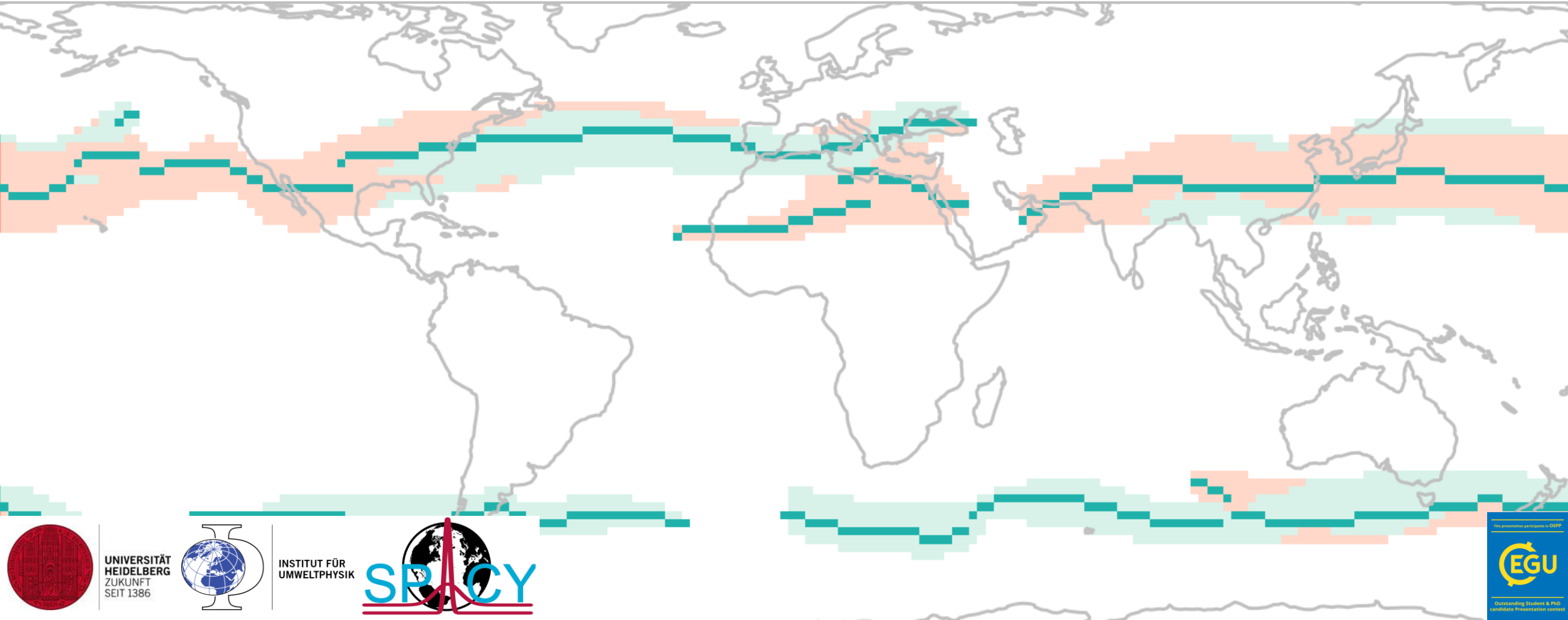
Characterising simulated changes of jet streams since the Last Glacial Maximum

P. Schoch, J.P. Baudouin, N. Weitzel, M. Kapsch, T. Kleinen, and K. Rehfeld



UNIVERSITÄT HEIDELBERG ZUKUNFT SEIT 1386
INSTITUT FÜR UMWELTPHYSIK
SPACY

Goal & Motivation

Goal

Investigate changes of the jet streams during the last deglaciation

Problem

Windfields stored with monthly resolution

↕

jet charcteristics are defined for daily/subdaily data

Research Question

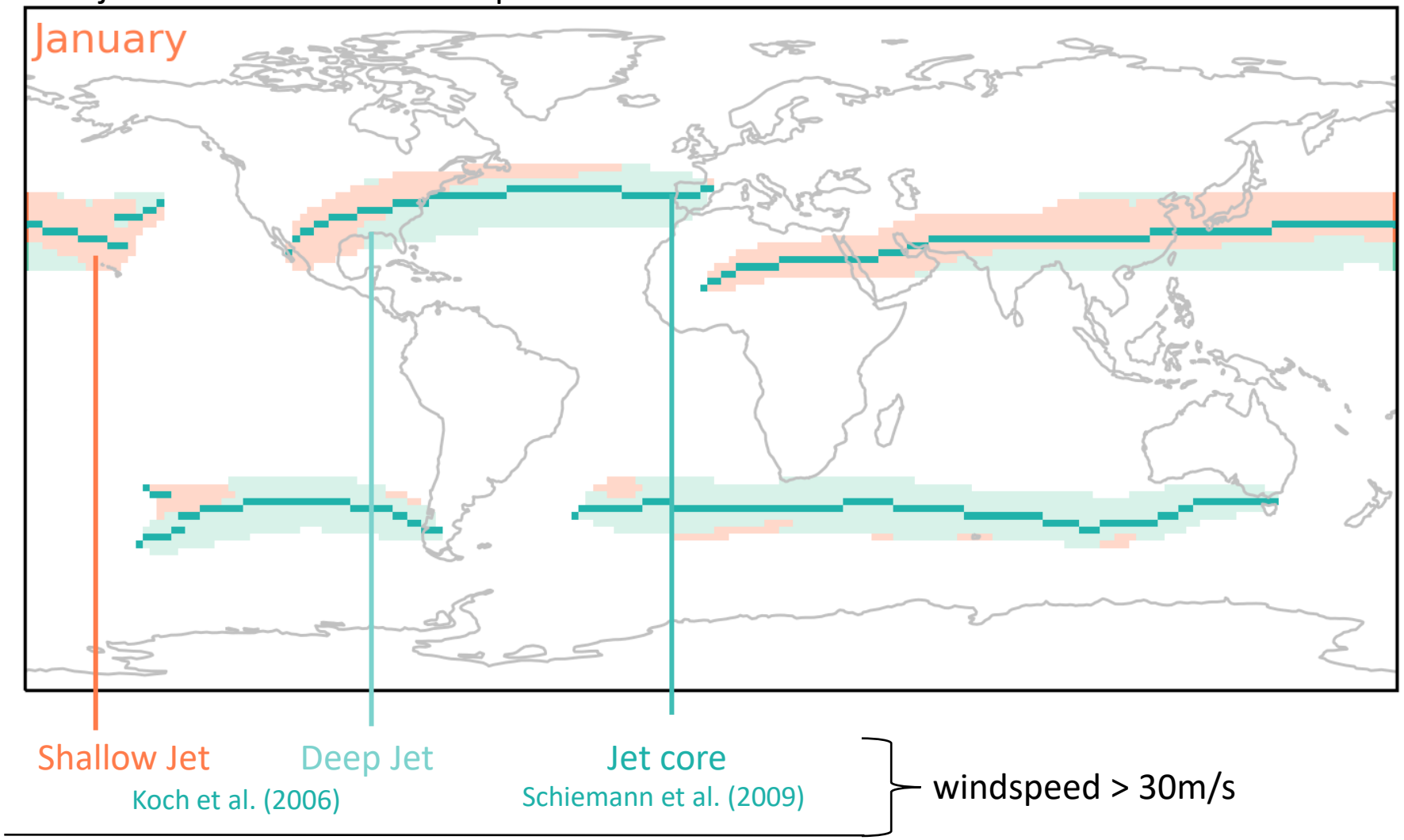
Can we use jet climatologies on data with a monthly resolution?

Data:

- PMIP4 simulations with MPI-ESM1.2-LR
- Daily and monthly resolution
- LGM & PI

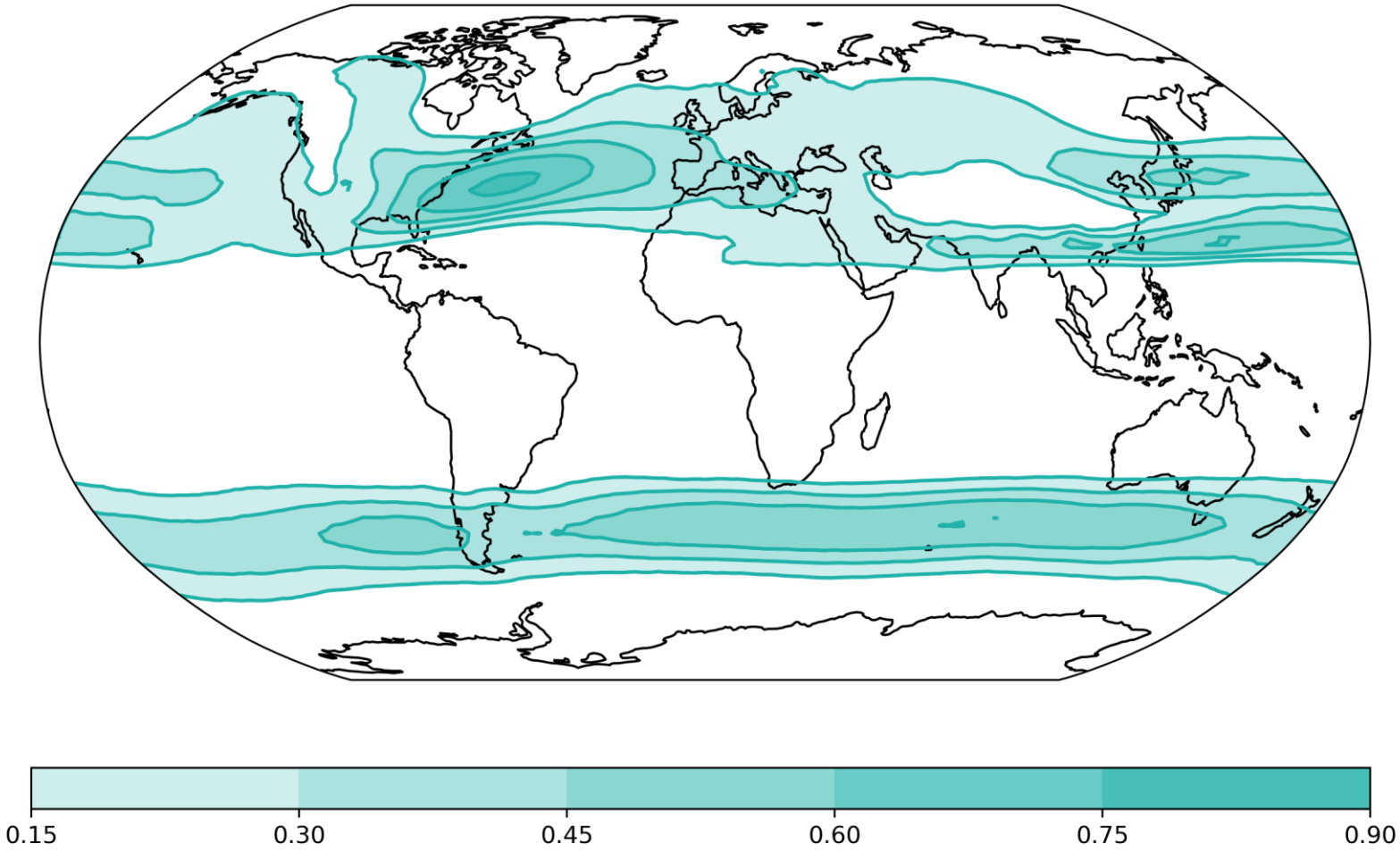
Jet events

Find jet events in each timestep



Jet climatologies

LGM Deep Jet occurrence frequency in DJF
Daily data

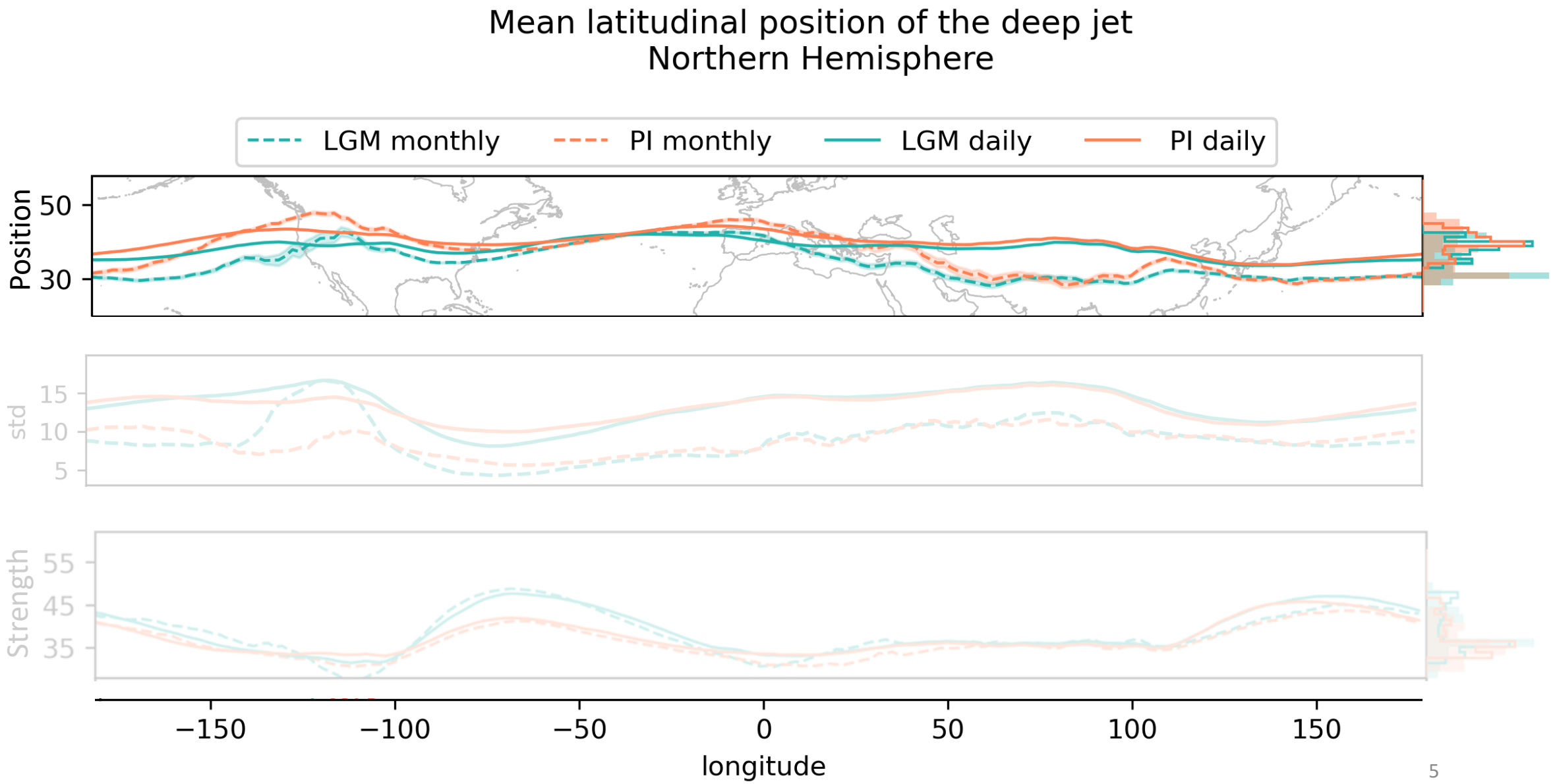


- Position
- Variability
- Strength
- Tilt

Can we use these methods on monthly resolved data?

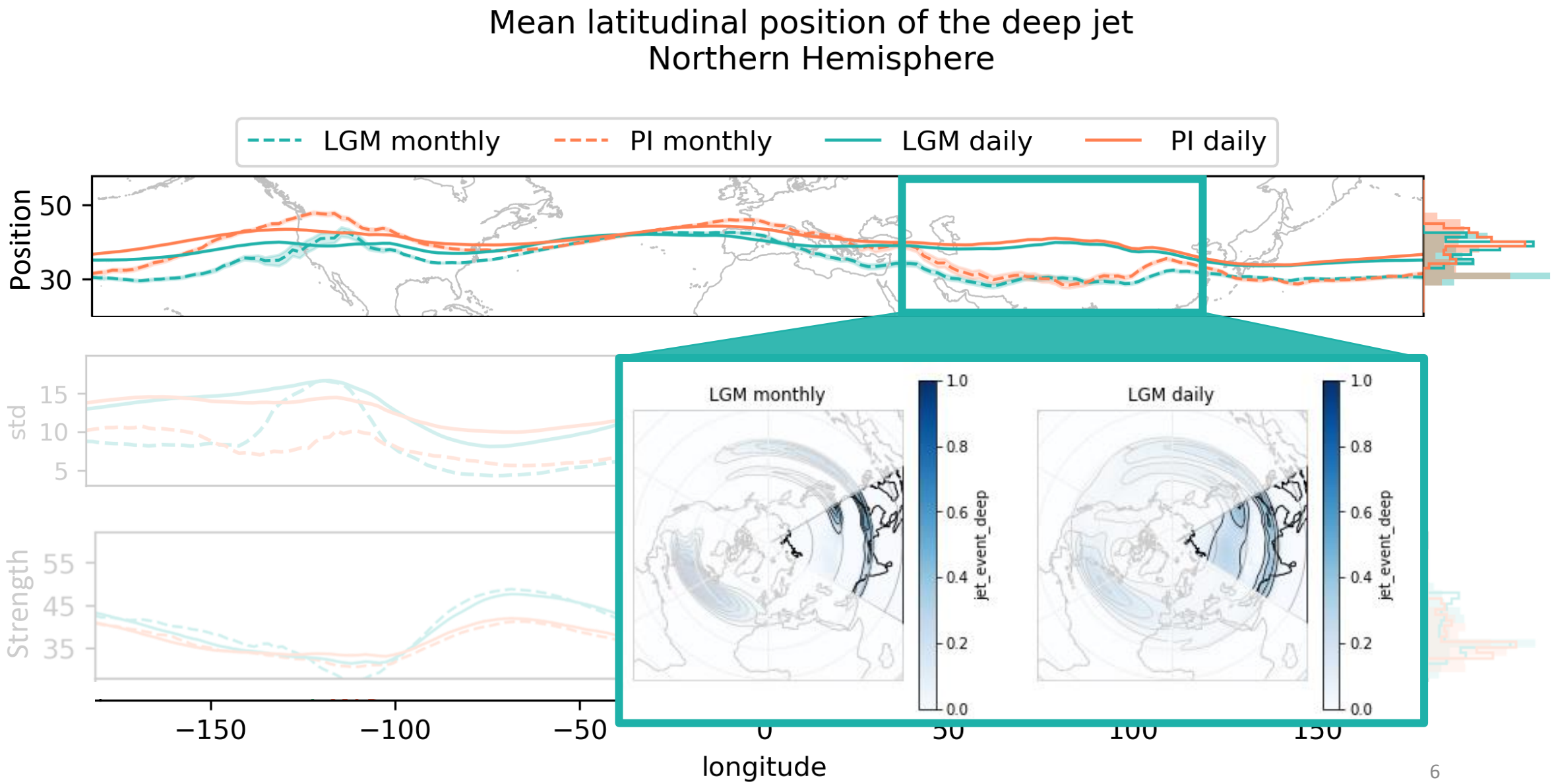
DJF

Jet climatologies in monthly & daily data



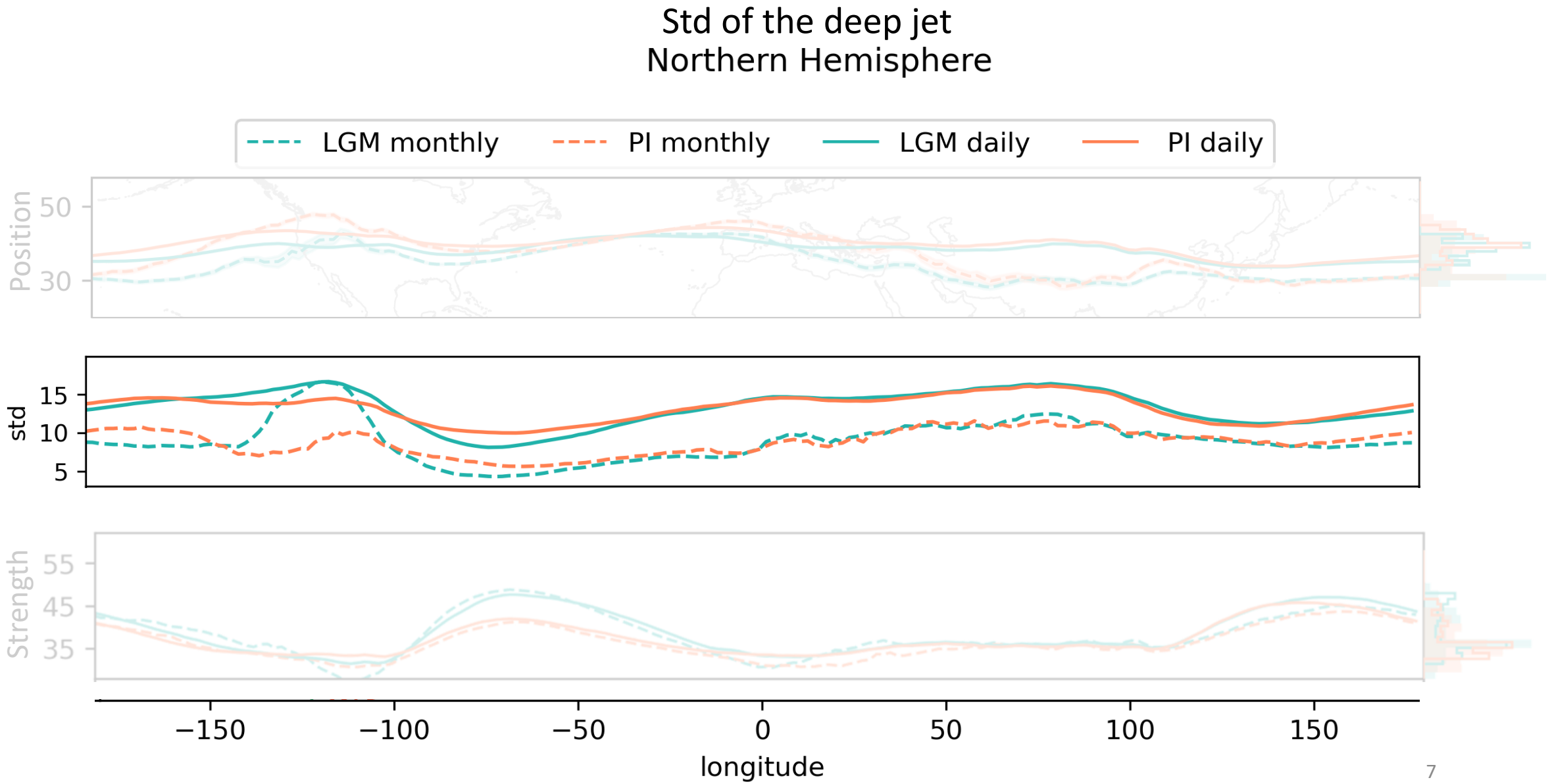
DJF

Jet climatologies in monthly & daily data



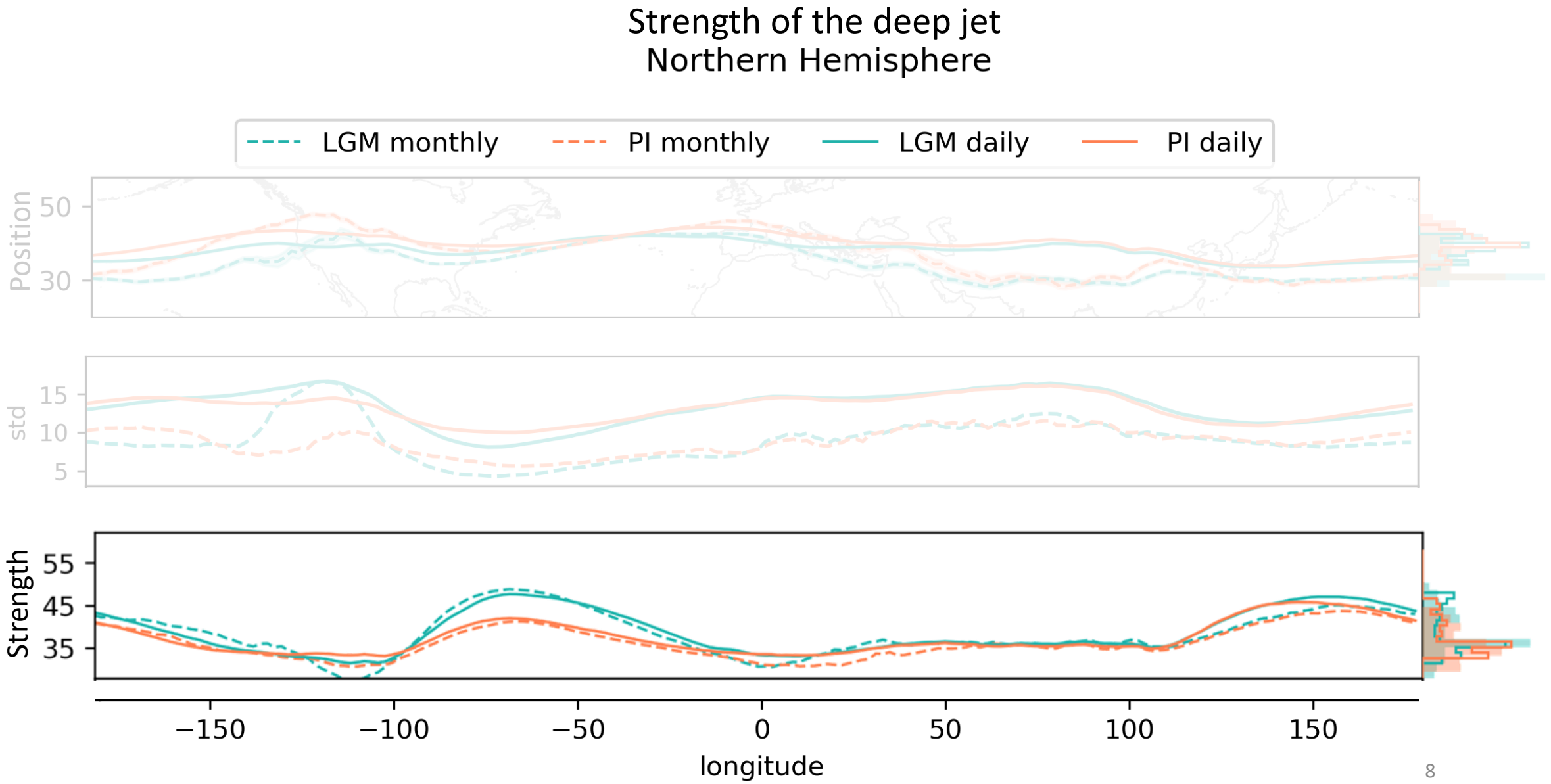
DJF

Jet climatologies in monthly & daily data

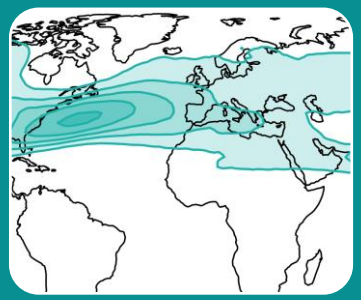


DJF

Jet climatologies in monthly & daily data

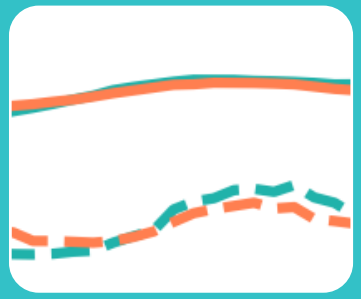


Summary & Conclusions



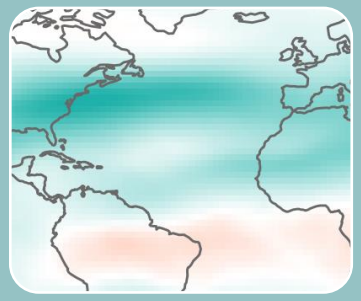
Position

- Monthly jet position highlights the most frequent position
- Monthly & daily positions deviate most for
  - Weak jets (close to threshold value)
  - Non persistent jets



Standard deviation

- Smaller std in monthly data is not state dependent for most positions



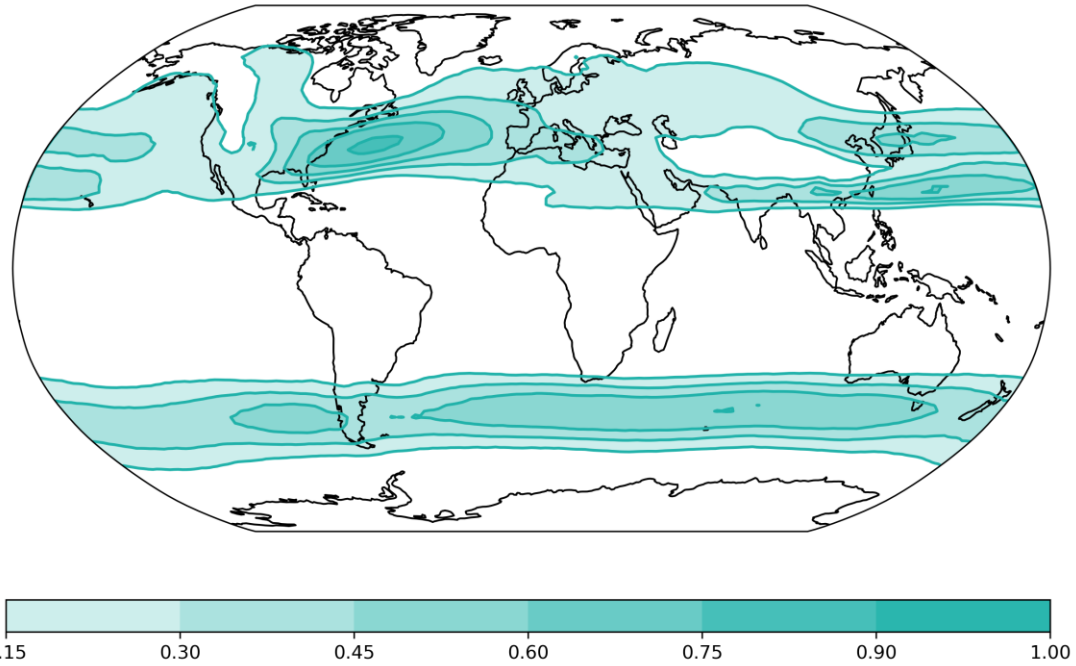
Strength

- Strength is consistent for monthly and daily data

Sources

- P. Koch, H. Wernli, and H. C. Davies, “An event-based jet-stream climatology and typology,” International Journal of Climatology, vol. 26, 2006.
- R. Schiemann, D. Lüthi, and C. Schär, “Seasonality and interannual variability of the westerley jet in the tibetan plateau region,” Journal of Climate, vol. 22, 2009.
- Jungclaus et al. (2019). *MPI-M MPI-ESM1.2-LR model output prepared for CMIP6 PMIP lgm*. Earth System Grid Federation. *https://doi.org/10.22033/ESGF/CMIP6.6642*

LGM DJF Deep Jet occurrence frequency - daily



LGM DJF Deep Jet occurrence frequency - monthly