

Arctic observing networks- Climate and weather

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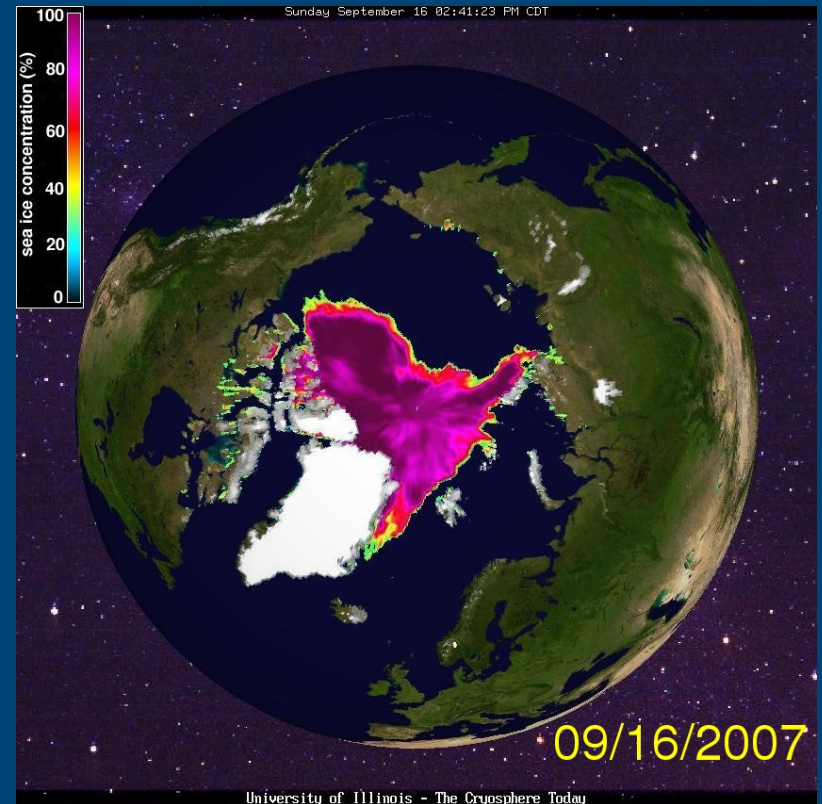
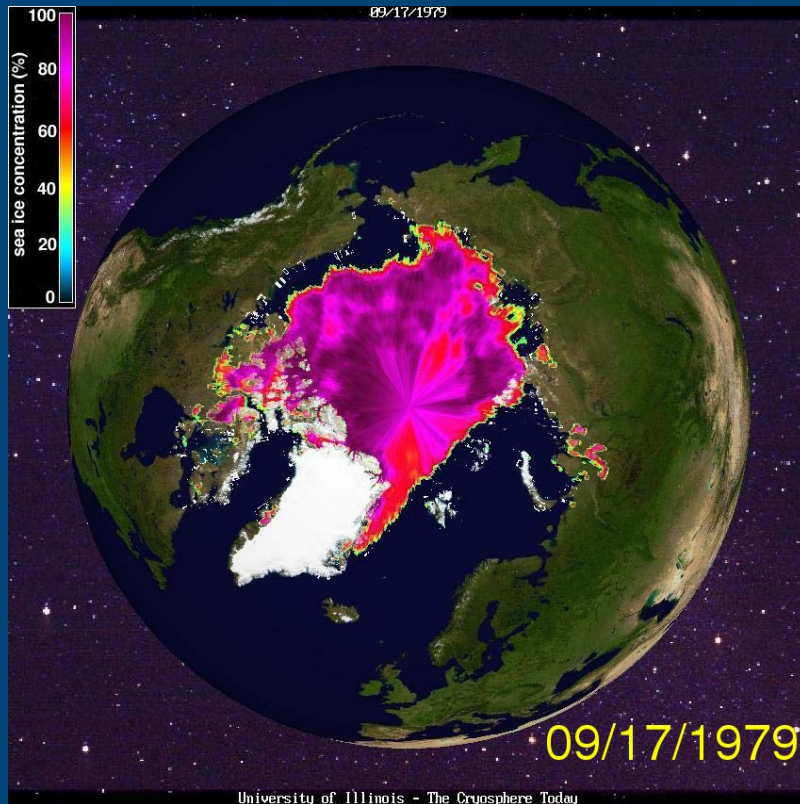
Stockholm University



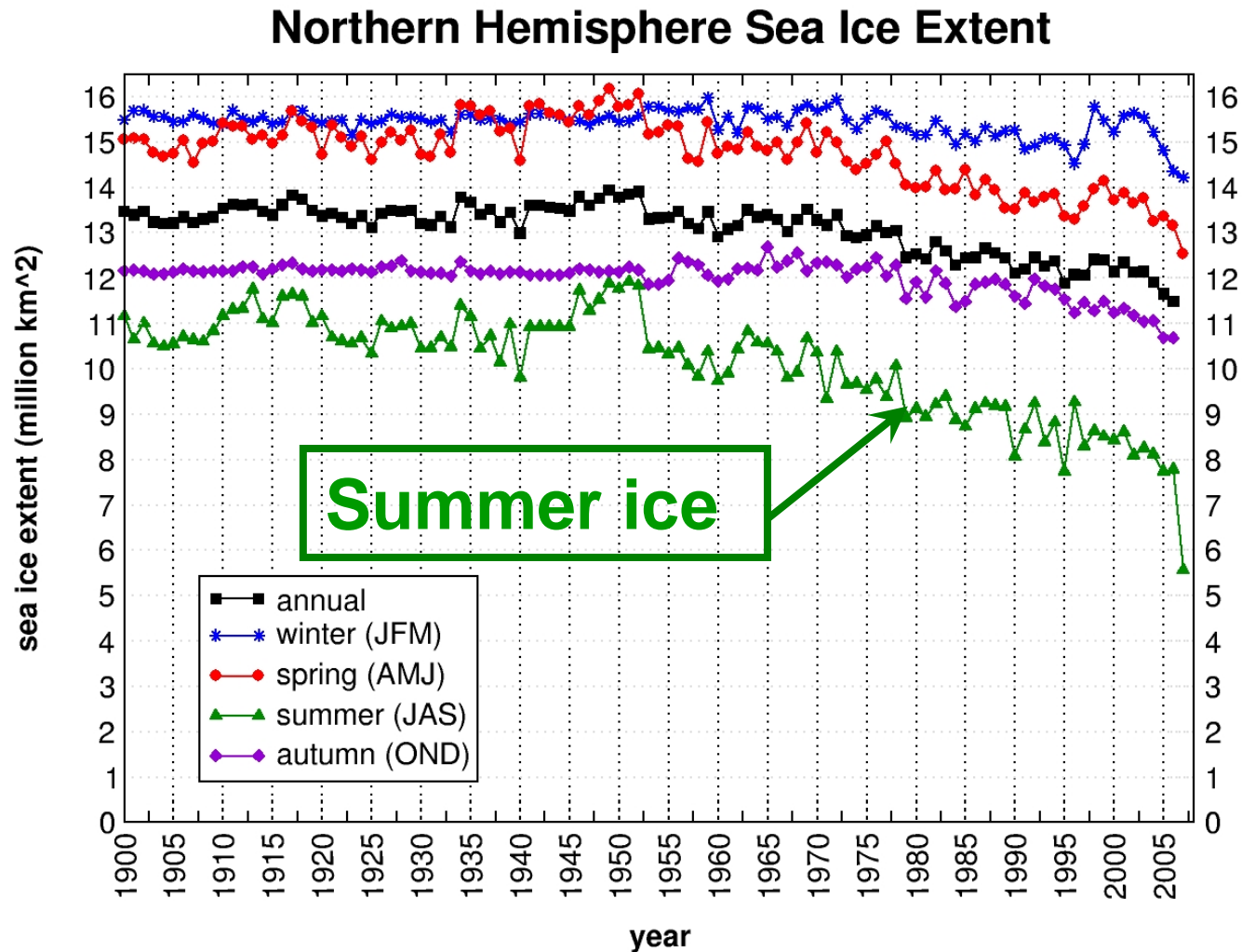
Arctic sea ice September

1979

2007



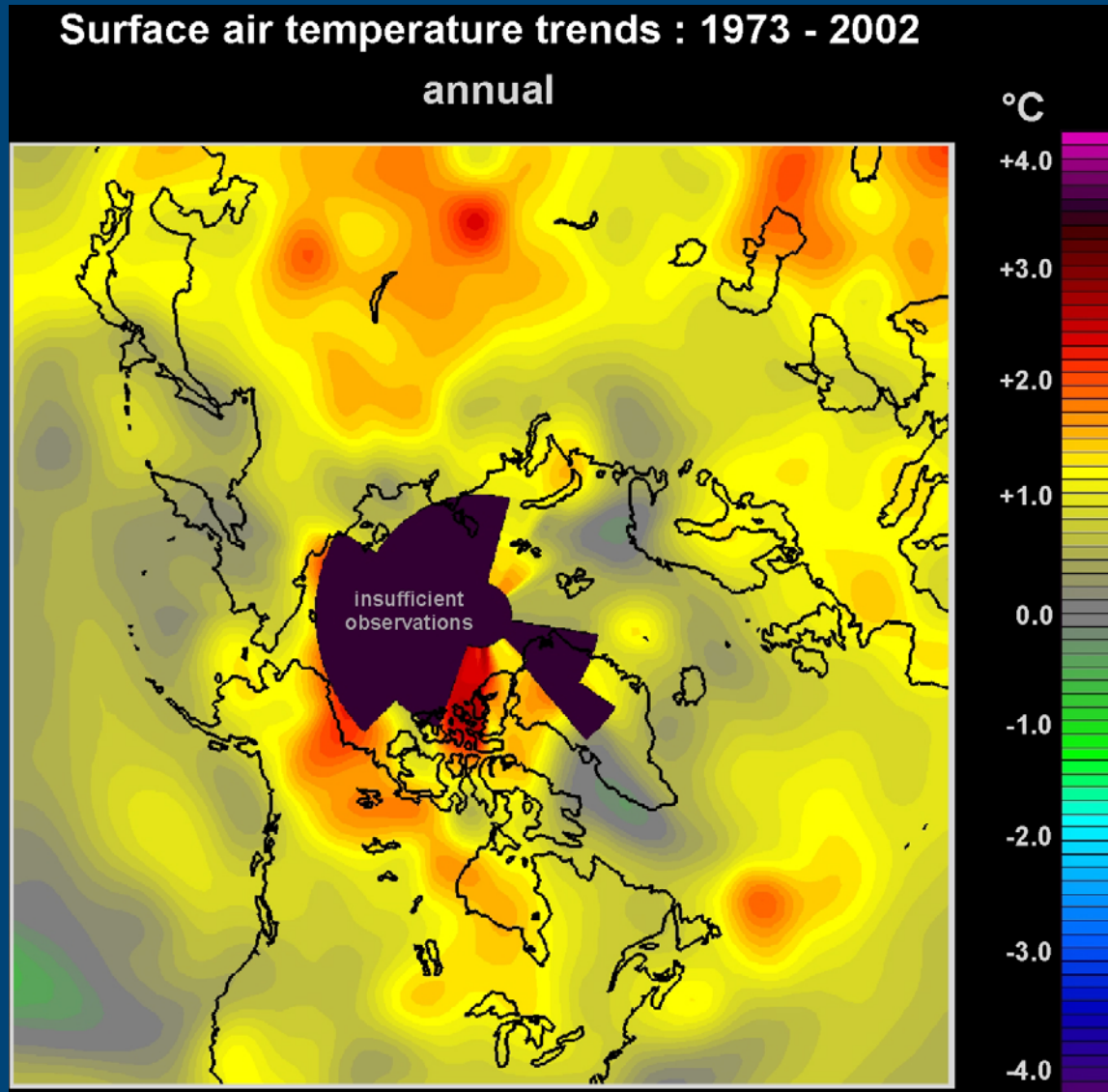
Extent of Arctic sea ice



Why?

- Greenhouse gas warming
- Ice-albedo feedback
- Changes in heat transports (atmosphere and ocean)
- Changes in wind patterns
- Black soot on snow

Arctic warming



W. Chapman,
Univ. Illinois

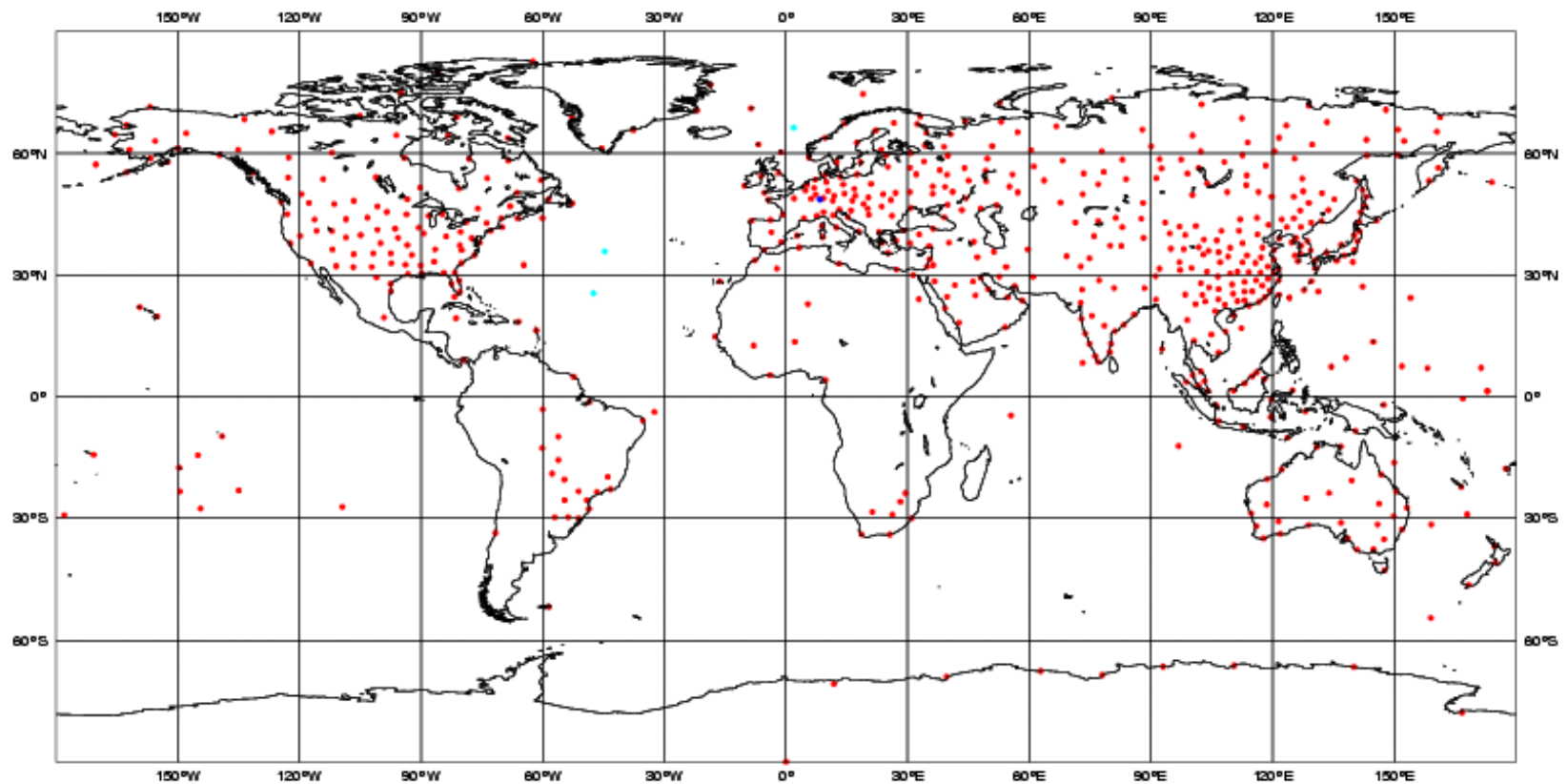
Re-analysis

Use of weather forecasting
model system to assimilate
past and present
observations

Weather balloons

Temperature, humidity and wind

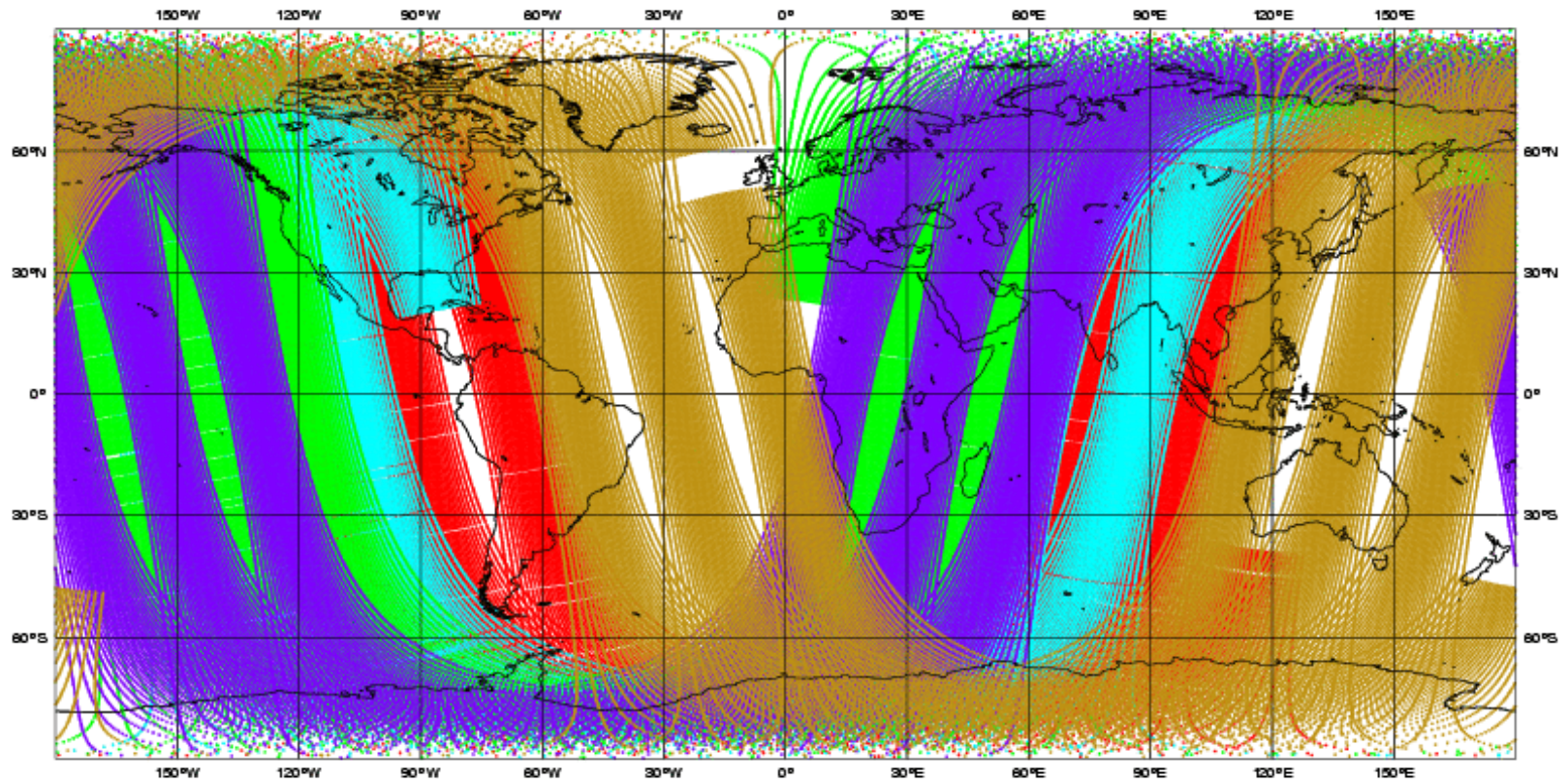
Total number of obs = 607



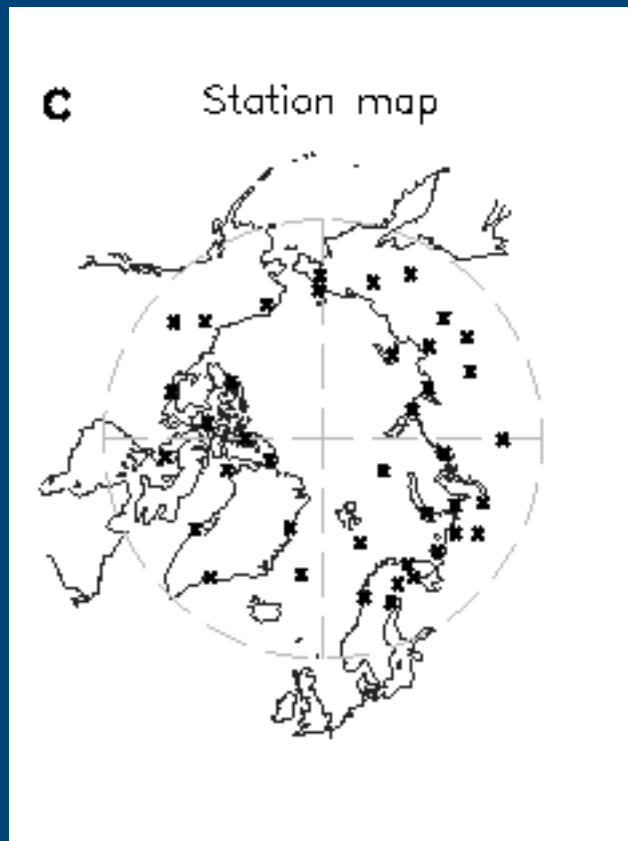
Satellite data

Temperature and humidity

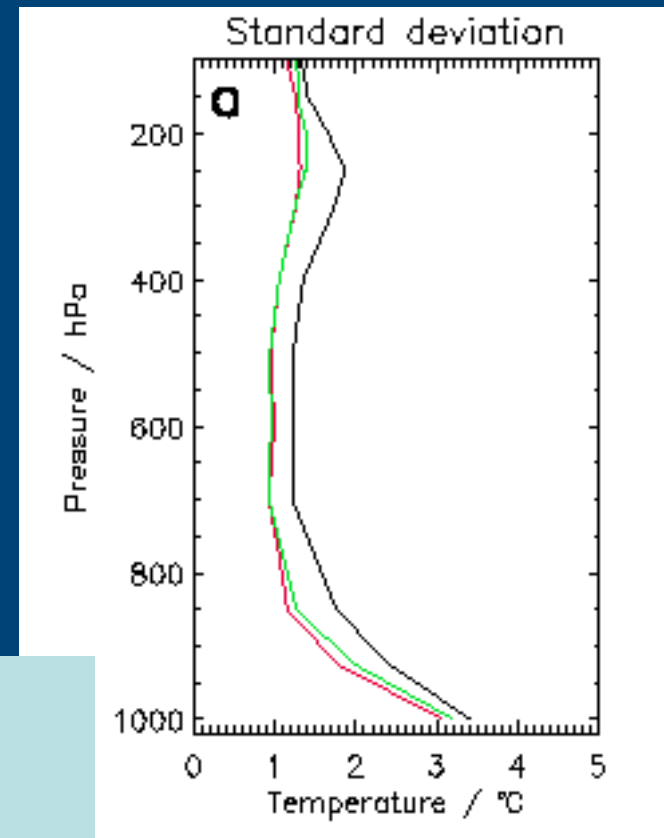
Total number of obs = 352445



Comparison between balloon data and re-analyses in the Arctic



Black: NCEP
Green: JRA25
Red: ERA-40



Comparison with more than 50,000 soundings from 1979-1996
Soundings are from the Historical Arctic Rawinsonde Archive (HARA)

Conclusions

- In-situ weather observations must be maintained and extended
 - Weather balloons
 - Surface stations
- Satellites
 - **Temperature and humidity.** Coverage adequate, accuracy needs to be improved.
 - **Winds.** Urgently required.
- Re-analysis efforts must be continued