Calibrated probabilistic forecasts from GLAMEPS

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• GLAMEPS
  – 54 members
  – 8 km grid spacing
  – Multimodel/multiphysics
  – European domain
  – 3h forecasts up to 54h

• Probabilities unreliable
Calibration approach

- Calibrate whole grid
- Obs from 3100 stations
Calibration approach

- Calibrate whole grid
- Obs from 3100 stations
- Pick a distribution
- Fit parameters

<table>
<thead>
<tr>
<th>GLAMEPS predictors</th>
<th>Spatial variables</th>
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<tbody>
<tr>
<td>• Ens mean</td>
<td>• Elevation</td>
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<tr>
<td>• Ens variance</td>
<td>• Latitude</td>
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<td>• Longitude</td>
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<td>• Land/sea</td>
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<td>• Surface type</td>
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Calibration approach

- Calibrate whole grid
- Obs from 3100 stations
- Pick a distribution
- Fit parameters

- Update every 2 weeks
- 6 week training period
- Separate for each leadtime and initialization
- 2m temp and 10m windspeed

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|                  | Longitude         |
|                  | Land/sea          |
|                  | Surface type      |
2m temperature calibration

• Raw GLAMEPS is underdispersed
2m temperature calibration

- Gaussian distribution

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2m temperature calibration

- Improvement in spread-skill ratio (+36h)
2m temperature calibration

- Improvement in spread-skill ratio (+48h)
2m temperature calibration

- Improvements in Brier Skill Score

Daytime: +36h

Nighttime: +48h
2m temperature calibration

- Improvements in reliability
2m temperature calibration

- Improvement in CRPS (+36h)

Better (73% of stations)

Worse (27% of stations)
2m temperature calibration

- Improvement in RMSE

Daytime: +36h

Nighttime: +48h
10m wind speed calibration

- Box-Cox t-distribution

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<th>Skewness</th>
<th>Kurtosis</th>
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<td>• Ens mean</td>
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10m wind speed calibration

- Improvements in Brier Skill Score

**Daytime: +36h**

**Nighttime: +48h**

![Graph showing improvements in Brier Skill Score for daytime and nighttime predictions.](image)
10m wind speed calibration

- Improvements in CRPS (+36h)
• Improvements in CRPS (+48h)
Conclusions

• Gridded calibration of 2m-temperature and 10m-wind speed
• Improvements to Brier skill scores and reliability

• Future work:
  – Use further spatial parameters
    • Land/sea mask
    • Coast proximity
    • Model climatology
    • Regional biases
  – More advanced models for skewness & kurtosis