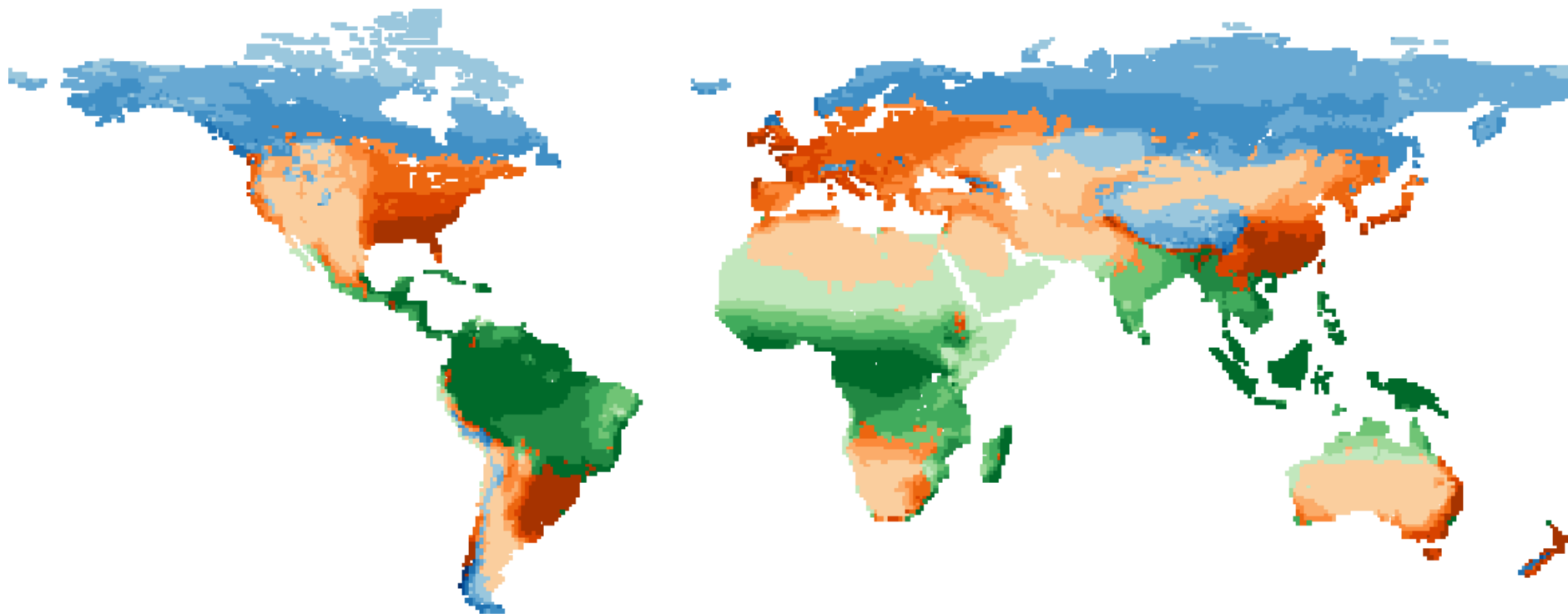


Understanding the influence of agro-ecological zones on land use projections



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CLIMATE & CARBON SCIENCES PROGRAM



In the context of the integrated Earth System Model (iESM)

- How do we make robust projections of land use change in the context of projected climate change?
- **How do spatial boundaries influence projected land use?**

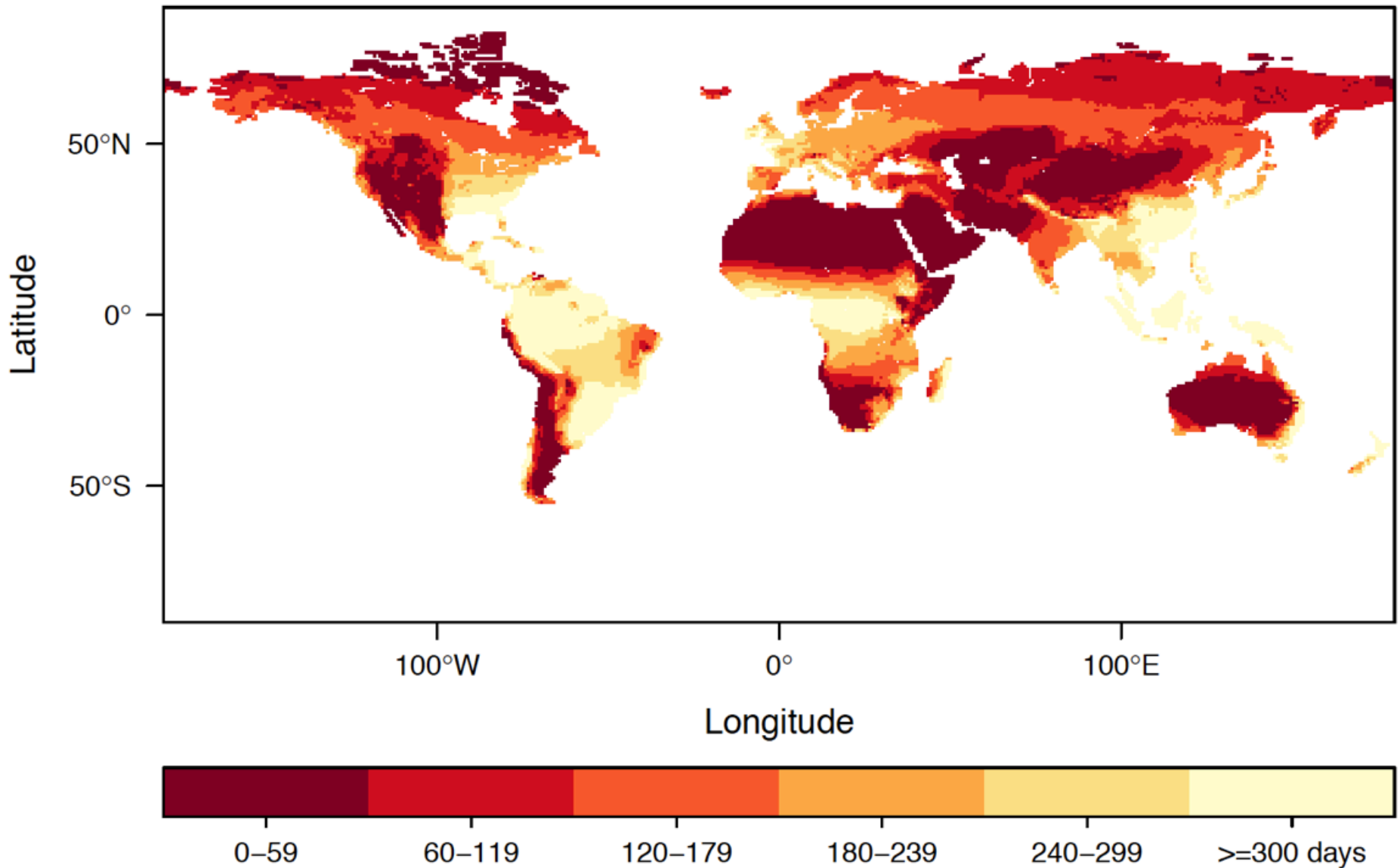
Overview

- **What are agro-ecological zones?**
- **Why do agro-ecological zones matter?**
- **Current versus projected agro-ecological zones**
- **Next steps**

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Agro-Ecological Zones (AEZs) are bio-climatically defined

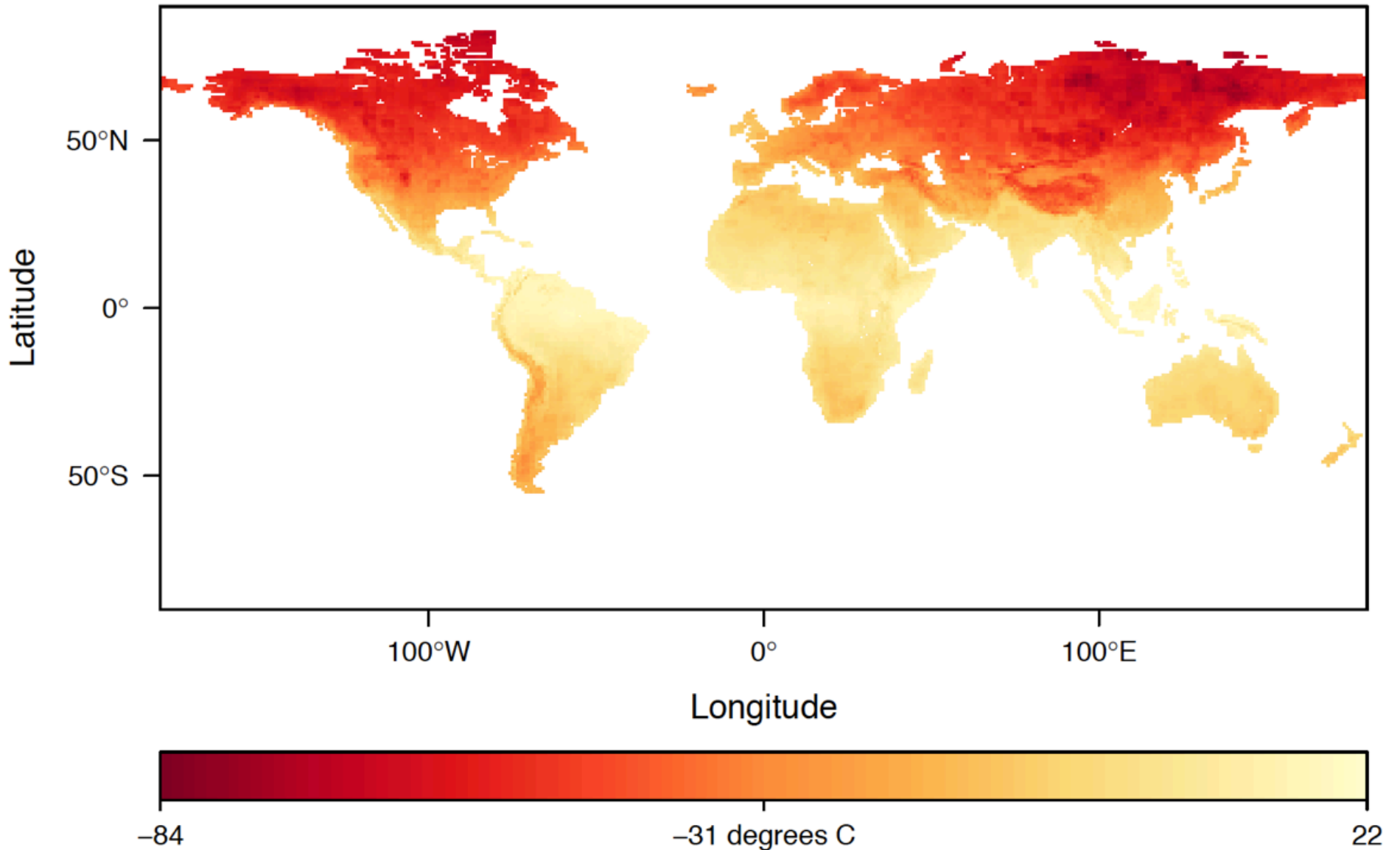
Original Length of Growing Period merged (days)



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Absolute minimum temperature:
 $> 0\text{ }^{\circ}\text{C}$ = tropical; $< -45\text{ }^{\circ}\text{C}$ = boreal

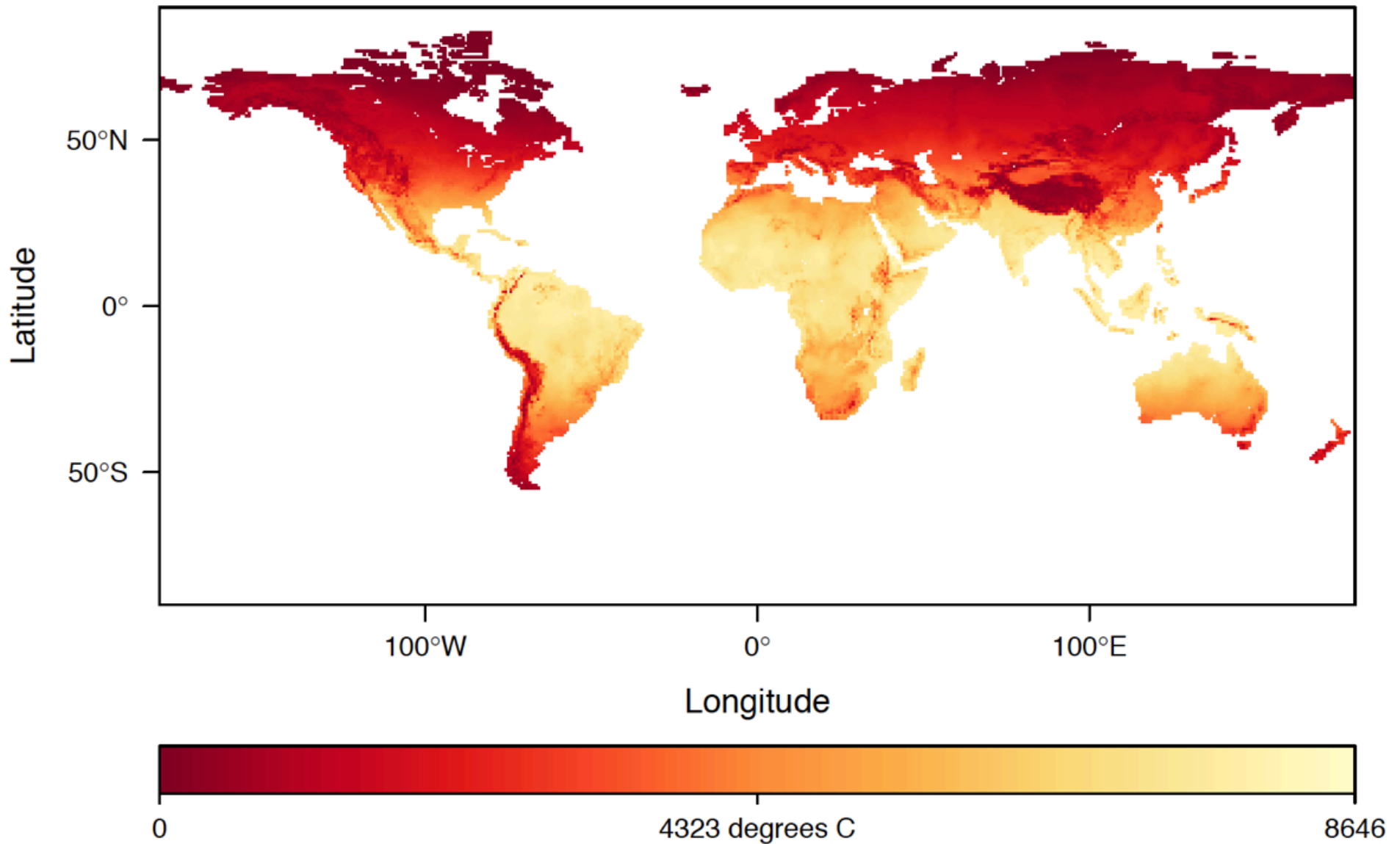
Baseline 1961–1990 absolute minimum temperature (C)



6

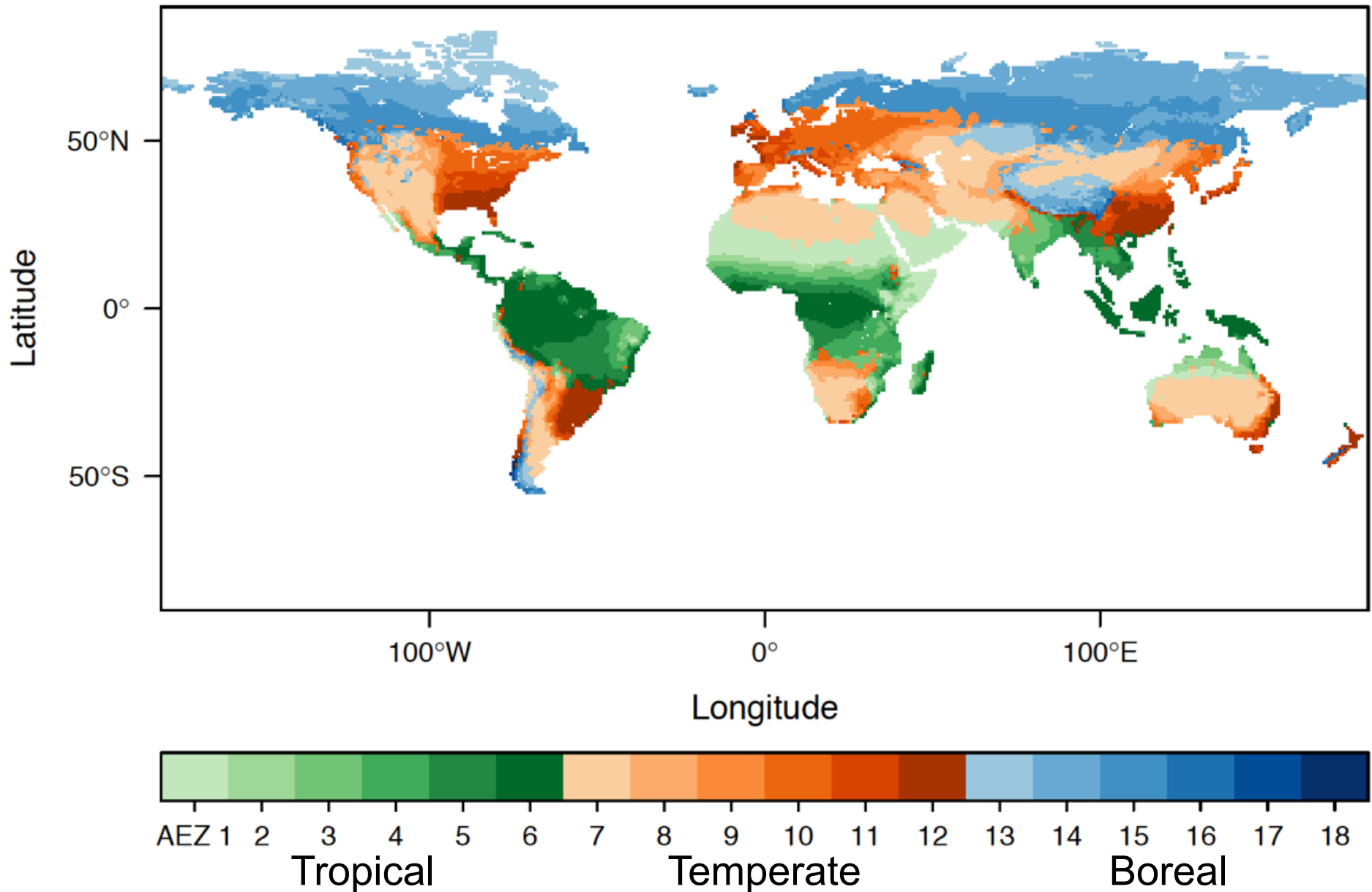
Growing Degree Days; splitting temperate and boreal

Worldclim 1961–1990 annual Growing Degree Days (C)



Original agro-ecological zones

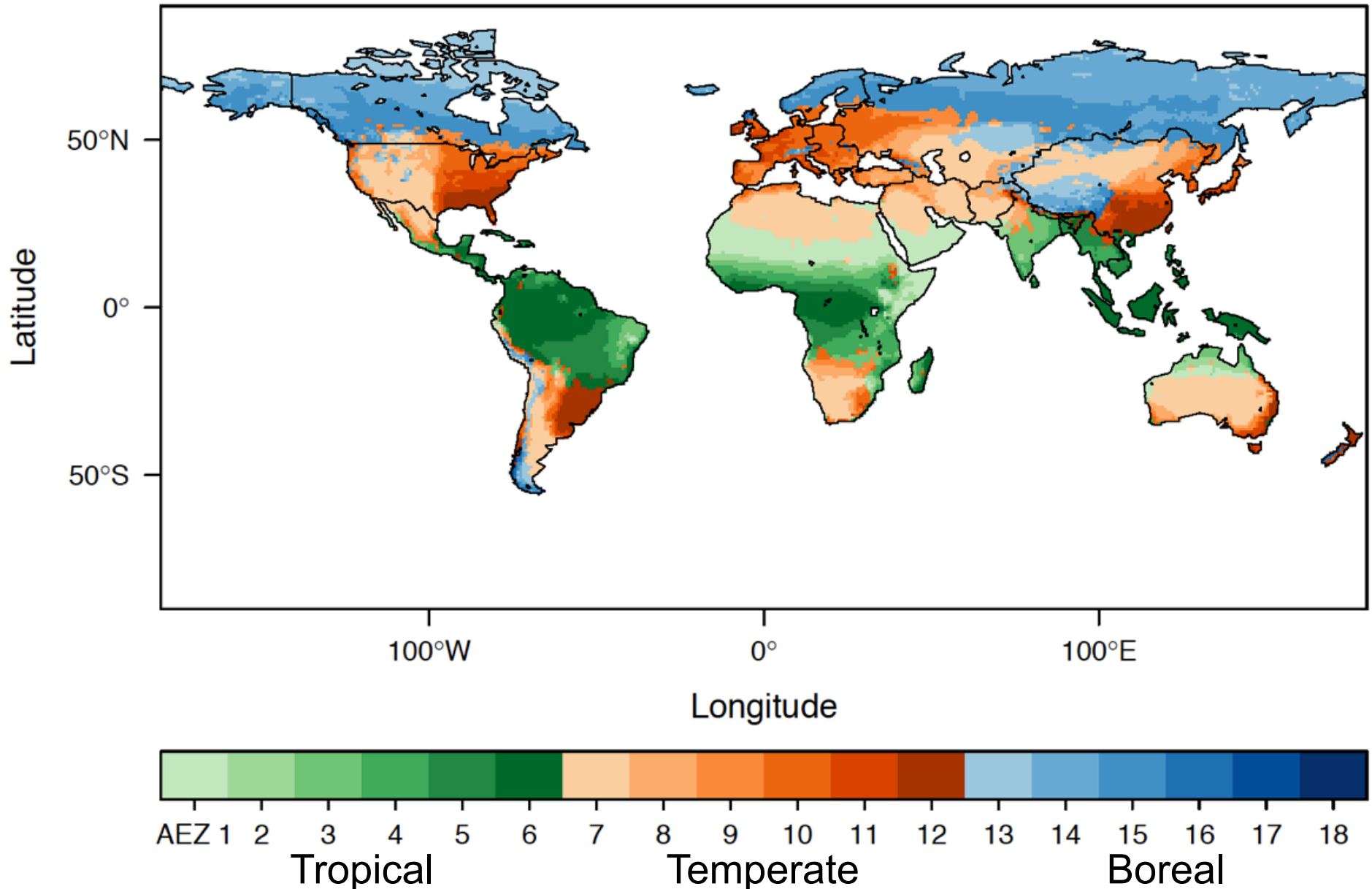
Original baseline climate agro-ecological zones



8

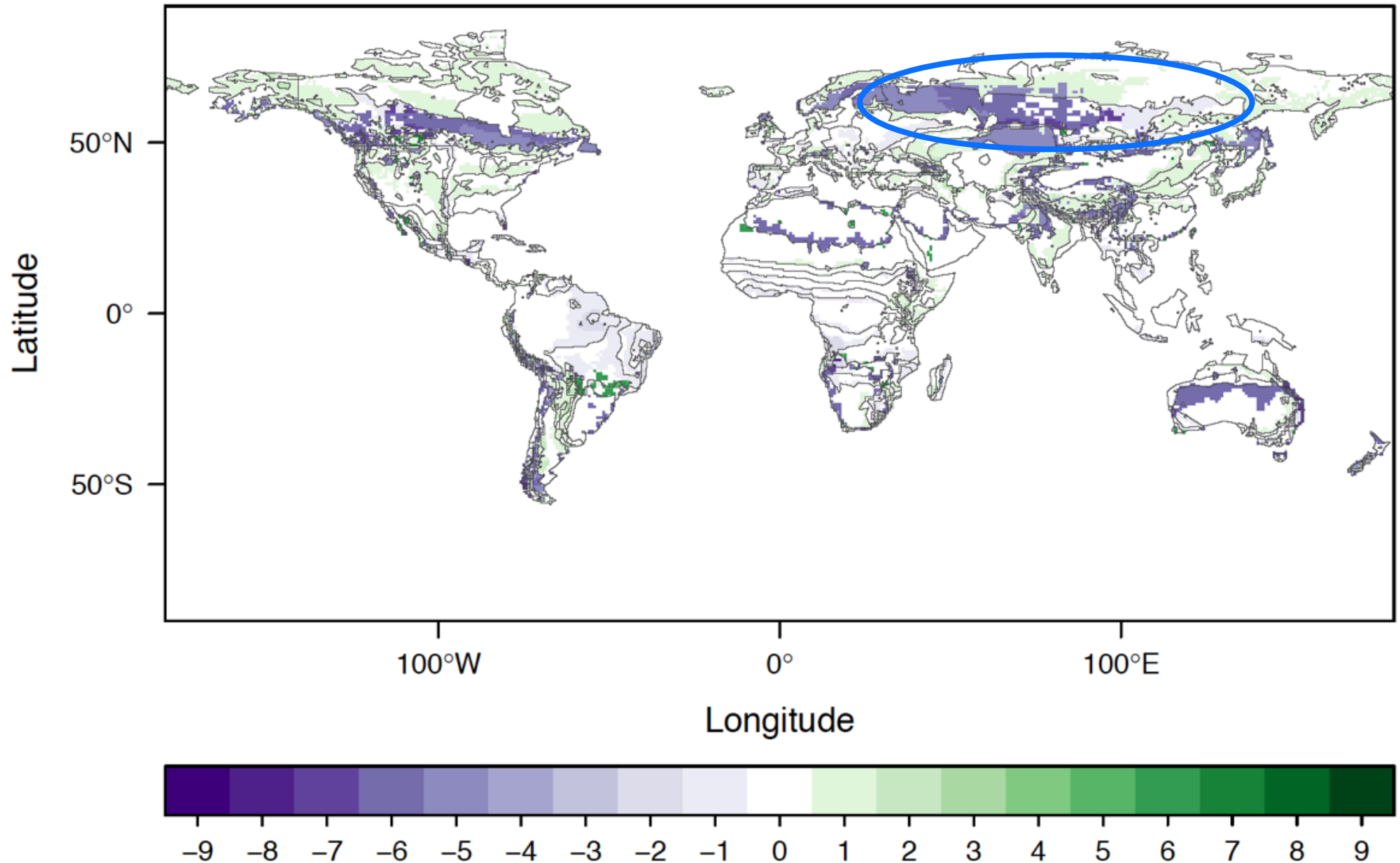
Land use distribution assumes uniform vegetation productivity within zones

Original baseline climate agro-ecological zones



Current AEZs become heterogeneous

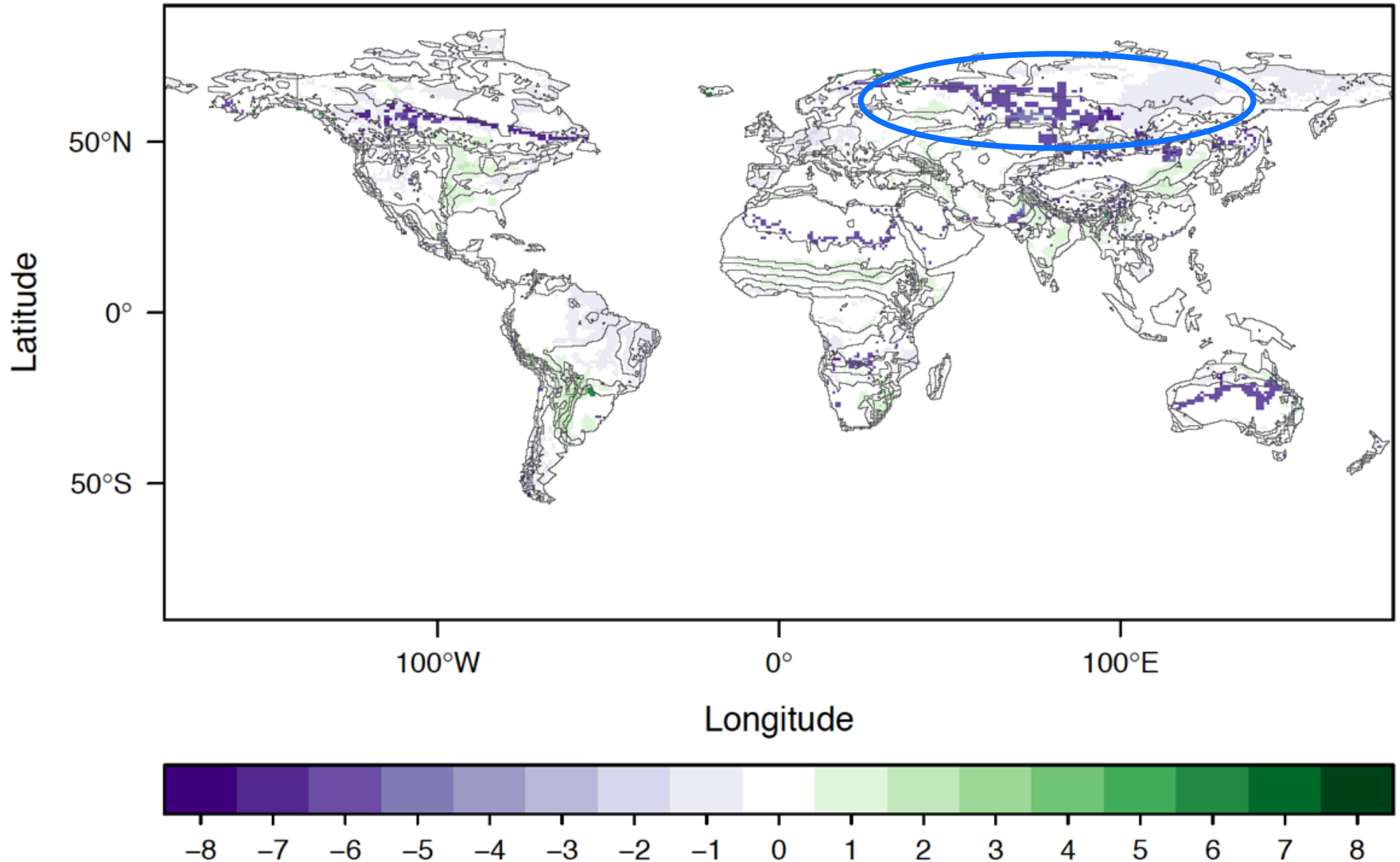
ECHAM 2100 AEZs – original baseline AEZs



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Projected AEZs differ by climate model

ECHAM 2100 AEZs – CSIRO 2100 AEZs

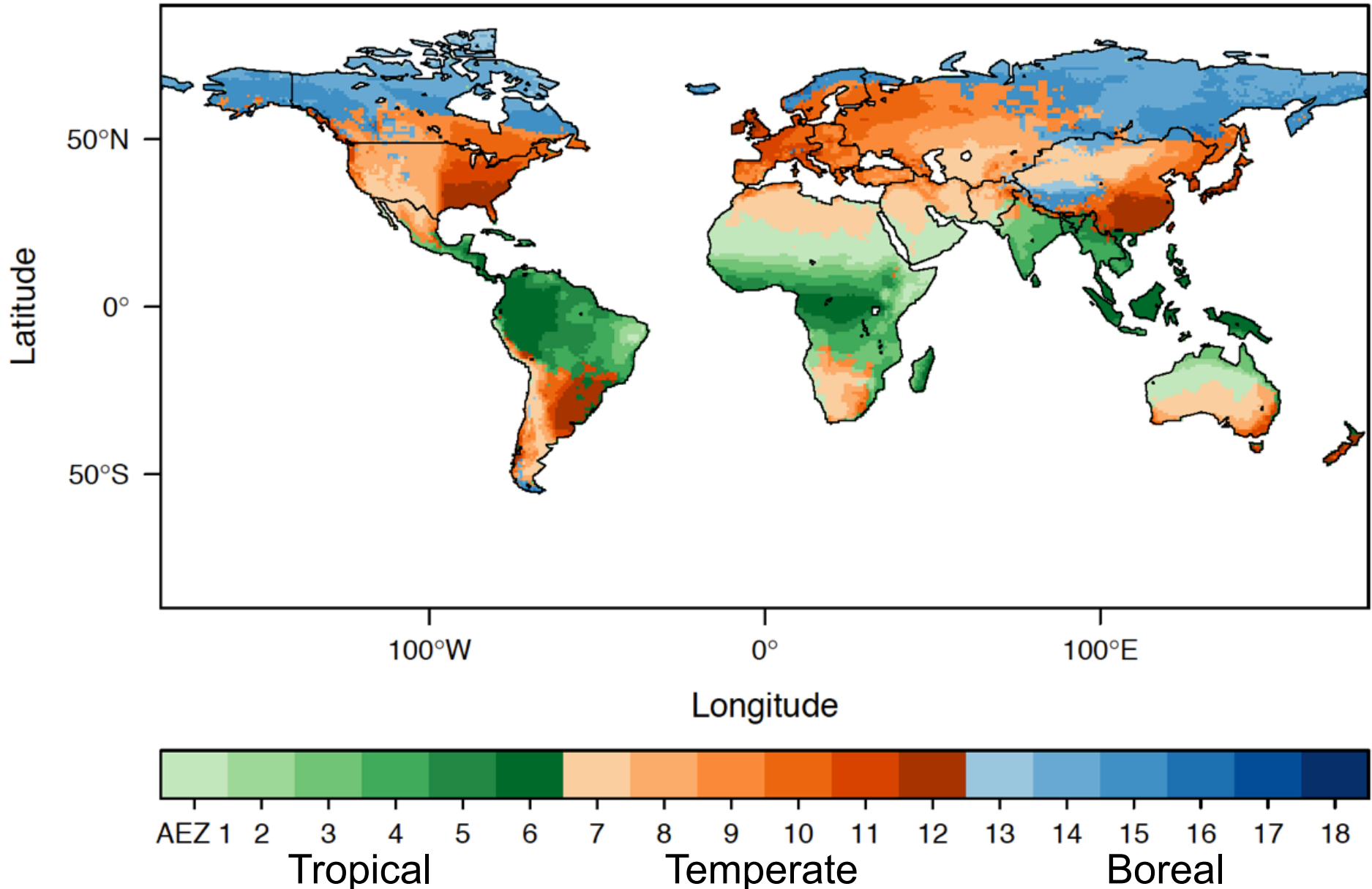


Next steps

- Calculating AEZ initial conditions
 - Crop area
 - Crop yield
 - Land value
- Sensitivity experiment with iESM
 - Current versus projected AEZs

Land use distribution assumes uniform vegetation productivity within zones

ECHAM 2071–2100 climate agro-ecological zones



Land use distribution assumes uniform vegetation productivity within zones

- Do projected Agro-Ecological Zones alter land use trajectories?

