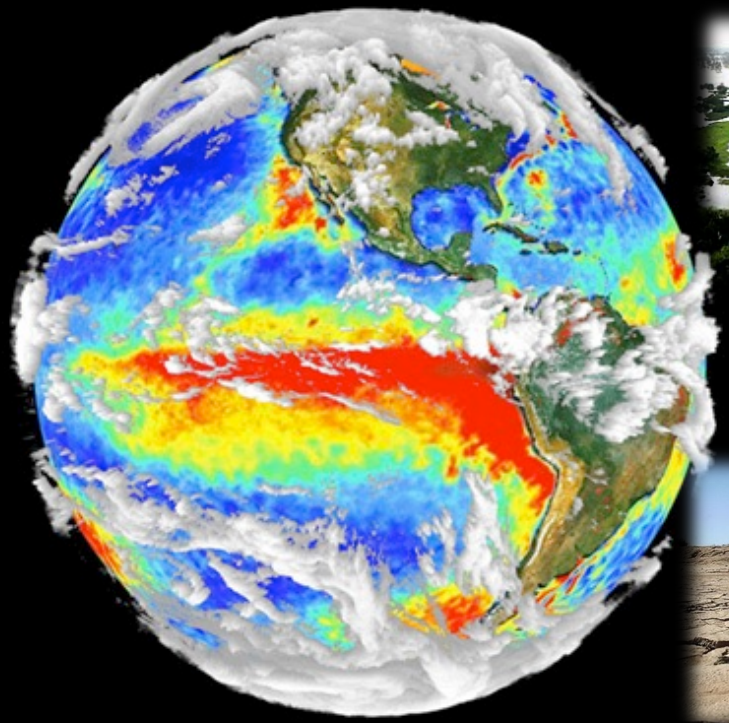
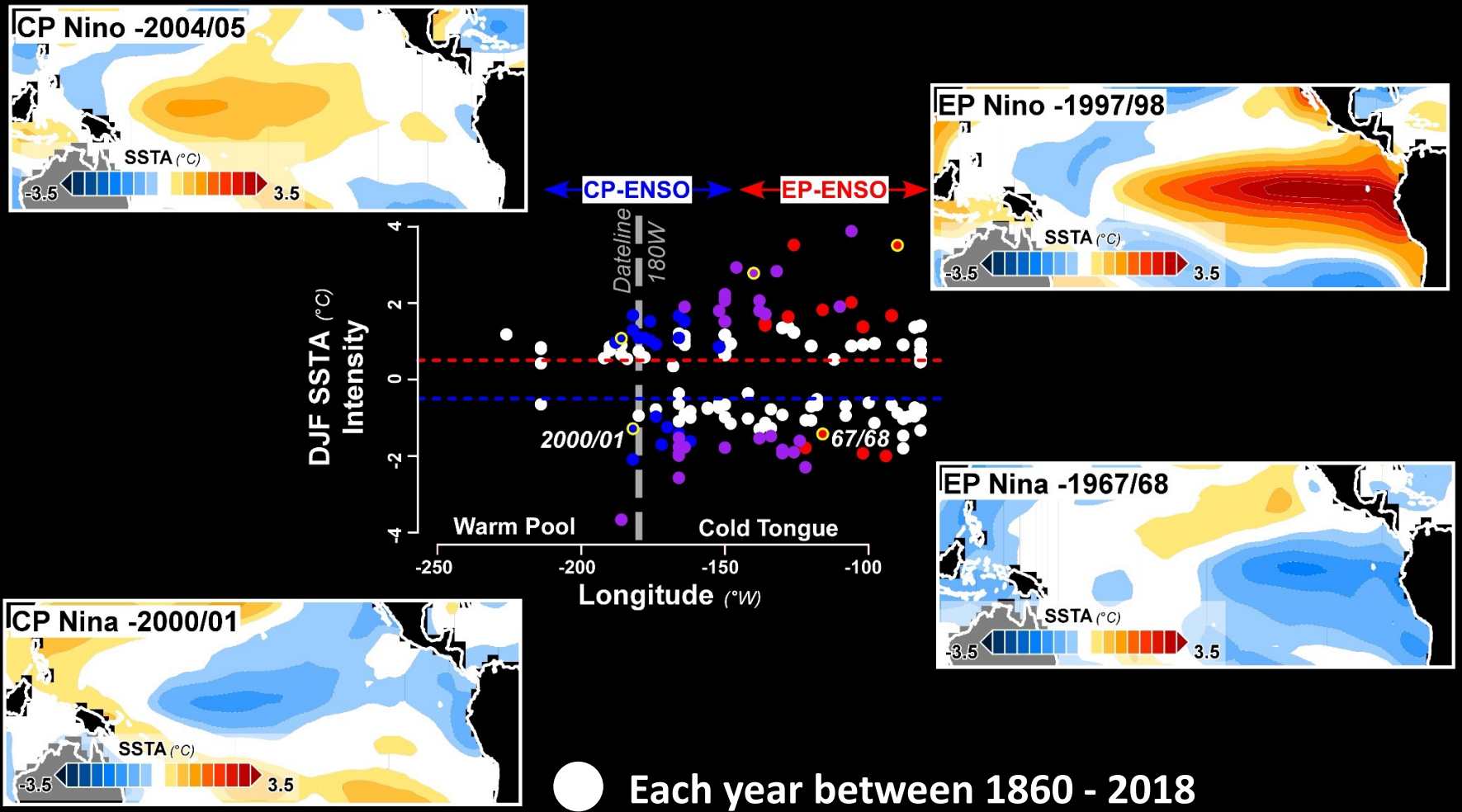
How could uncertainty in future ENSO diversity influence assessments of seasonal precipitation anomalies over the 21st century?

DIEPPOIS Bastien, MAHER Nicola,
CAPOTONDI Antonietta, O'BRIEN John



EGU 2022 General Assembly, 25th May 2022

What is ENSO diversity?



Each year between 1860 - 2018

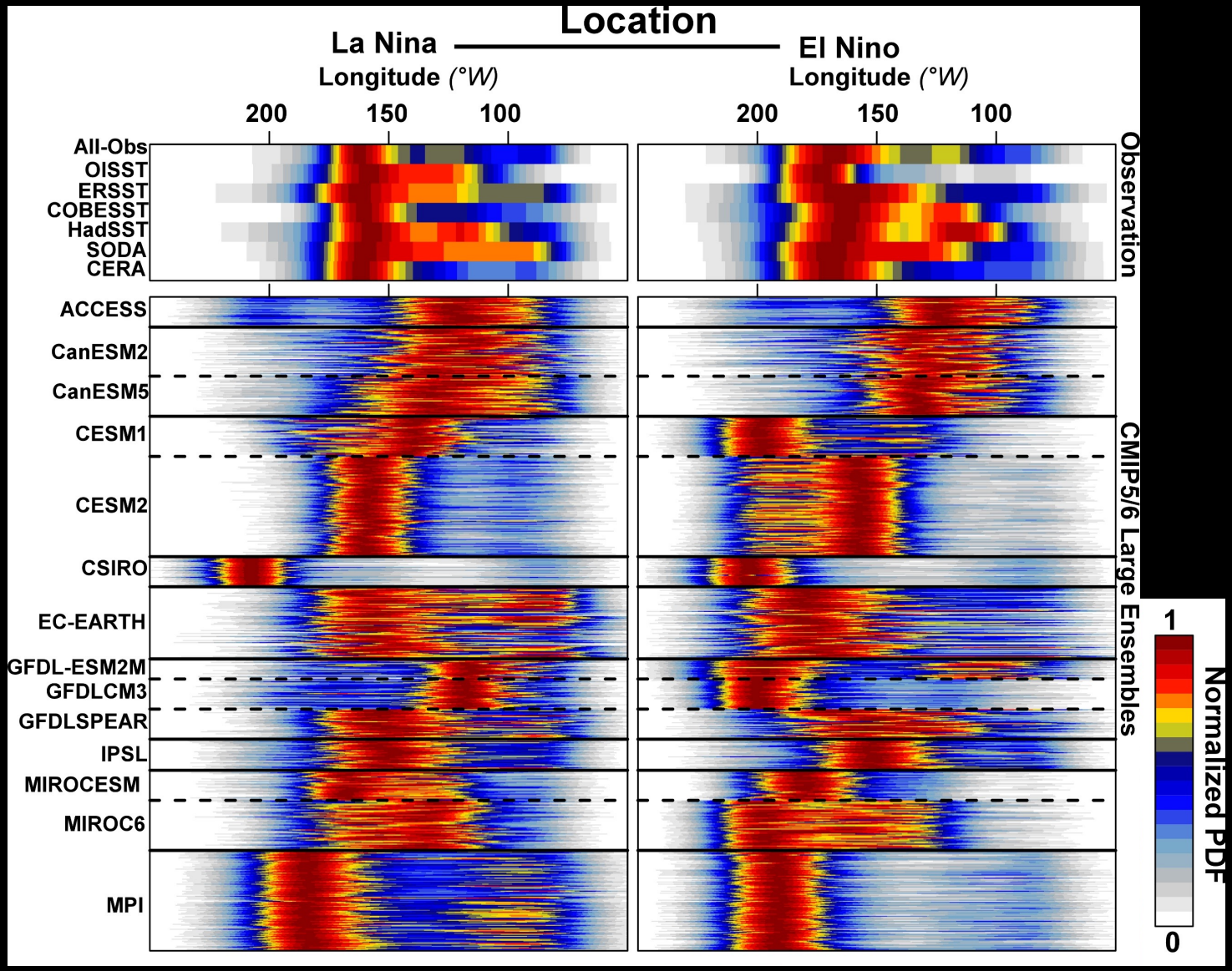
Event captured by CP index *(Kao & Yu 2009)*

Event captured by Nino3 index *(Rasmusson & Carpenter 1982)*

Event captured by both indices

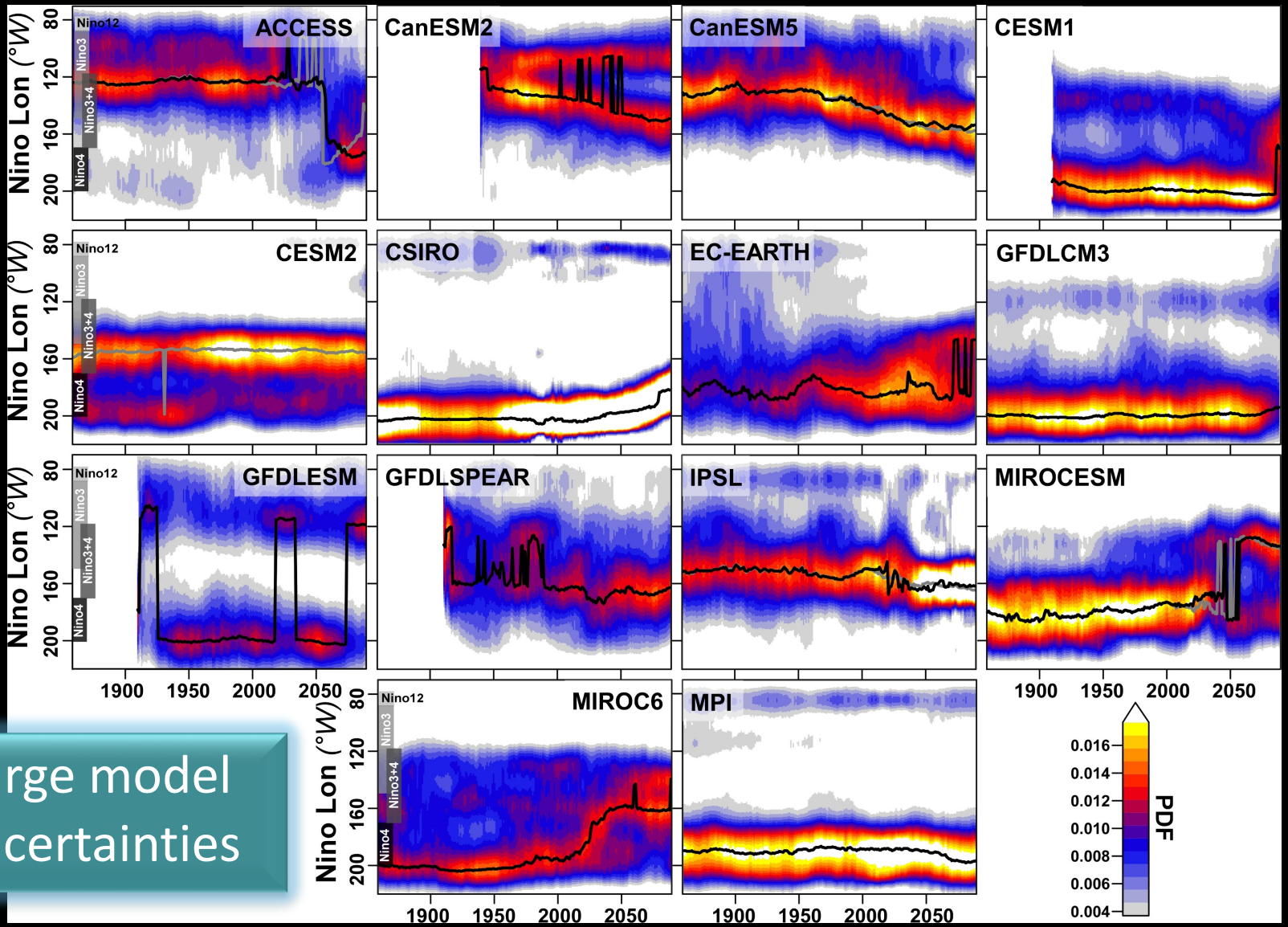
Contrasted performances in Climate Models…

Cf. Dieppois et al. 2021



6 Refs, 14 models, with 20 to 100 realizations, each

Would Central or Eastern Pacific events become more likely in the 21st century???

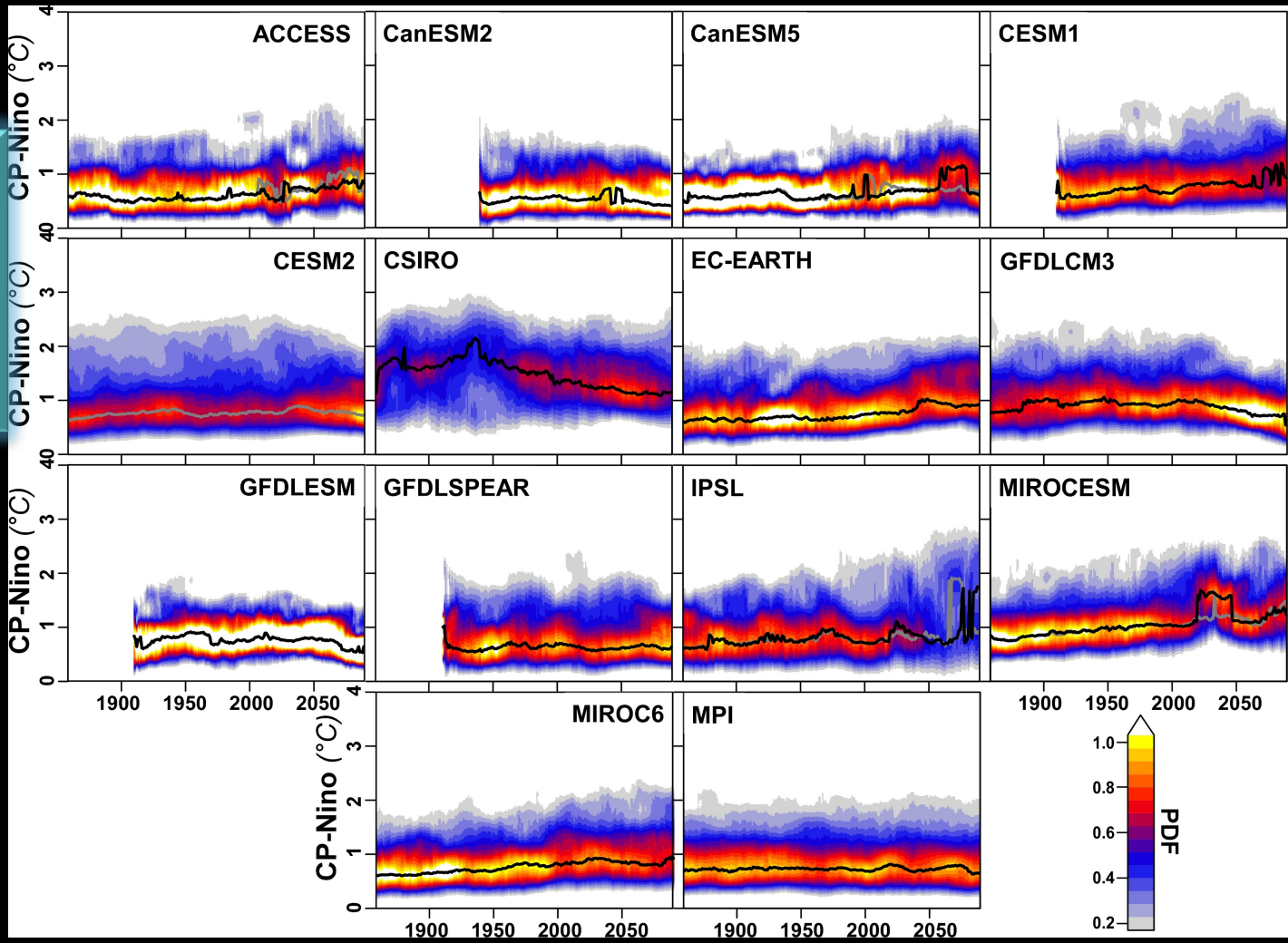


Cf. Dieppois et al. 2021

Large model uncertainties

Would EP- and CP-events become more intense in the 21st century???

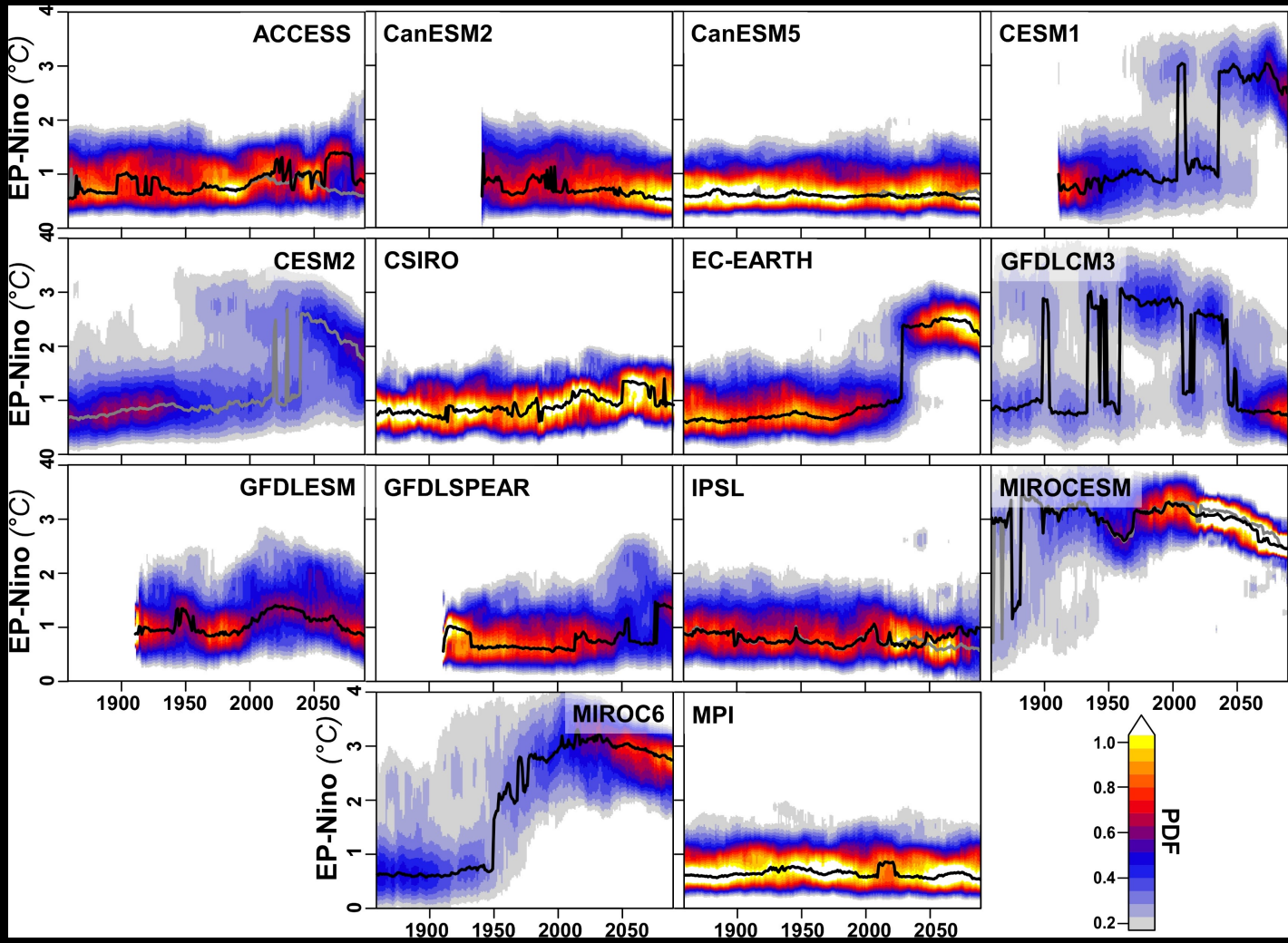
CP-events tend to become slightly more intense in most model



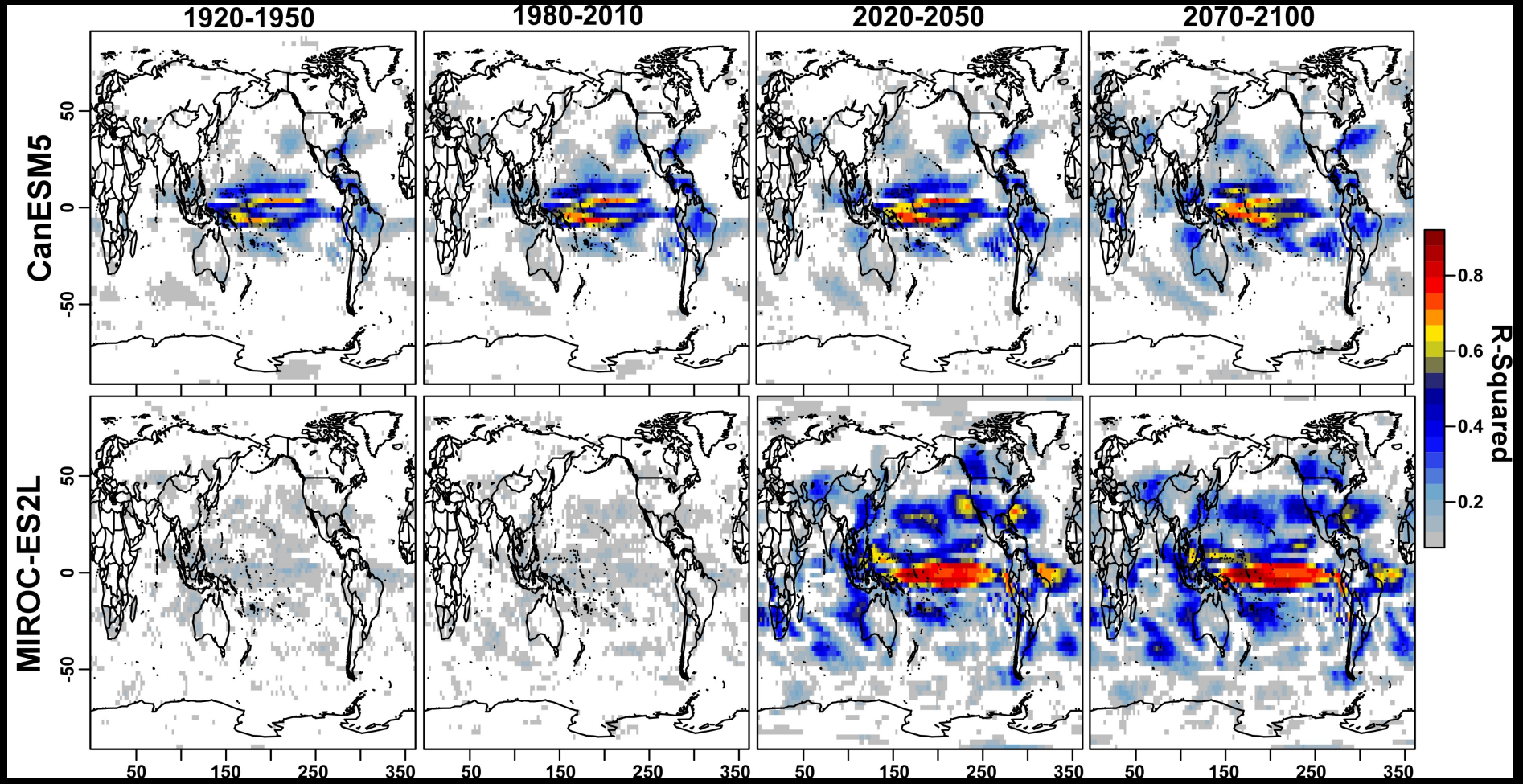
Would EP- and CP-events become more intense in the 21st century???

EP-events tend to become more intense

Very abrupt increases in some models



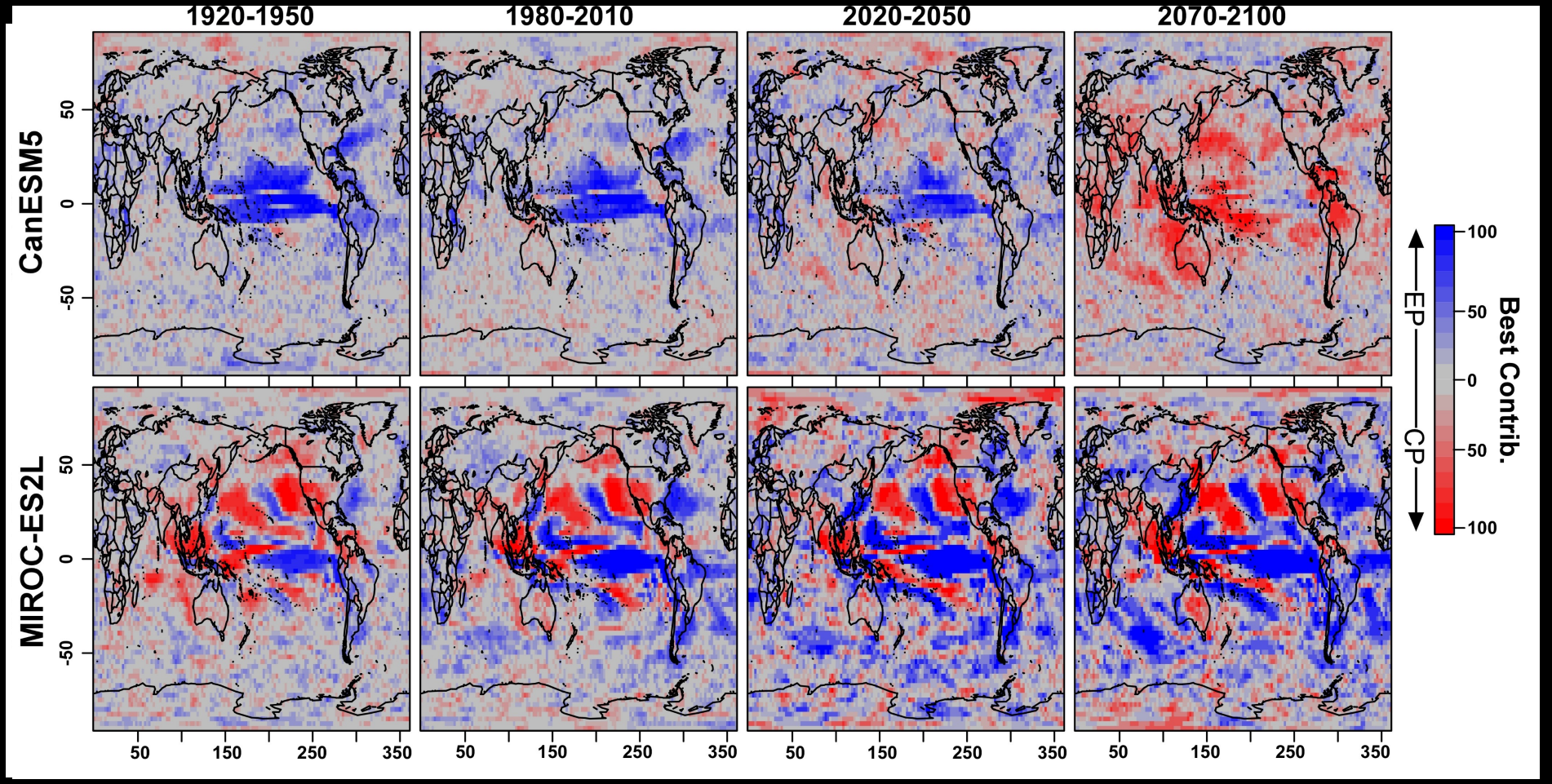
How will these changes impact precipitation?



Increasing impact of ENSO in 21st century

Very abrupt increases in predictability

How will these changes impact precipitation?



Potential switches in best drivers (predictors)

Summary

1. Evaluation

All ENSO events are different → ENSO diversity

ENSO diversity → Climate models reproduce this diversity

Climate models reproduce this diversity → But can favour EP- or CP-events

2. Future Trends

Contrasted trajectories for future ENSO event locations → Changes in main drivers of precipitation variability

increased intensity for future ENSO events → Potentially abrupt for EP-Nino → Increased impact on precipitation

Large implications for future seasonal to decadal forecasting!

Thank You!

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