

Switzerland's Contribution to ACPCA

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*"Arctic Climate Processes Linked Through the Circulation of the
Atmosphere"*

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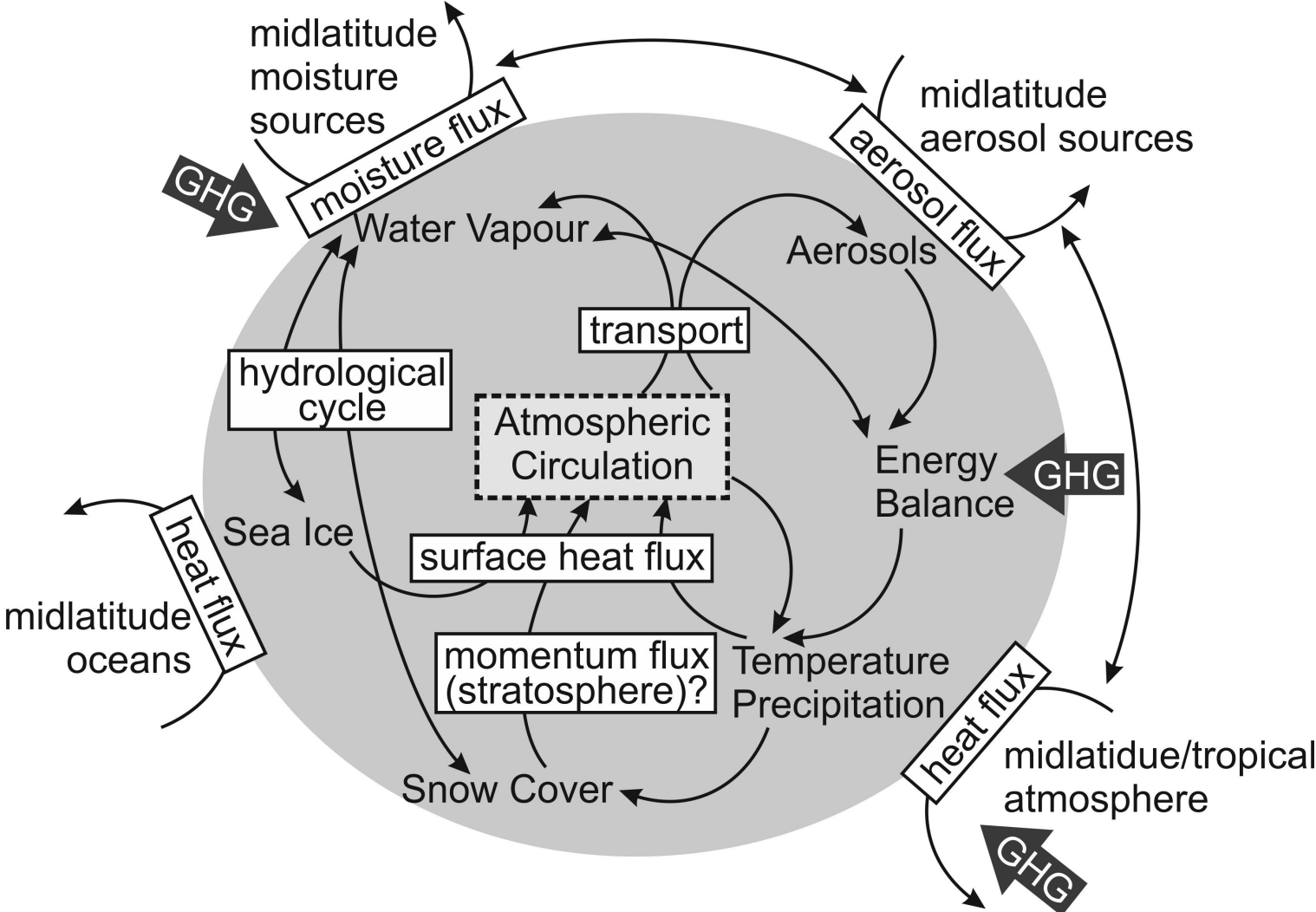
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Changes in:

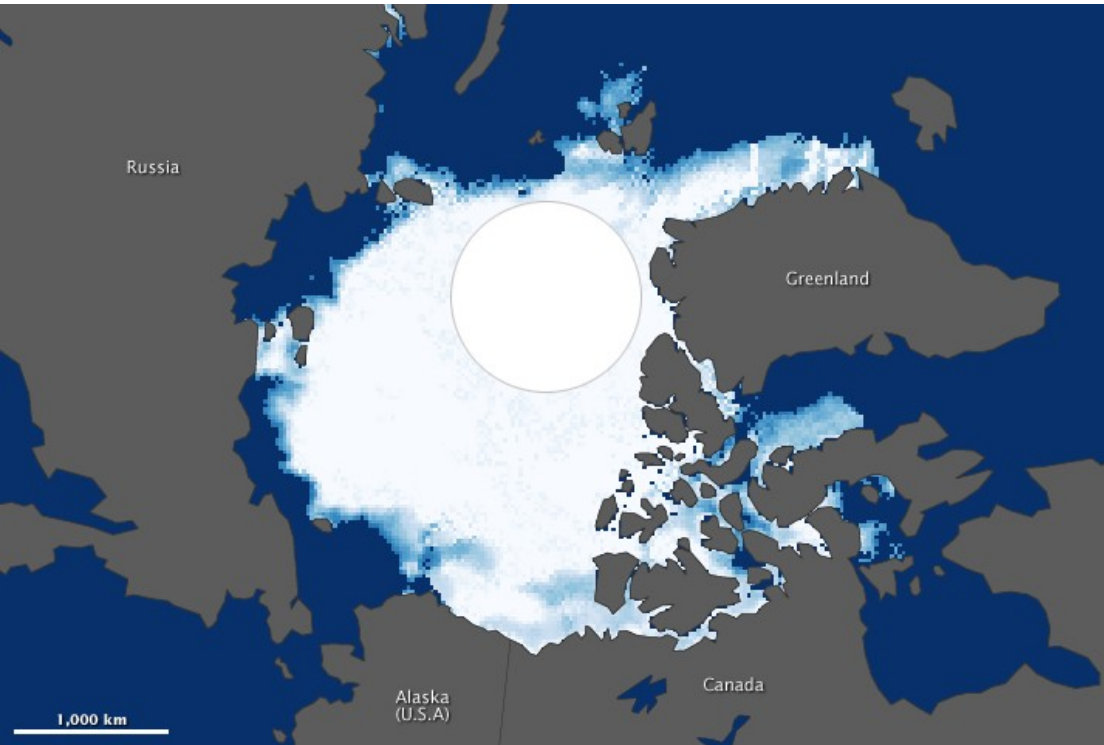
- o Circulation
- o Energy balance
- o Aerosol transport
- o Atmospheric water transport
- o Sea ice
- o Snow cover



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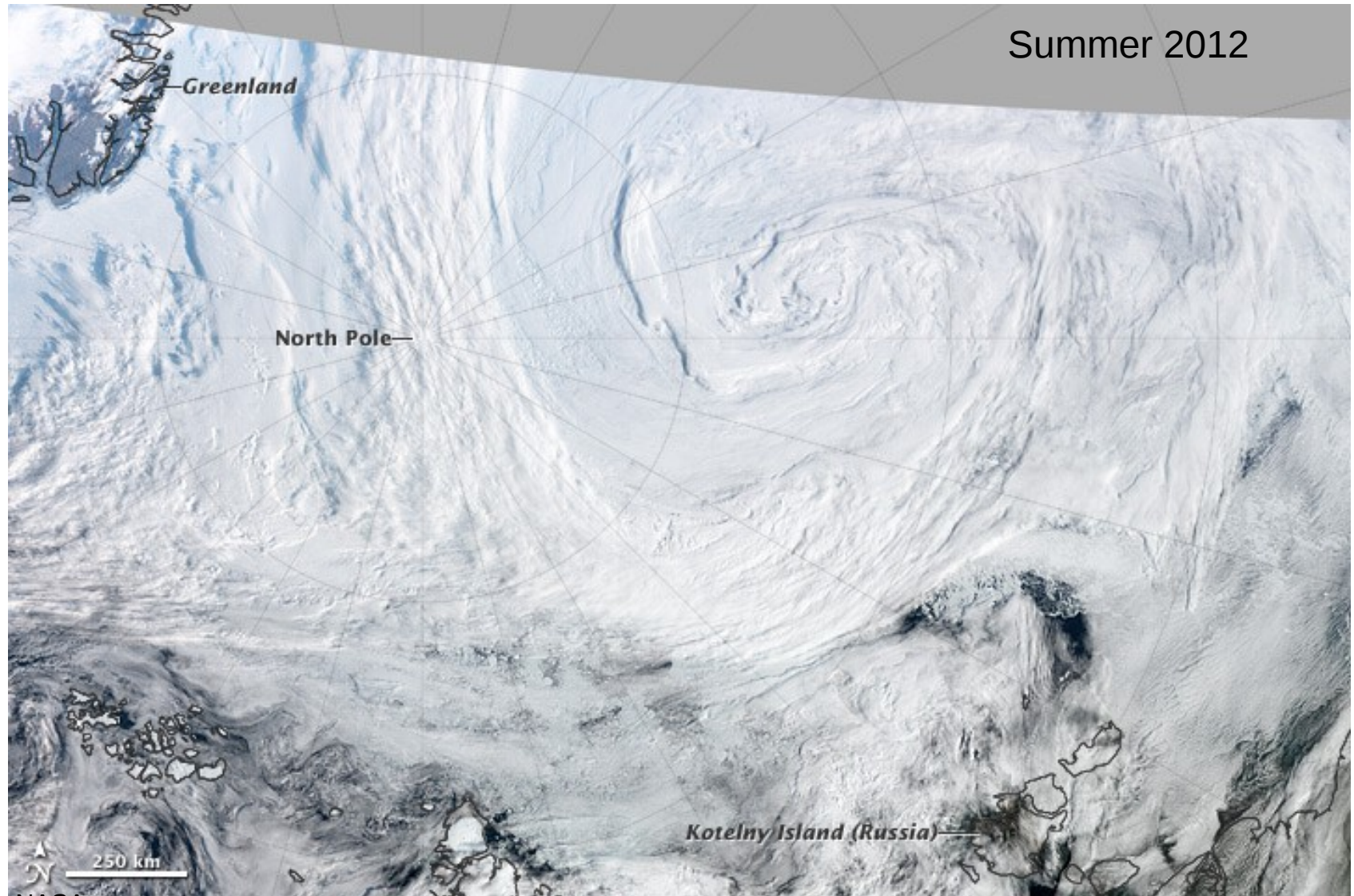


Summer 2012

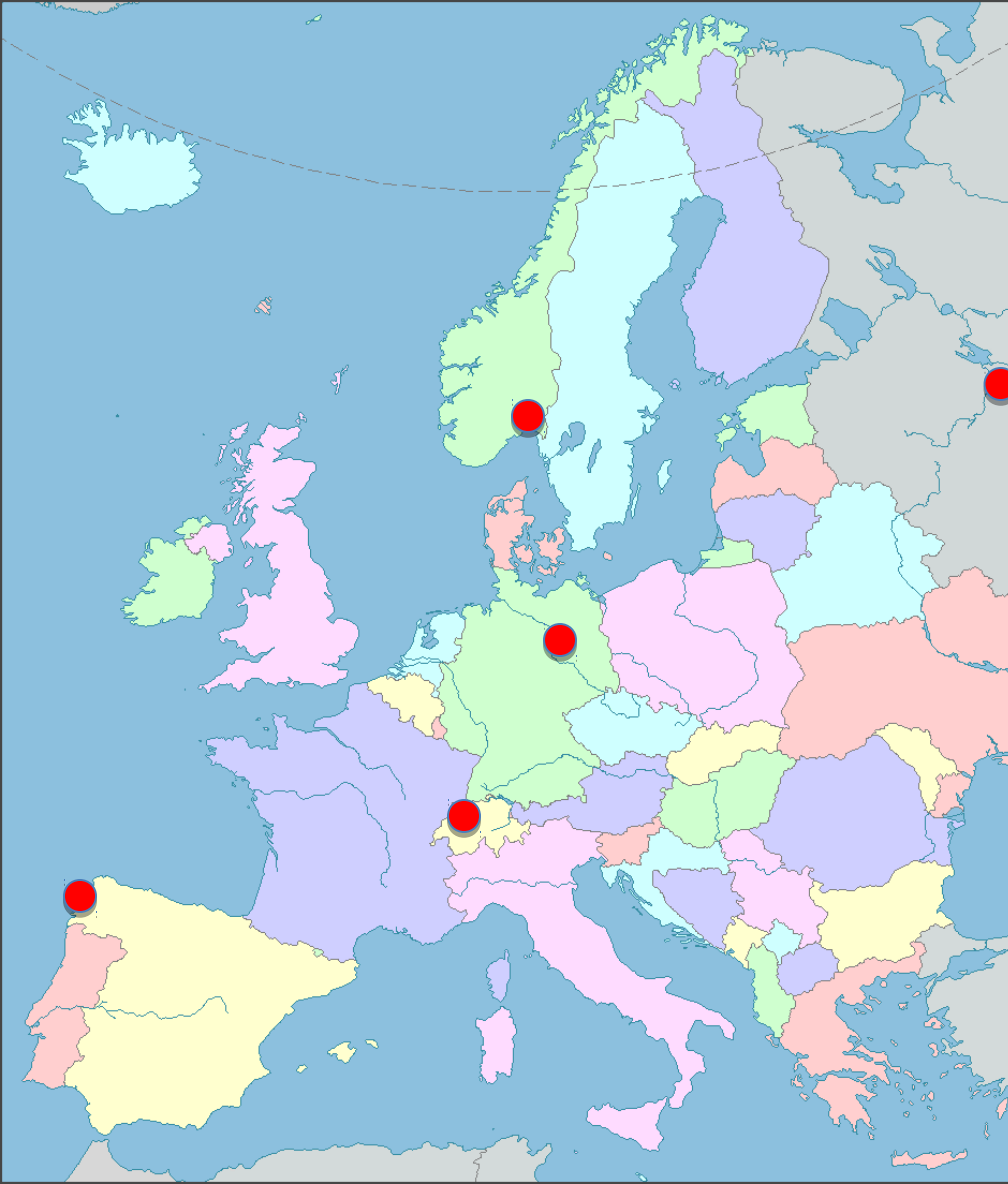


Summer 1984

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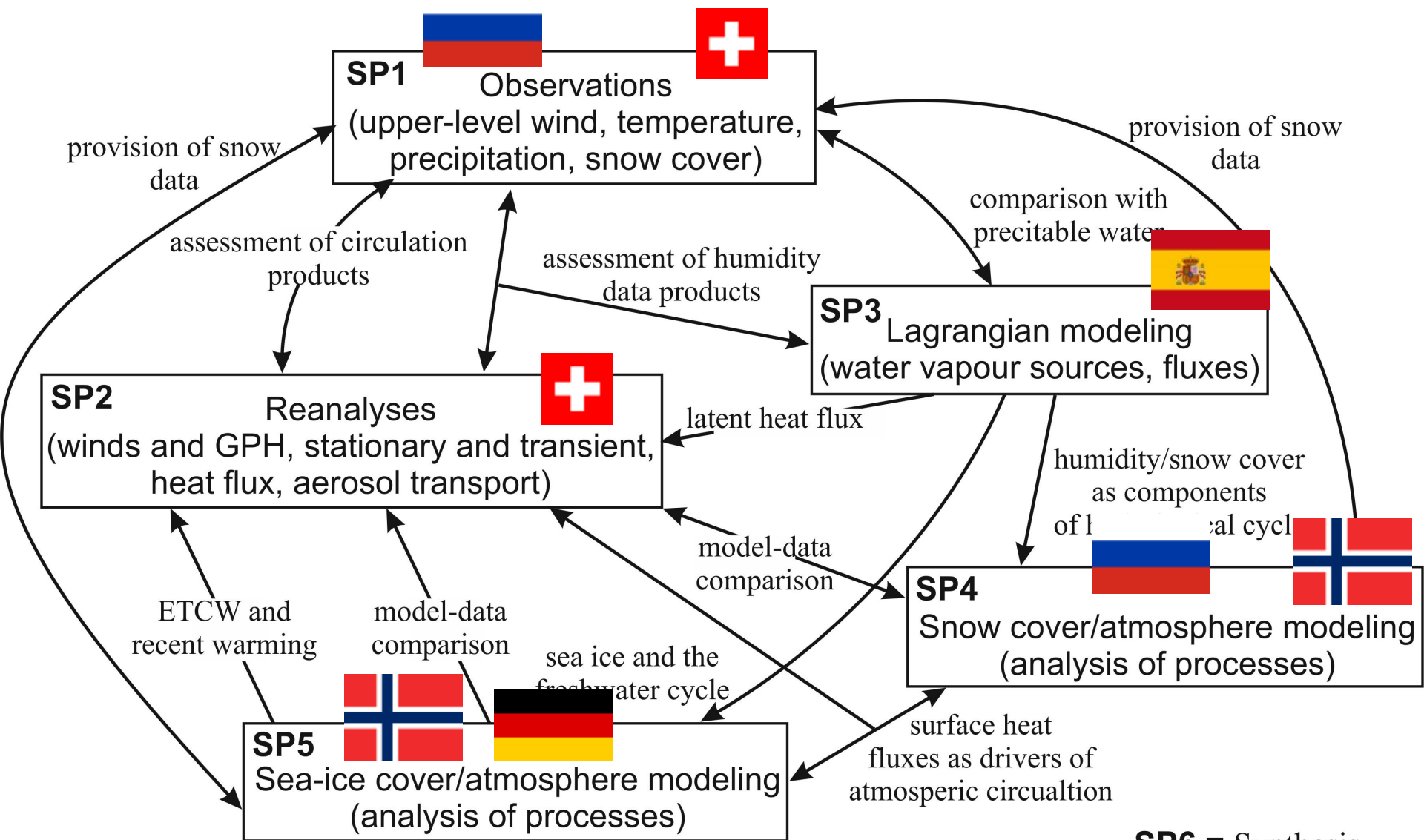
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project partner

- o Uni Bern, Switzerland
- o Uni Vigo, Spain
- o AWI Potsdam, Germany
- o NILU Oslo, Norway
- o RIHMI Obninsk, Russia

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Bern's expertise

Atmospheric circulation in historical context (last 100 - 400 years)

Gridded datasets and how to manipulate

Historical upper air data

Teleconnections (vulcanos, ENSO, NAO)

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Main Research Questions:

What are the main differences (in circulation / atmospheric structure) between the recent and past Arctic warming?

What is the result of those possible differences concerning water and energy?

How can extreme influxes of aerosols into the Arctic be explained and what are the main source regions?

How much is the Arctic radiation budget influenced by the moisture and aerosol fluxes?

How will the two main datasets 20CR and ERAHAM perform?

Which role play cyclones concerning Arctic warming?

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Tools:

Calculating circulation indices (Arctic Dipole)

Calculating Eulerian Energy and Aerosol fluxes

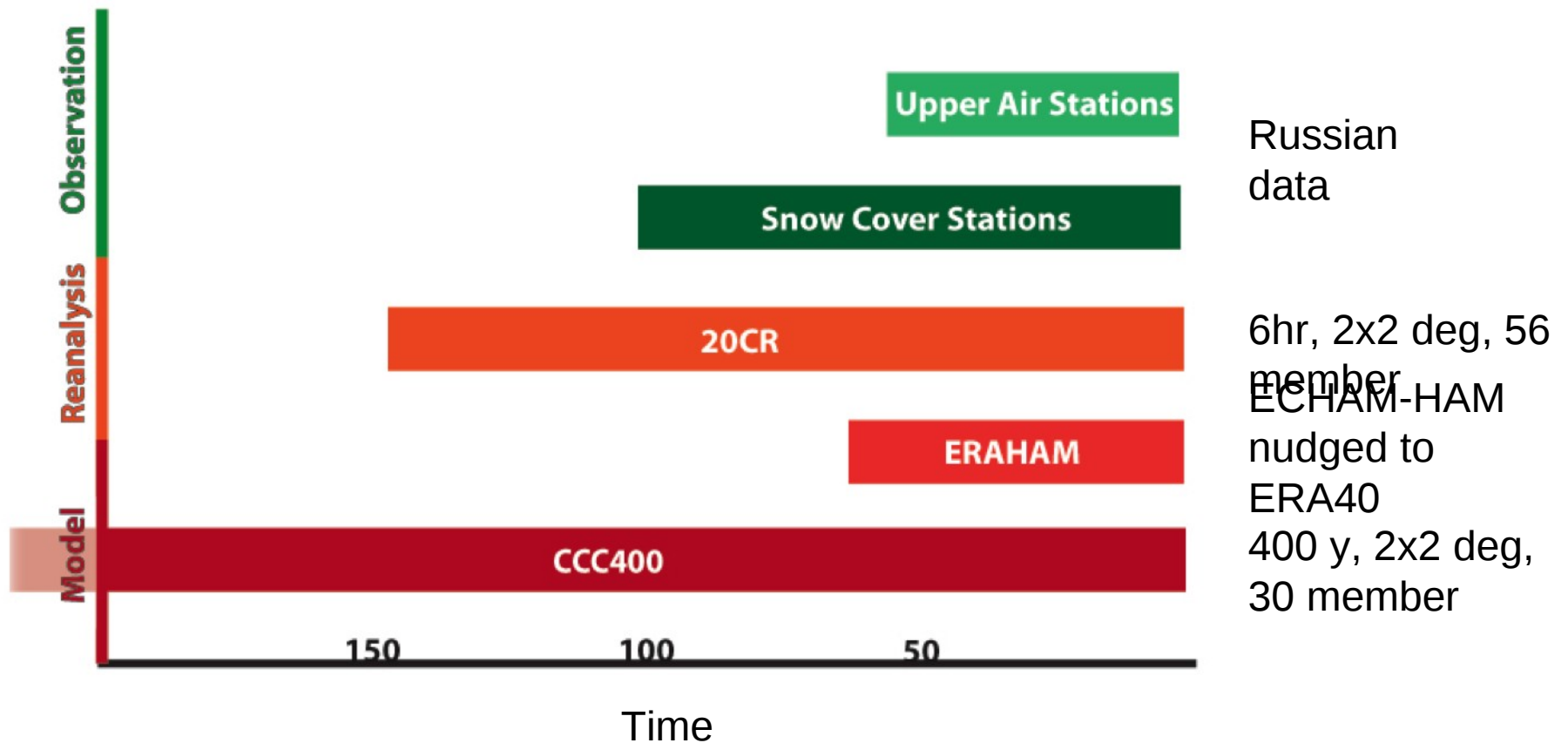
Checking the performance of different datasets

Find common patterns (statistics) in the climate variables

Looking at vertical profiles as well as spatial anomalies

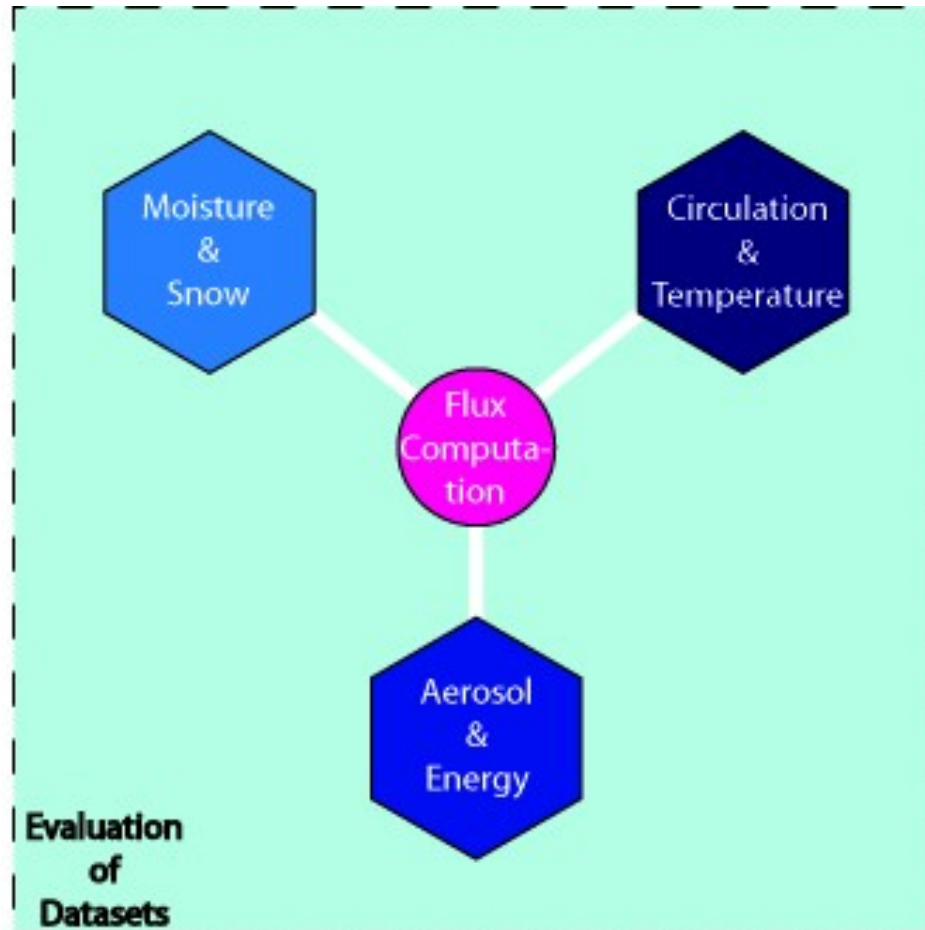
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Datasets:



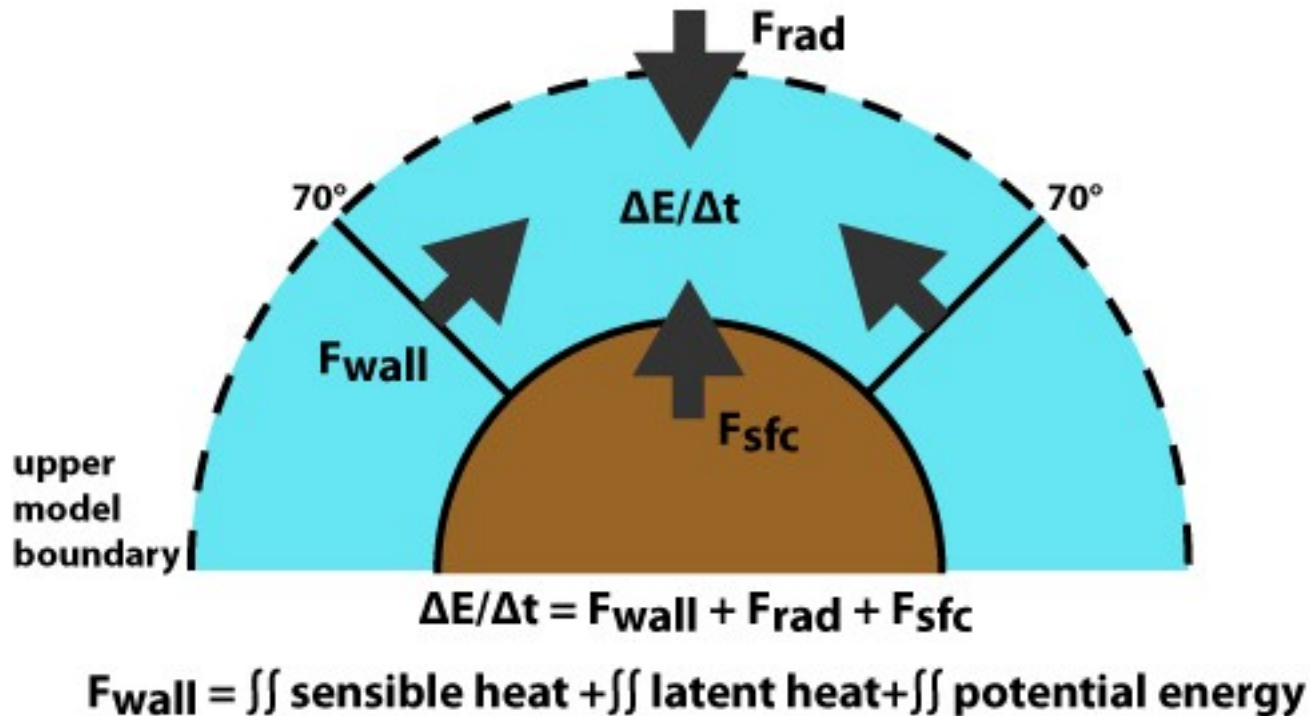
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Synthesis of my PhD:



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Right now:



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(Eularian) Energy Fluxes:

Different components

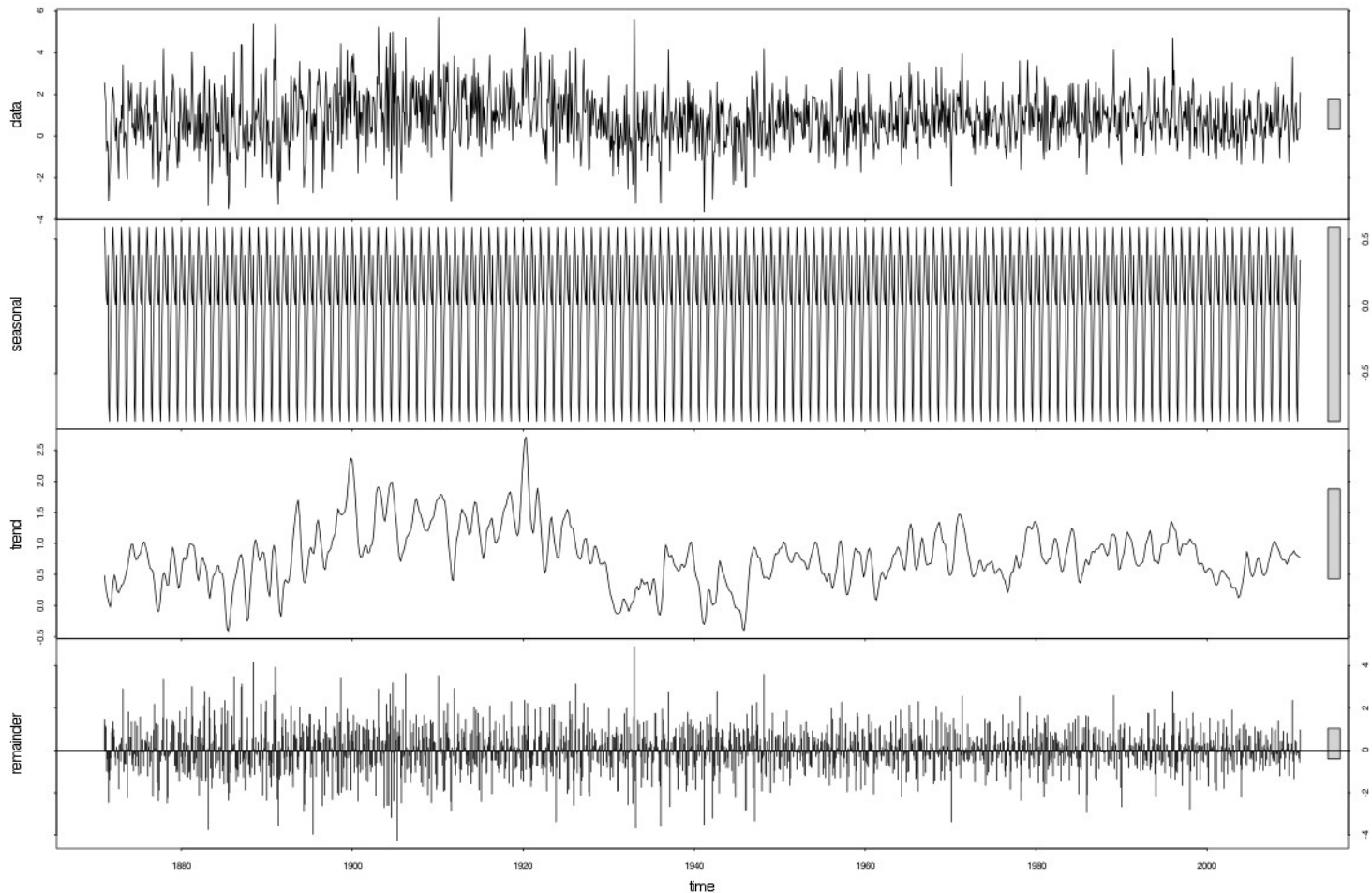
Time resolution is important

Mass balance must be correct (which is not default in reanalysis)

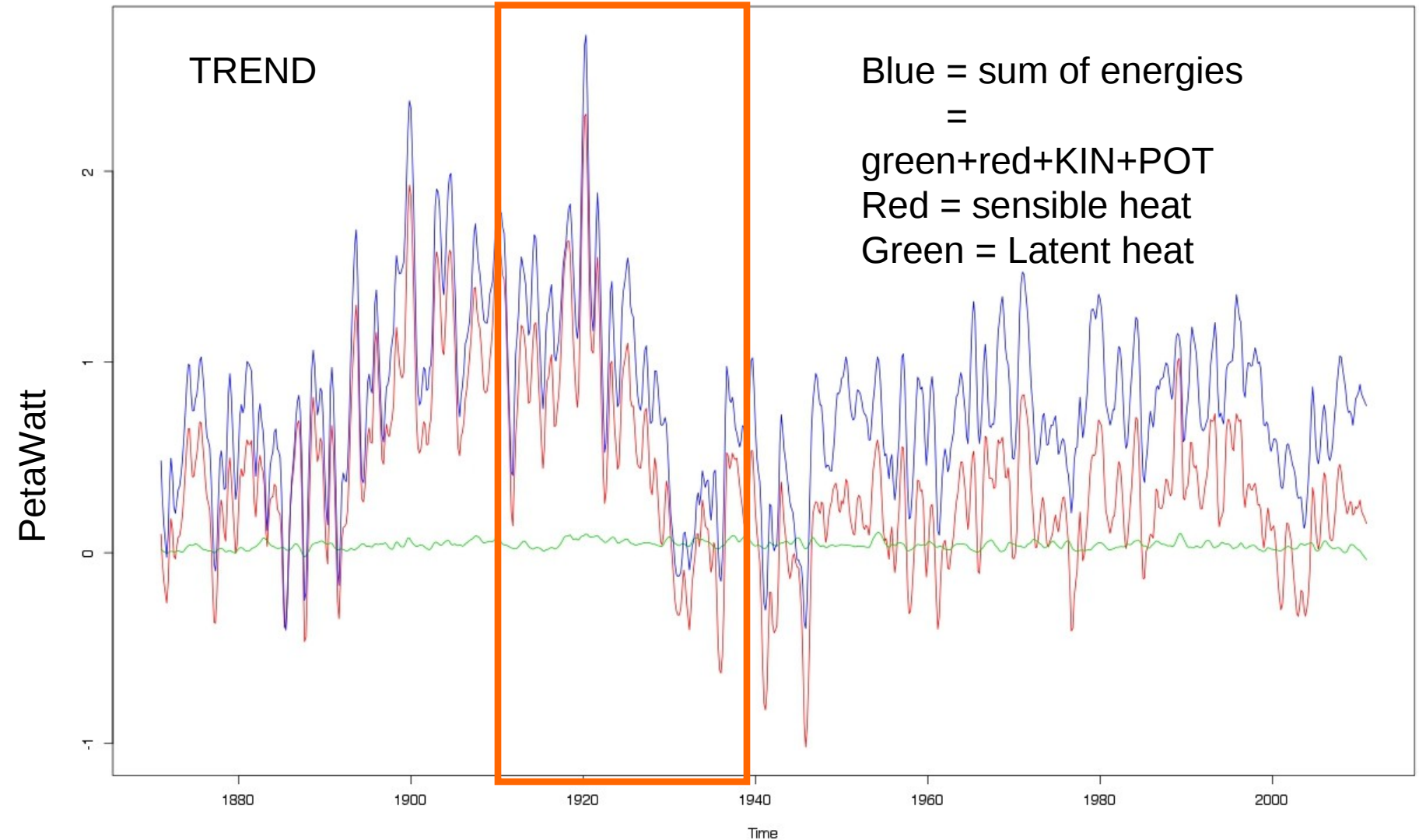
-> Would love some help and discussion

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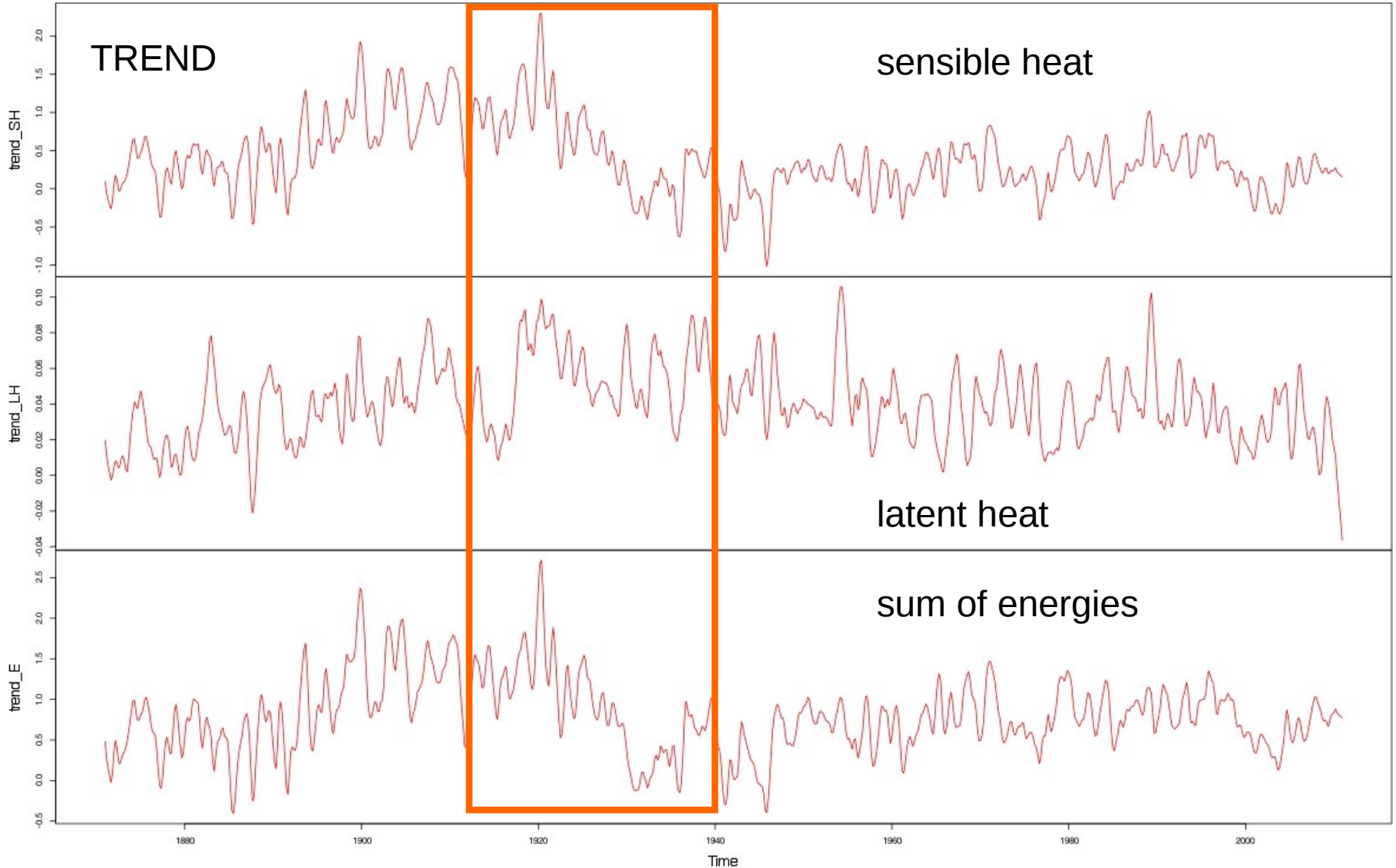
So far: *20CR, uncorrected, monthly basis, wall at 70° N*



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Next steps:

Compute fluxes on 6hr basis -> basically everything set, but computing power...

Correct the mass balance in the reanalysis (HELP!!)

Compute fluxes in all datasets, compare

Compute aerosol fluxes

Check for reasons in trend / extreme values -> circulation

-> Would love some help and discussion