Observation impact: State of affairs

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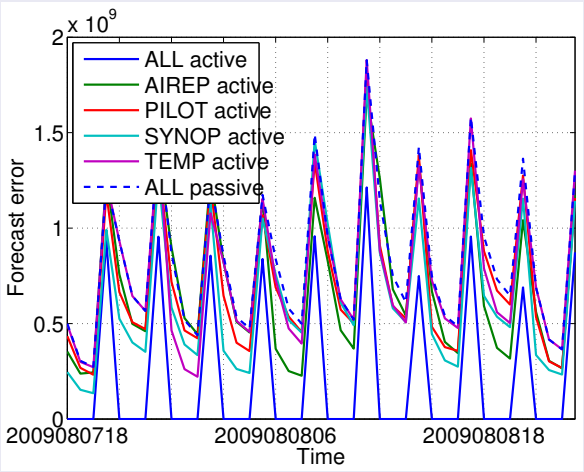
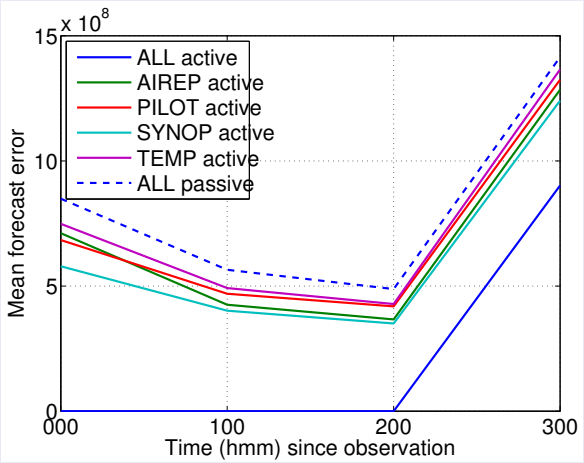
Hans-Ertel-Zentrum für Wetterforschung
Deutscher Wetterdienst

Time series



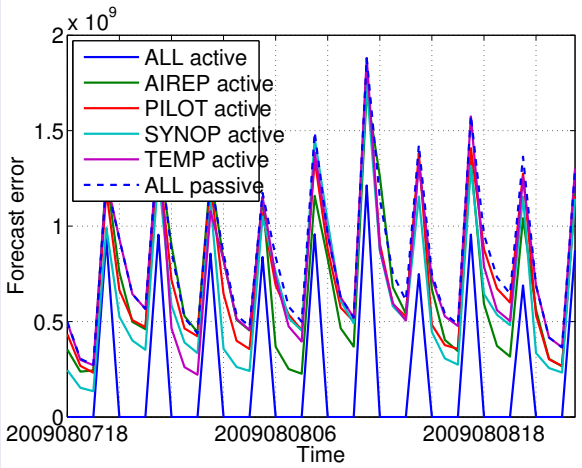
(a) True Forecast Errors

Mean

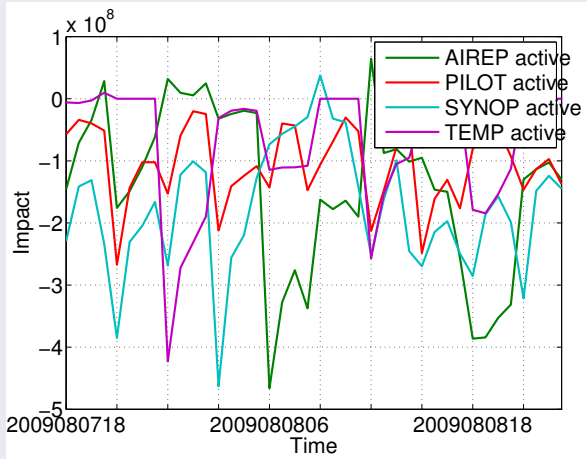


(d) True forecast error

Time series

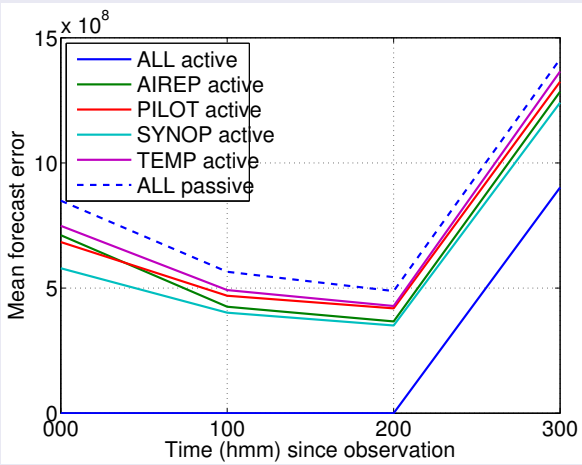


(a) True Forecast Errors

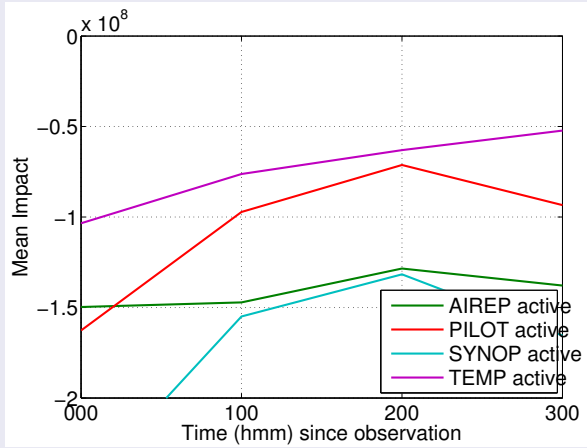


(b) True Impact

Mean



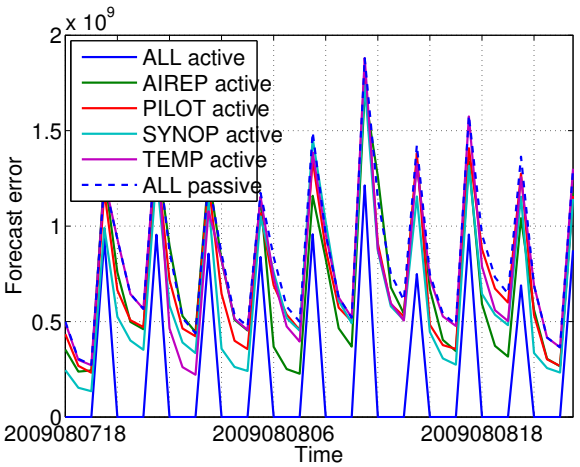
(d) True forecast error



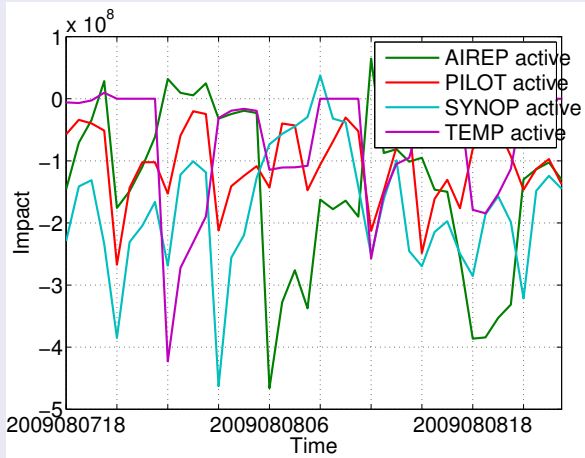
(e) True impact

Definition

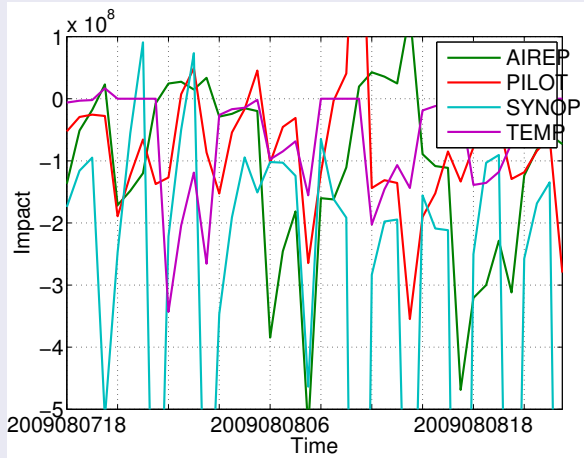
Time series



(a) True Forecast Errors

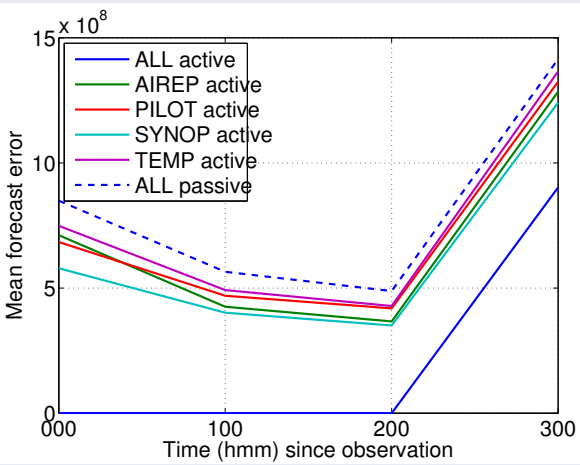


(b) True Impact

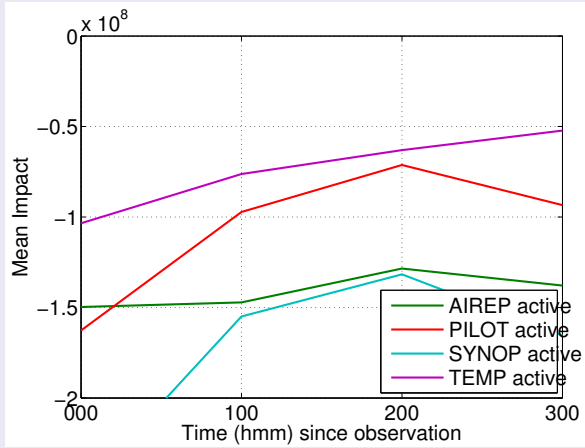


(c) Estimated Impact

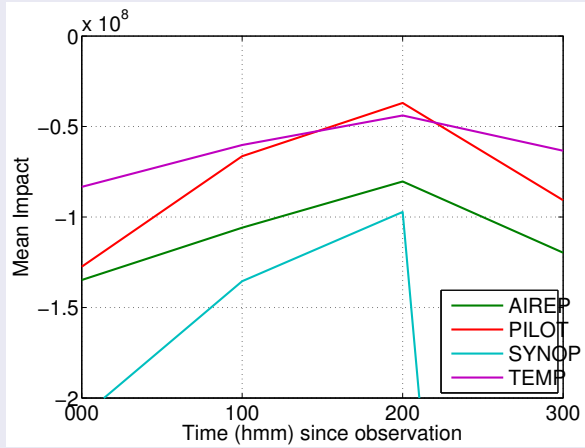
Mean



(d) True forecast error



(e) True impact



(f) Estimated Impact

New since last talk (Jan. 2013)

Before

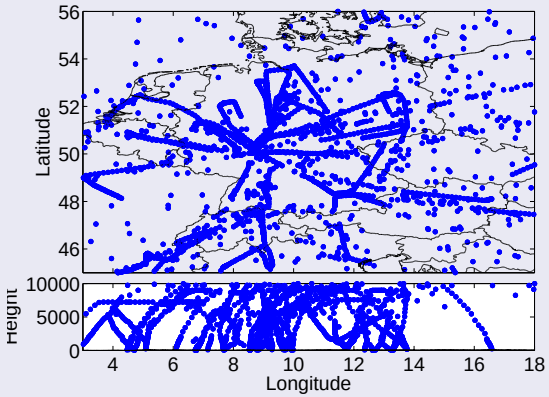
- 1 3h-cycle
- SYNOP impact overestimation
- Impact of main observation classes
- No conclusion about method reliability

Now

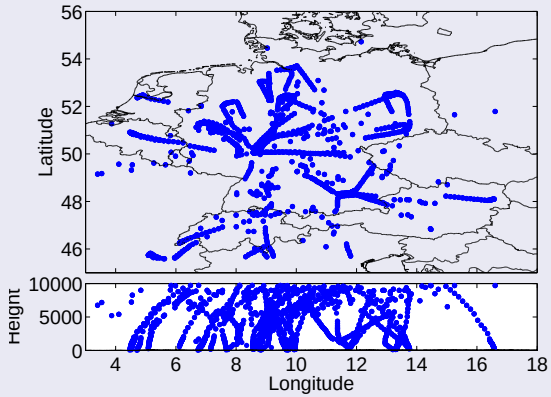
- 10 6h-cycles
- Discarding SYNOP PS, T
- Impact of any observation
- Statistical analysis of impact
- Operational analysis as verification
- Method seems reasonably reliable

Observation distribution

AIREP observations

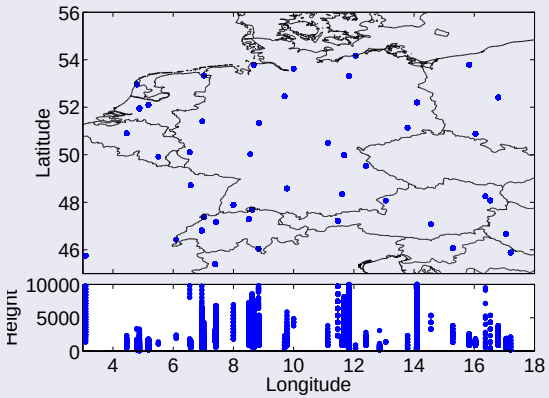


(a) All

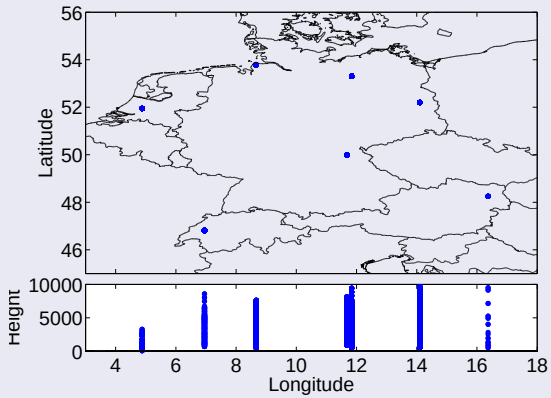


(b) Active

PILOT observations



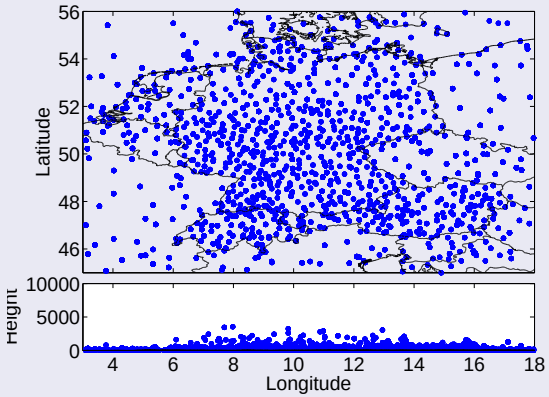
(c) All



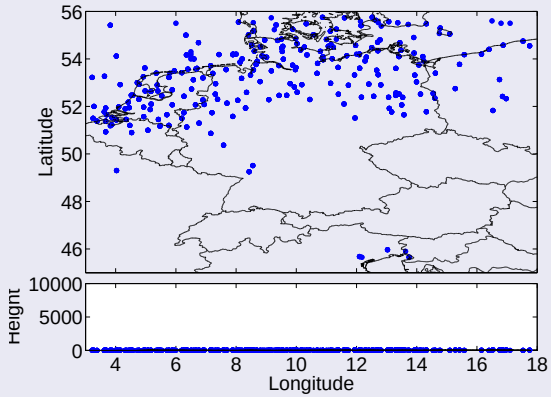
(d) Active

Observation distribution

SYNOP observations

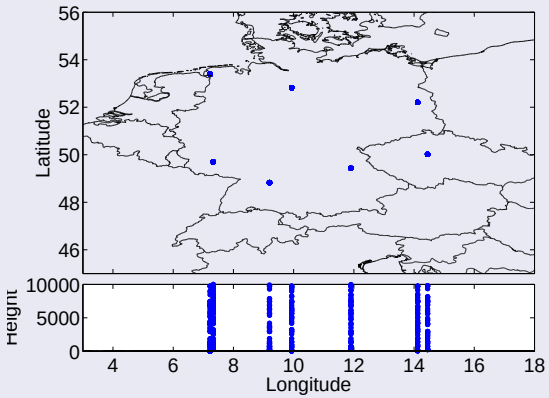


(a) All

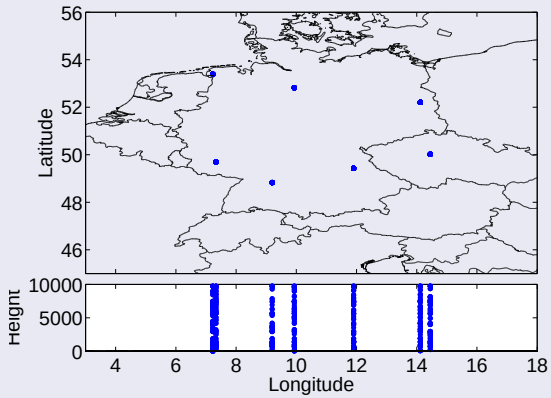


(b) Active

TEMP observations



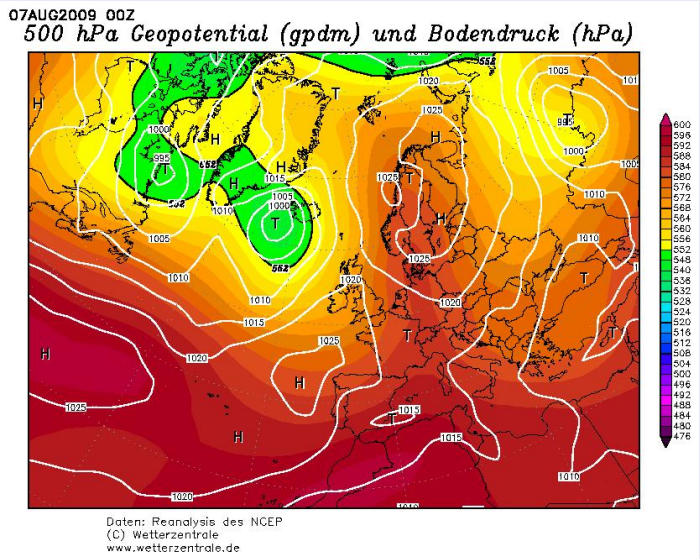
(c) All

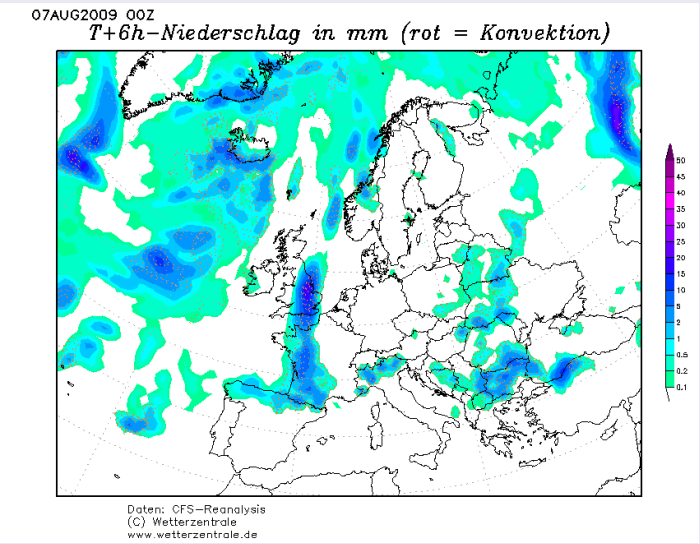


(d) Active

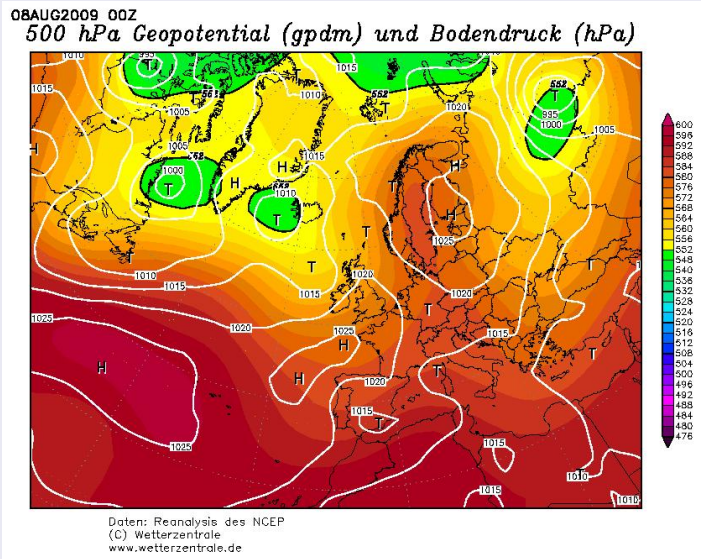
Wetter situation

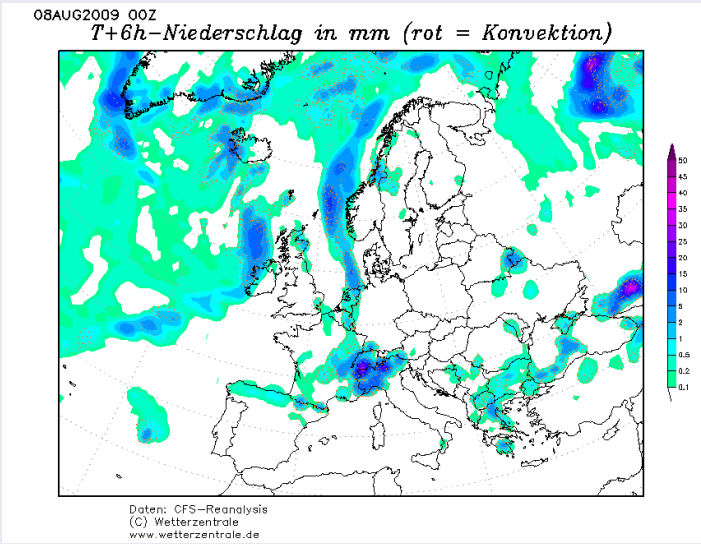
August 7 2009





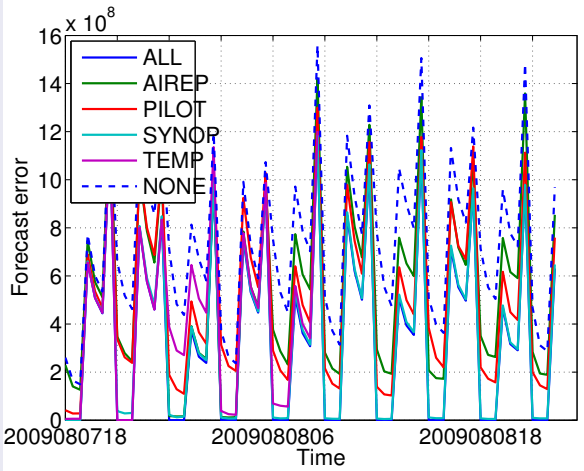
August 8 2009





Total impact (KENDA analysis as verification)

Time series



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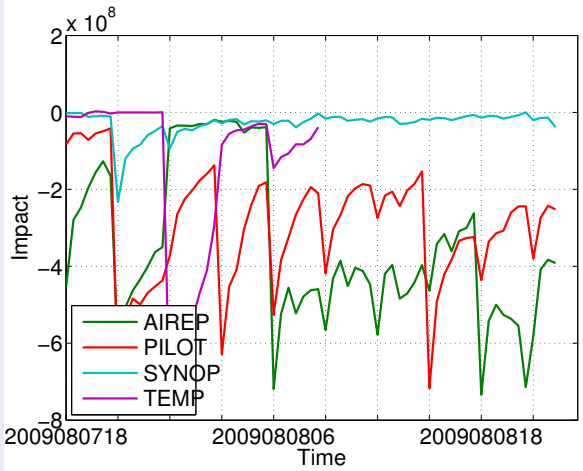
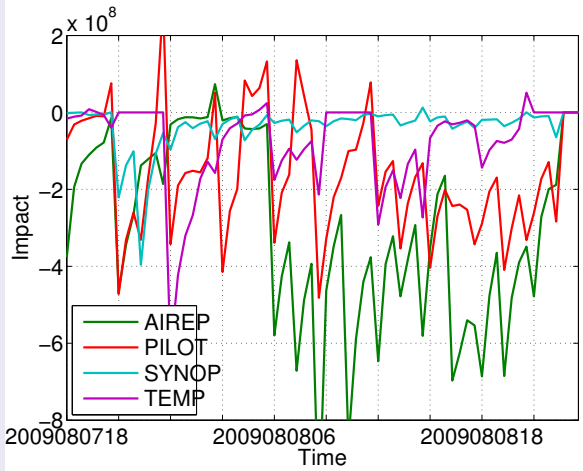
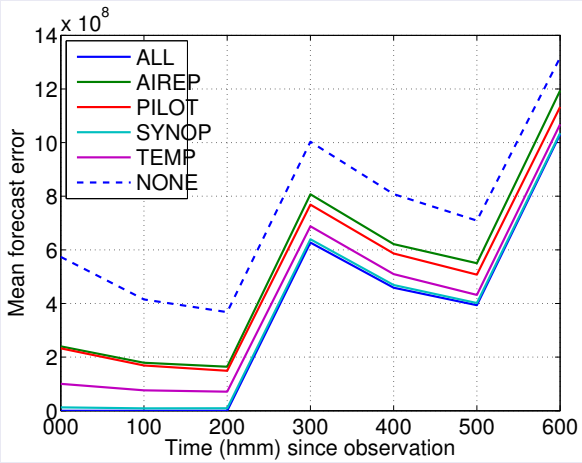


(b) True Impact

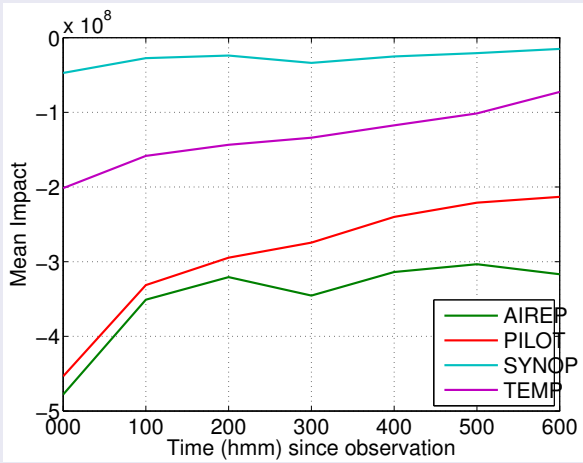


(c) Estimated Impact

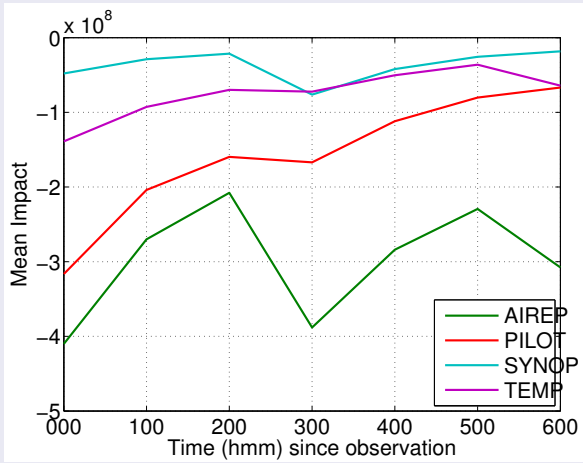
Mean



(d) True forecast error



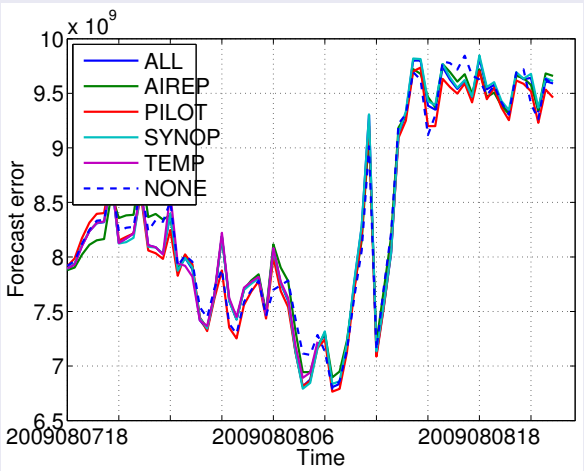
(e) True impact



(f) Estimated Impact

Total impact (Operational analysis as verification)

Time series



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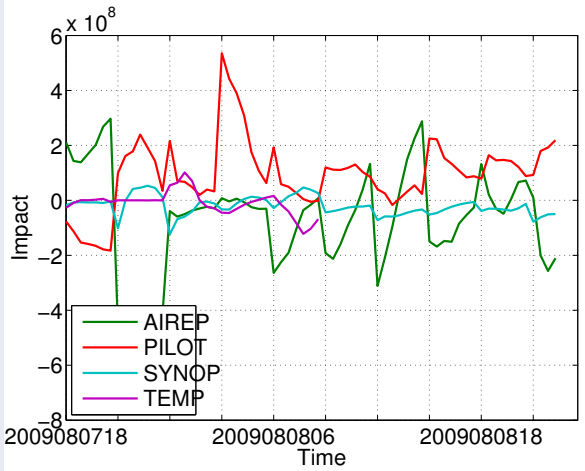
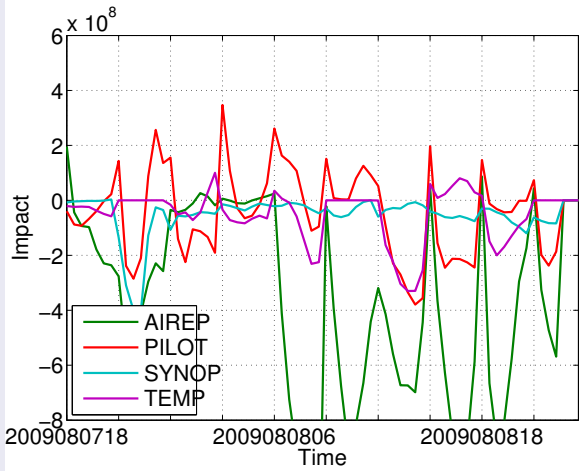
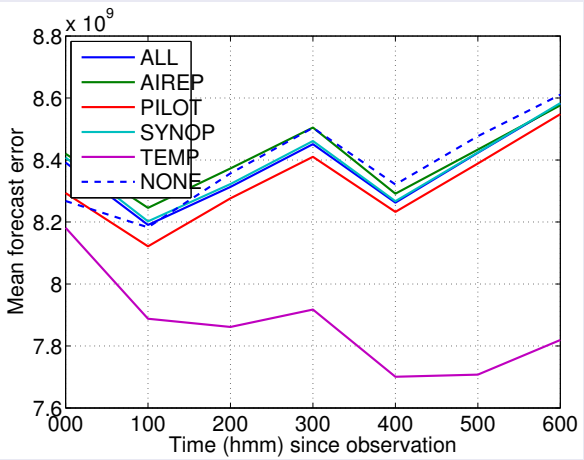


(b) True Impact

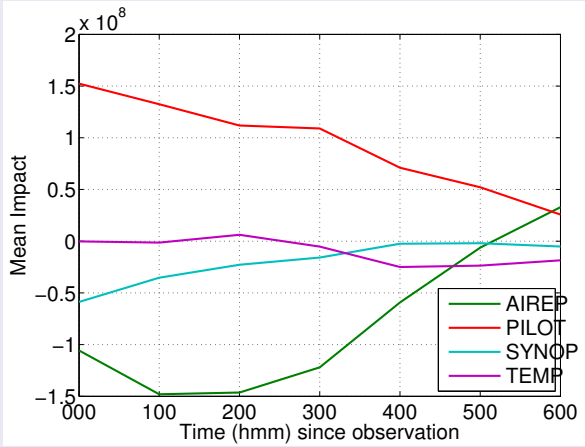


(c) Estimated Impact

Mean



(d) True forecast error



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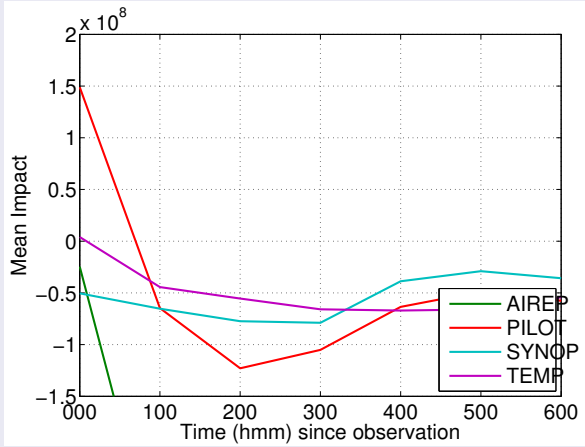
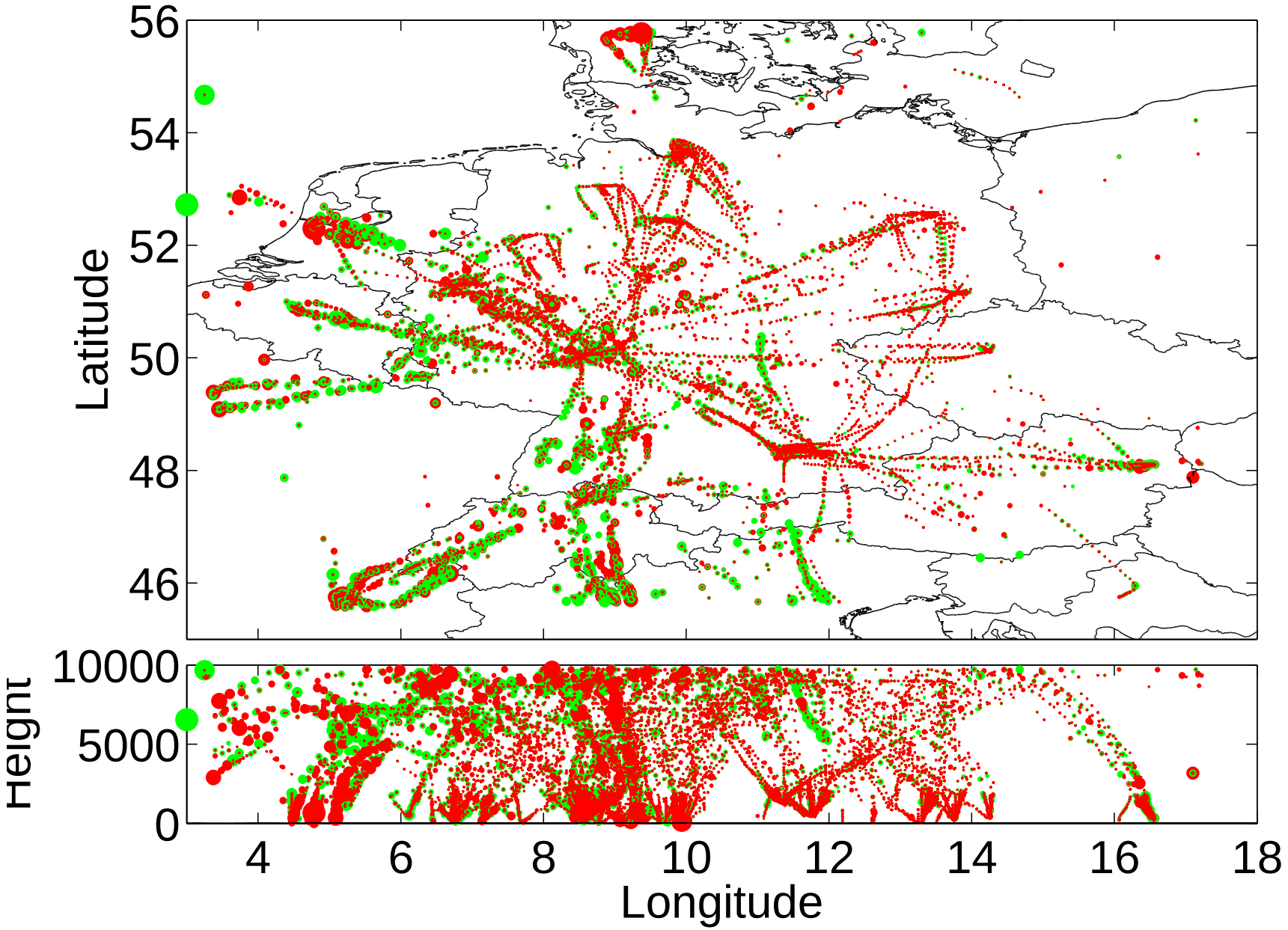
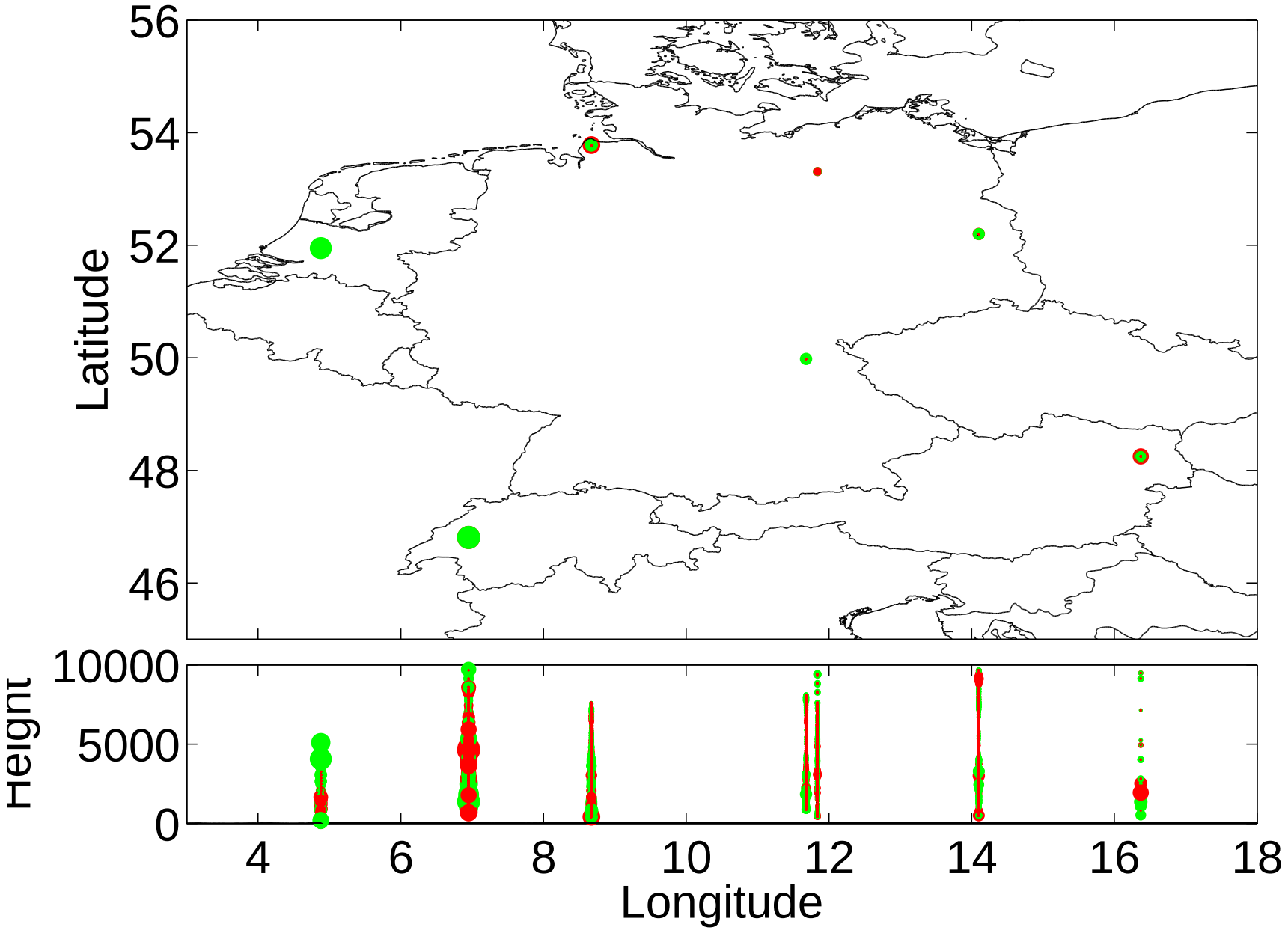


(f) Estimated Impact

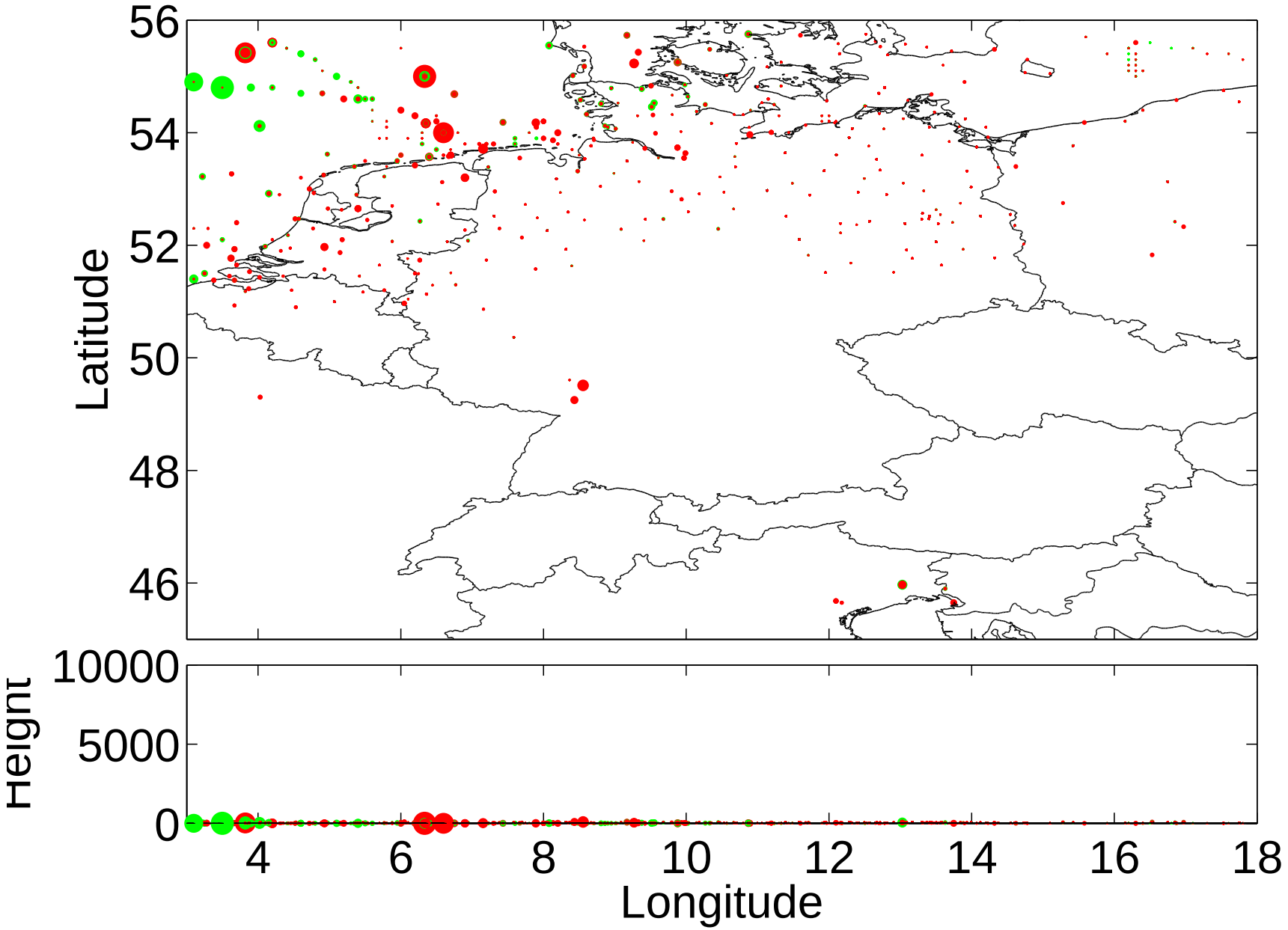
Impact distribution: AIREP



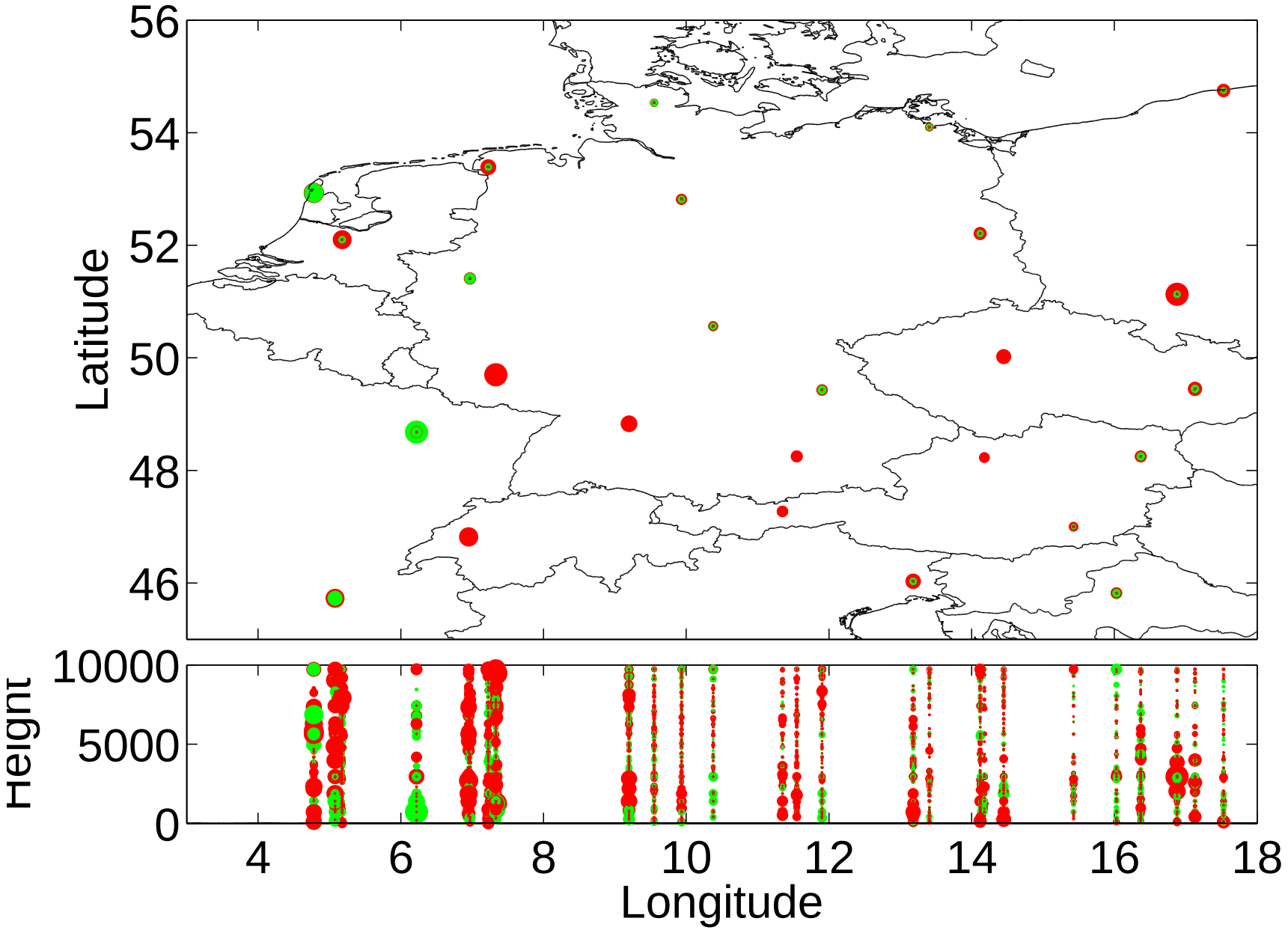
Impact distribution: PILOT



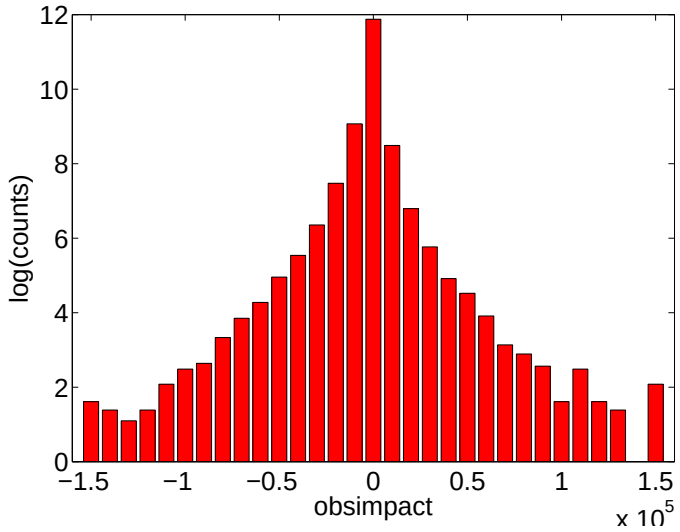
Impact distribution: SYNOP



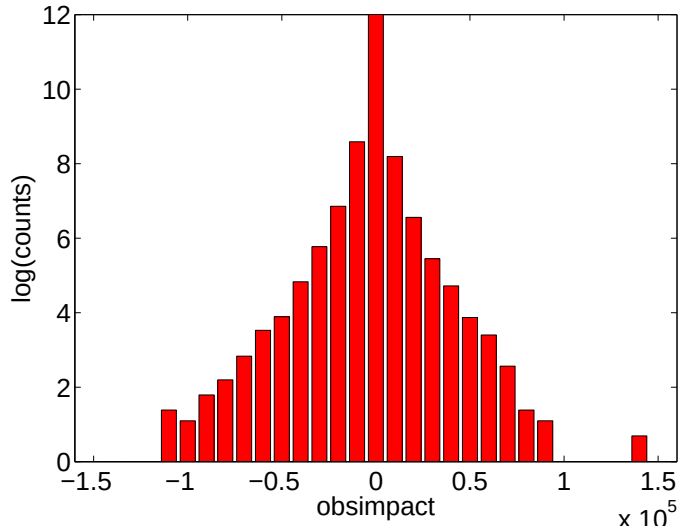
Impact distribution: TEMP



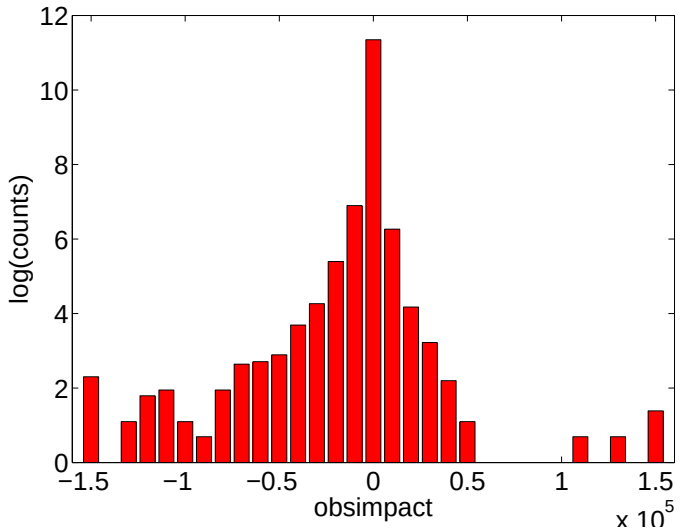
Impact statistics



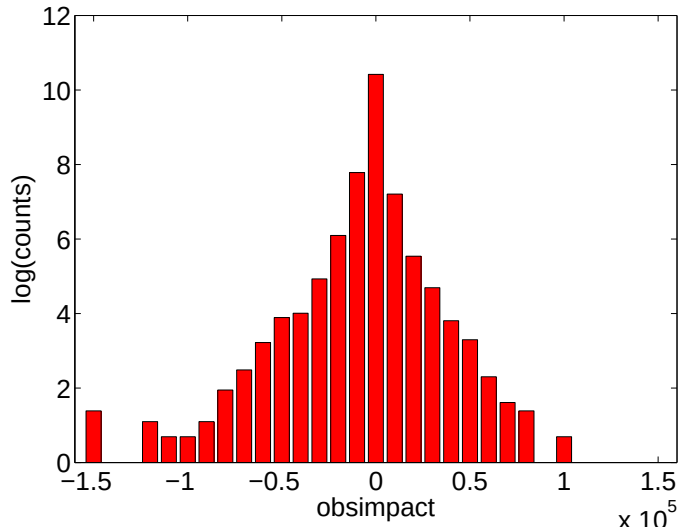
(a) AIREP



(b) PILOT

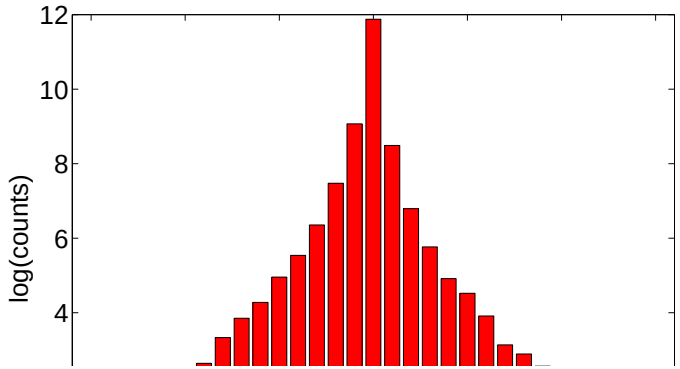


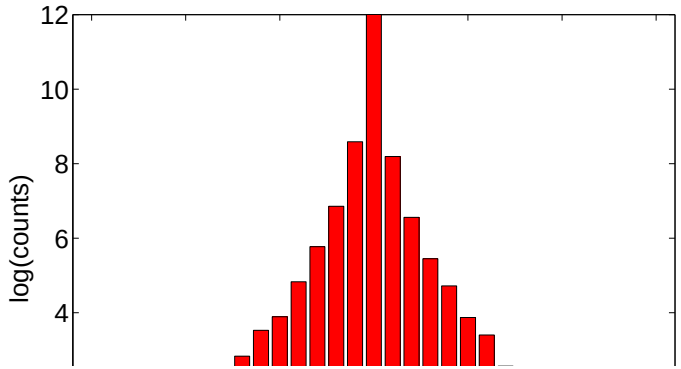
(c) SYNOP



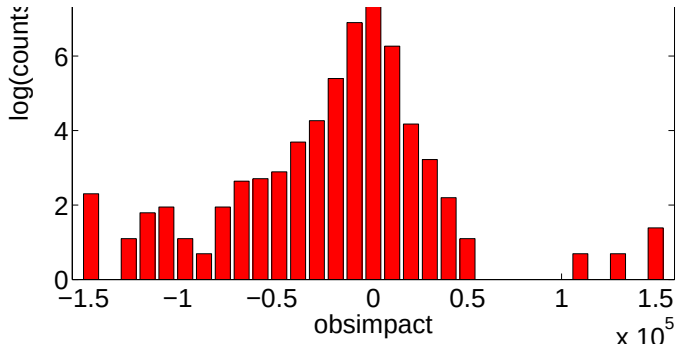
(d) TEMP

Impact statistics

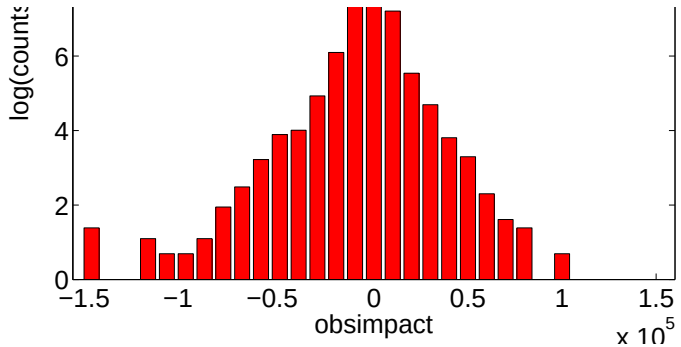




	AIREP	PILOT	SYNOP	TEMP
Number of Observations	161957	175025	86840	38402
Neg. Impact [%]	57.64	58.66	53.97	58.56
Pos. Impact [%]	42.36	41.34	46.03	42.44
Total Impact [J]	$-9.6 \cdot 10^7$	$-5.1 \cdot 10^7$	$-2.0 \cdot 10^7$	$-2.5 \cdot 10^7$
Impact Mean [J]	-594.47	-290.39	-230.53	-659.18
Impact Standard Deviation [J]	6491.3	4358.7	4453.9	6774.7



(c) SYNOP



(d) TEMP

Summary

Summary

- Omitting SYNOP PS and T observations increases accuracy of method
- Reasonable estimation of observation impact up to 6 hours possible
- Works better for 'small' errors
- Reasonable, though difficult to estimate distribution of impact values

Next steps

- Try to detect unbeneficial observations and verify with data denial experiment
- Compute artifical experiment with wrong observation error
- Recompute with more accurate form of approximation

Linux cluster suggestion

- Let's have a node exclusively for running scripts, submitting, compiling etc.
- Use own computer for interactive jobs
- If necessary, reserve one of the lx machines for interactive jobs?