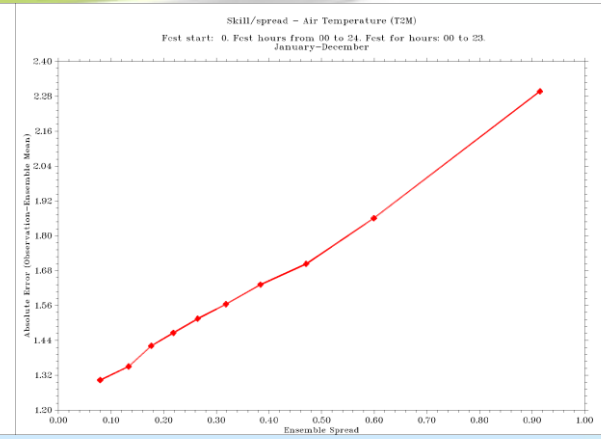
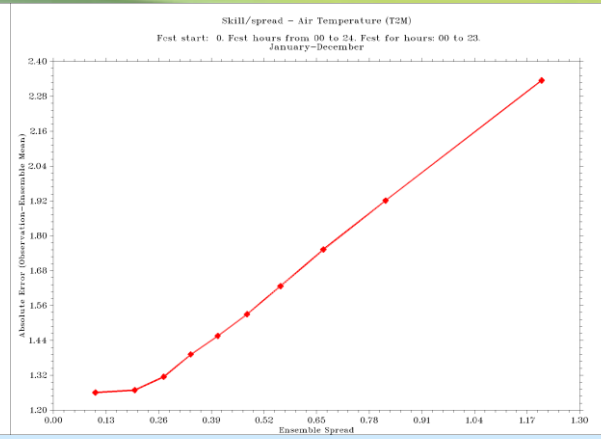
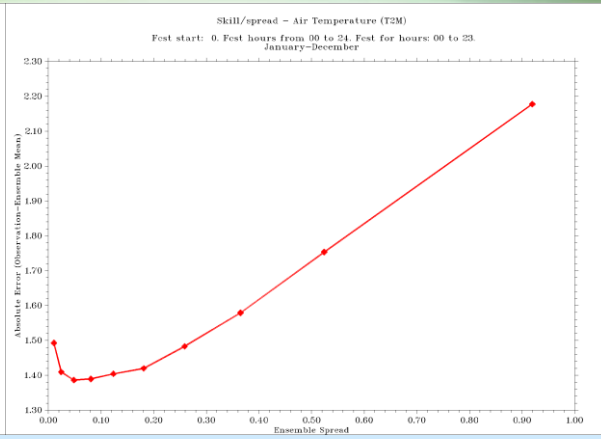
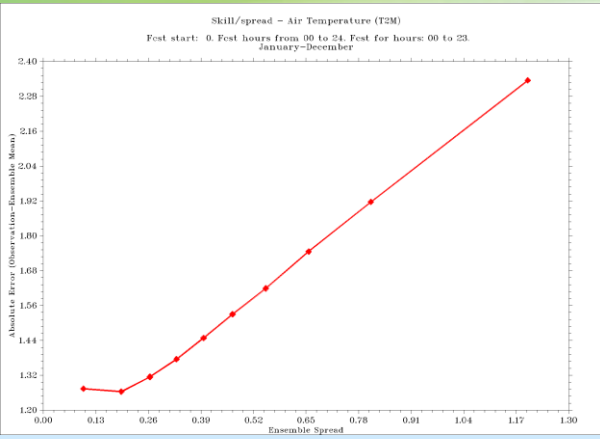
Surface pert.

Down to ~1.0m

Down to ~2.5m



Skill-spread relations, T2M/TD2M (2011-2021)



Operational

Surface pert.

Down to ~1.0m

Down to ~2.5m



Skill and spread mean values, T2M/TD2M (2011-2021)

T2M	Oper.	Sfc.	1.0m	2.5m
Skill	1.64	1.69	1.64	1.63
Spread	0.49	0.27	0.52	0.52
TD2M	Oper.	Sfc.	1.0m	2.5m
Skill	1.54	1.56	1.53	1.52
Spread	0.59	0.31	0.56	0.58

Subtask 3.5

Current operational setup – every member is used with equal importance (and equal probability with input weight), and every group has the same number of members. This data is subsequently passed to ANN-based post-processing.

Modification of postprocessing of the lagged-approach scheme is essentially an assessment whether a change in the input weight assigned to a specific member may positively affect the EPS results.

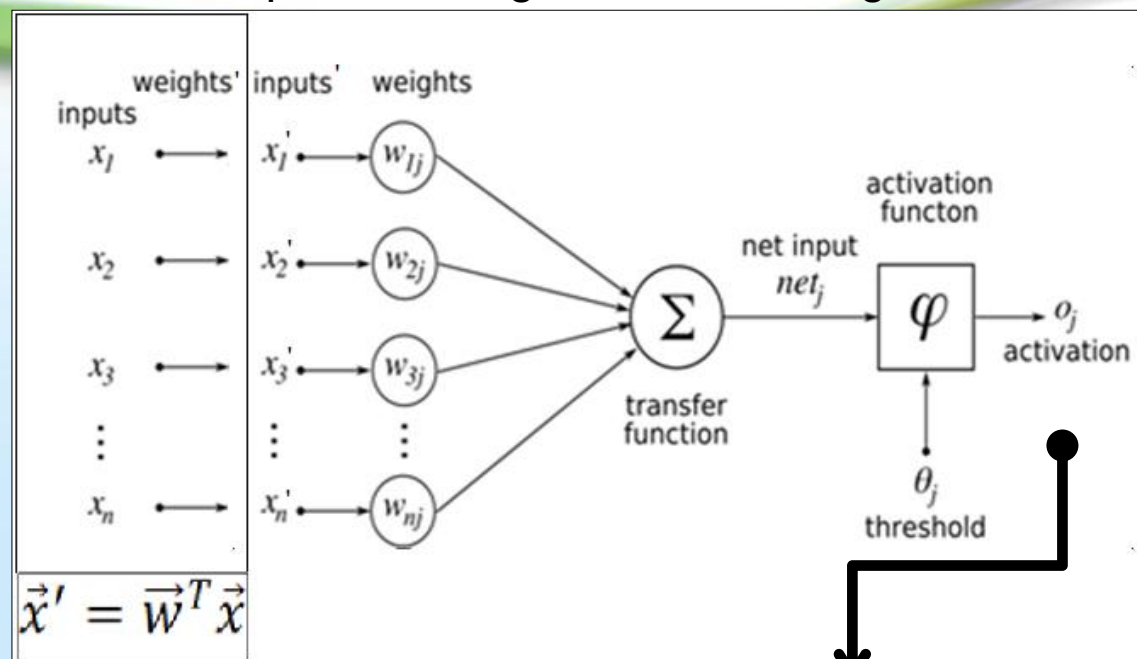
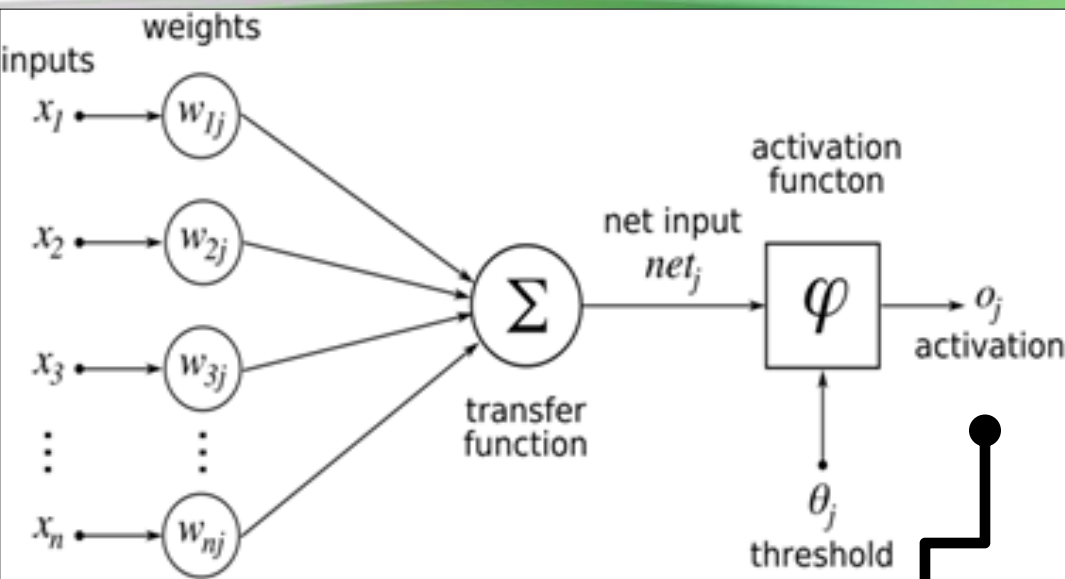
The 'weight with memory' approach – interesting alternative to equal weights. Slight improvement with linear time-dependency of particular member(s) weights



Modification of lagged-approach scheme – basic idea(s)

Operational setup

Setup with changeable initial weights



"Raw" values of skill

Corrected values of skill

Final output

Which approach gives better results?

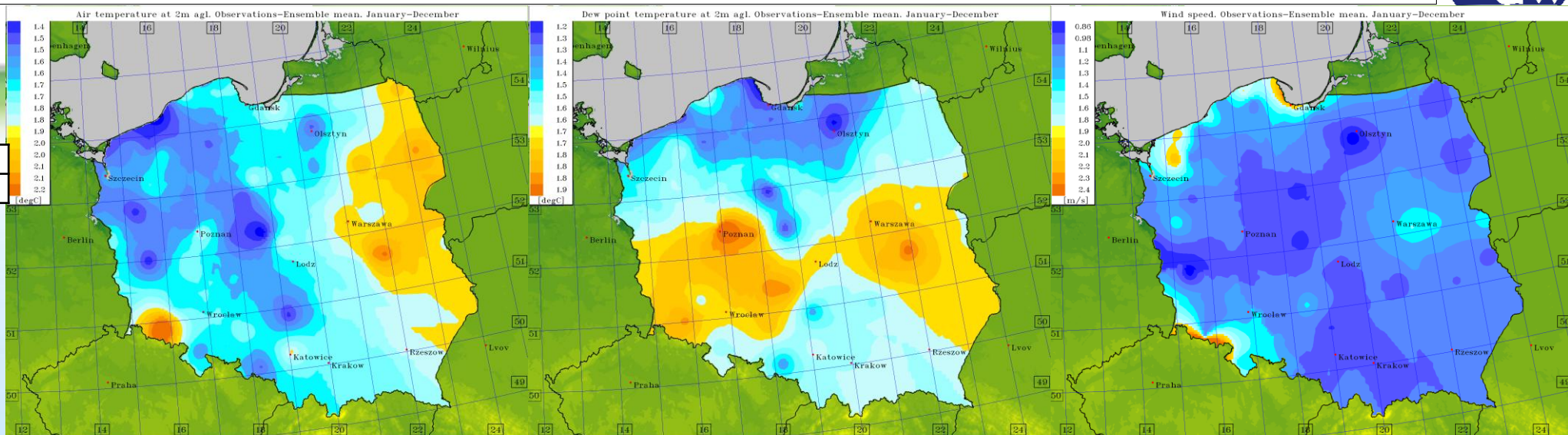




Standard vs. corrected weights (2011-2021)

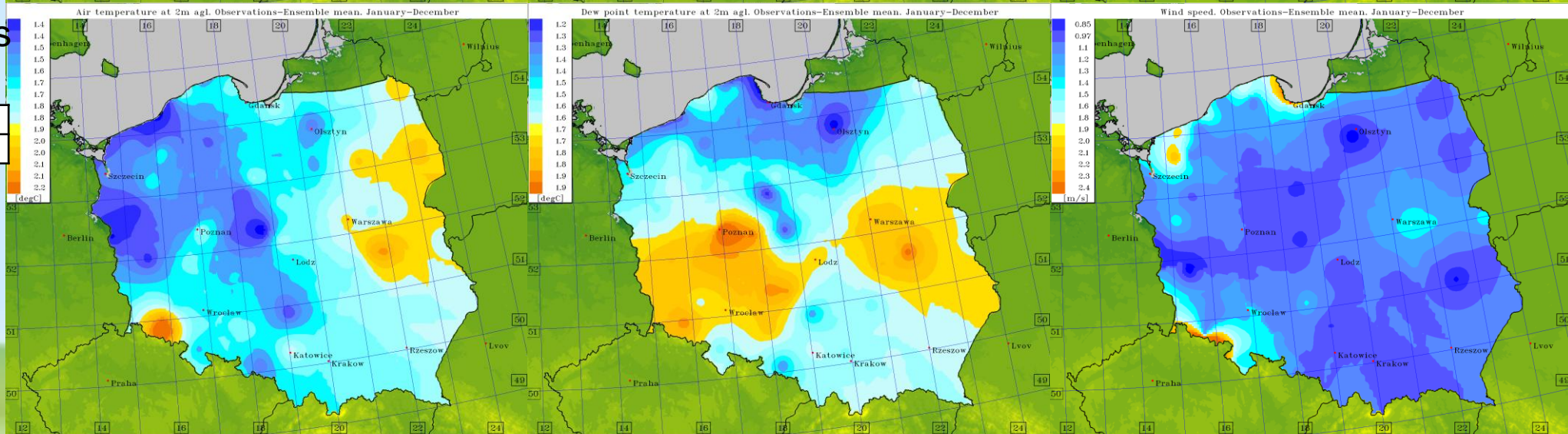
standard weights
avg. skill

T2M	TD2M	U10M
1.69	1.53	1.14



corrected weights
avg. skill

T2M	TD2M	U10M
1.64	1.52	1.12

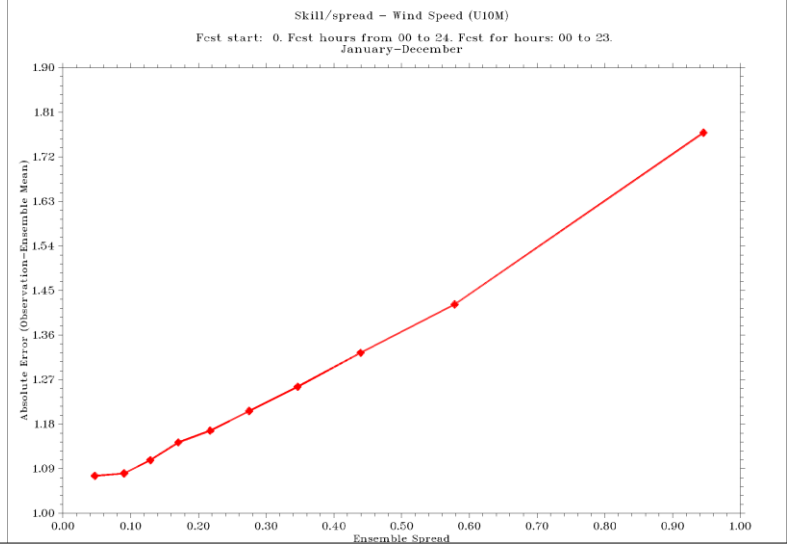
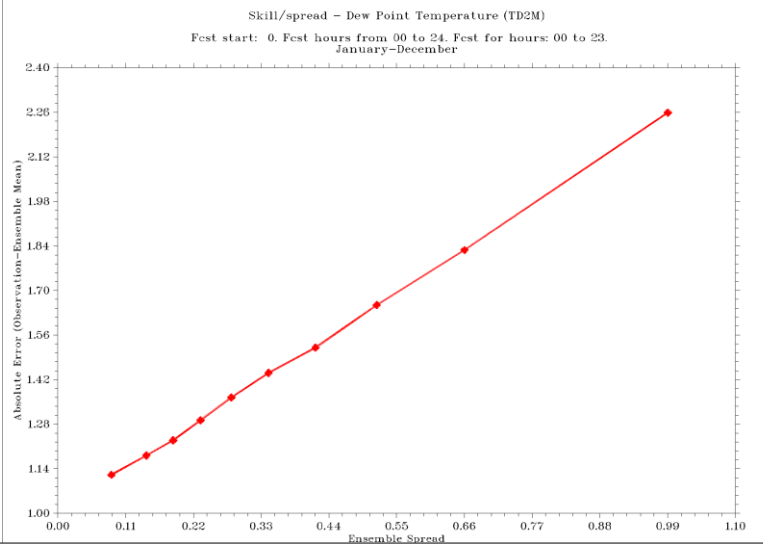
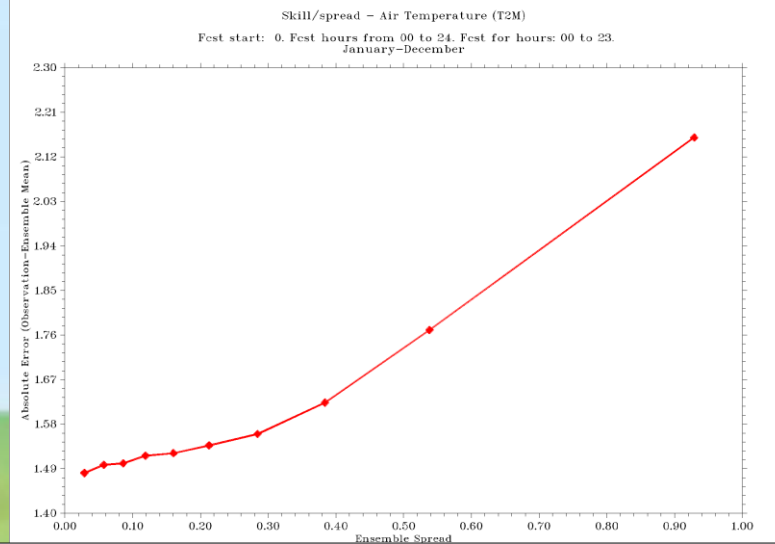
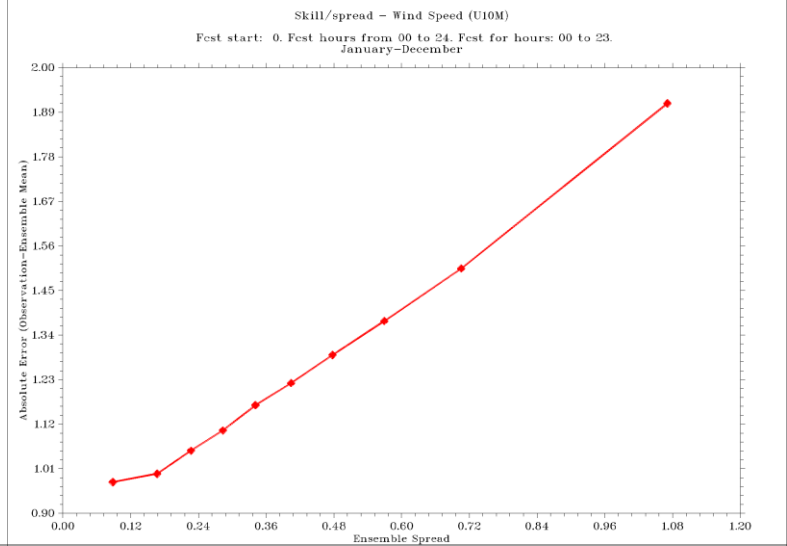
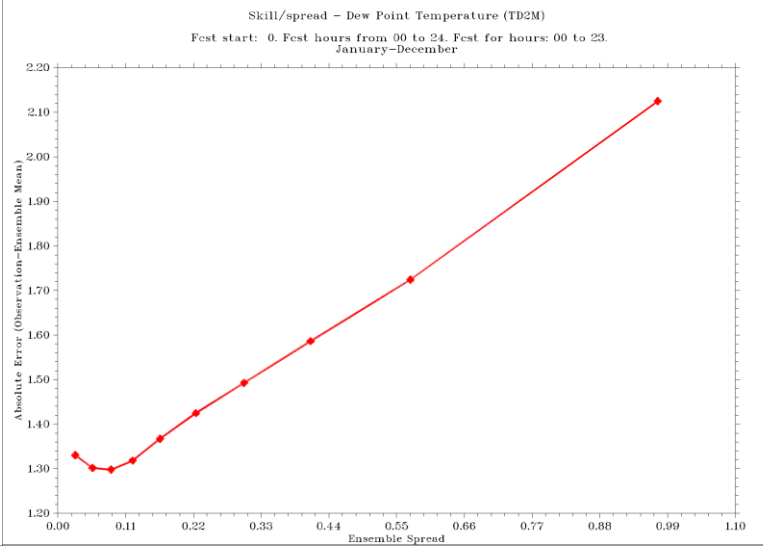
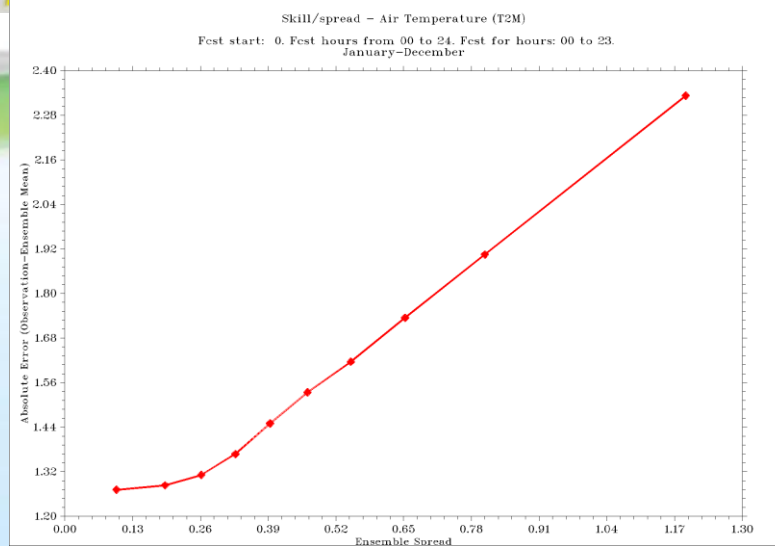


T2M

TD2M

U10M

Standard vs. corrected weights (2011-2021)



T2M

TD2M

U10M



Cumbre Vieja (Old Peak) – September - December

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Erupción volcánica de La Palma de 2021



Ash plume, view from Tenerife, 30.09

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The eruption on 20.09



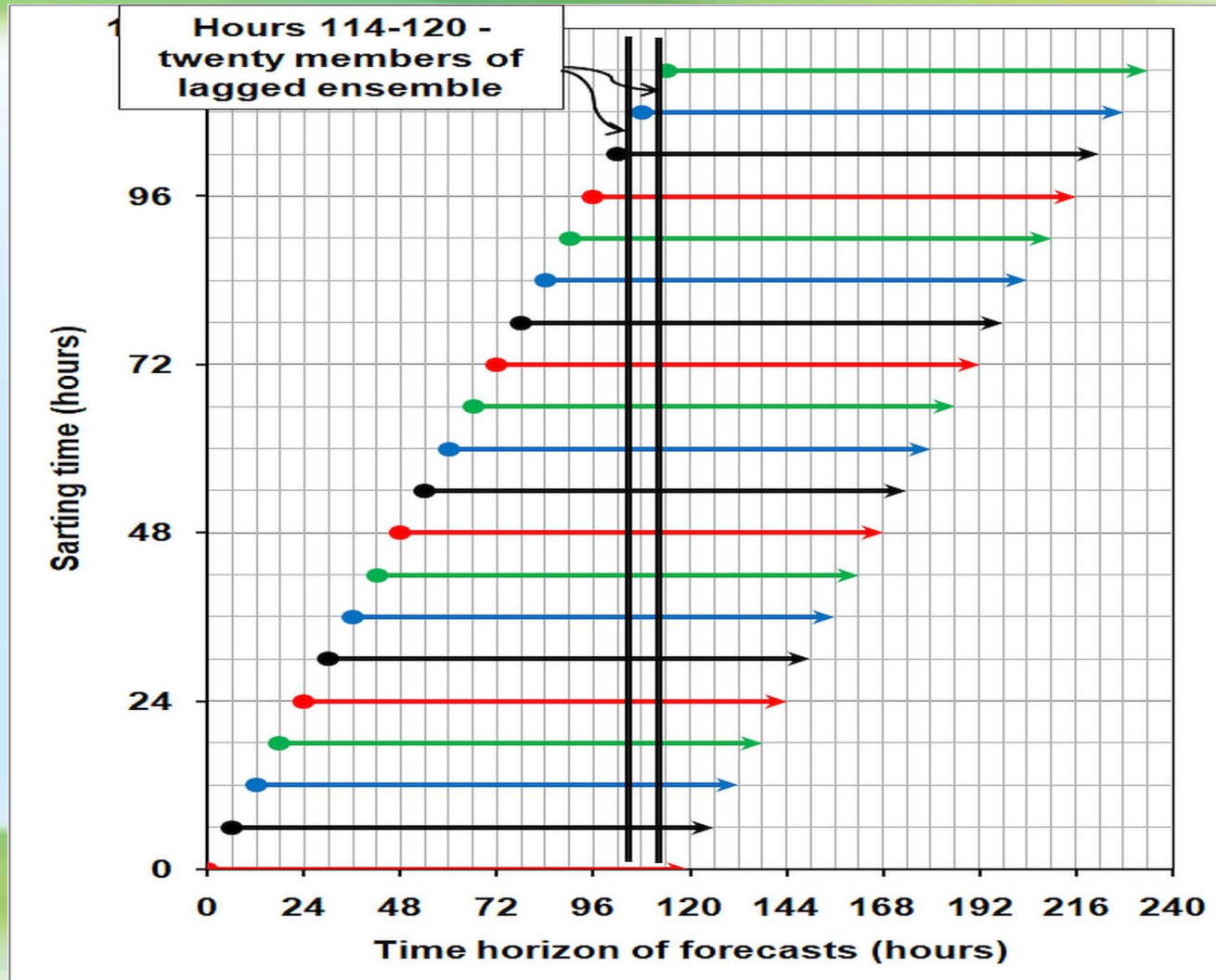
Molten lava flow, Copernicus image, 01.10

Copernicus Sentinel data 2021,
Attribution,
<https://commons.wikimedia.org/w/index.php?curid=110628016>



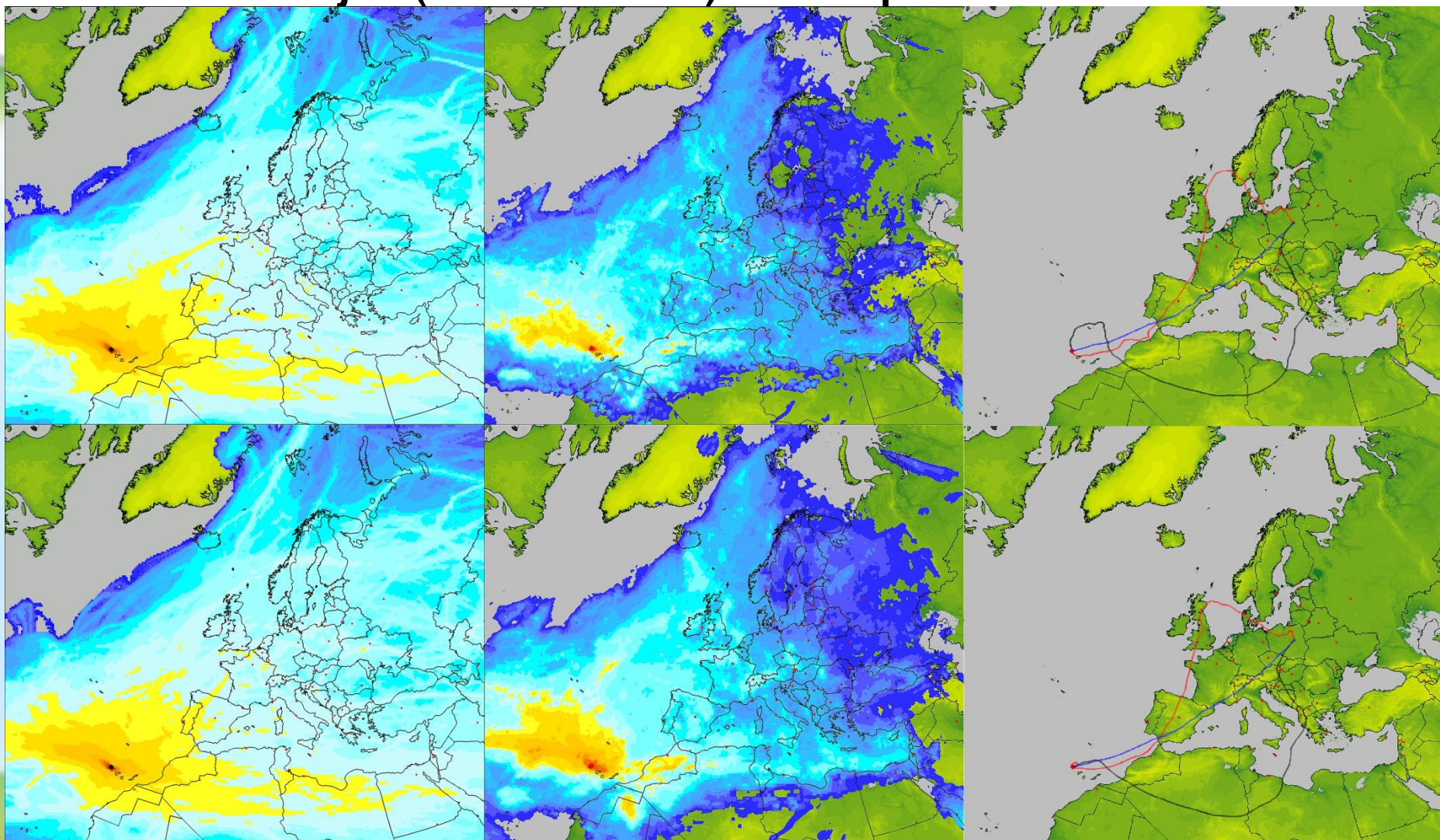
Cumbre Vieja (Old Peak) – September - December

Base – NCEP GFS Forecasts, 120 hourly data, 0.25 degree grid. Start (19.09.2021 – 5 days+)





Cumbre Vieja (Old Peak) – September – December



Det.

EPS

Eruption from Cumbre Vieja 2021.09.19–2021.12.21
Impact probability [%]



Eruption from Cumbre Vieja 2021.09.19–2021.12.21
Deposition [mg/m2]



Trajectories to Warsaw



Conclusions

1. Subtask 1.1 – preliminary assessment of changes to operational setup has been carried out. No conclusive decision was made so far.
2. Subtask 2.2 – further analysis of the influence of various methods of perturbation of initial field of soil temperature. Required correction – an increase (decrease?) in maximum perturbation depth to 2-2.5 meters results in slightly better outcomes.
3. Subtask 3.5 – modification of postprocessing of the lagged-approach scheme positively affects the results (esp. verification vs. measurements). The 'weight with memory' introduces slight improvement comparing to equal initial weights.



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