Weather system dynamics in polar regions

– or –

How we profited from and worked with the SPI

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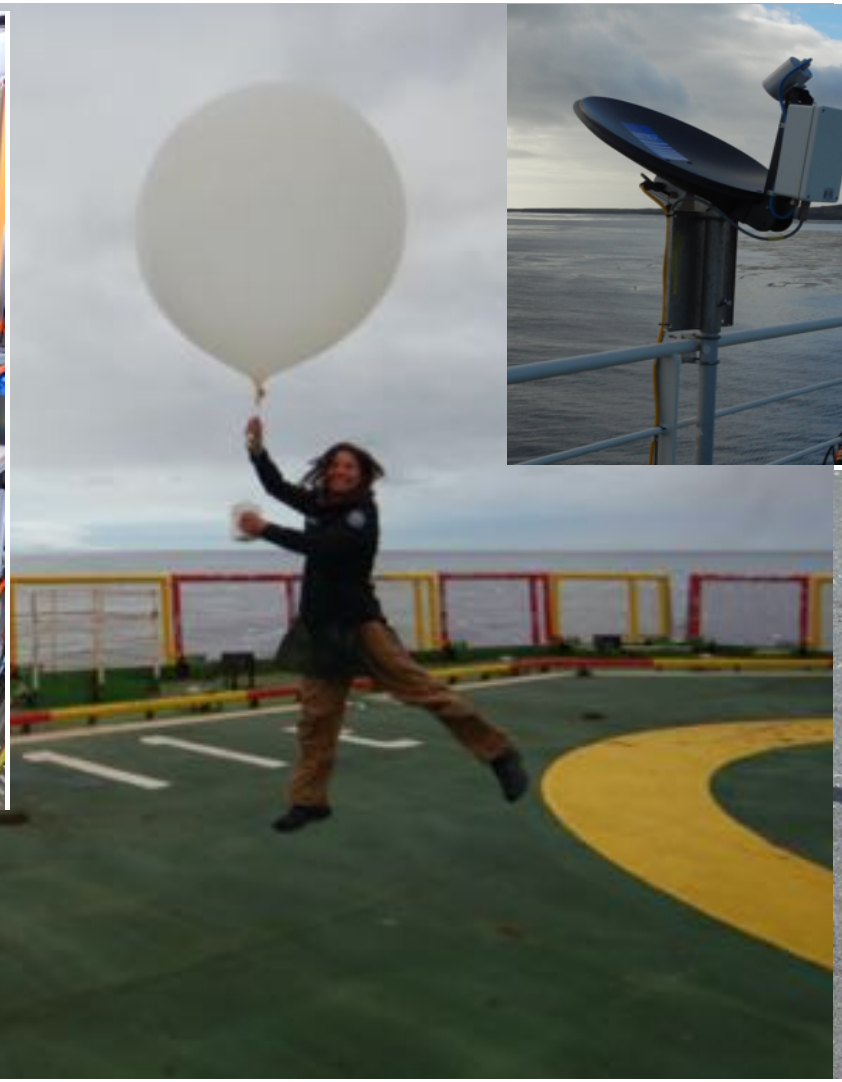
Our overall research question:

Which physical processes determine the structure, evolution, impact and prediction of weather systems?

Interactions with SPI

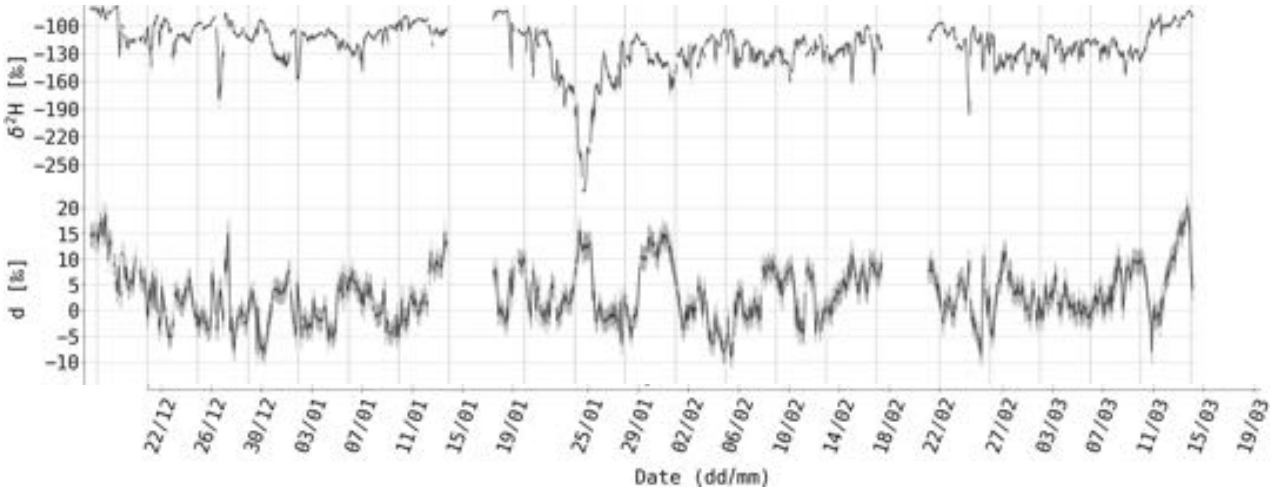
- **Contribute** to establishing SPI as member of Scientific and Technical Advisory Board
- **Contribute** as reviewer of SPI Grants
- **Participate** in ACE and RACE ship expeditions in 2016/17 and 2021 to Southern Ocean and Russian Arctic, respectively
- **Profit** from unique research opportunities
  - PhD of Iris Thurnherr with 3+3 publications
  - PhD of Esther Breuninger (in group of Lenny Winkel)
- **Profit** from new national and international collaborations
- **Profit** from increased visibility of Swiss polar research

The Antarctic Circumnavigation Expedition



The Antarctic Circumnavigation Expedition

3-month time series of δ^2H and d-excess in vapour over Southern Ocean

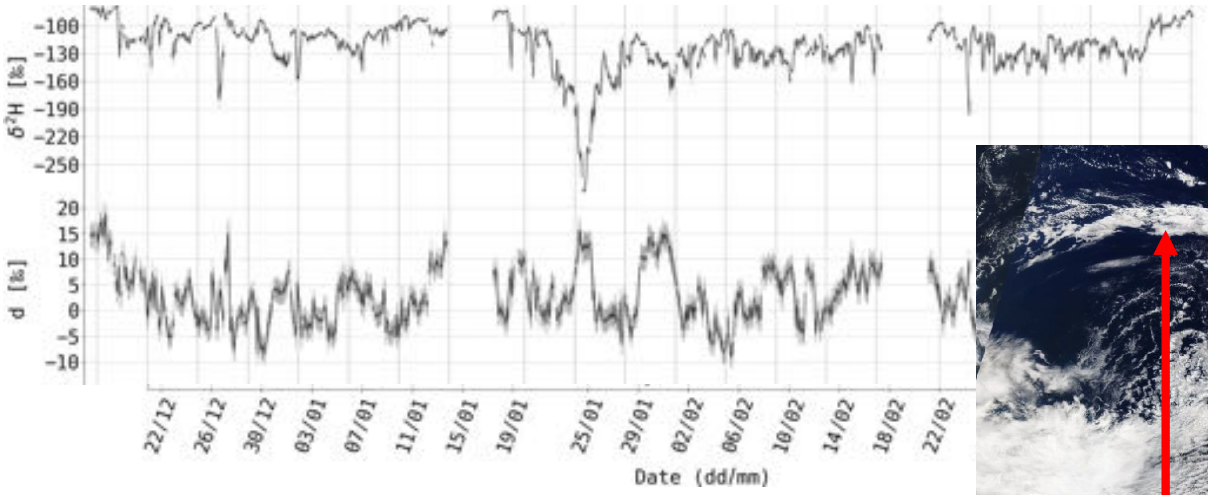


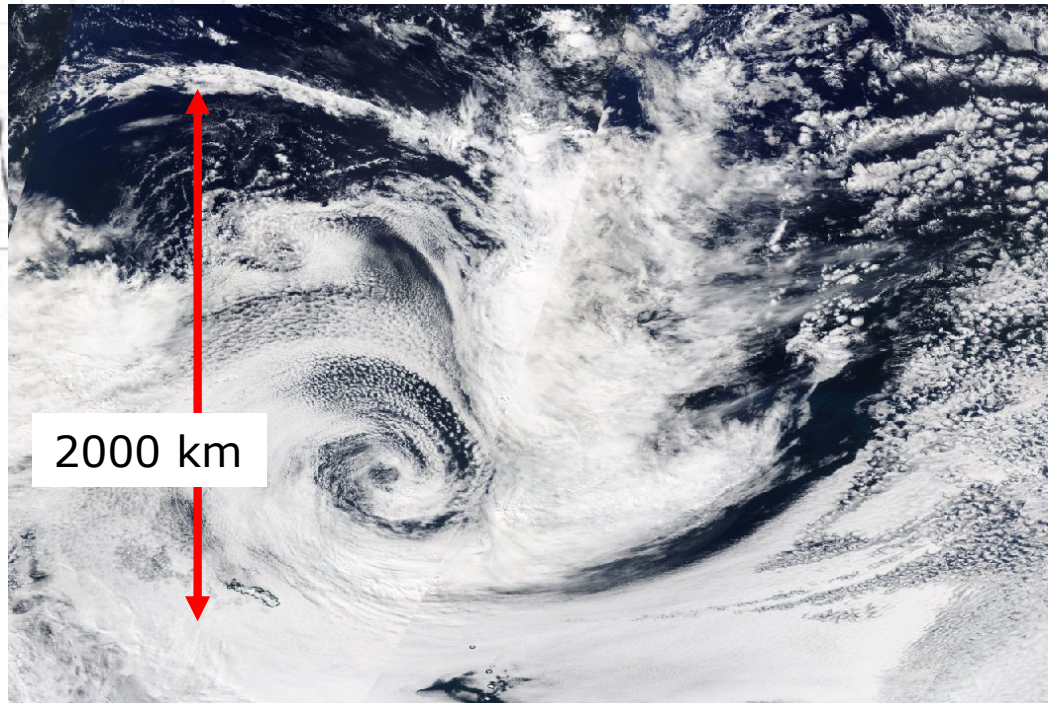
→ interesting variations! Why?
What are the meteorological processes that determine these variations?

Thurnherr et al. 2020 (ACP)

The Antarctic Circumnavigation Expedition

3-month time series of d2H and d-excess in vapour over Southern Ocean

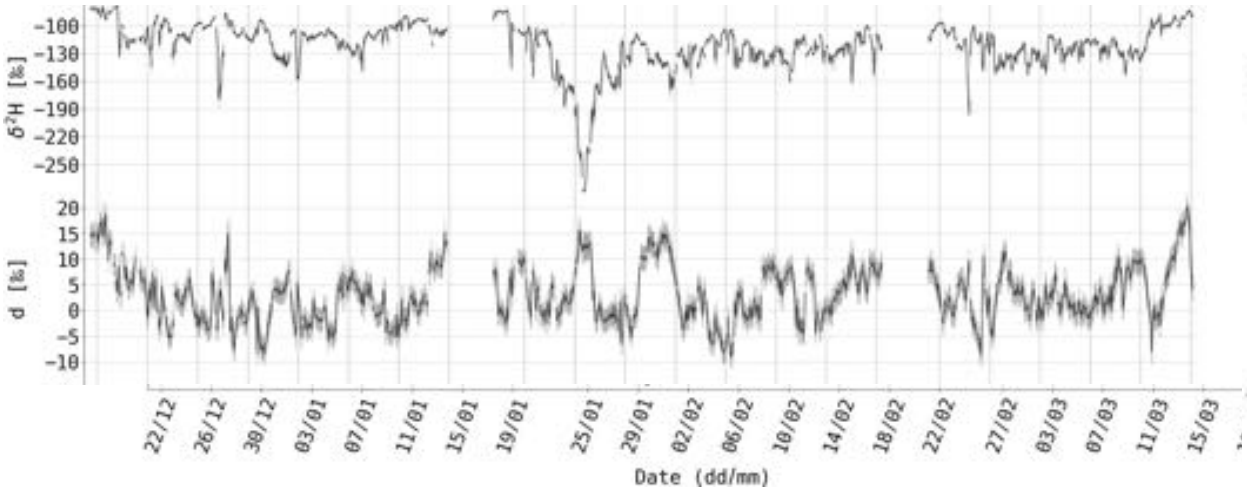




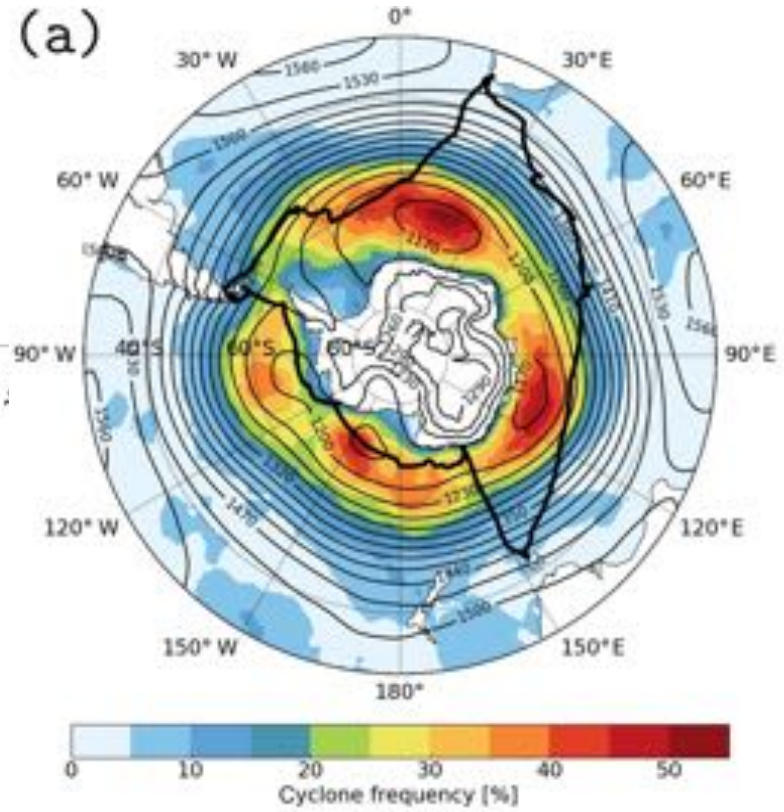
Cyclones!!

The Antarctic Circumnavigation Expedition

3-month time series of d2H and d-excess in vapour over Southern Ocean



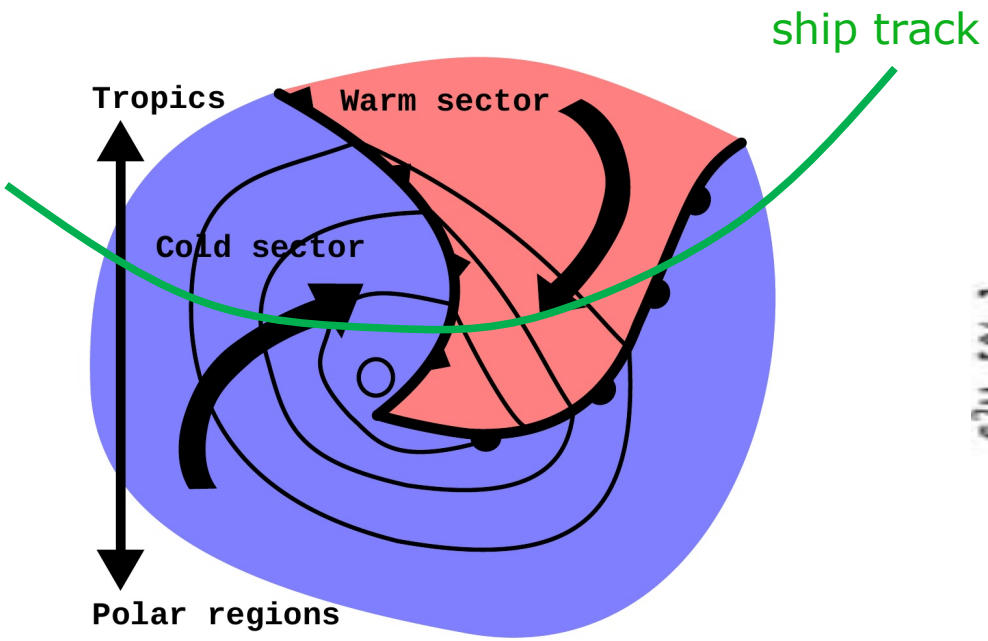
Thurnherr et al. 2020 (ACP)

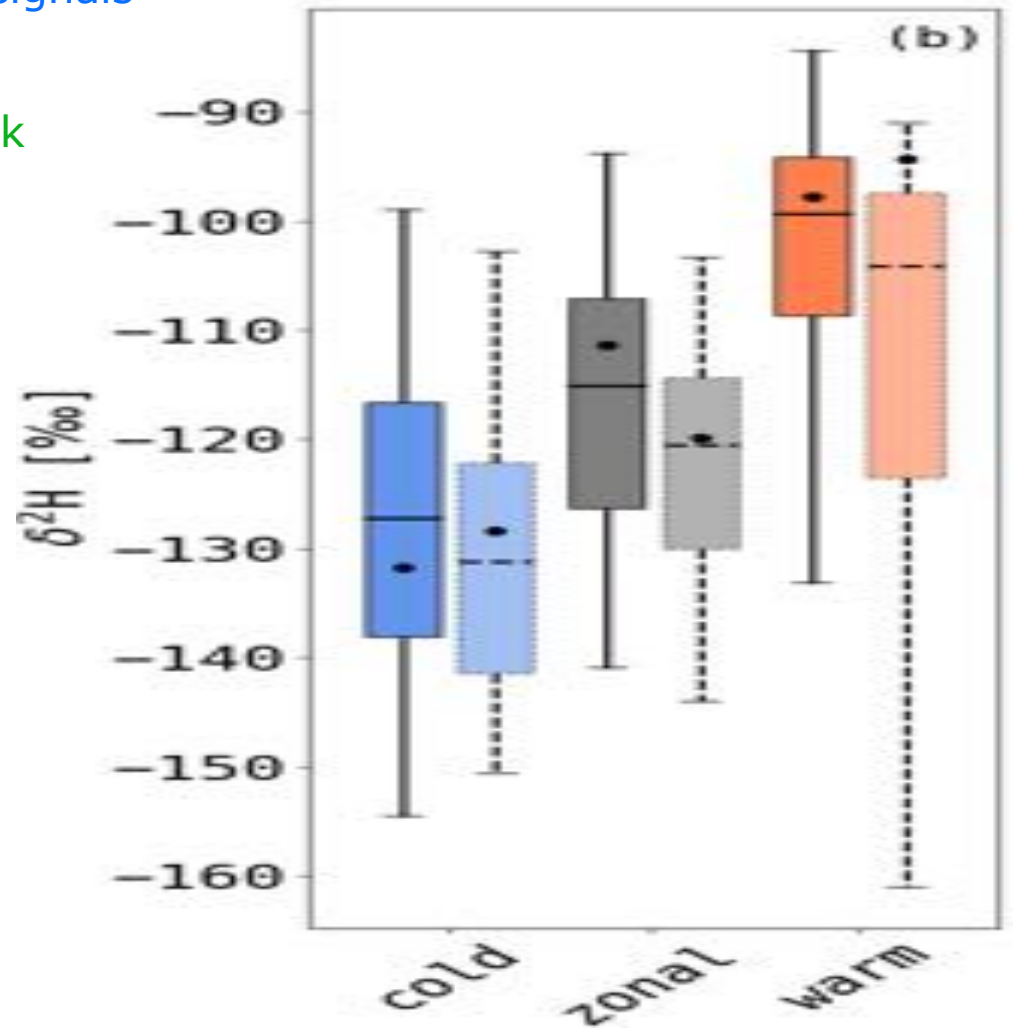


Cyclone frequency over Southern Ocean during ACE

The Antarctic Circumnavigation Expedition

Objective identification of cold and warm sectors of cyclones and statistical evaluation of systematically different stable water isotope signals





Thurnherr et al. 2021 (WCD)

General conclusions about our SPI-funded polar research

- Scientifically very successful
- Research opportunities that would never have happened without SPI
- Start of new (and nice!) collaborations at ETH, in CH & internationally
- Polar research is infrastructure-heavy, expensive, and comparatively inflexible (e.g., we could not influence the ship track :-)
- It's a serious investment for a normal research group, but feasible thanks to SPI support and teamwork across CH

→ I can wholeheartedly encourage you to work with SPI, apply for some of their grants, and thereby strengthen your links with CH polar science