



VEGETATION AND FIRE: FEEDBACKS TO PLIOCENE ARCTIC CLIMATE

Presenting Author: Tamara Fletcher

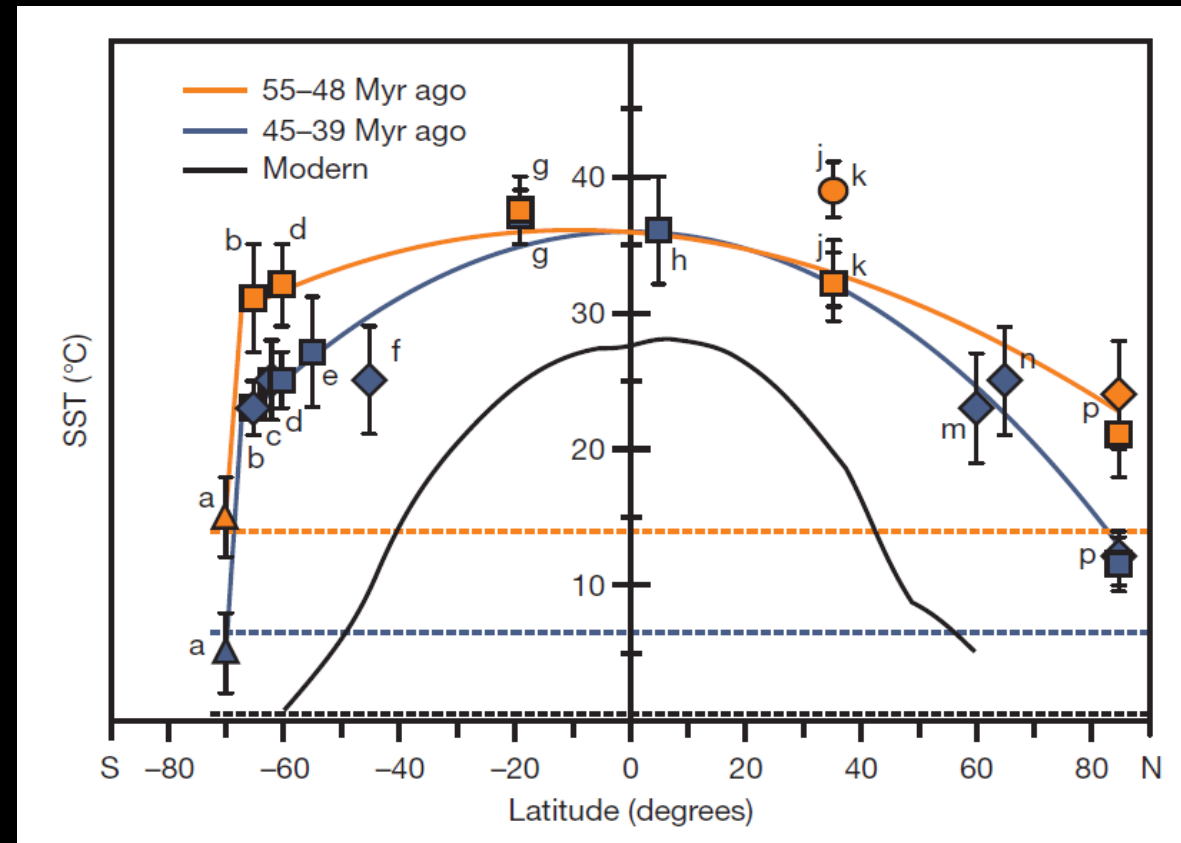
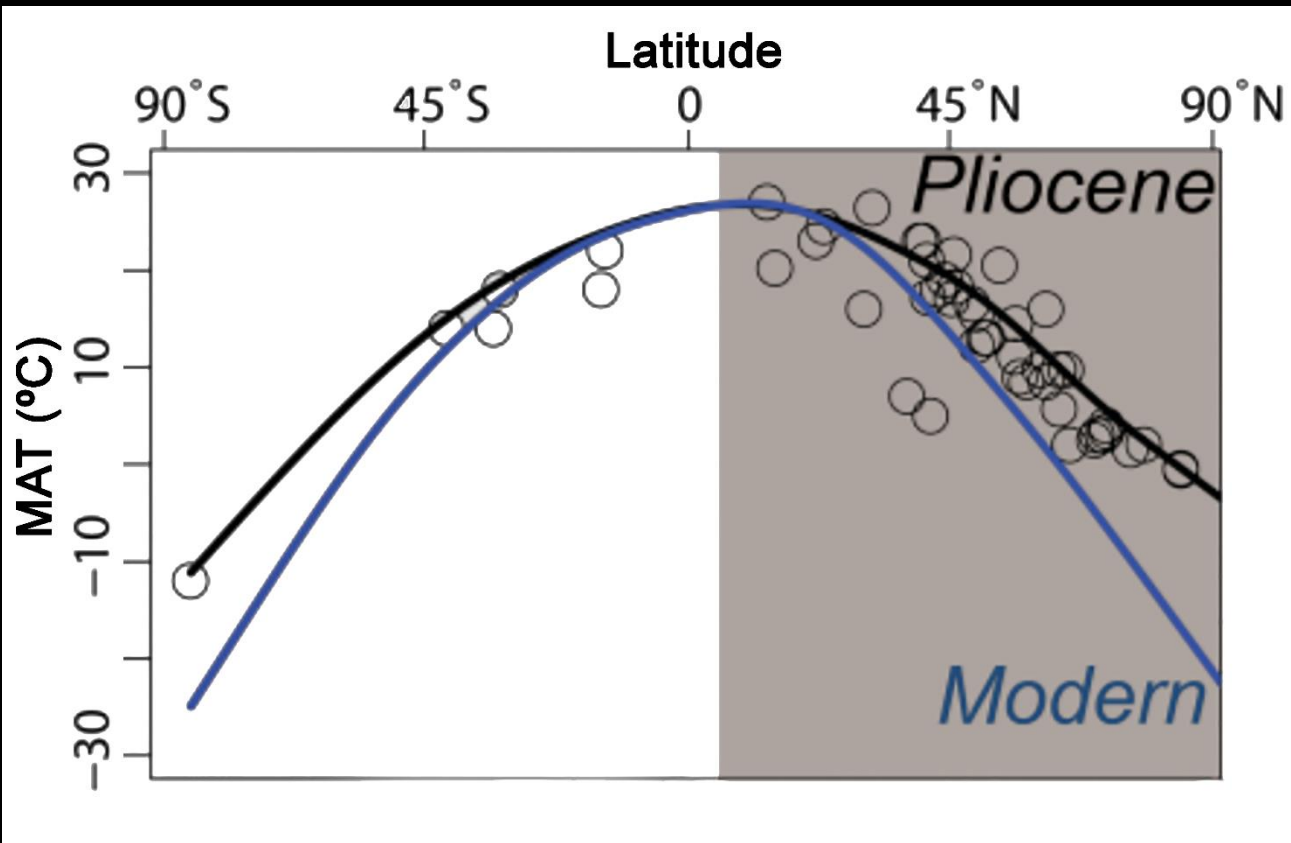
Co-authors: Feng, R., Brown, K., Warden, L., Sinninghe Damste, J., Csank, A., Higuera, P., Rybczynski, N.,
Otto-Bliesner, B., Ballantyne, A.

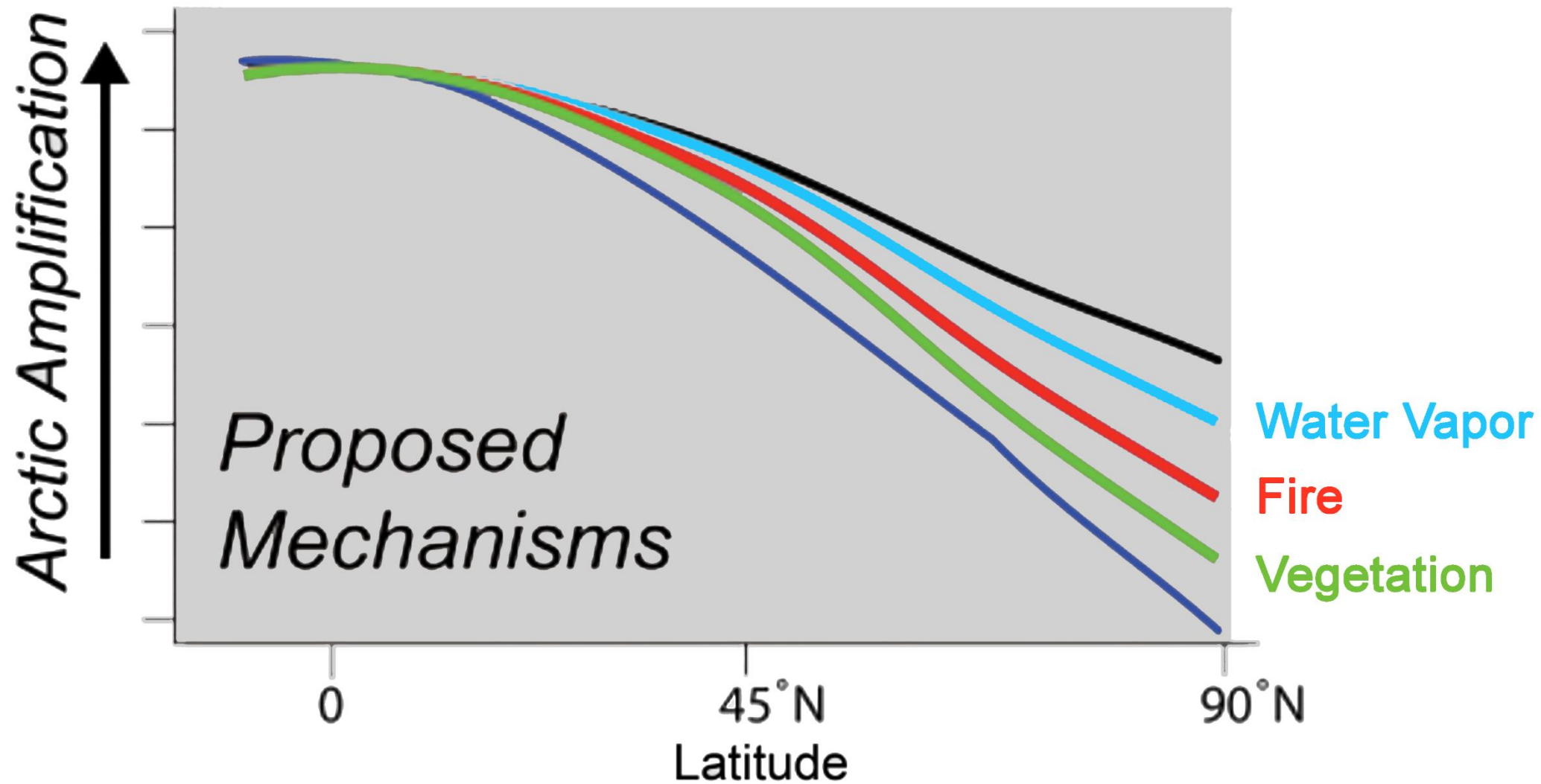


Strathcona Fjord
by George *Rinaldino* Teichmann 2004
reproduced courtesy of Canadian Museum of Nature



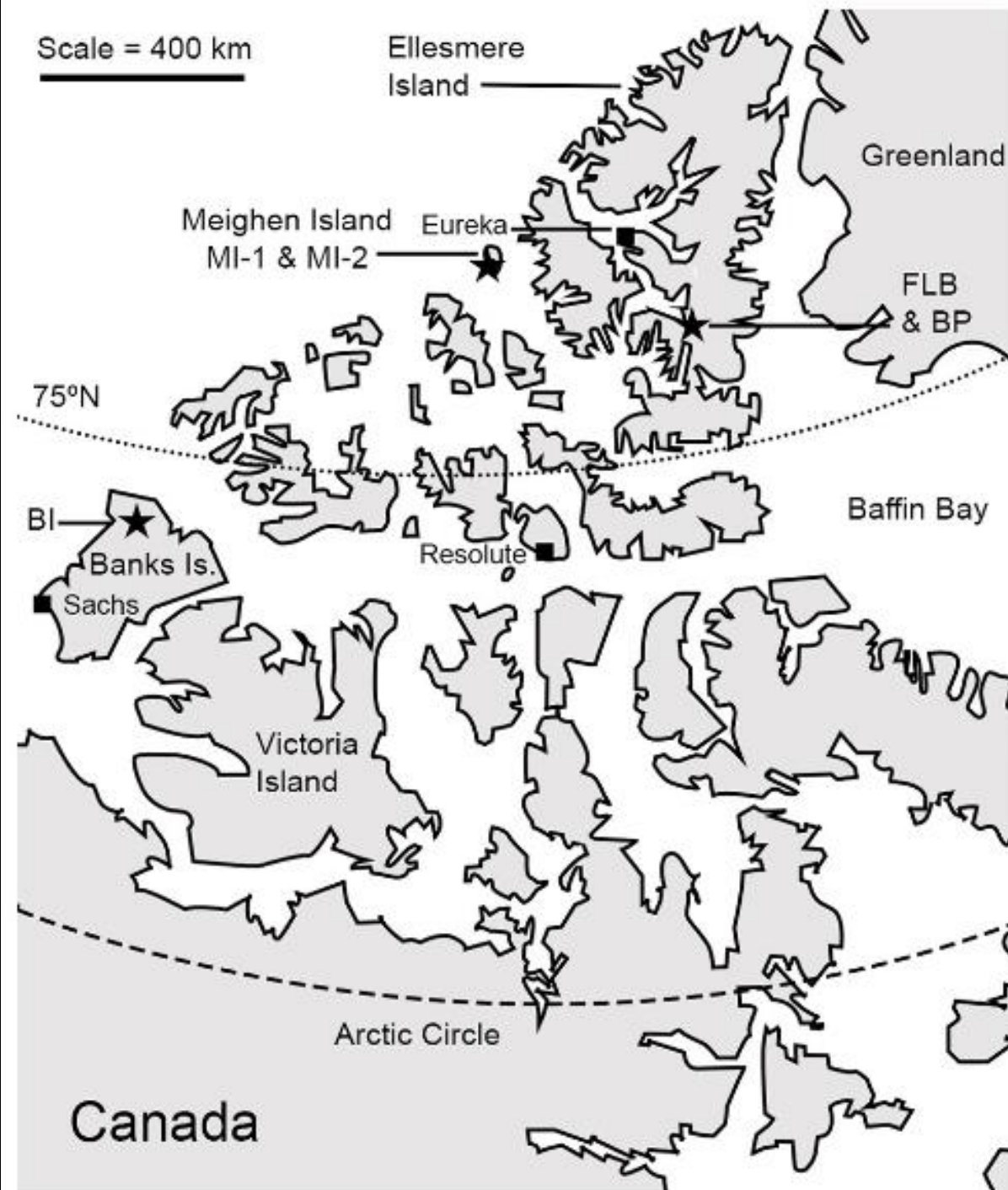
Polar Amplification

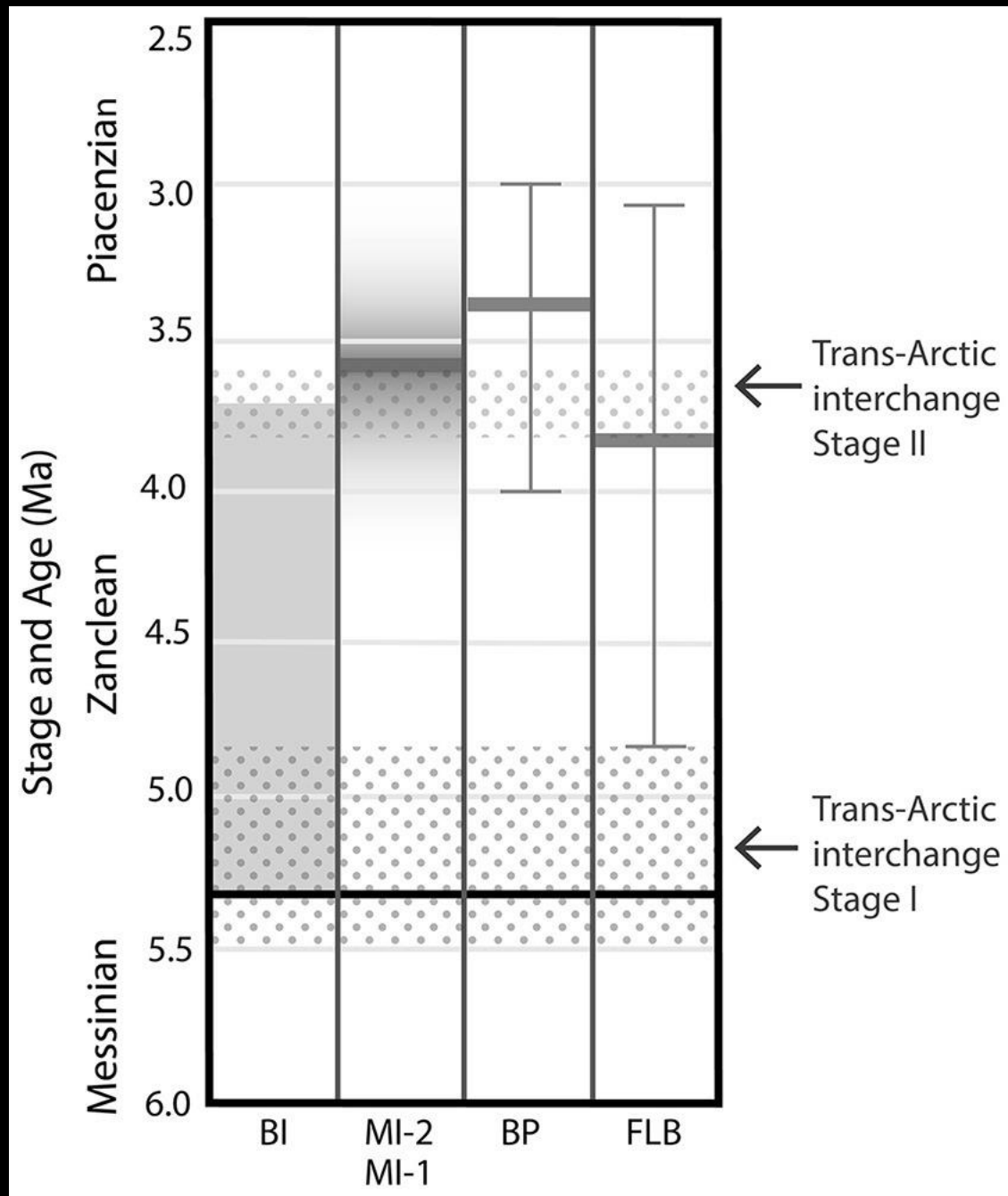


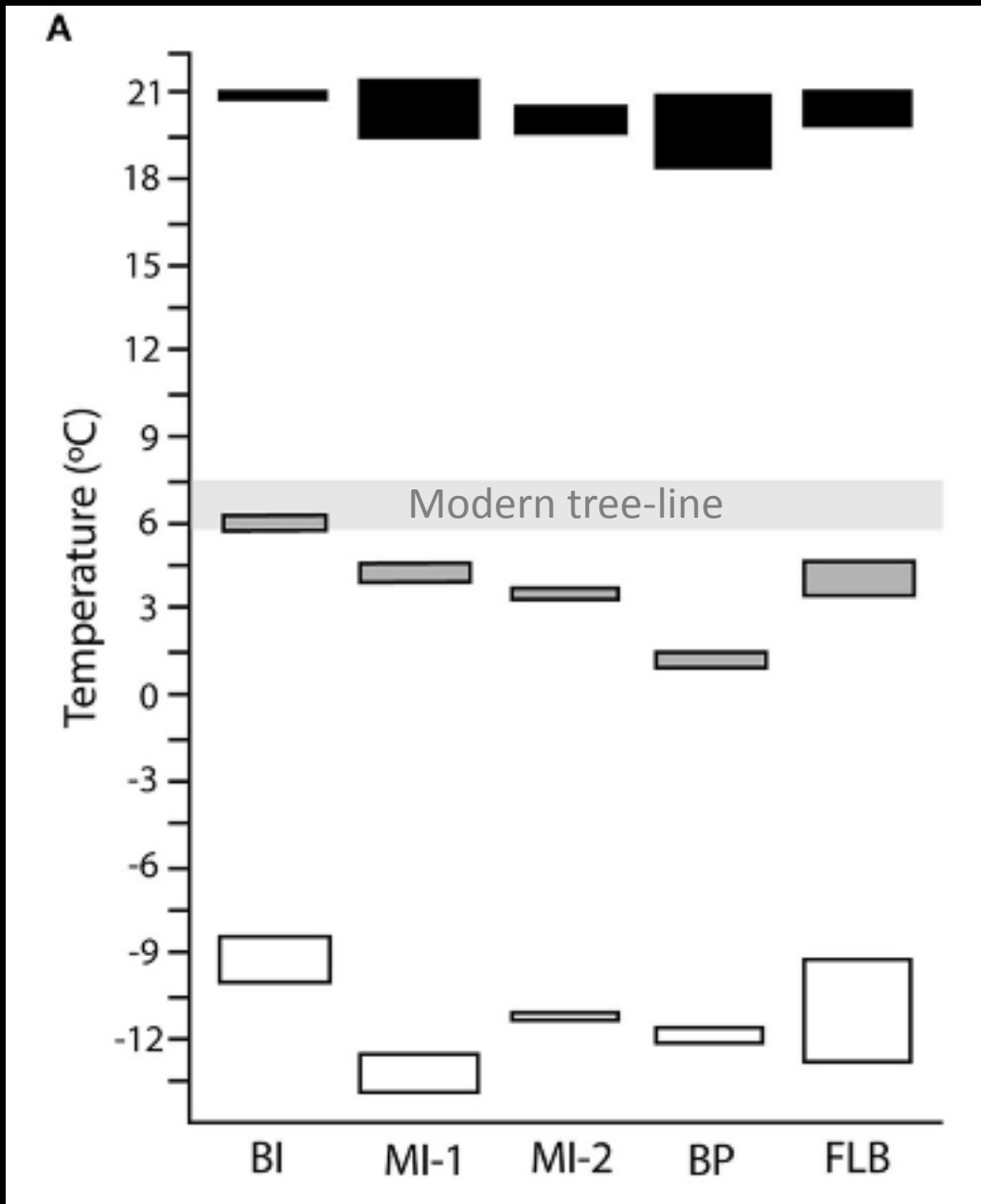


Approach

1. Improve spatial and temporal resolution of proxies for climate in the Pliocene Canadian Arctic Archipelago (PCAA)
2. Investigate the Pliocene Arctic fire regime across the PCAA
3. Explore vegetation-fire relationships in the PCAA
4. Model the influence of fire as a mechanism for Arctic amplification of temperature using the Community Earth System Model from NCAR



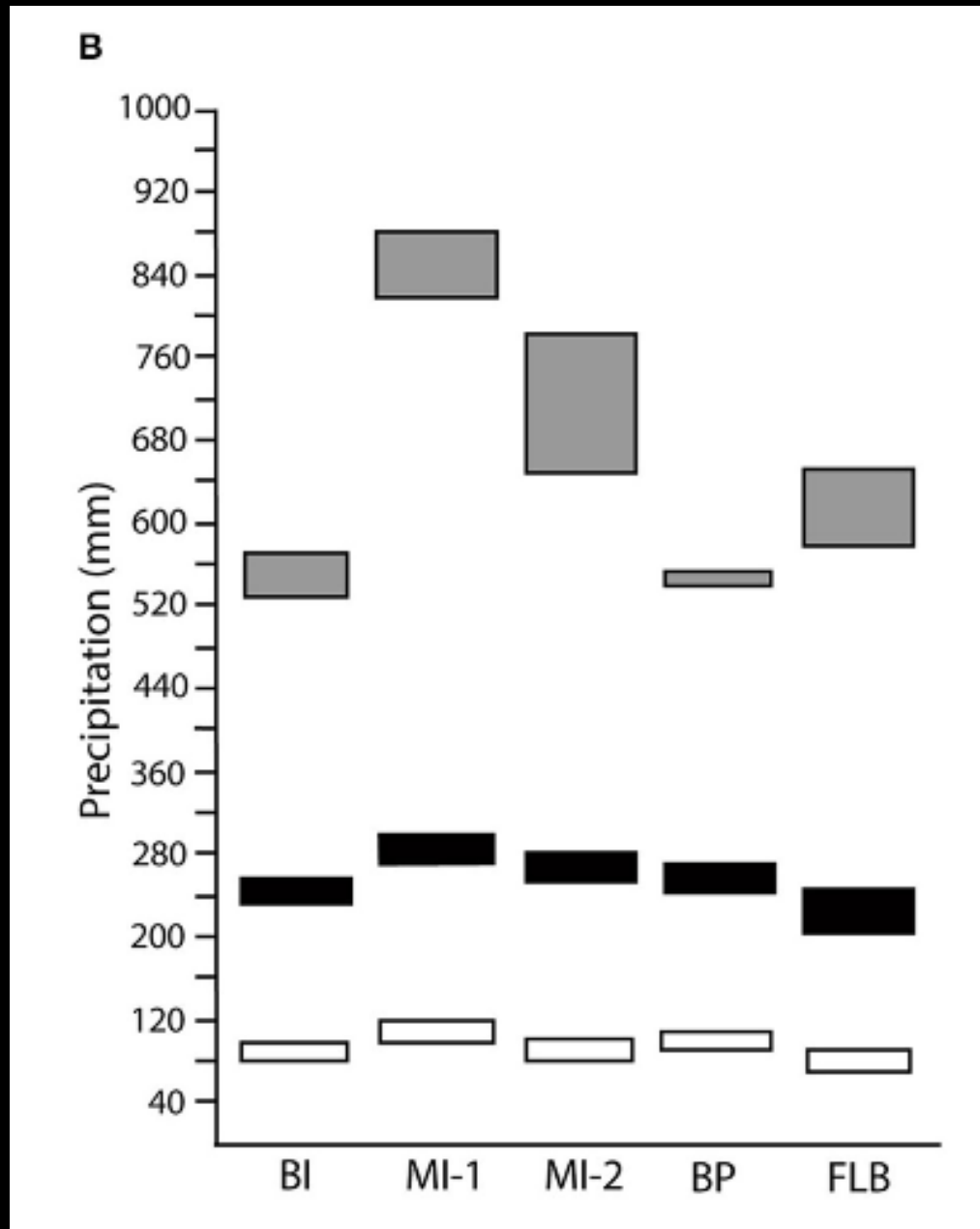




Maximum temperature of the warmest month

Mean annual air temperature

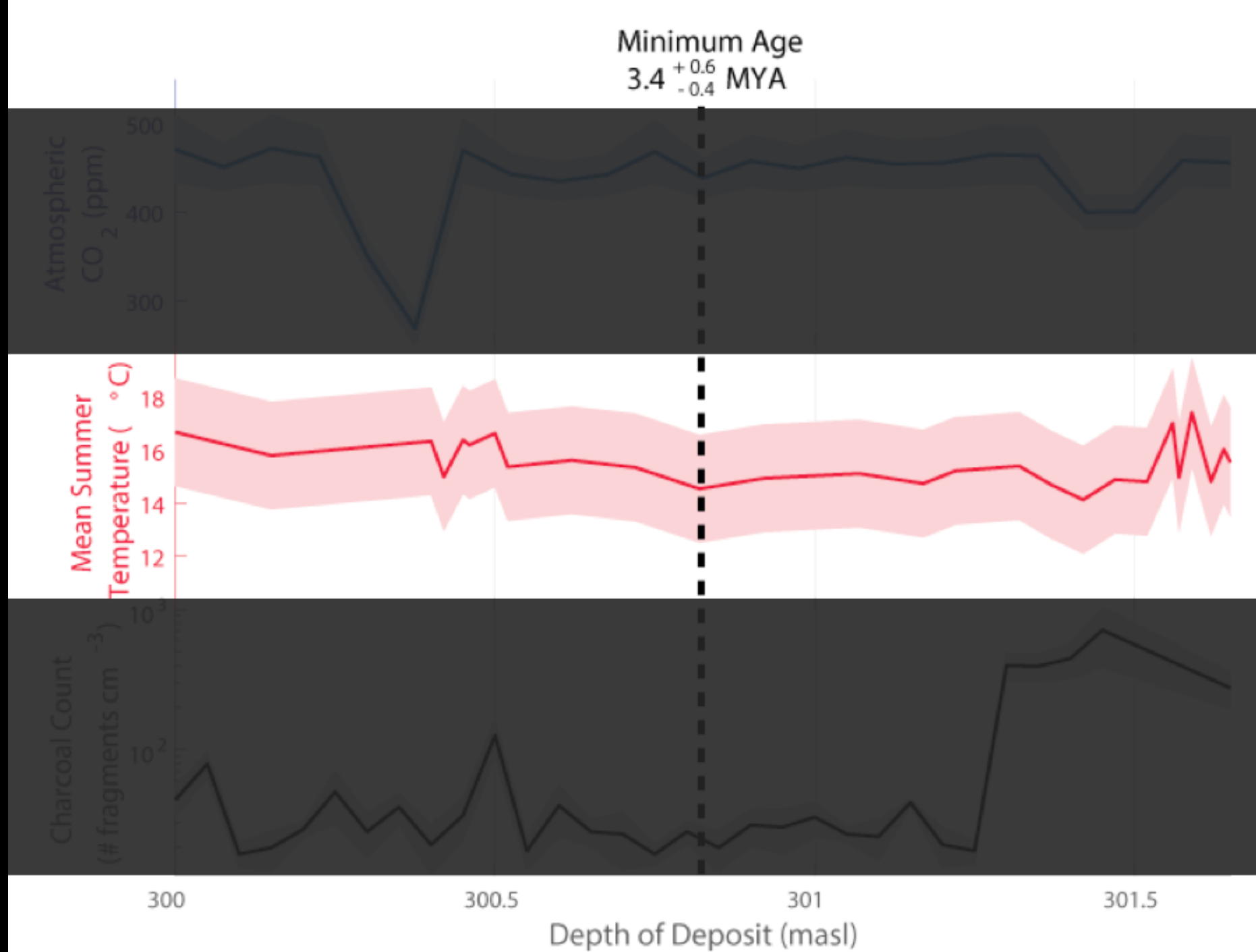
Minimum temperature of the coolest month



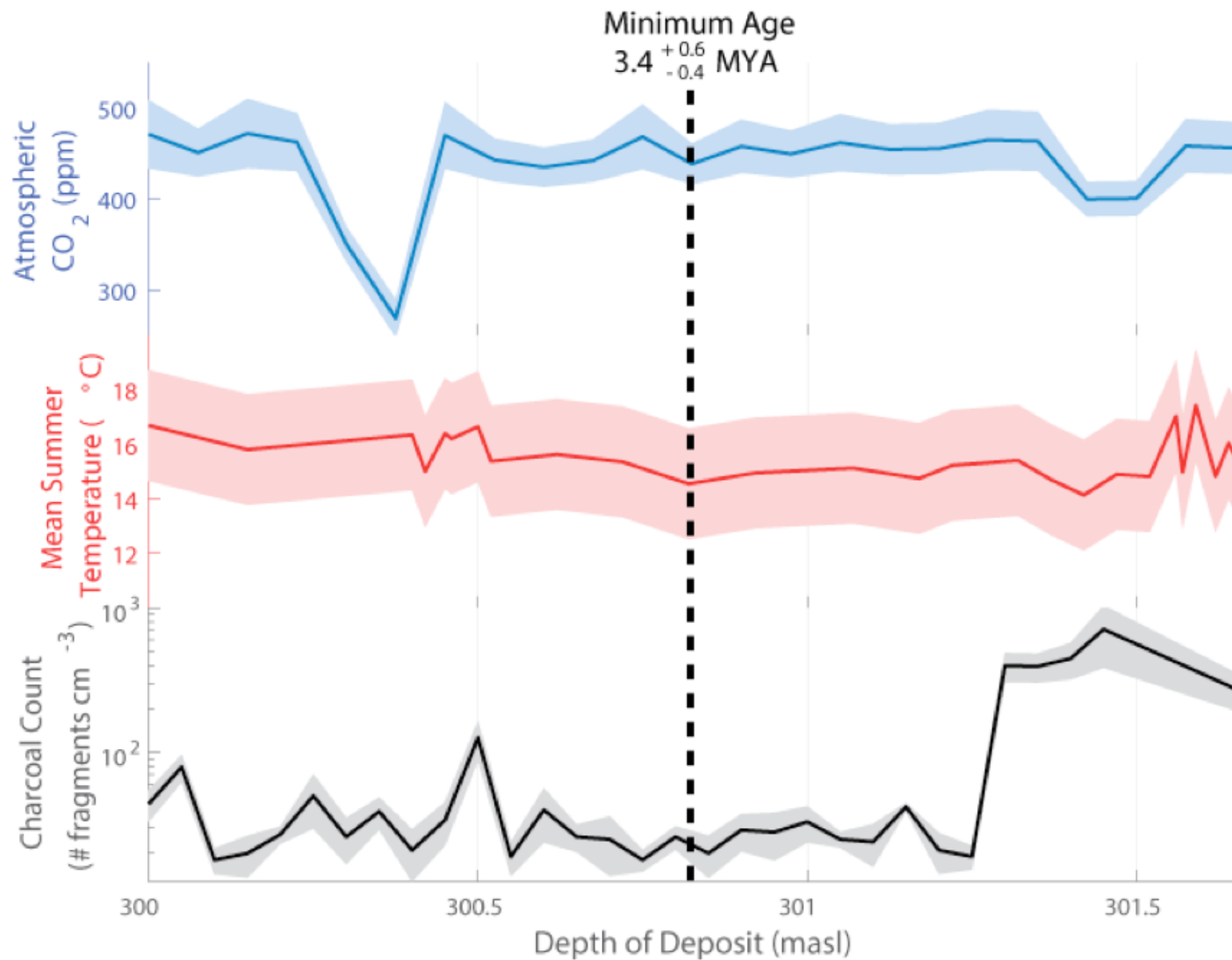
Mean annual precipitation

Precipitation of the wettest quarter

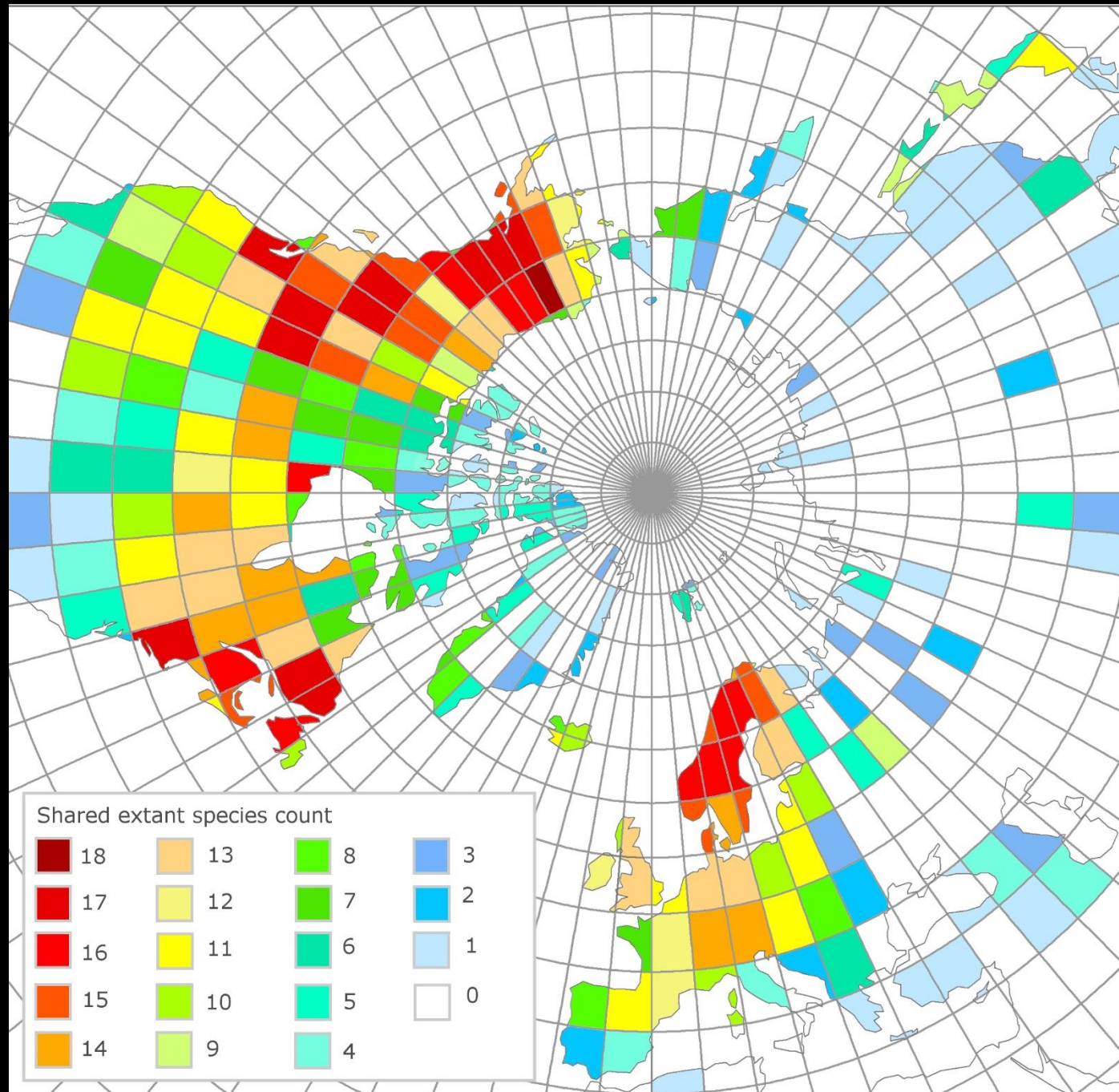
Precipitation of the driest quarter

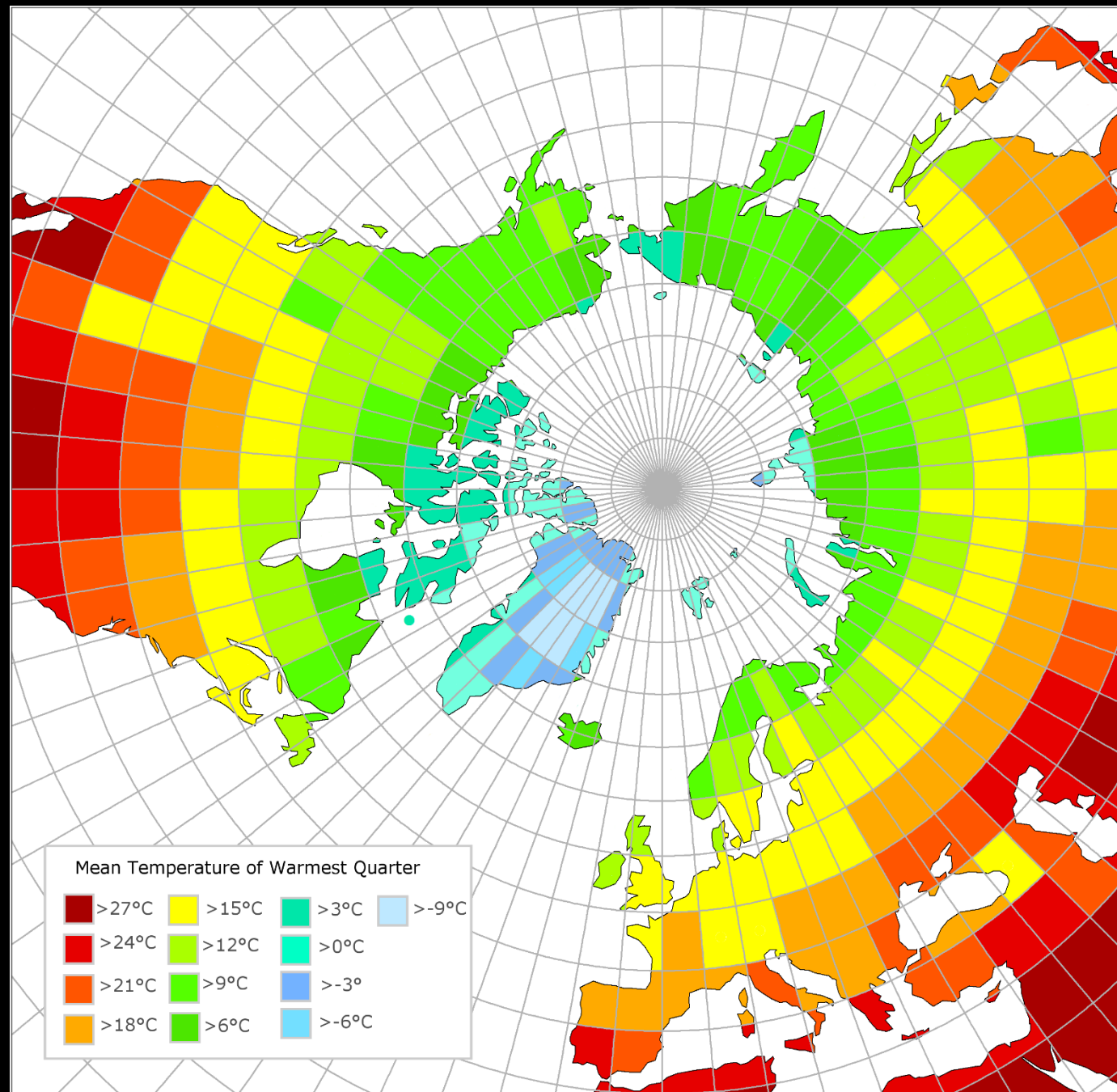


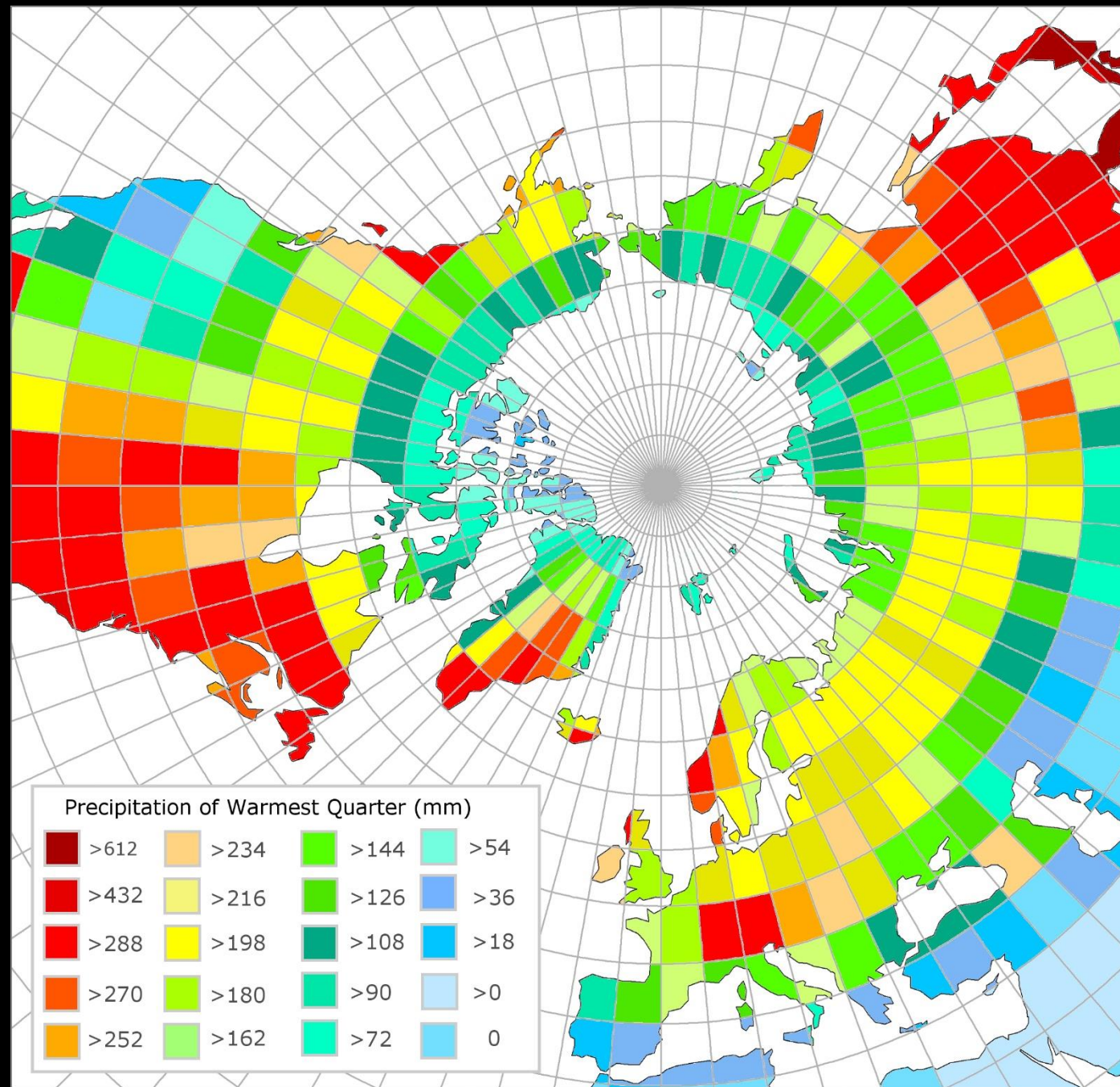
Preliminary
data:
Fletcher et
al. in prep

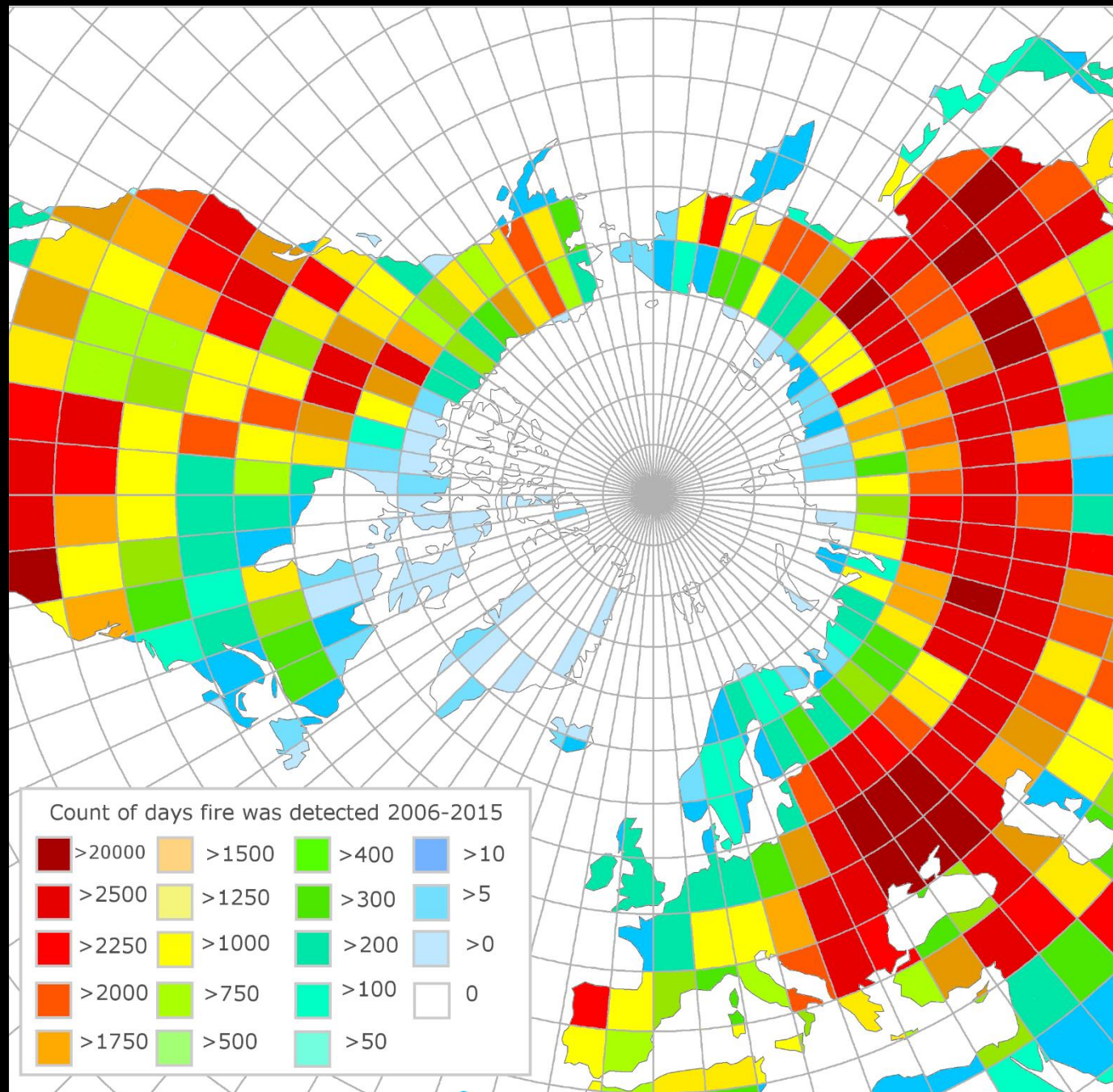


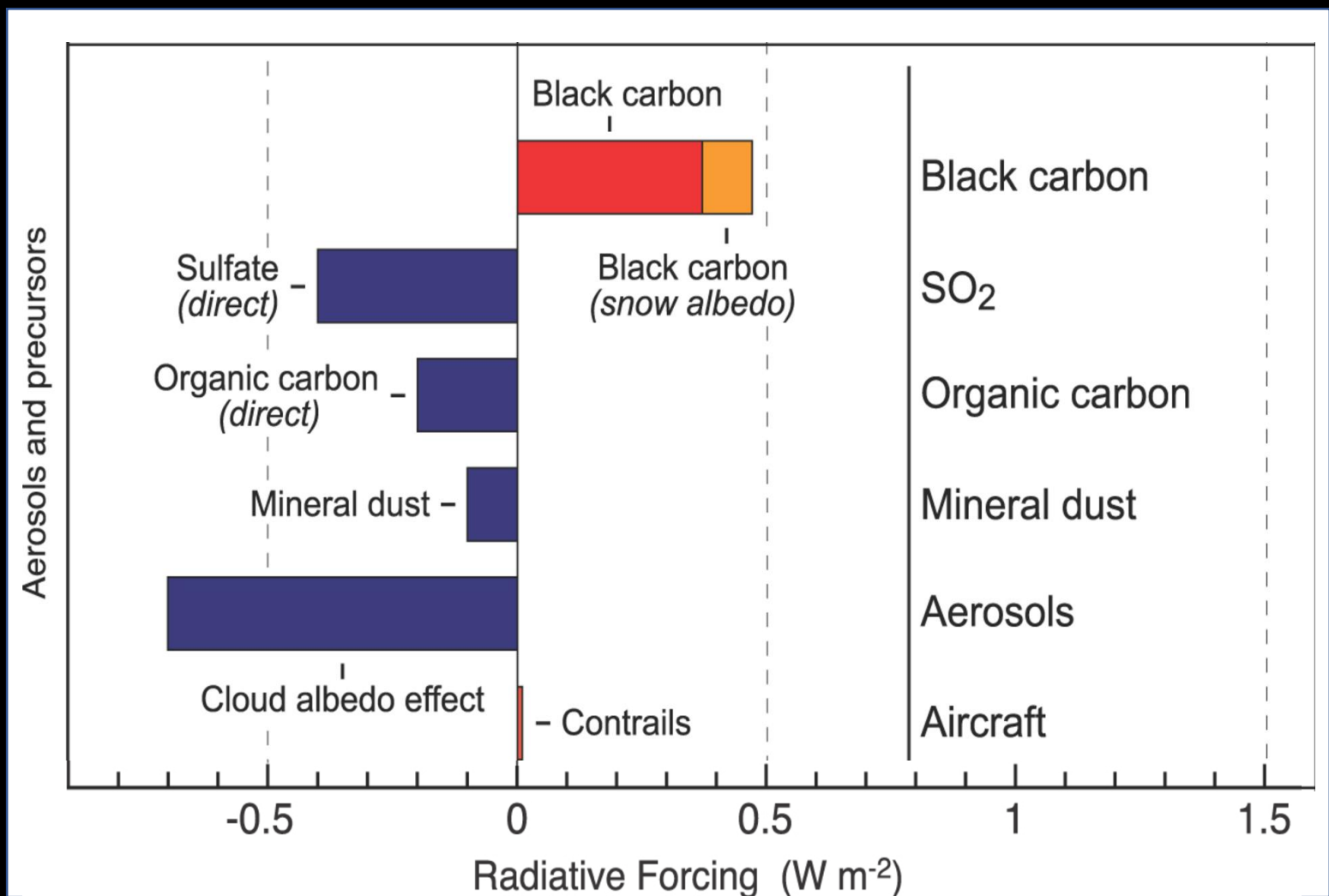
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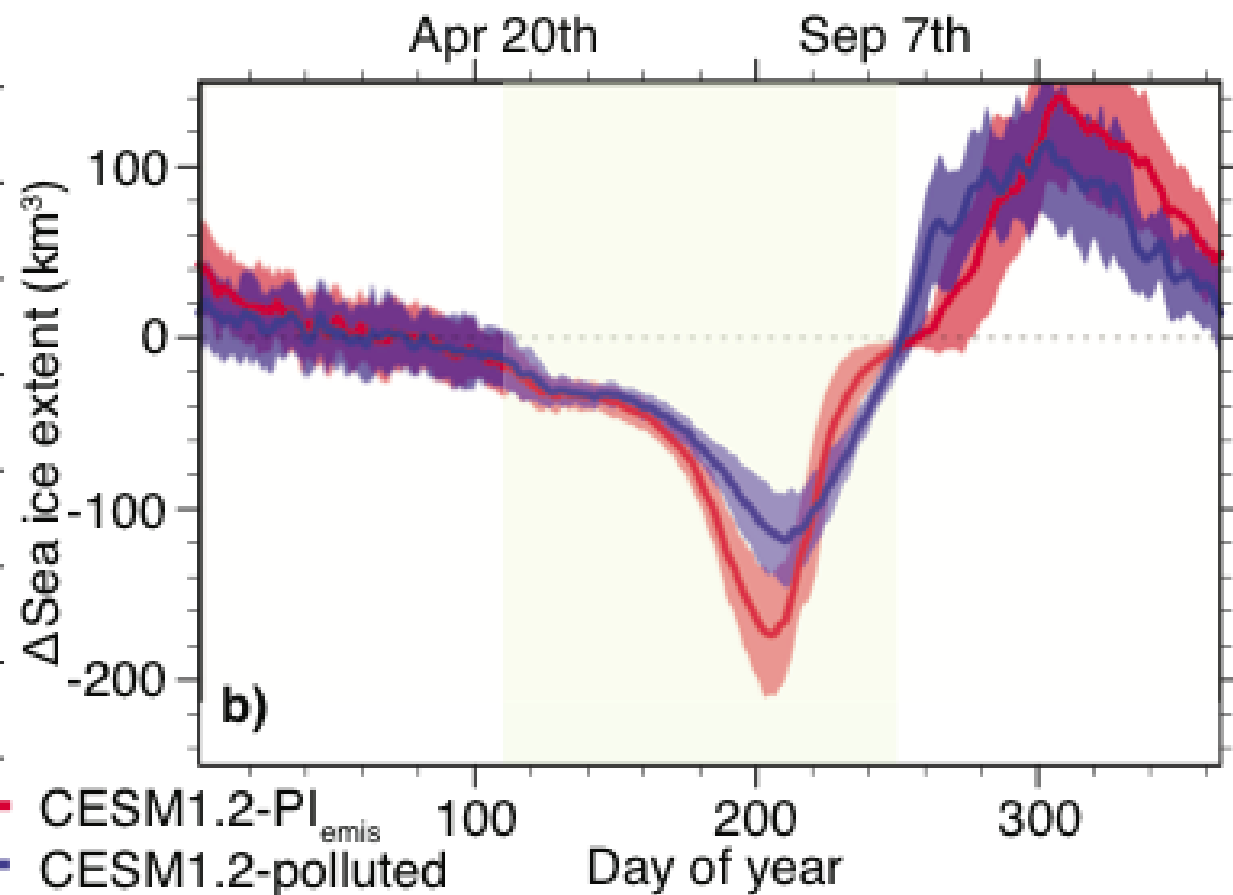
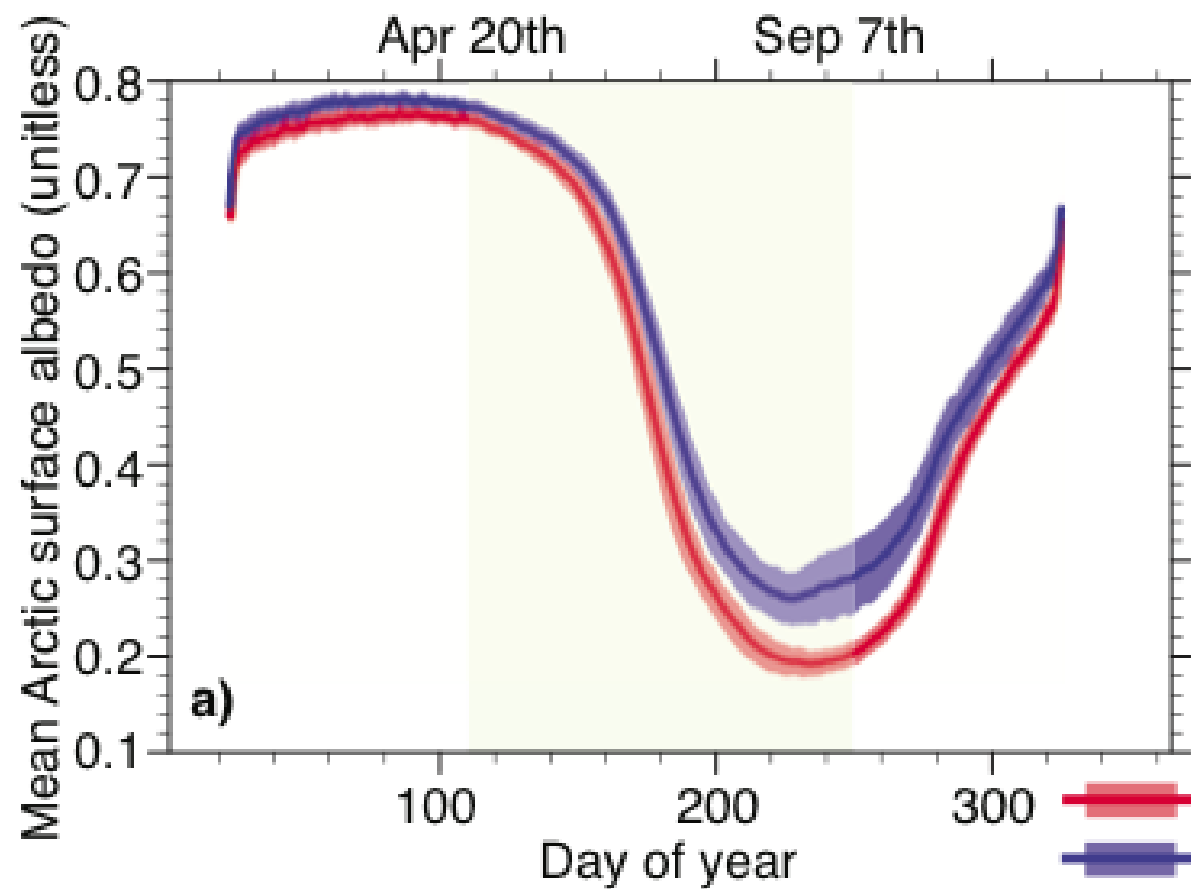












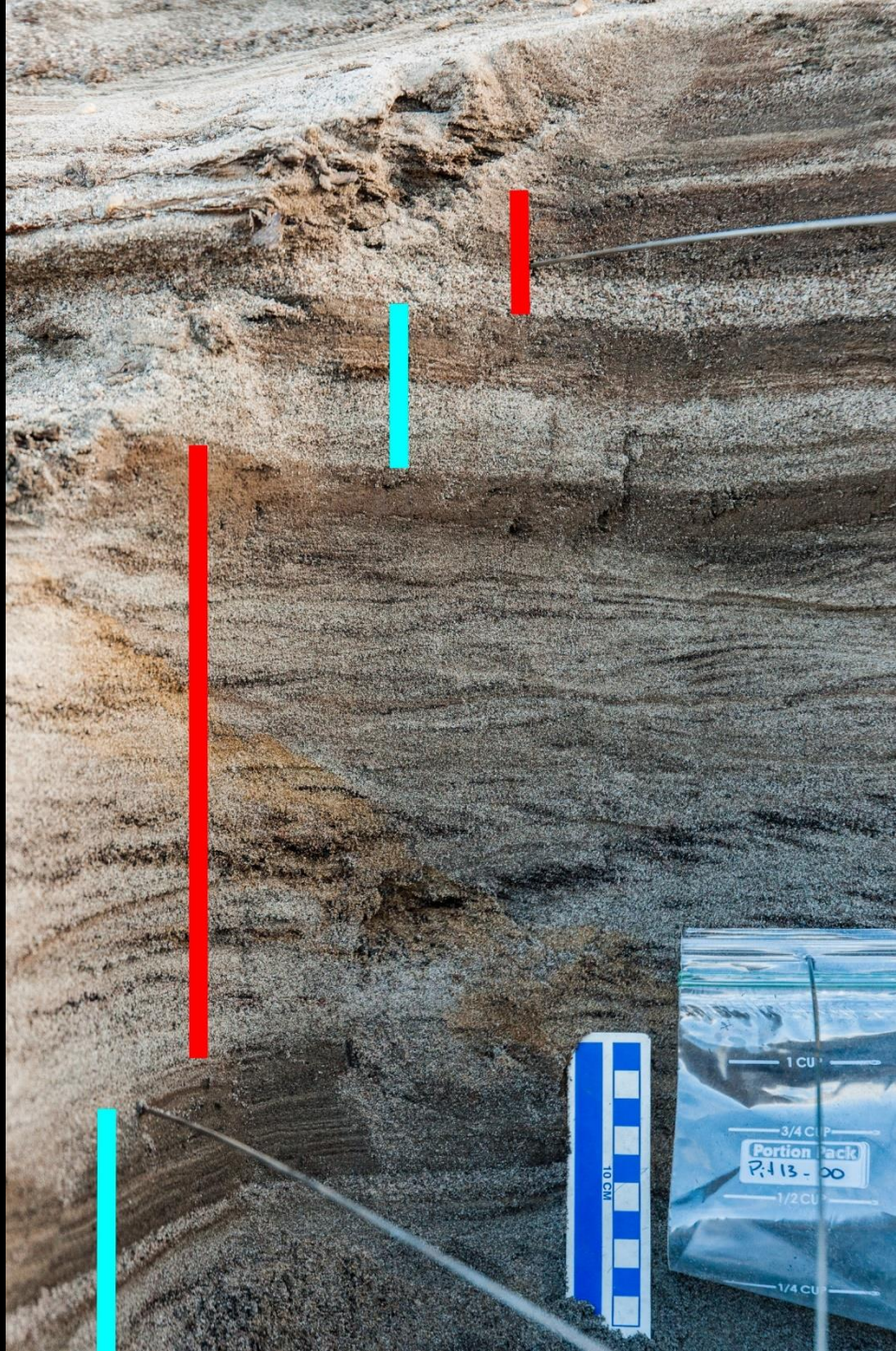
Key Findings

Fire was widespread geographically and temporally in the Pliocene Arctic

Fire has important effects on regional climate via interaction with vegetation, clouds, and sea ice albedo

The addition of long-term feedbacks improves proxy-model mismatch for the Pliocene Arctic

Much still to do, including:



Pollen-charcoal high resolution study at Fyles' Leaf Beds

Fire scar analyses



Improving black carbon effects in Earth System Models



Photo: Wing-Chi Poon



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- Canadian Museum of Nature



- Title image from *Elk Bath* by John McColgan.

*corrected from abstract and proceedings