EVALUATION OF ECMWF 2M TEMPERATURE FORECASTS DURING EXTREME COLD EVENTS IN NORTHERN SWEDEN

ANTONIO FUENTES MORENO, SMHI

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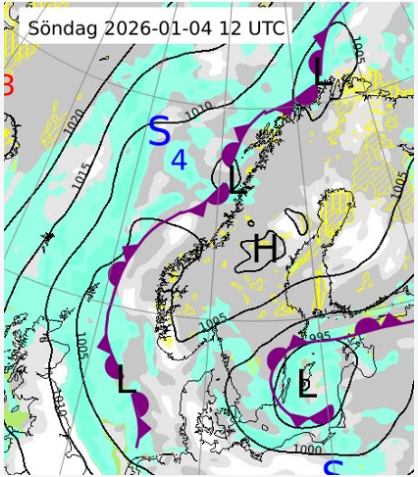
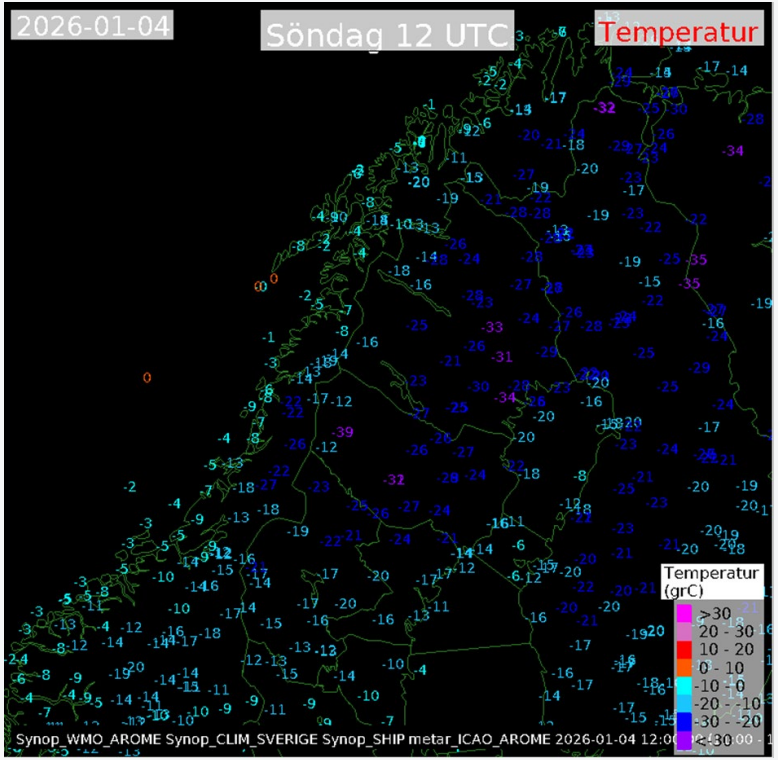
- **Cold events (Jan–Feb): −30 °C to −40 °C**
- **Goal:** Assess ECMWF 2-m temperature forecast performance





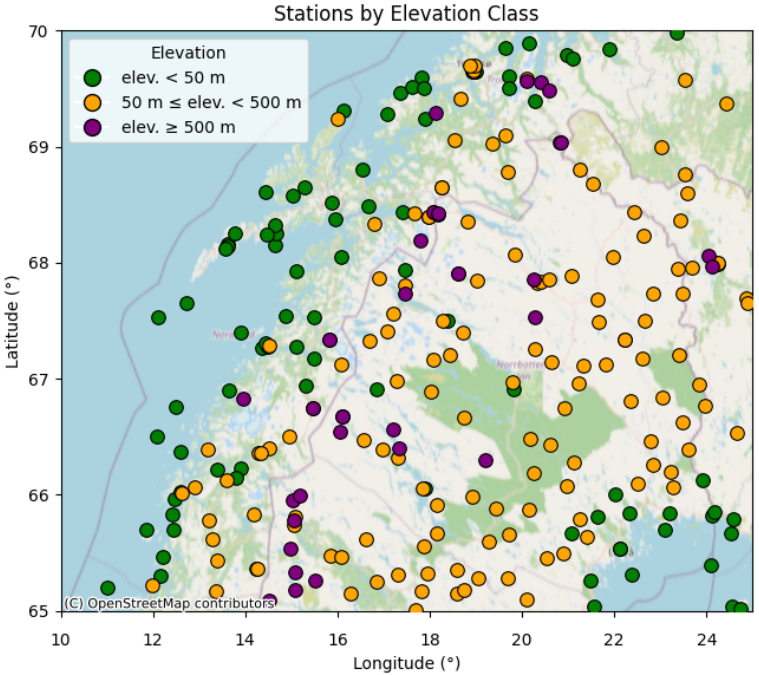
Analysis and 2-m Temperature at 12 UTC on 4 January 2026

- **Area:** 65-70°N; 10-25°E
- **Stations grouped by elevation**:

  elev. < 50 m: 44 stations

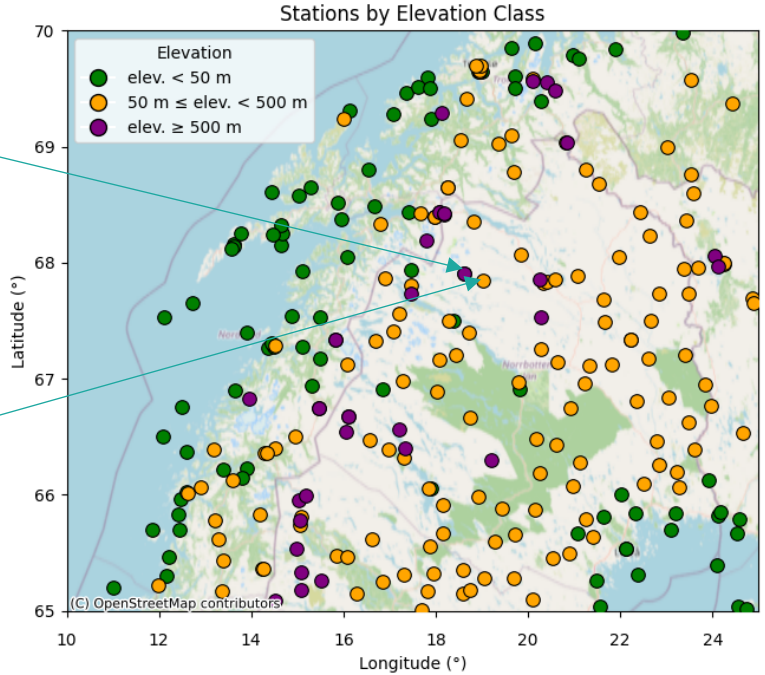
  50 m ≤ elev. < 500 m: 52 stations

  elev. ≥ 500 m: 13 stations
- **IFS Forecasts:** 00, 06, 12 and 18 runs, 3-hour lead time steps.
- **Period:** January-February 2026

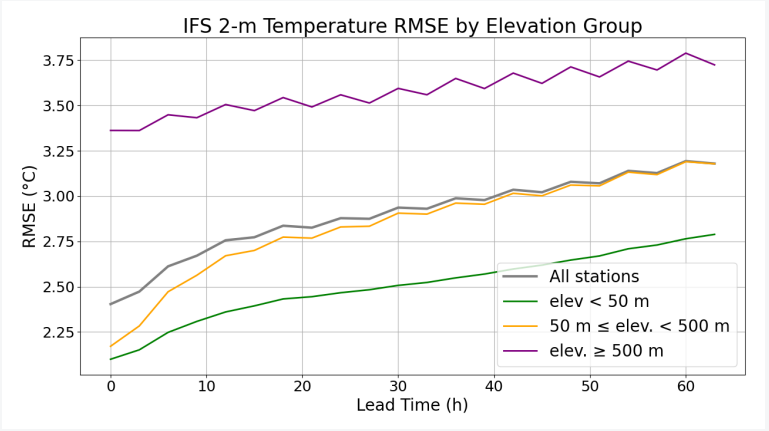


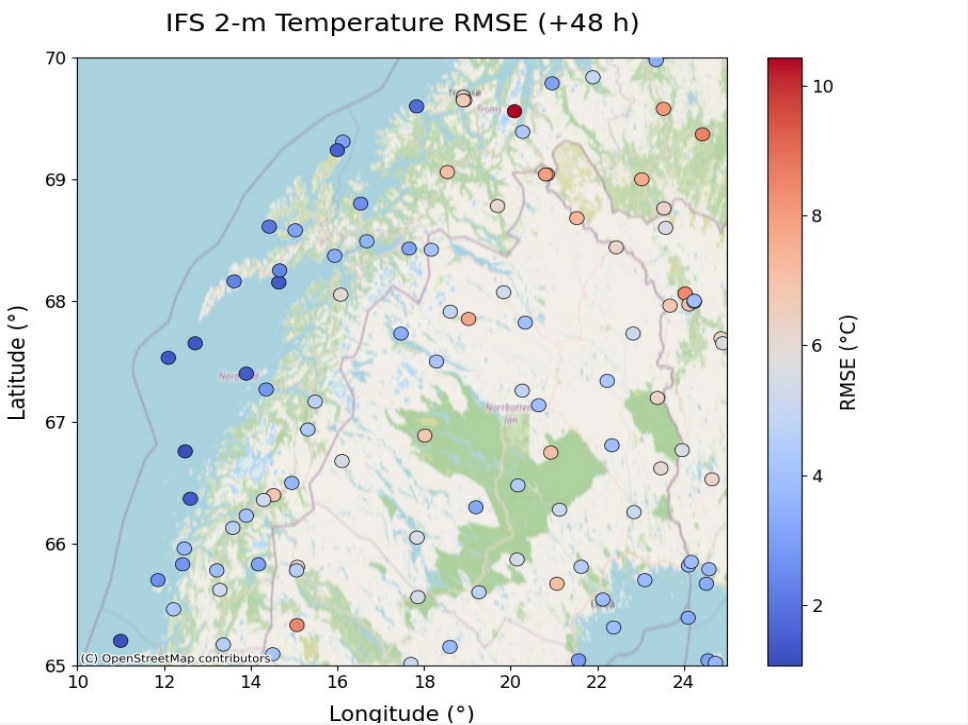
Tarfala 1,144 m

Nikkaluokta 467 m



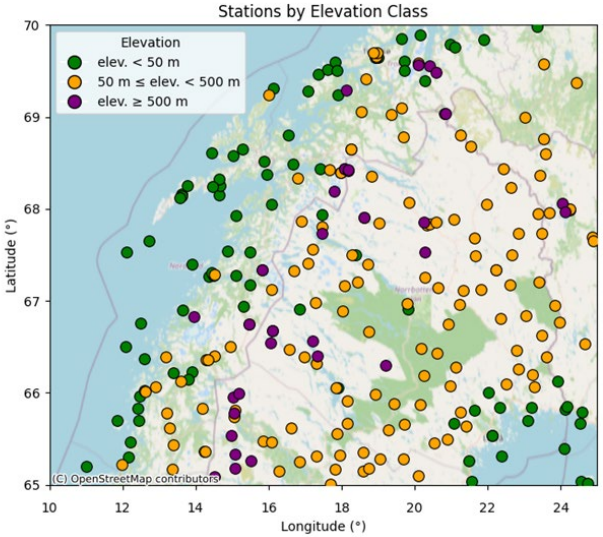
RMSE – Jan-Feb 2026

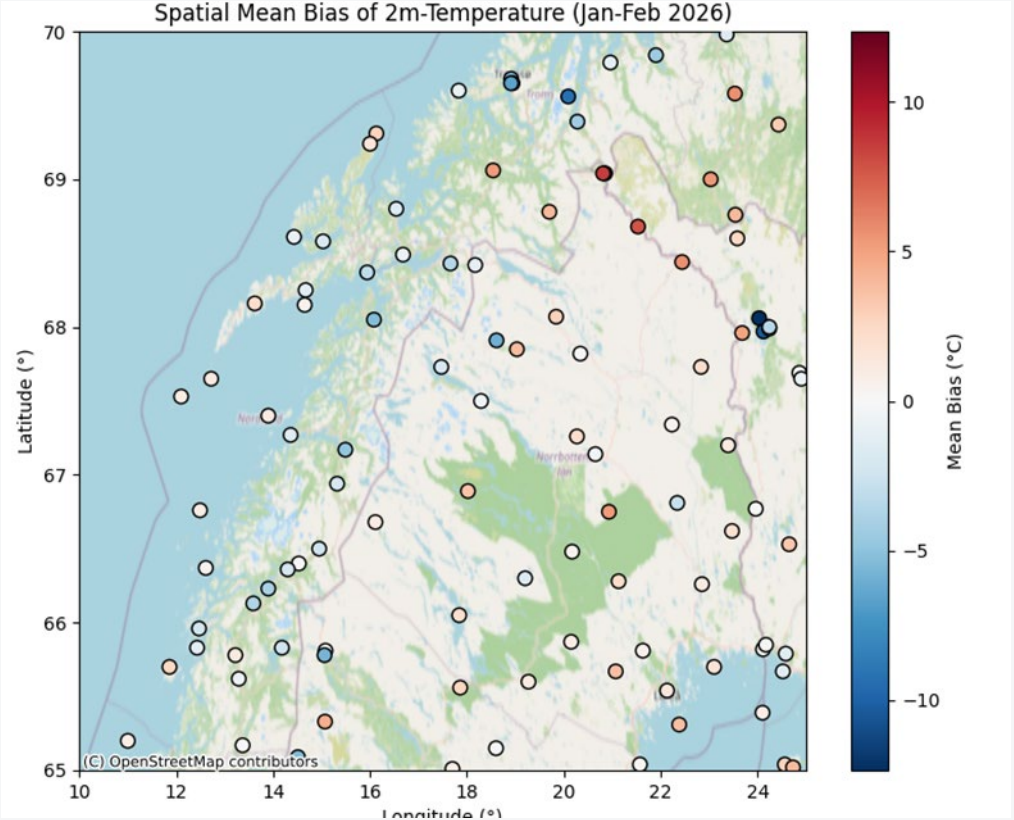




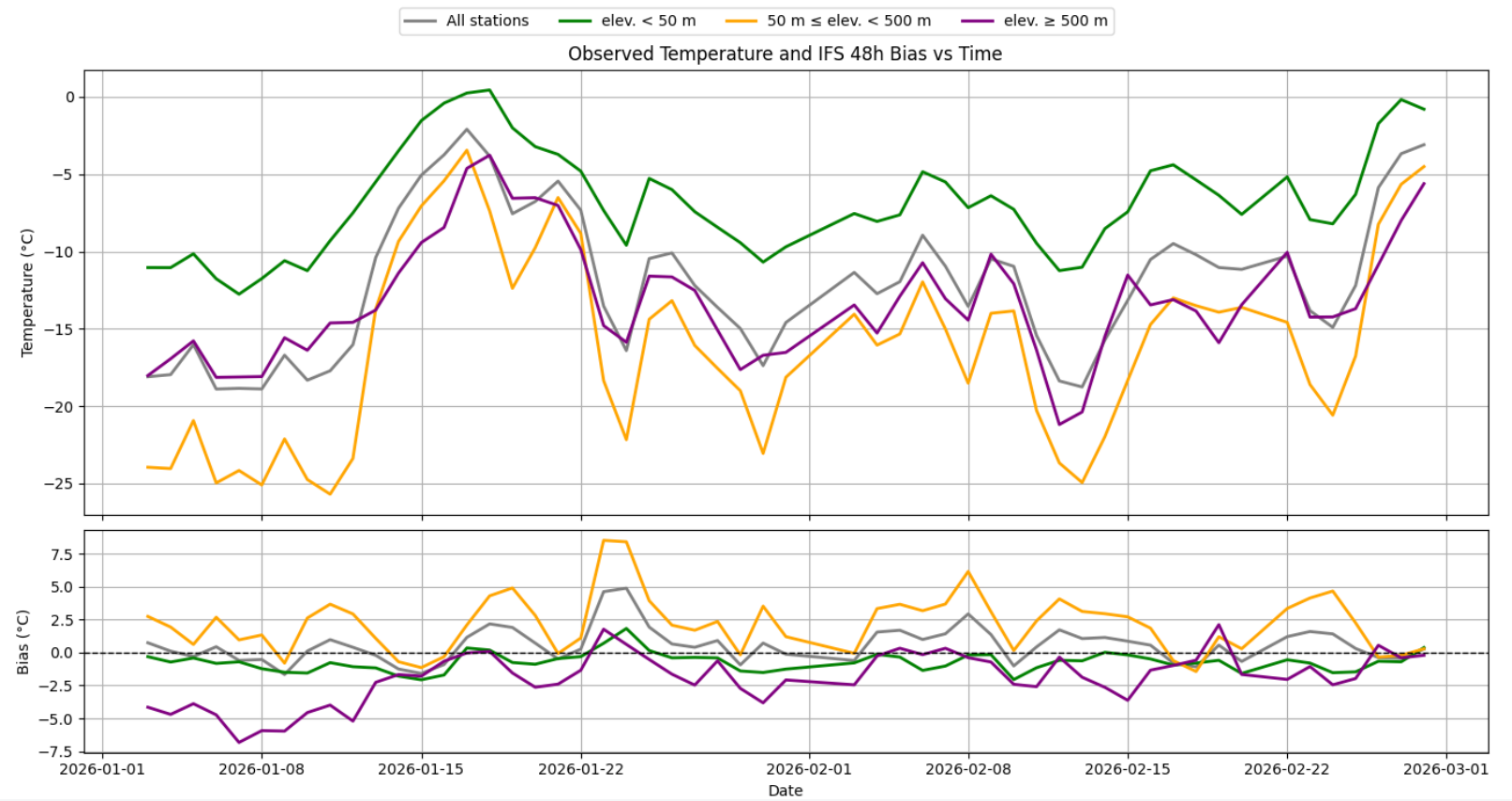
Spatial Mean Bias – Jan-Feb 2026

- Significant spatial differences in mean bias

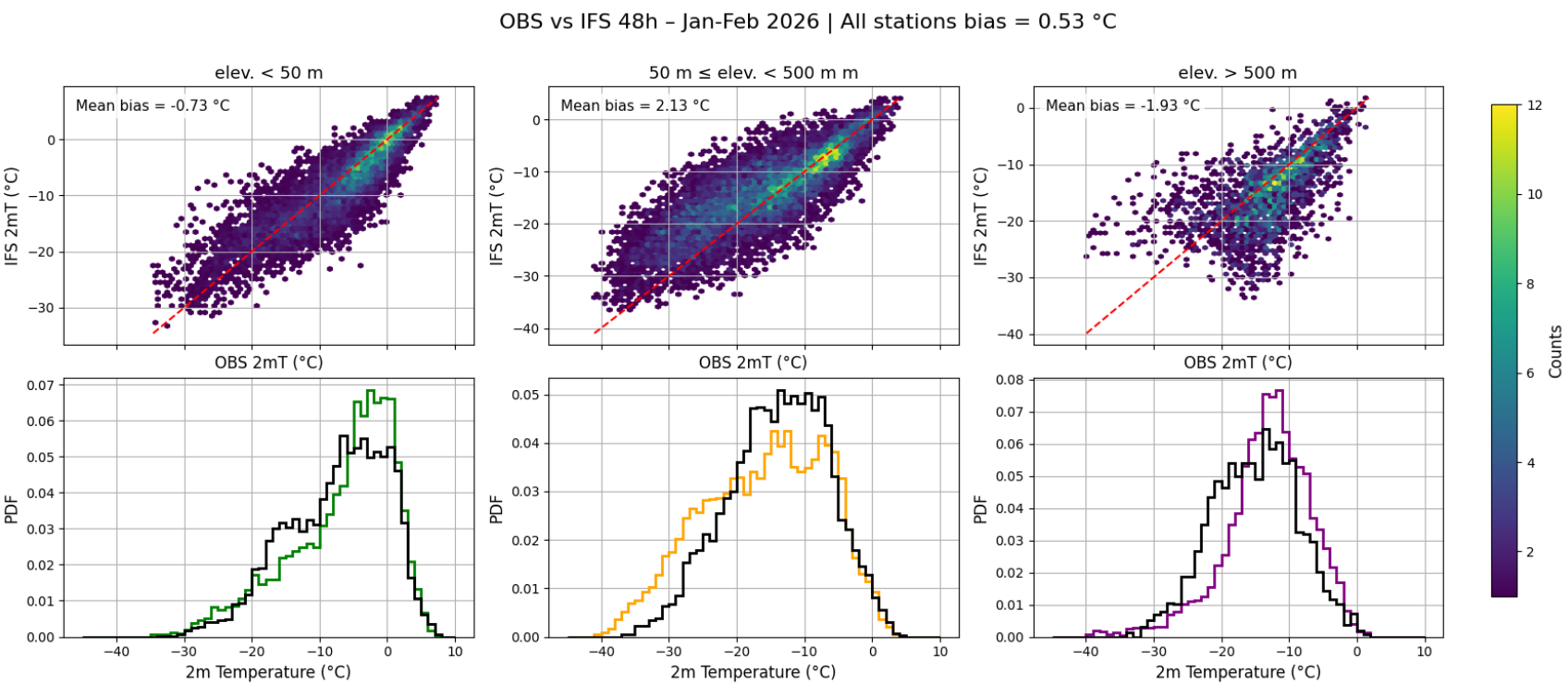




2-m Temperature & Bias – Jan-Feb 2026



Observed and Forecast 2-m Temperature Distributions



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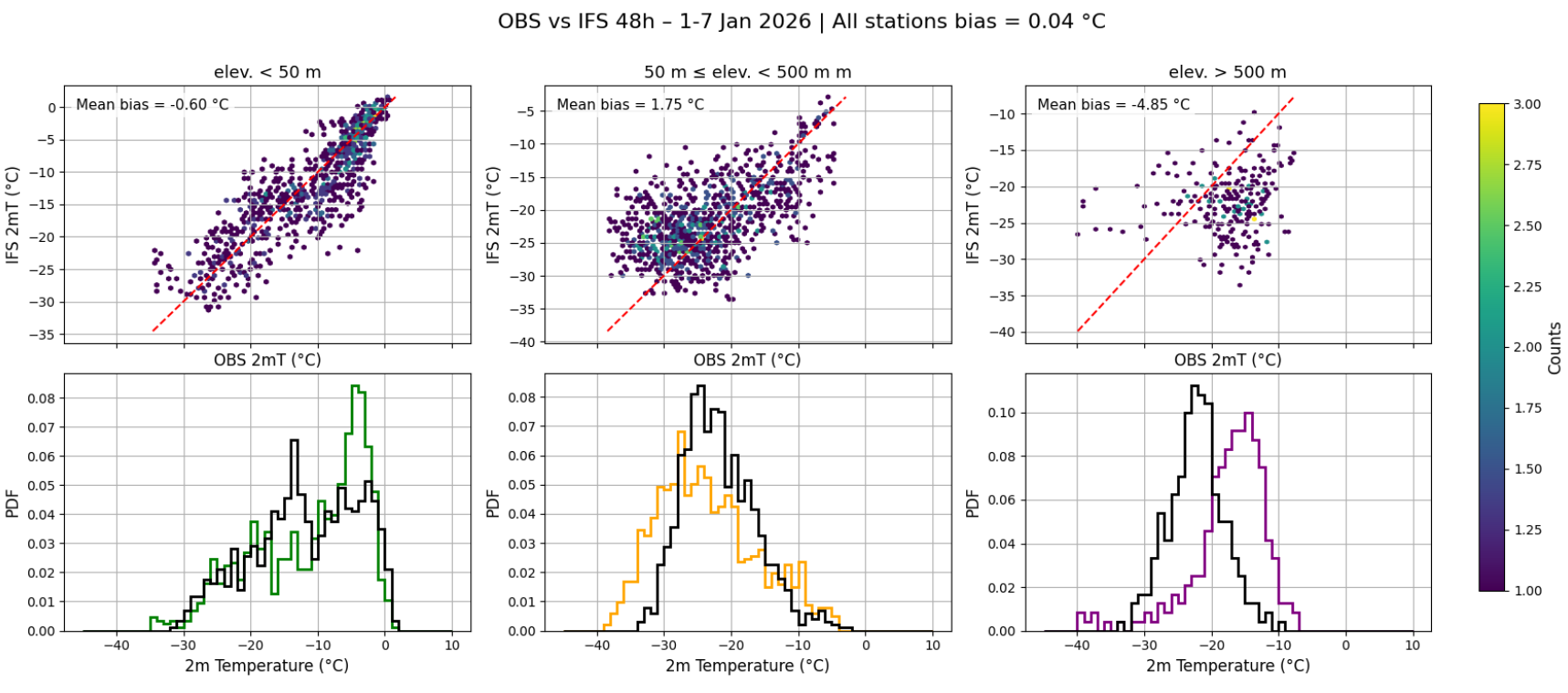

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Key findings

- RMSE increases with elevation.
- Mid-elevation stations show a warm bias (+2.1°C).
- Low-elevation and mountain stations show a cold bias (-0.7°C and -1.9°C).
- During the January cold outbreak, the mountain bias increased to -4.9°C.
- Extreme cold events remain particularly challenging to forecast in mountainous regions.

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Thank you for your attention. Questions?