Climate change and projections for the Barents region

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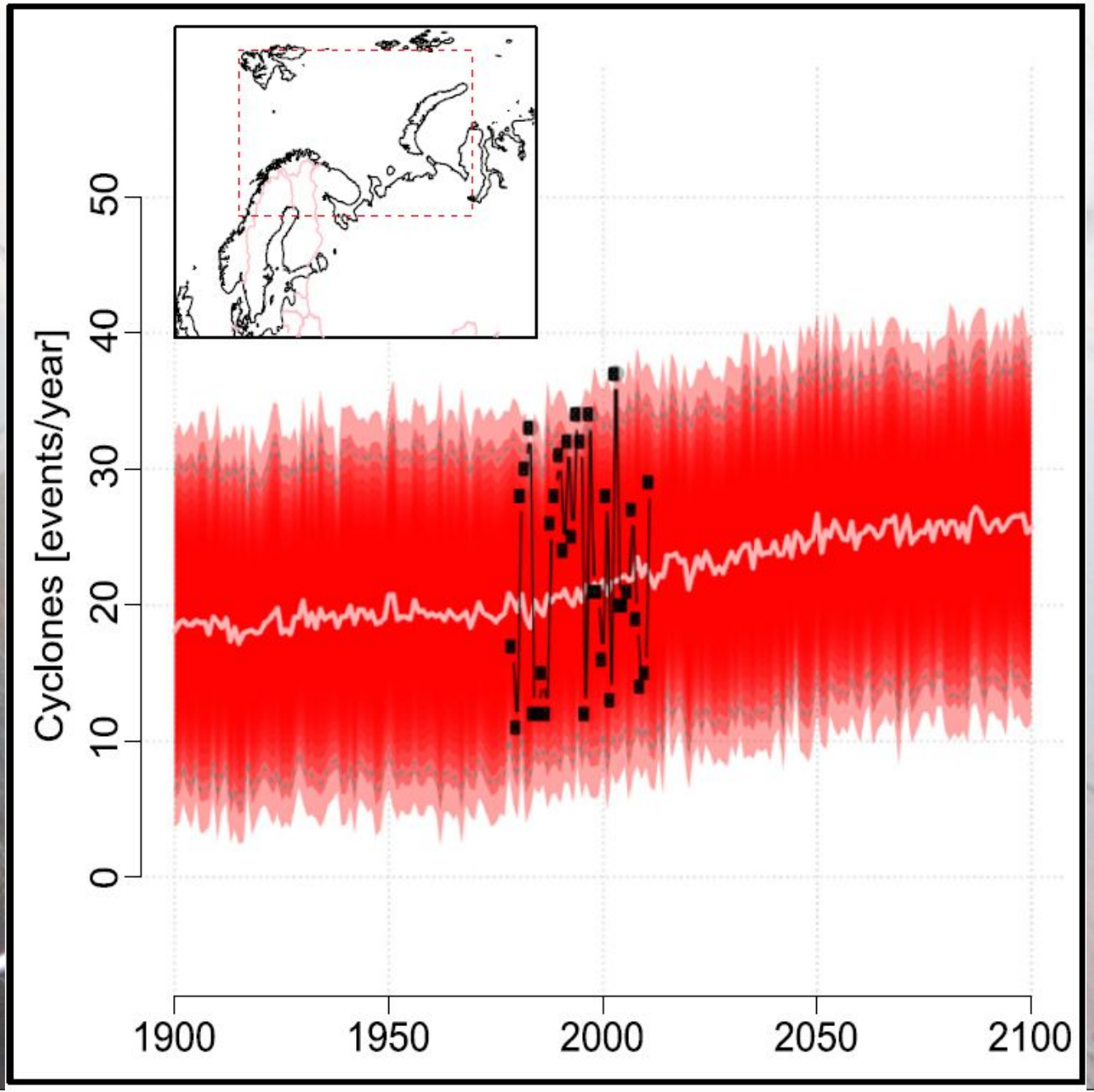
Meteorologisk institutt 150 år

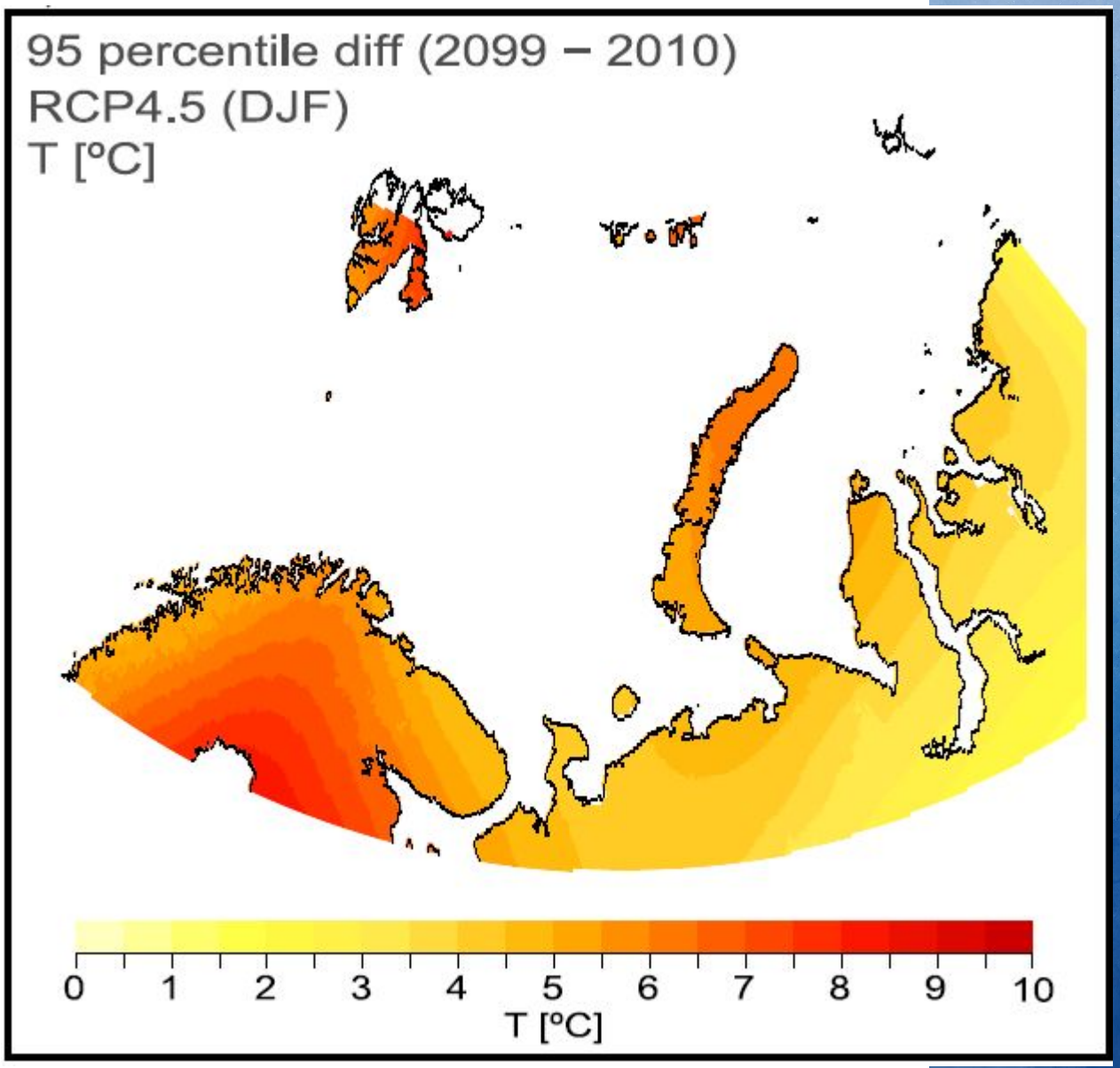
Outlook for 2100

- Increasing **storm activity** over the Barents sea
- Strongest **warming** in the winter over Svalbard & northern Fennoscandia.
  - As much as 18°C in some locations?
- Increased **precipitation** by up to 70%

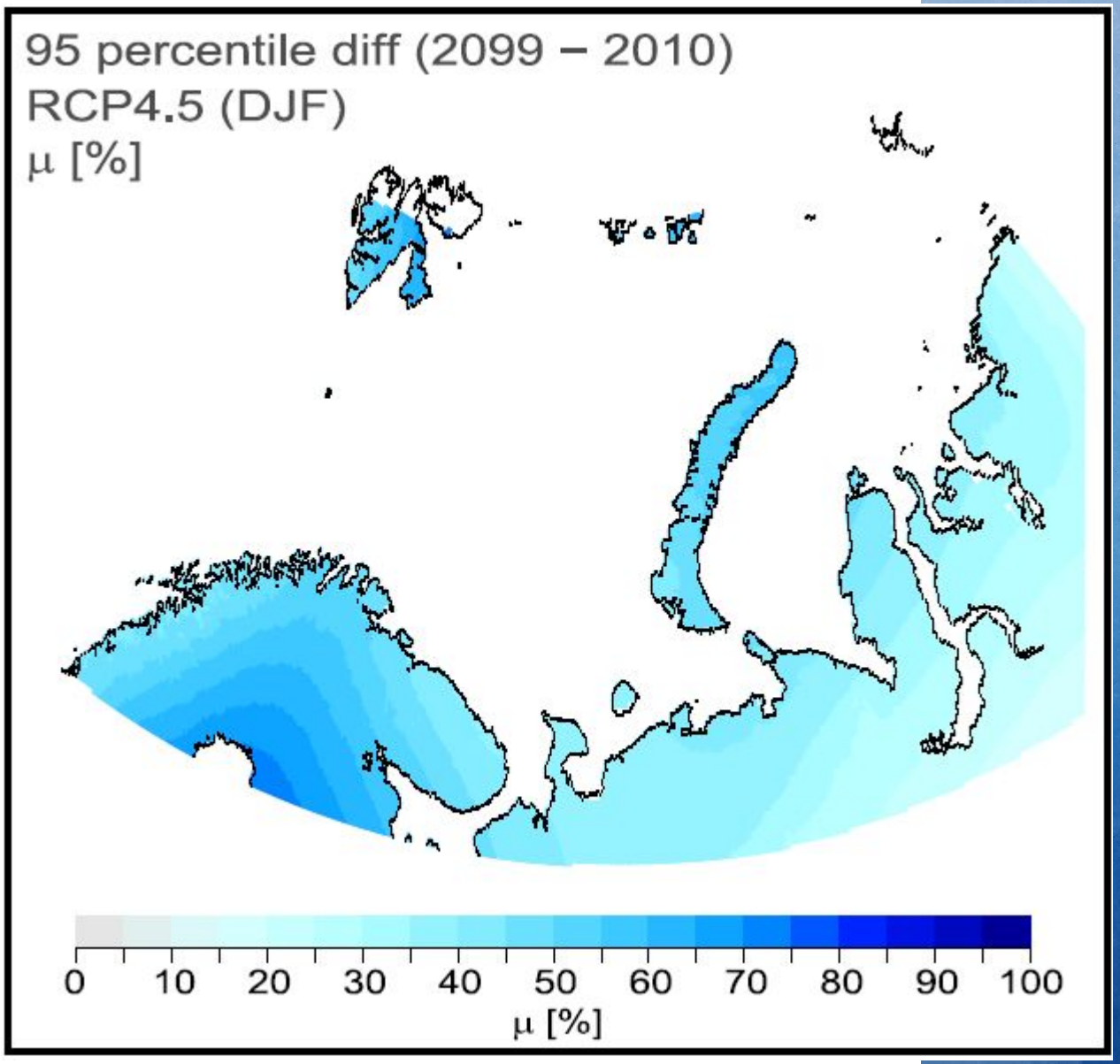
Number of storms



Projected Temperature



Projected Precipitation intensity



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The story behind the results

Statistical analysis: Downscaling, PCA, validation

(EMS2016-214 & EMS2016-222)

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- Large ensembles of GCM simulations
  - Internal variability
  - Emission scenarios
  - Model differences
- Common EOFs
  - Validation
  - Consistent spatial structure
- PCA to represent predictands
  - Signal-to-noise ratio
  - Speed
- Multiple regression
  - Stepwise screening
  - Cross-validation

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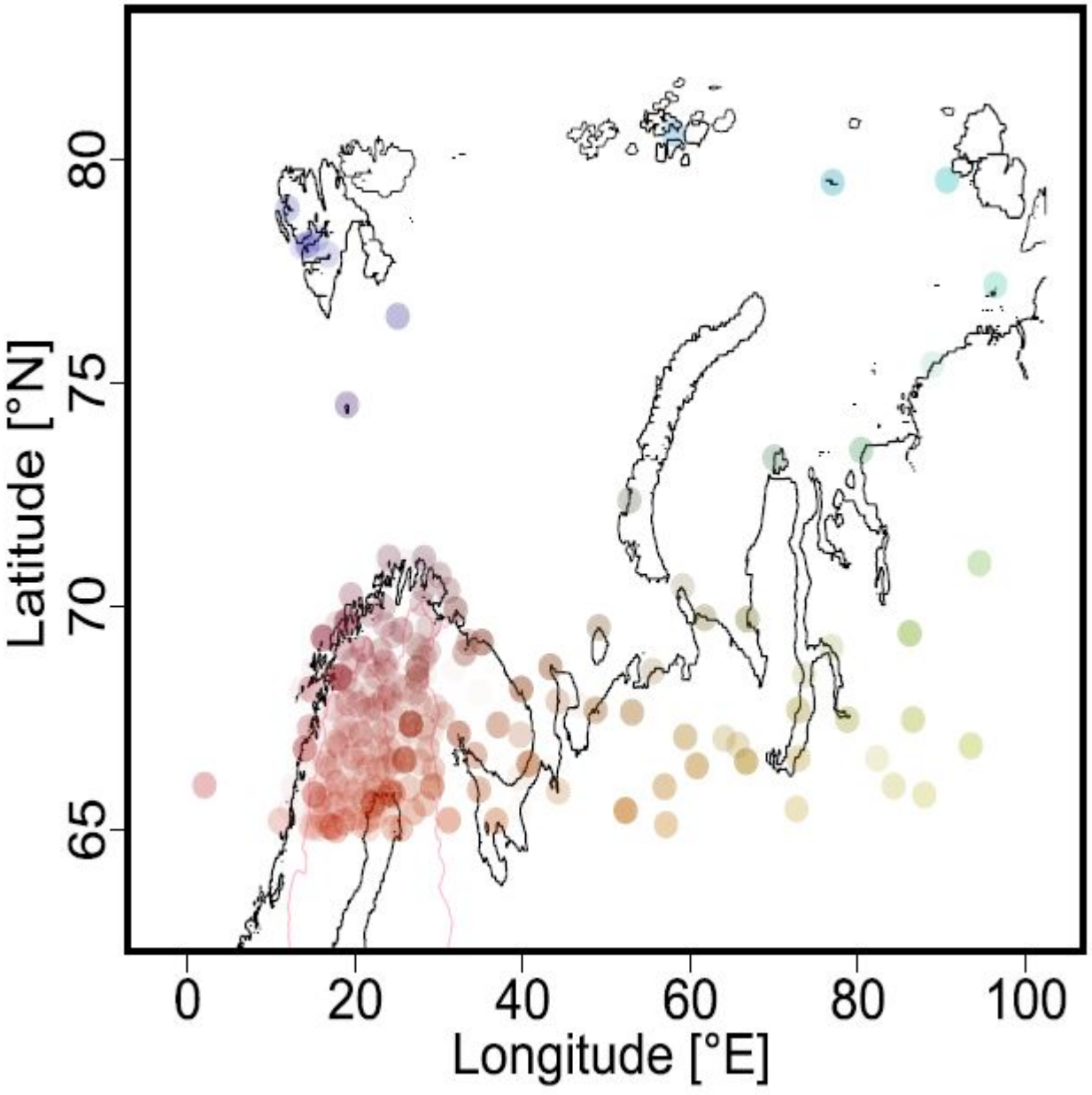
- Sensitivity tests
  - Various conditions
  - Experience/history

a)
Mean temperature
T [°C]
20
10
0
−10
−20
−30
−40
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
b)
Temperature variability
σT [°C]
12
10
8
6
4
2
0
c)
Temperature persistence
R[τ] (correlation)
1.0
0.8
0.6
0.4
0.2
d)
Precipitation intensity
μ [mm/s]
20
15
10
5
0
e)
Wet−day frequency
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
f)
Mean dry−spell length
ncdd [mm/s]
9
8
7
6
5
4
3
2

Station network



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- Gridding
  - NCAR's LatticeKrig
  - 'fixed rank Kriging' + large number of basis functions
  - Elevation used as a covariate

Thank you for your attention!

Meteorologisk institutt 150 år

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LETTER • OPEN ACCESS

Climate change and projections for the Barents region: what is expected to change and what will stay the same?

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Abstract

1. Introduction

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- Implications
  - Impact on ecosystem and society.
  - Adaptation to change in snow conditions, ice, temperature and precipitation.
  - Input to Arctic Monitoring and Assessment Programme's (AMAP) report Adaptive Actions in a Changing Arctic