



Pros and cons of continuous EPS

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Continuous EPS

- Run m new members, including analysis, every hour
- Use 3h first-guess
- Update LBCs from global host model when new ones are available
- Include (time-lagged) perturbed members from the latest runs (typically 6 runs) in the ensemble
- NB. Perturbations are applied as if we had one big ensemble with $6m$ members
- Used operationally by MetCoOp, UWC-West, (DMI, MetEireann)

Expected pros and cons

- 😊 More evenly distributed computational load
- 😊 More spread from time-lagged members
- 😞 More complicated configuration
- 😞 Increased RMSE from time-lagged members

Reference experiment

12+1-member "burst" ensemble every 6 hours

	Analysis time					
LBC time	00	01	02	03	04	05
18	ctl+mbrs 1-12					

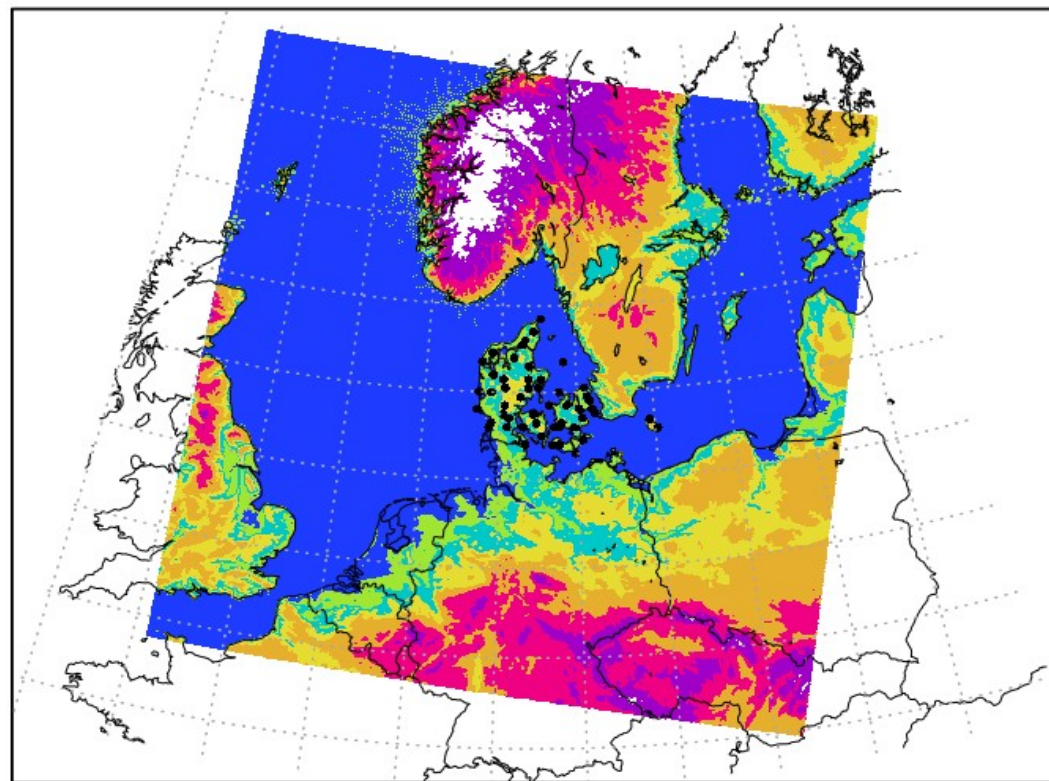
Continuous ensemble experiment

Continuous ensemble, 2+1-members every hour

	Analysis time					
LBC time	19	20	21	22	23	00
12	ctl+mbrs 11-12	ctl+mbrs 9-10	ctl+mbrs 7-8	ctl+mbrs 5-6	ctl+mbrs 3-4	
18						ctl+mbrs 1-2

Model configuration

- HarmonEPS cy43h2.2
- EDA for upper air and surface
- No model perturbations
- Danish stations used for verification, 1-14 Sep 2023

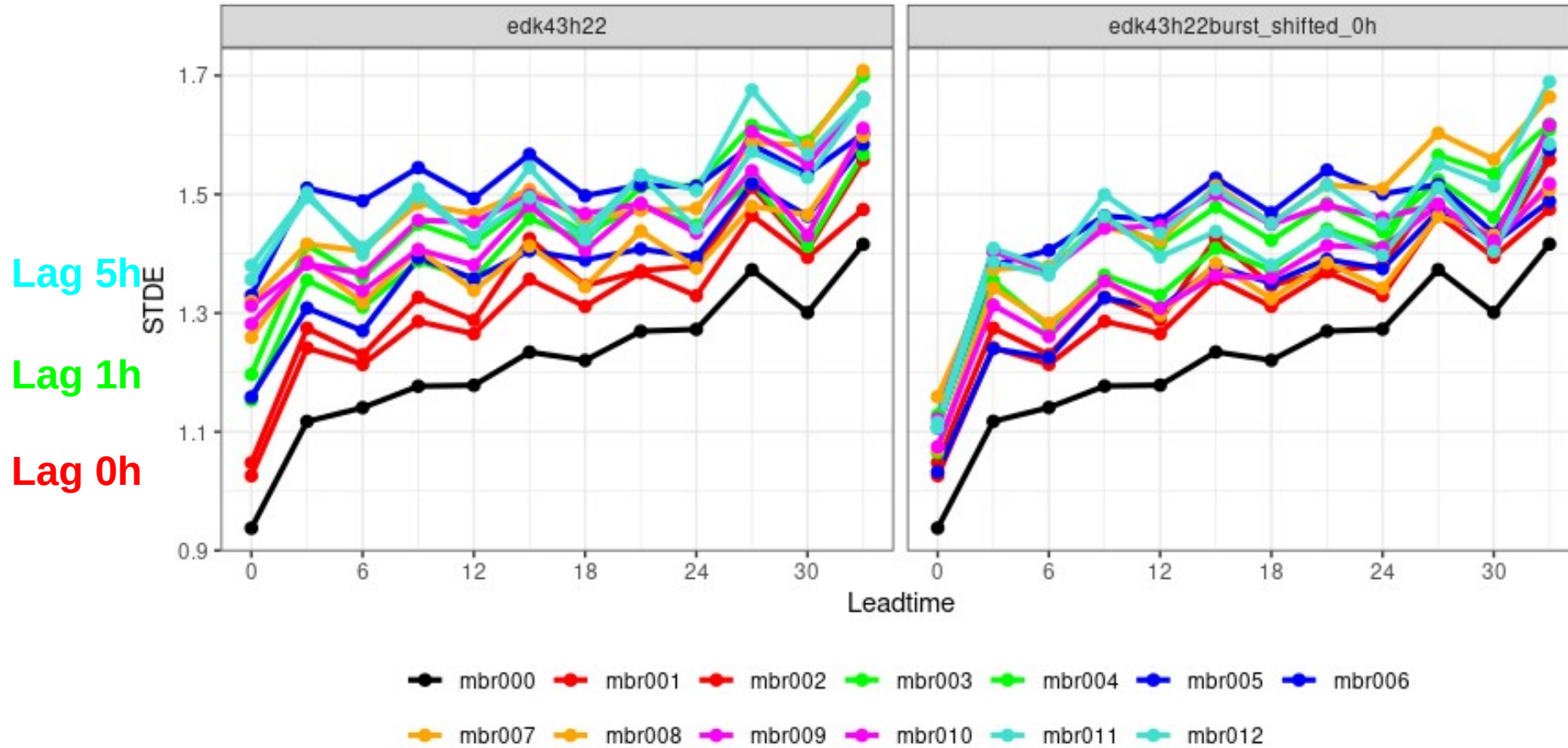


T2m error of members

STDE : 00:00 01 Sep 2023 - 18:00 14 Sep 2023

53 stations **Continuous ensemble**

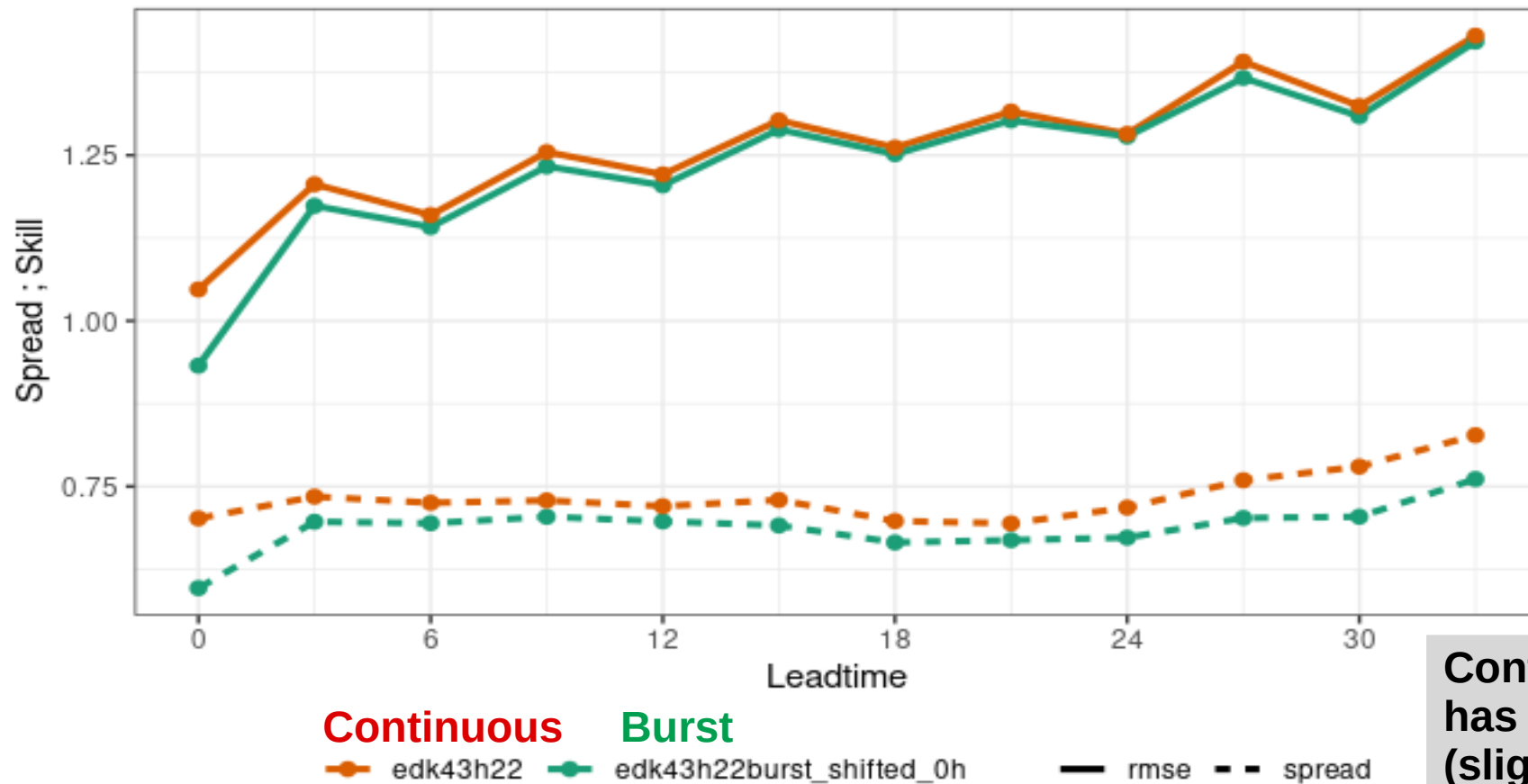
Burst ensemble



T2m spread/skill

Spread Skill : 00:00 01 Sep 2023 - 18:00 14 Sep 2023

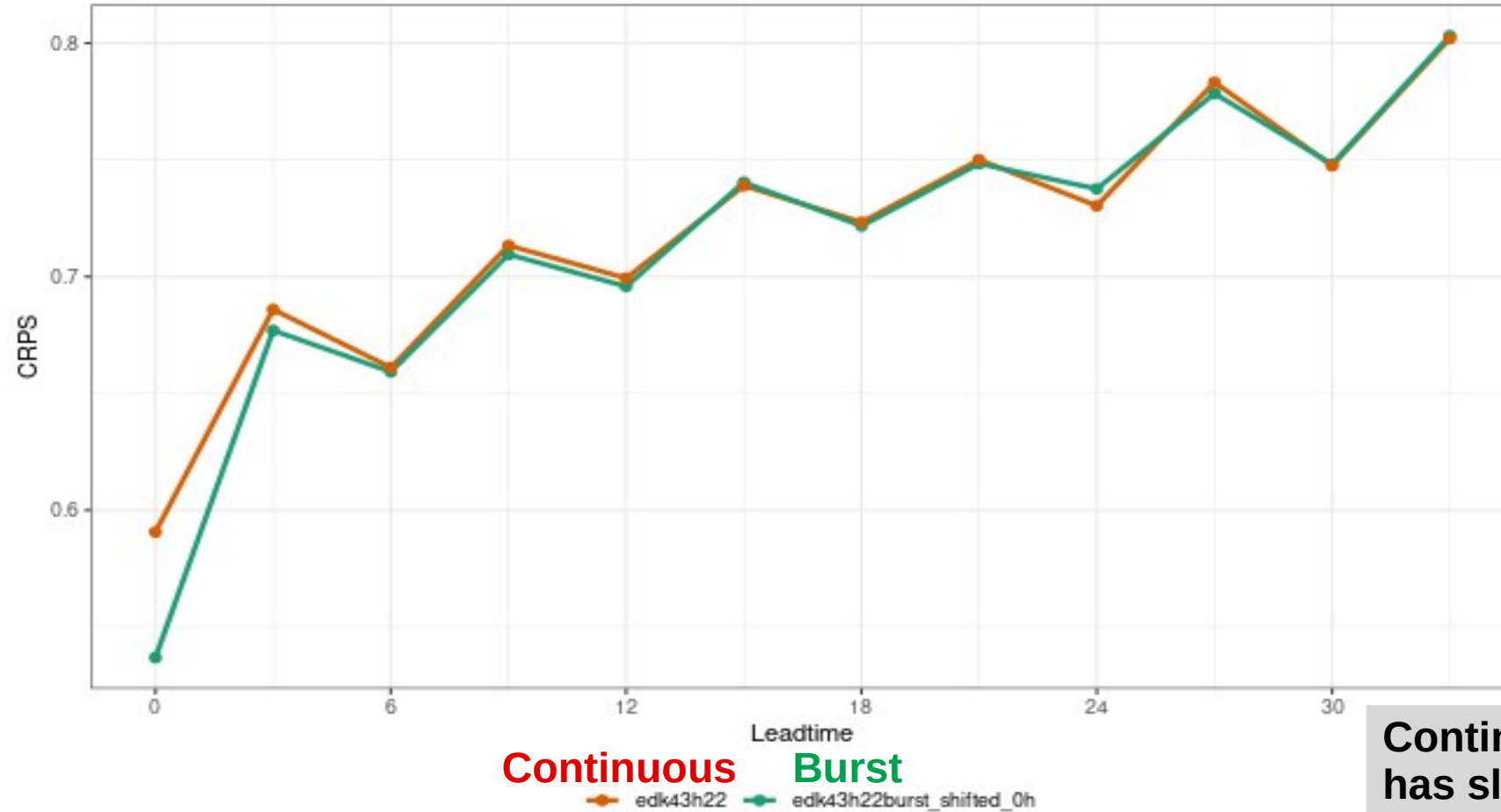
53 stations



Continuous ensemble has more spread and (slightly) more error

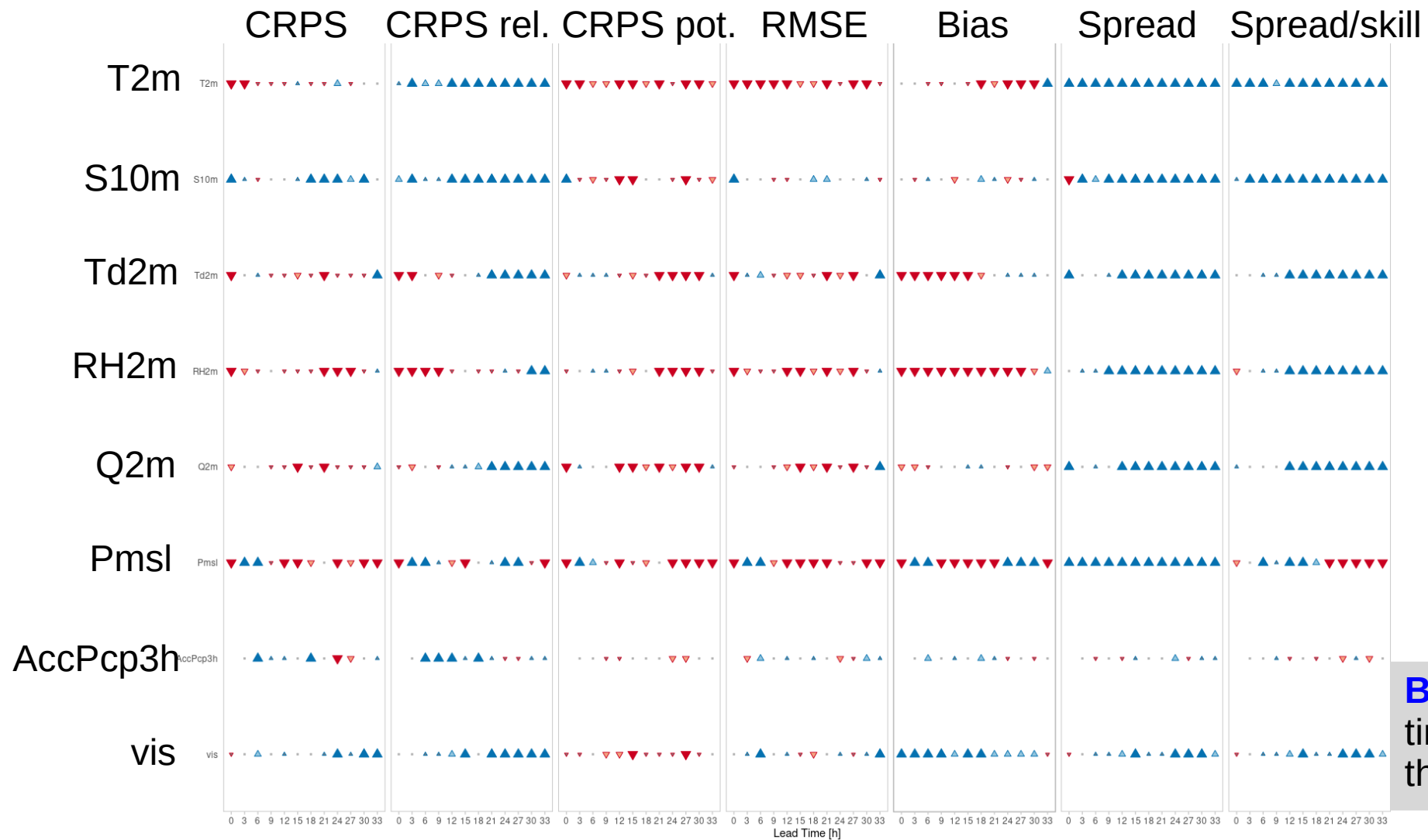
T2m CRPS

CRPS : 00:00 01 Sep 2023 - 18:00 14 Sep 2023
53 stations



Continuous ensemble has slightly worse CRPS

Scorecard

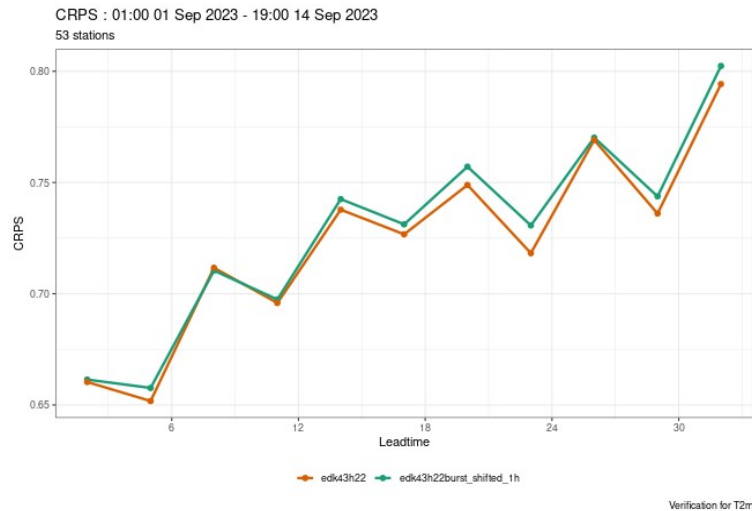


Blue means continuous ens. is better than burst ens.

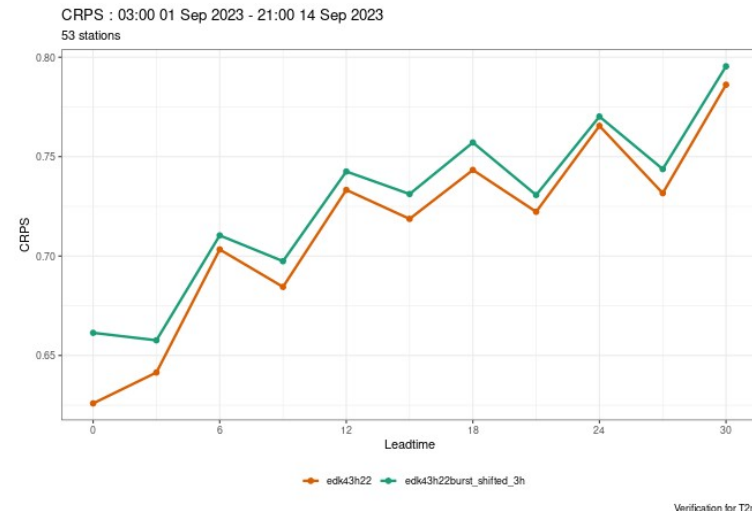


Updated continuous ensemble vs "old" burst ensemble

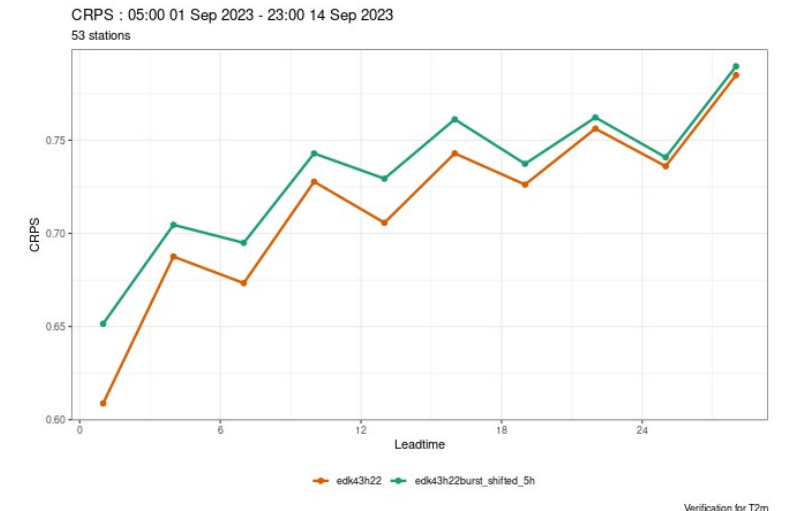
CRPS, T2m



1h older burst ensemble



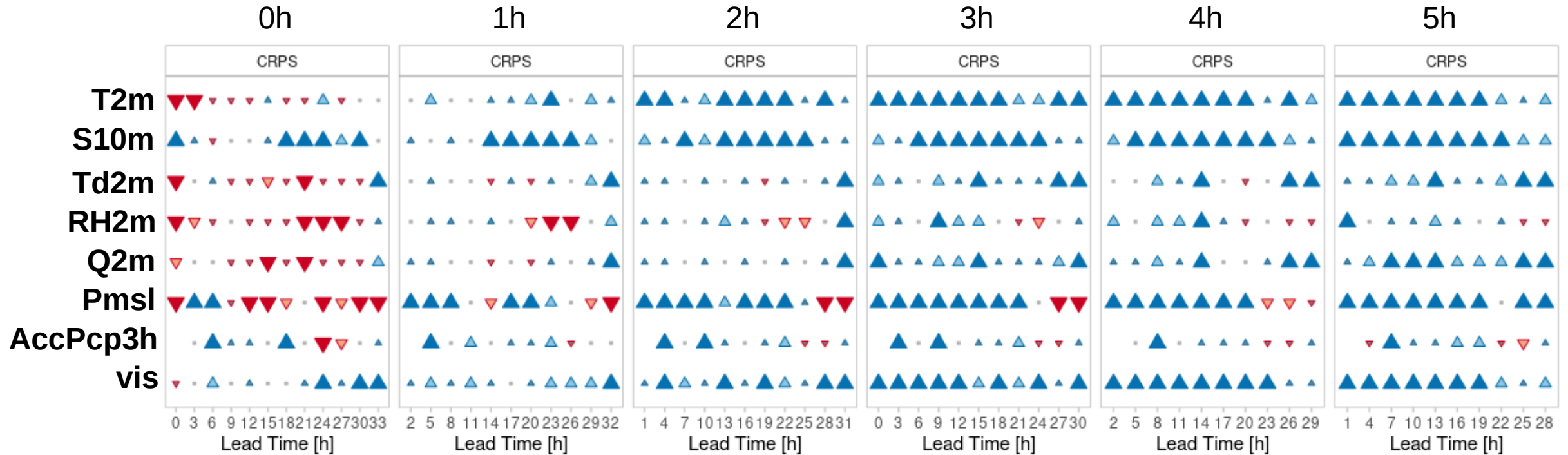
3h older



5h older

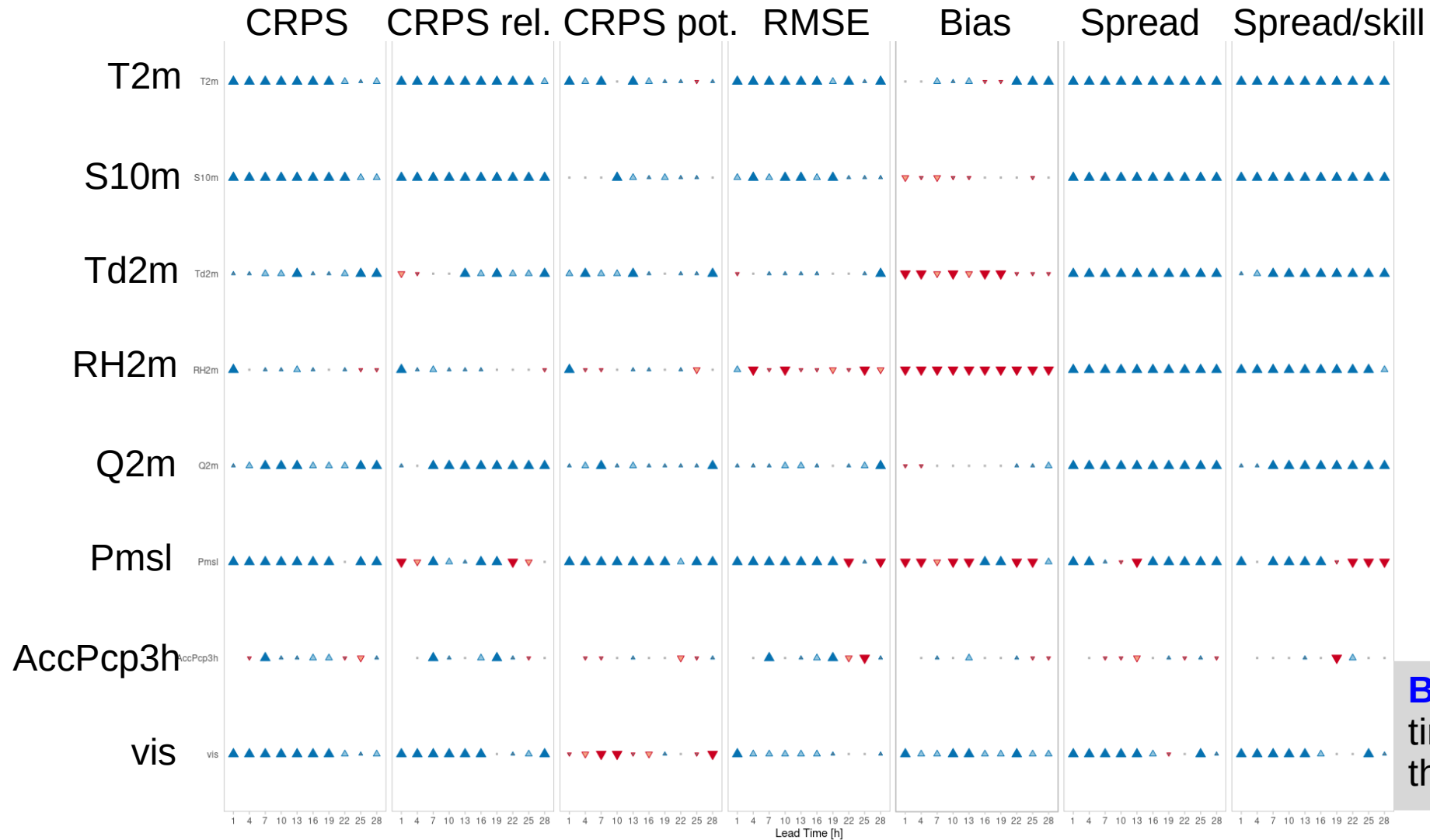
CRPS scorecards

Time difference between updated continuous ensemble and latest burst ensemble



Blue means continuous ens. is better than burst ens.

Scorecard, time difference 5h



Blue means continuous ens. is better than burst ens.

Summary

- The skill of the "continuous" ensemble is slightly degraded compare to a traditional "burst" ensemble, when the nominal analysis time is the same
- With every hourly update of the continuous ensemble it becomes increasingly more skillful and also more skillful than the burst ensemble, until the latter is updated (after six hours)

Thank you



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