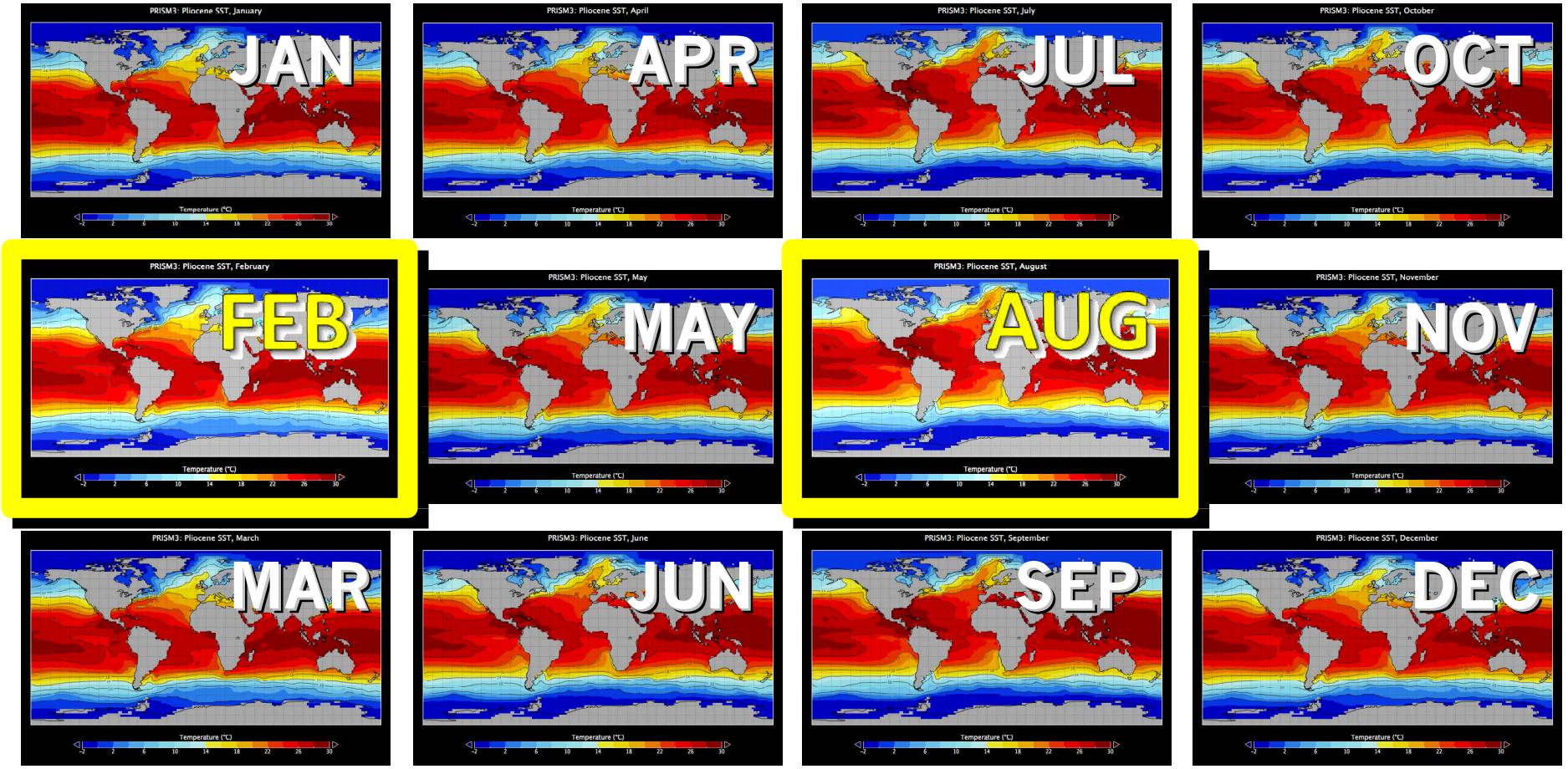
PRISM3D surface ocean (goal 1)



(*Phil. Trans. Royal Society Dowsett et al., in press*)

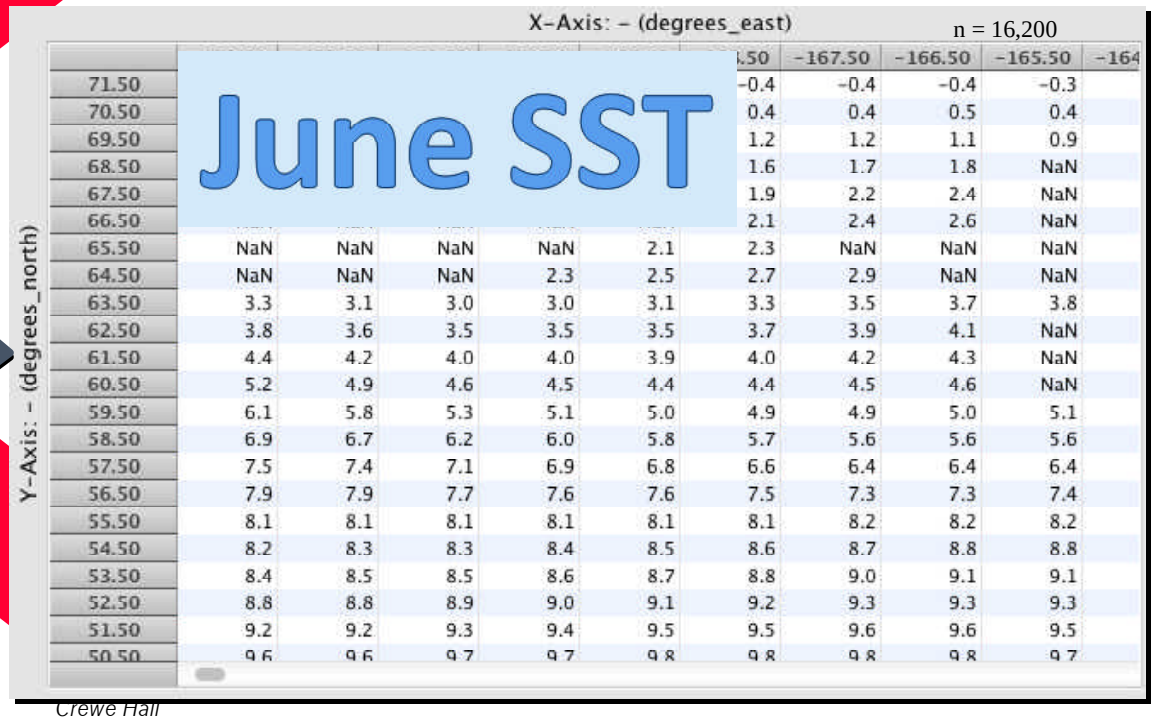
Digital Reconstruction = 126 global data sets

(goal 2)

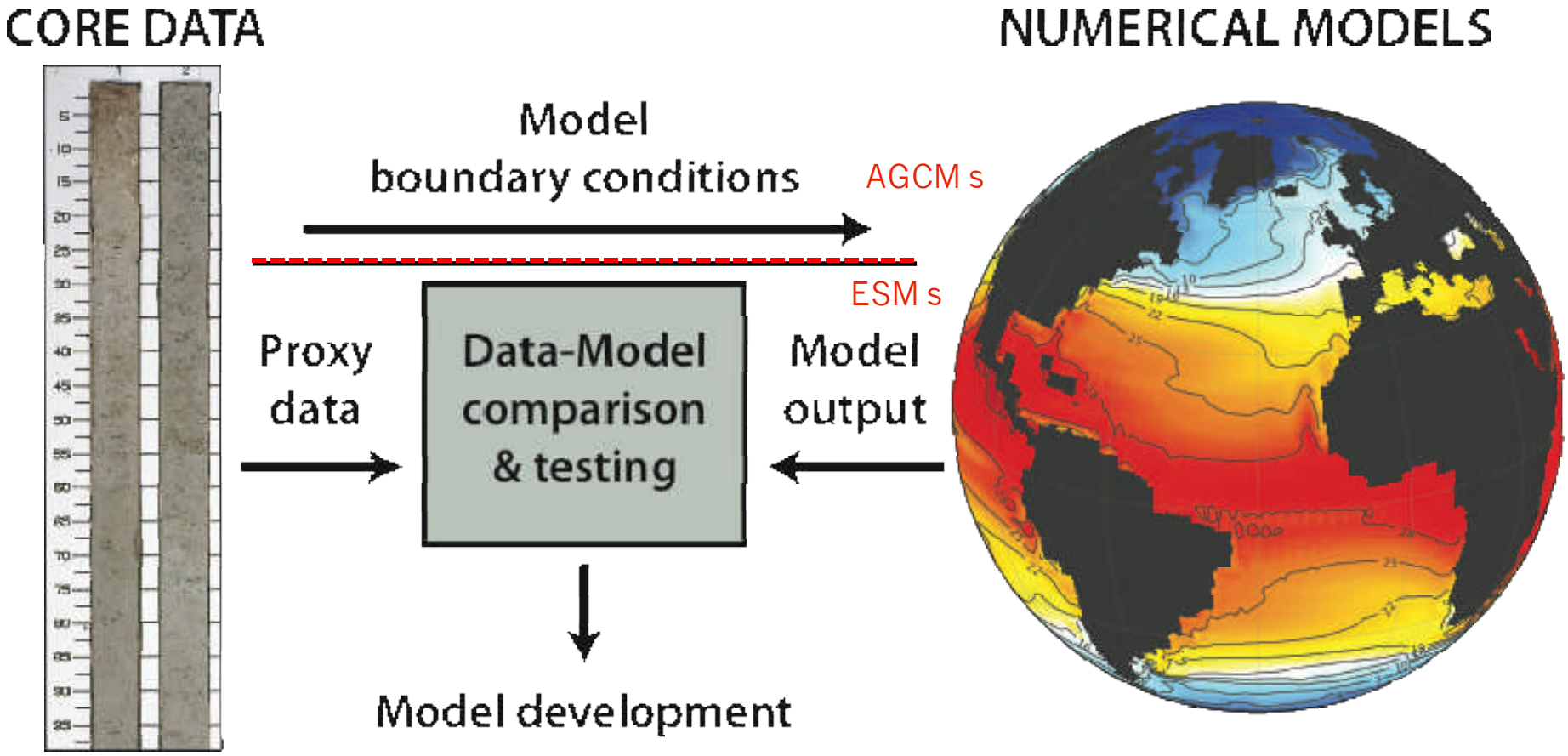
- Mean Annual Temperature (**2x2**)
- 3D Ocean temperature (**4x5x33**)
- BIOME Land Cover (**2x2**)
- Topography (**2x2**)
- Sea-Level (Land-Sea Mask) (**2x2**)
- Ice Sheets (3D) (**2x2**)

42 global datasets:
[non-fractional]
[fractional]
[preferred]
[alternate]

MIN	WPA	MAX
Jan	Jan	Jan
Feb	Feb	Feb
Mar	Mar	Mar
Apr	Apr	Apr
May	May	May
Jun	**Jun**	**Jun**
Jul	Jul	Jul
Aug	Aug	Aug
Sep	Sep	Sep
Oct	Oct	Oct
Nov	Nov	Nov
Dec	Dec	Dec



Data Model Comparison

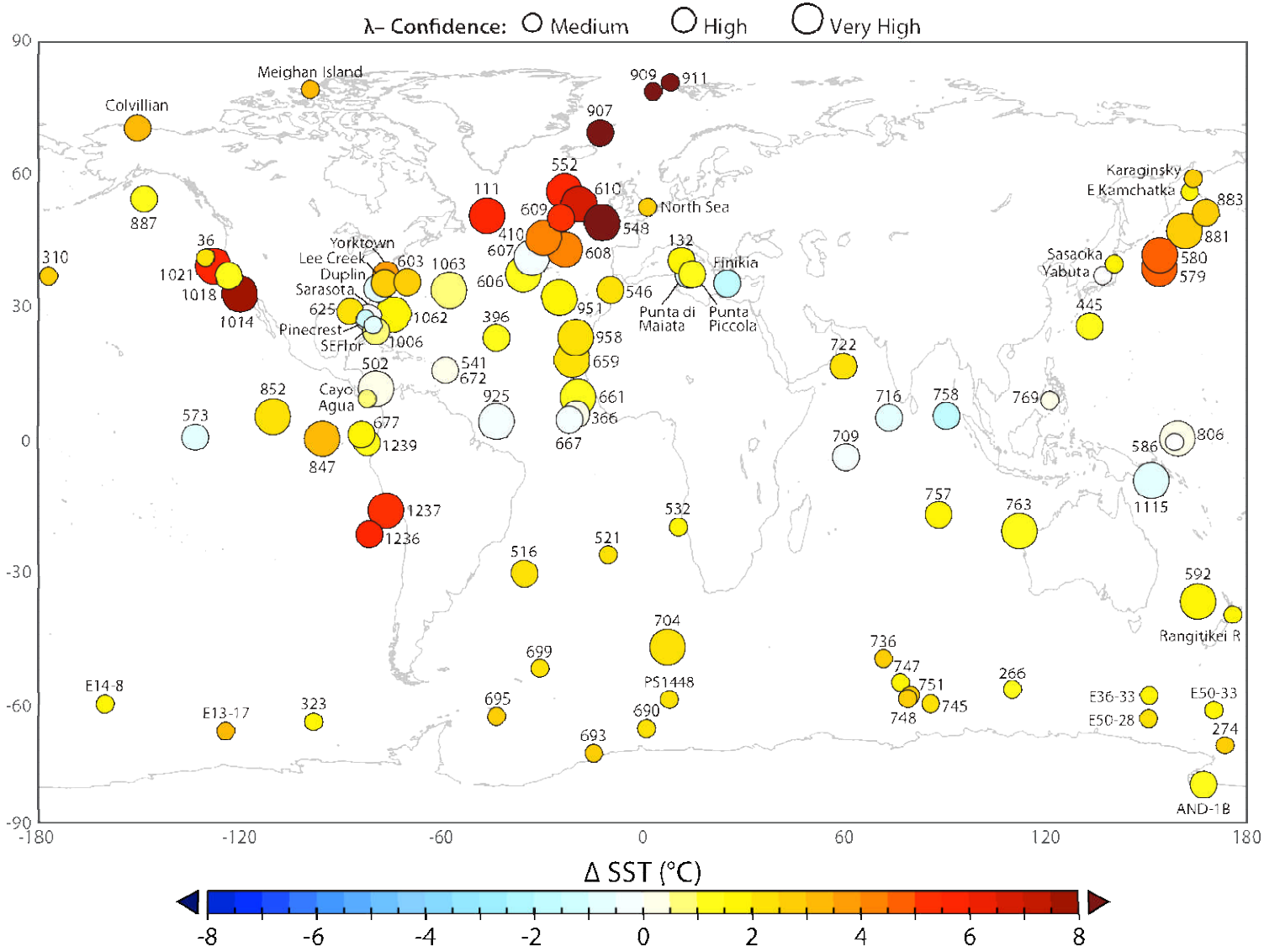


Data model comparisons

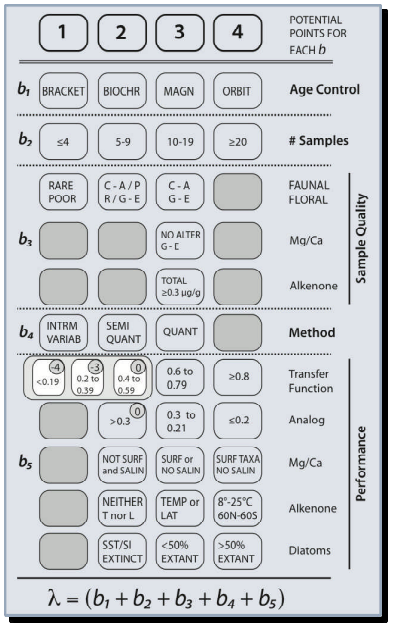
Climate Modelers

Micropaleontologists

PRISM3 ? MASST

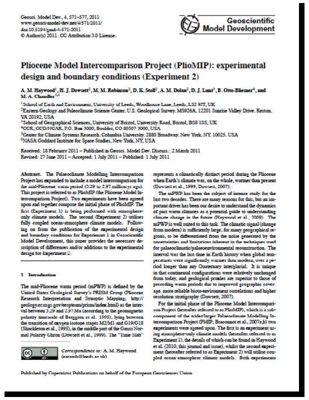


Confidence Rubri

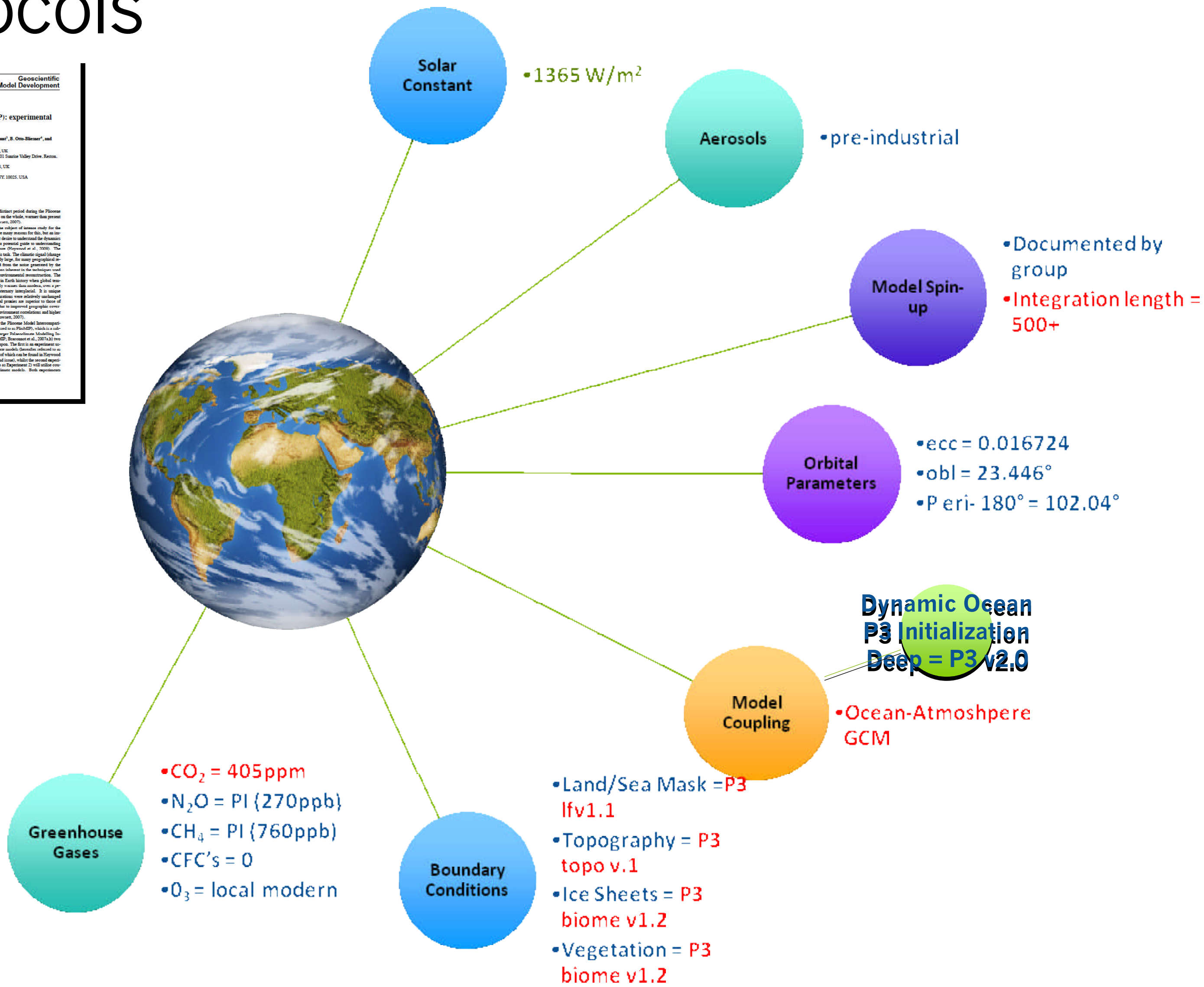


(*Nature Climate Change Dowsett et al., 2012*)

PlioMIP Pliocene Experiment 2 Protocols


Geoscientific Model Development

Pliocene Model Intercomparison Project (PlioMIP): experimental design and boundary conditions (Experiment 2)



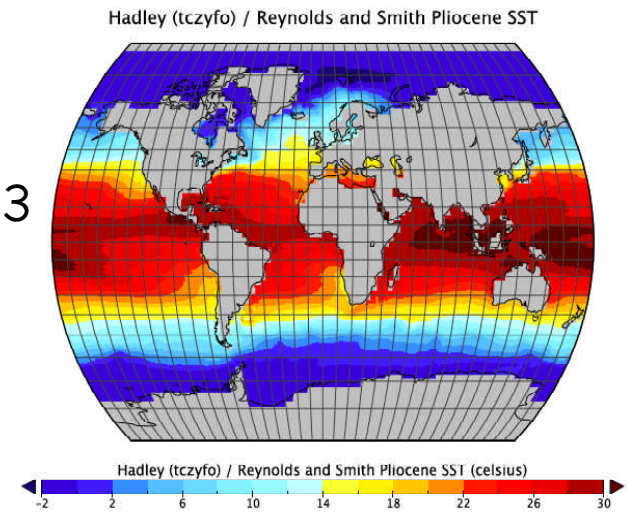
USGS science for a changing world PlioMIP

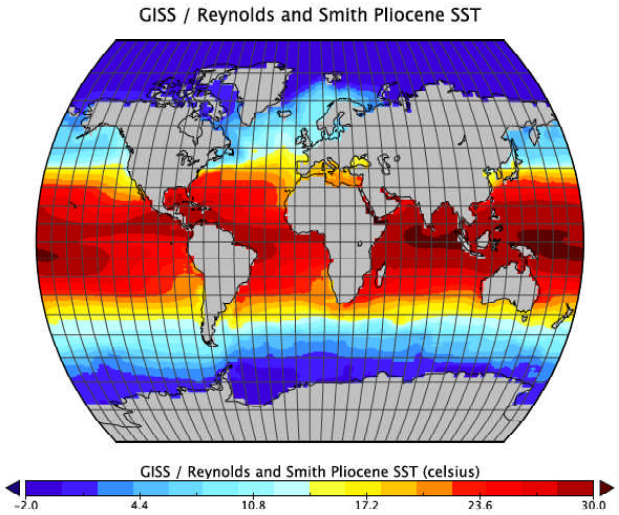
PlioMIP Climate Models

Model	Institute	Principal Investigator
CCSM4	NCAR	Otto-Bleisner
COSMOS	AWI, Bremerhaven, Bremen	Lohmann, Stepanek
GISS-ER	NASA, Columbia University	Chandler, Hansen
HadCM3	Leeds, Bristol University	Valdes, Lunt, Haywood
IPSL CM5A	IPSL, CNRS, France	Ramstein, Contoux, Jost
MIROC4m	JAMSTEC, Tokyo	Abe-Ouchi, Chan
MRI-CGCM2.3	Univ. Tsukuba, Tokyo	Kamae, Ueda
NorESM	Bjerknes Center, Norway	Zhang, Nisancoglu

Models used for initial PRISM3D comparison

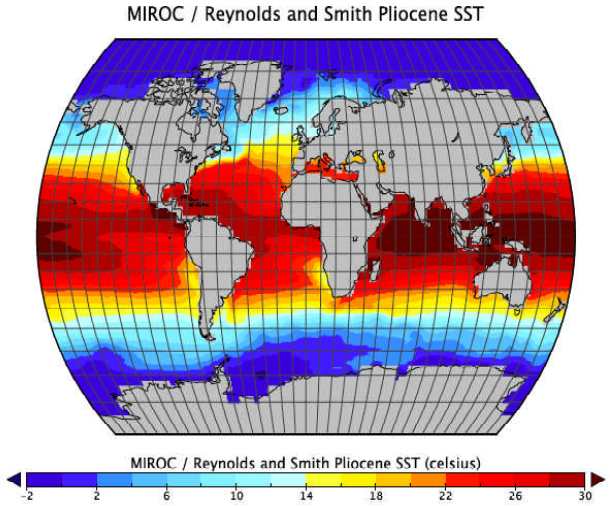
HadCM3

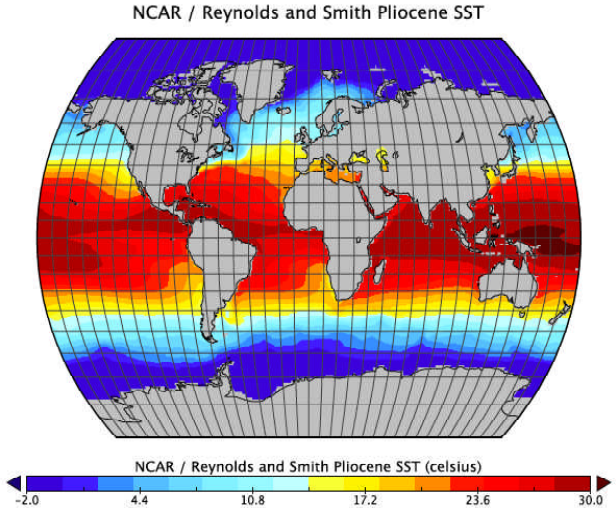




GISS

MIROC



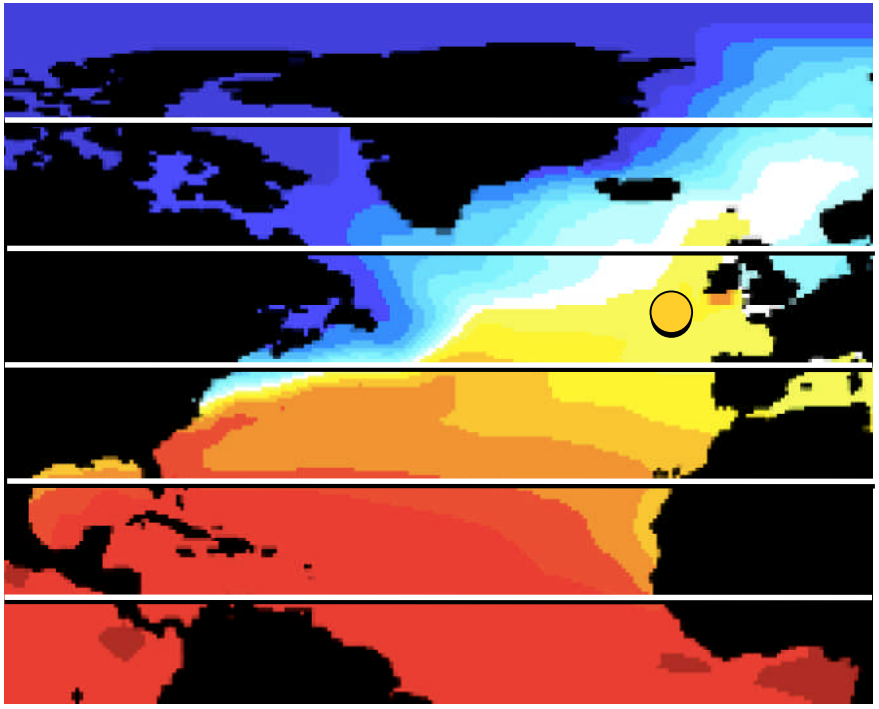


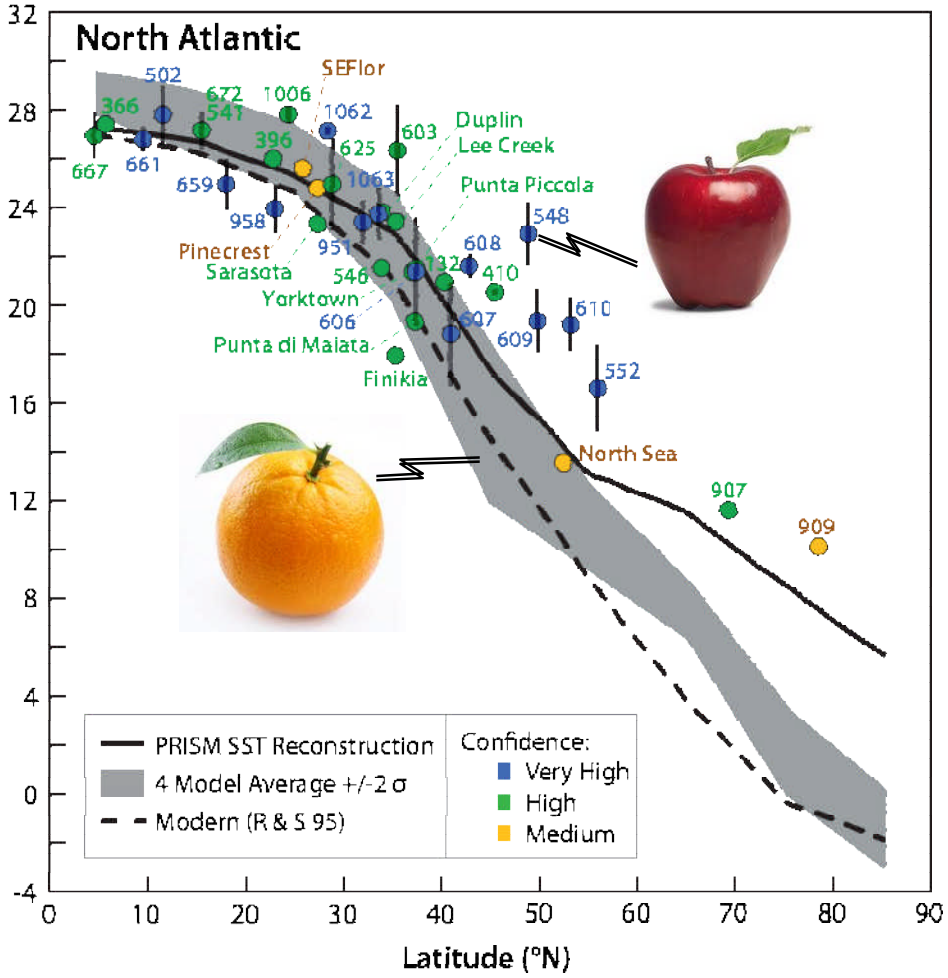
NCAR

USGS science for a changing world

PlioMIP

Preliminary Data Multi-Model Comparison [4 models]



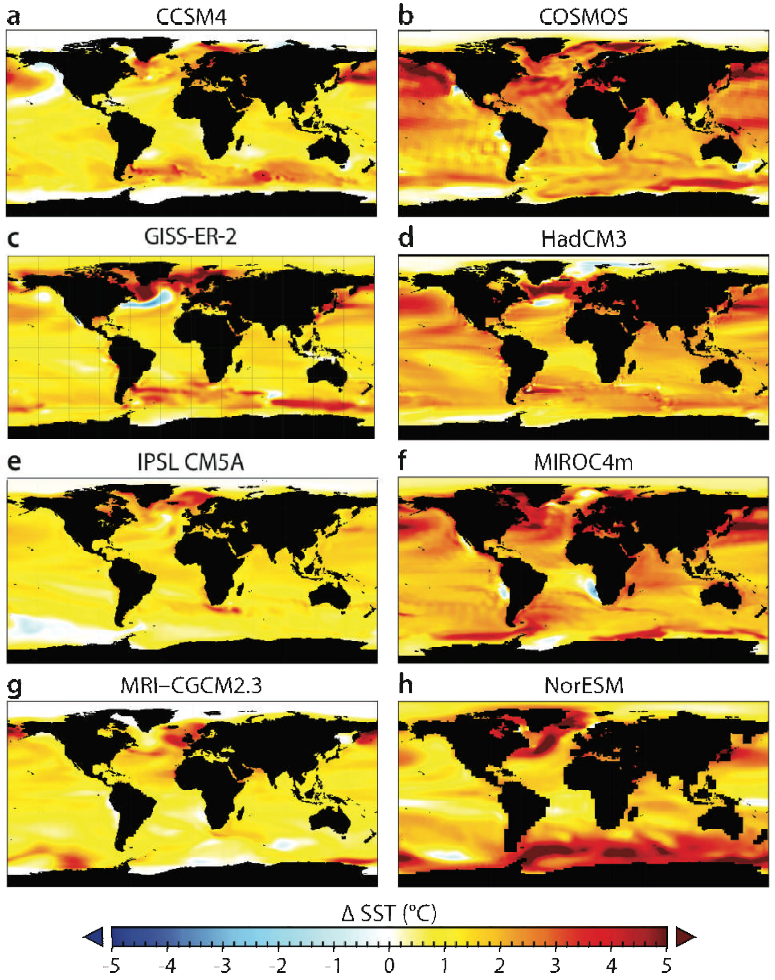


[Initial PlioMIP Exp.2 Results]

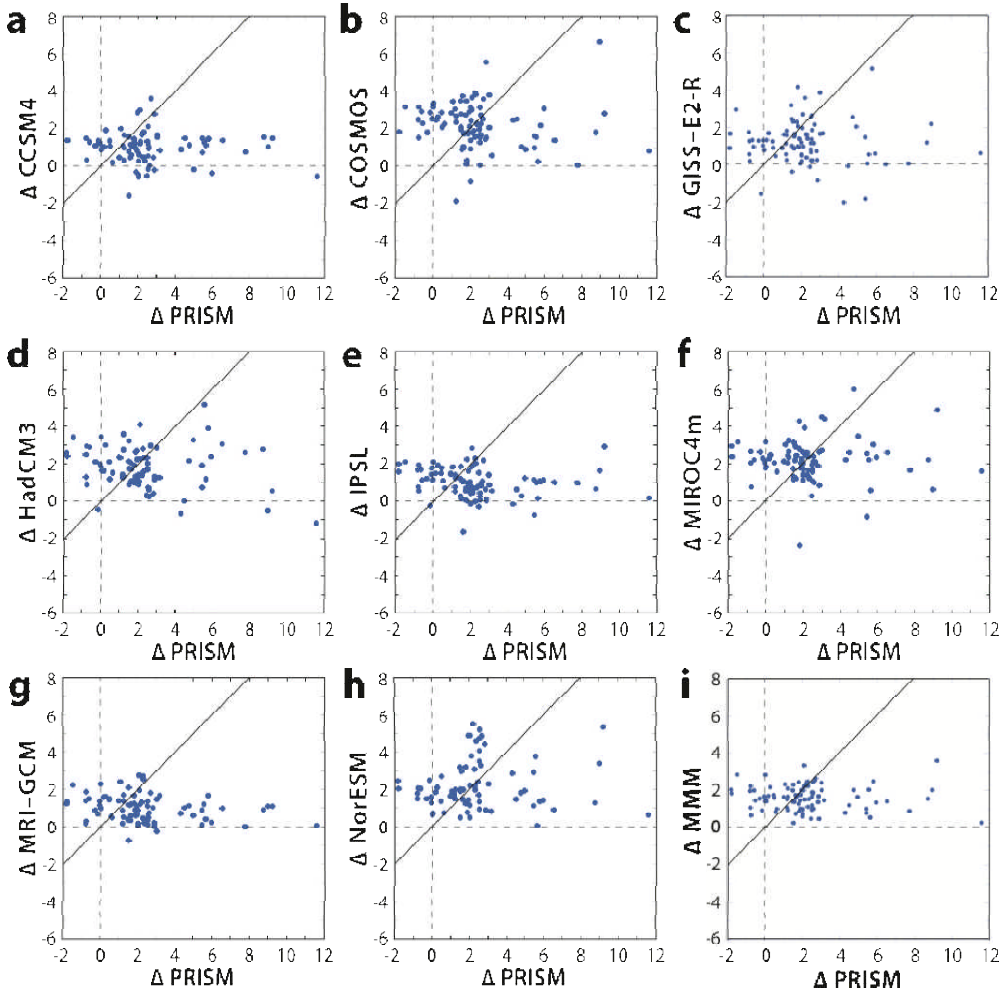
(*Nature Climate Change Dowsett et al., 2012*)

PlioMIP 8 coupled models

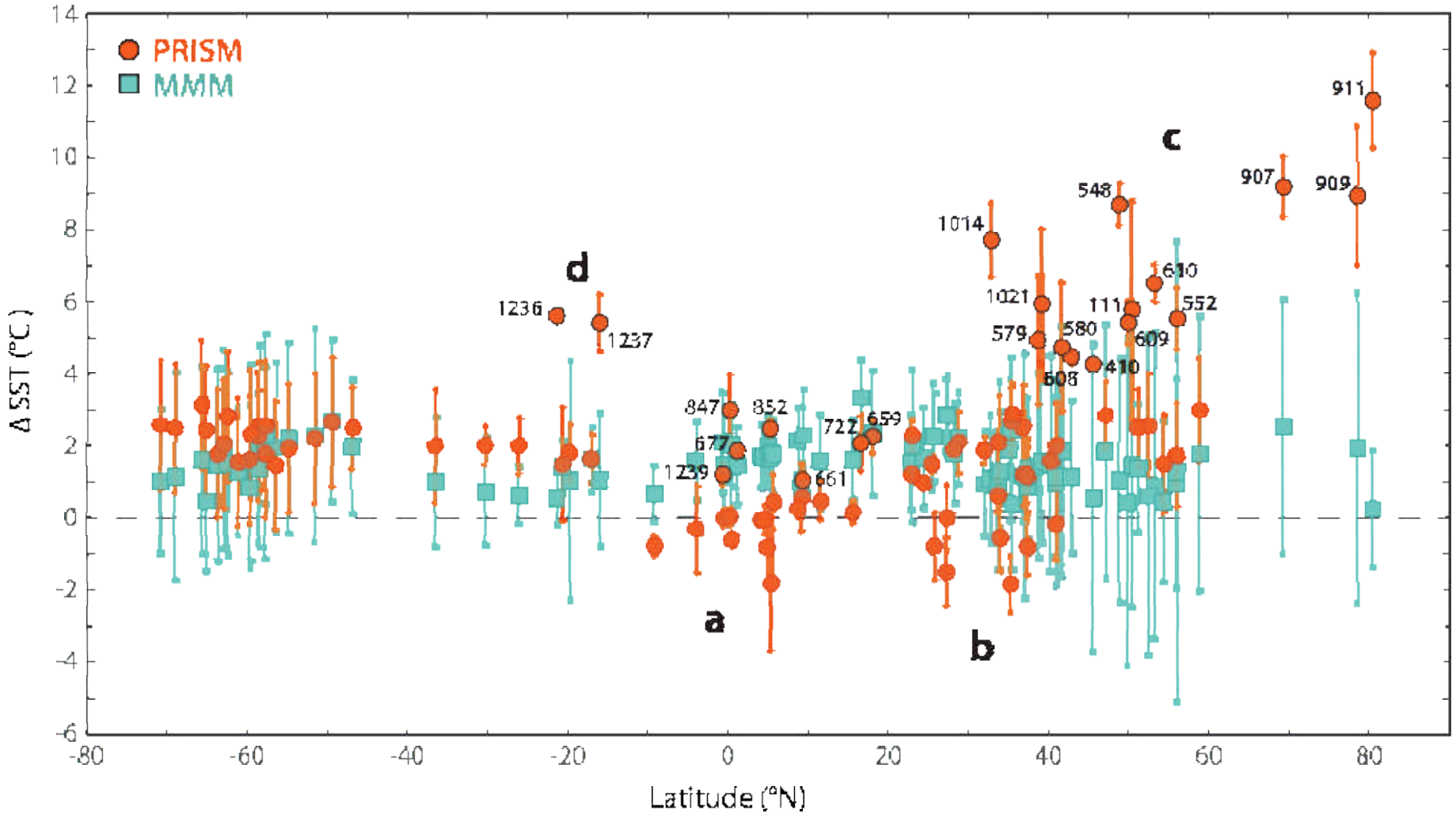
Pliocene minus Pre Industrial



PRISM vs Models



Data-model comparison



What does PlioMIP Phase I tell us

1. Tropics, upwelling & mid-high latitude North Atlantic are new targets.

2. Need to reduce uncertainty in both simulations and paleo estimates. How?

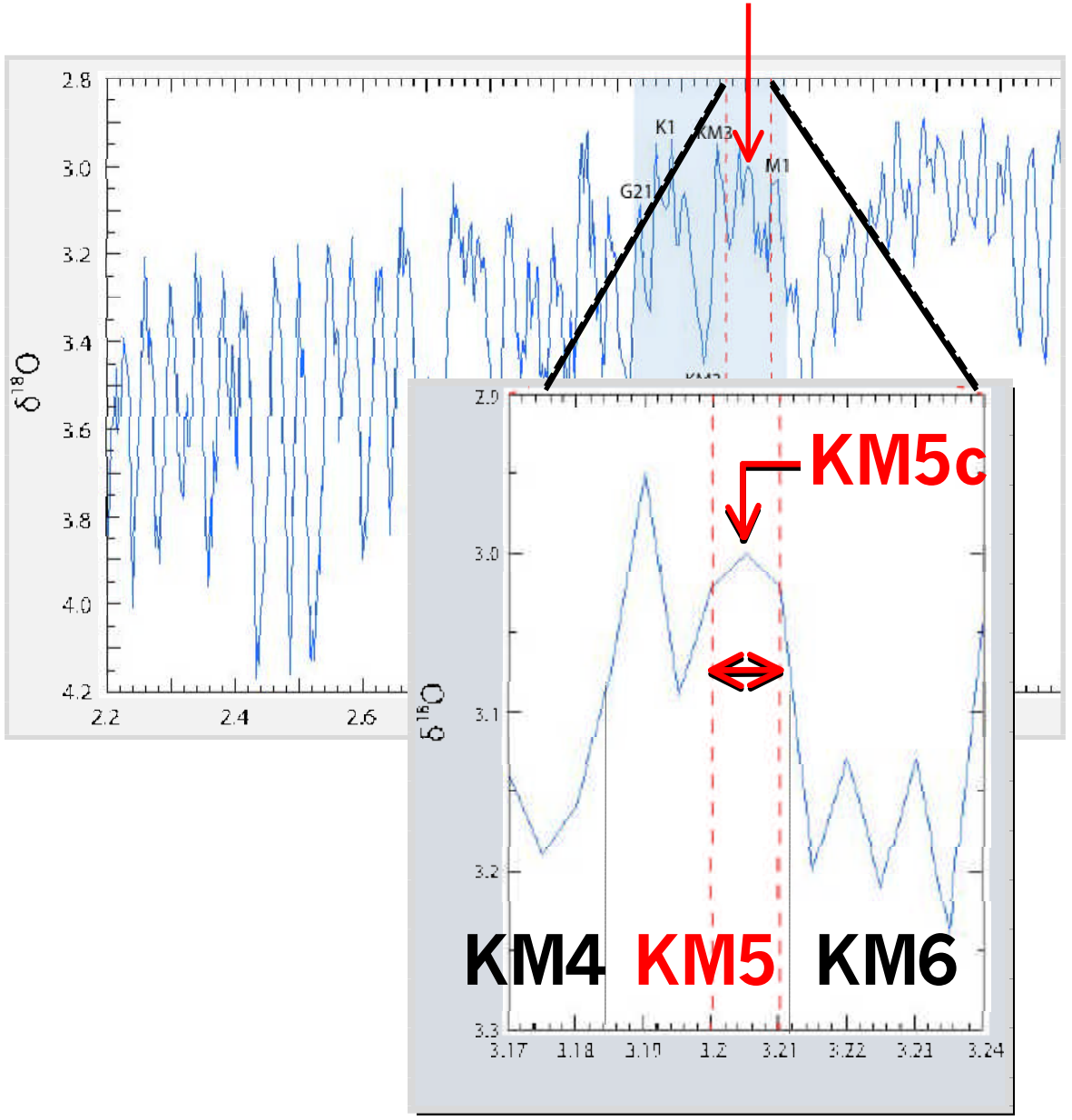
mid-Piacenzian Time Slice

KM5c Time Slice

3.200 – 3.210 Ma

- 1st mid-Piacenzian time slice to reduce uncertainties in data reconstruction & numerical modeling of a warm climate state during the Pliocene

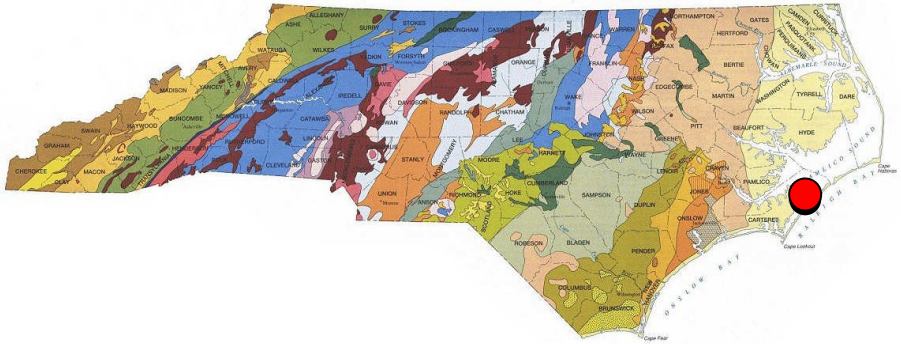
- Time slice will enable us to identify a discreet interval which was warmer, yet had same or very similar orbital configuration (i.e. forcing) as today

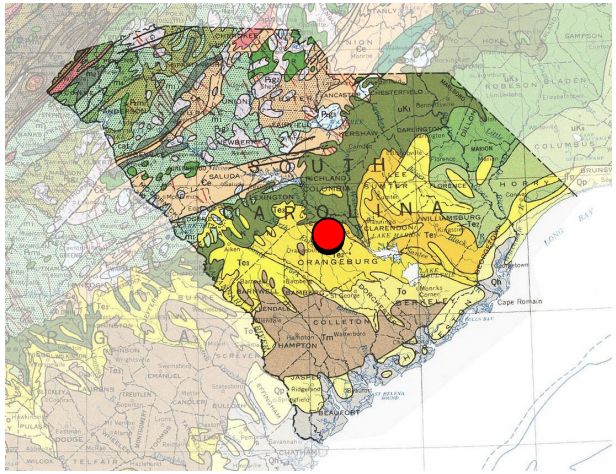


USGS science for a changing world

PlioMIP

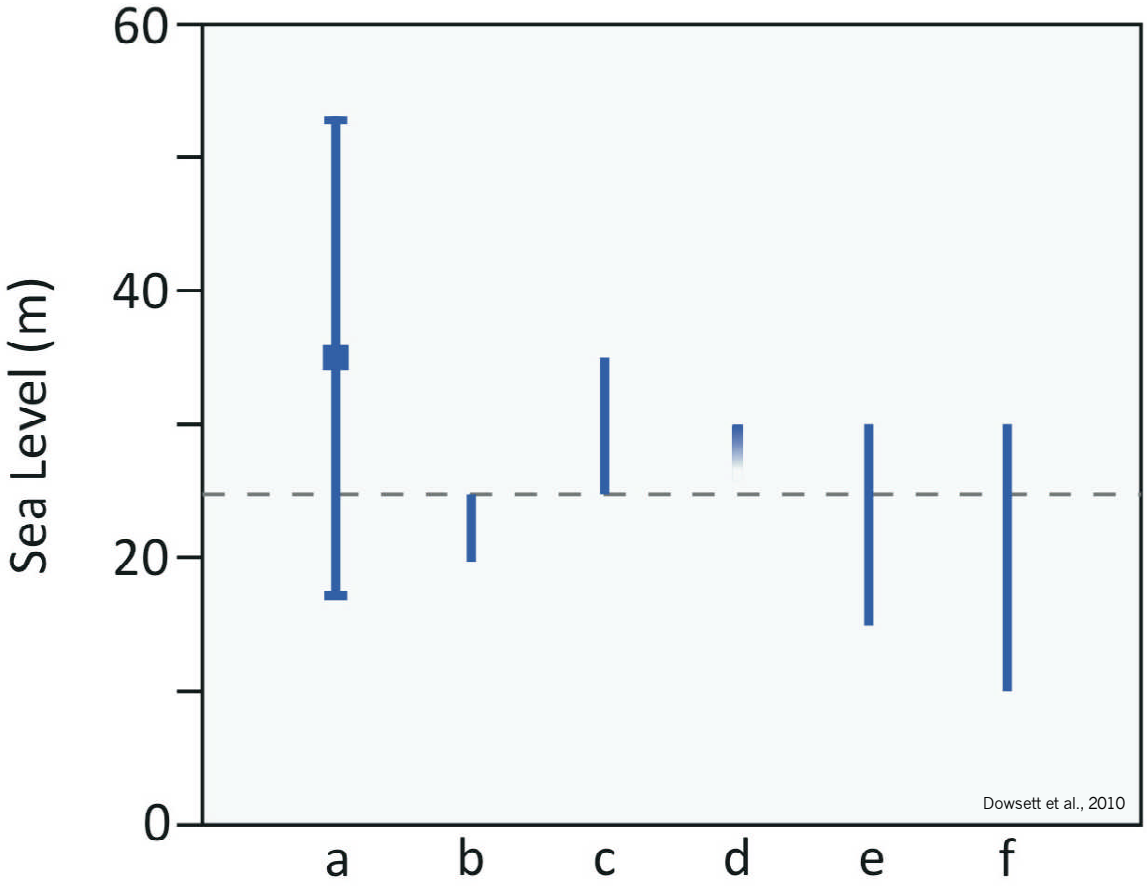
Pliocene Sea Level





USGS
science for a changing world

Estimates of the peak position of sea level during the Pliocene have a wide range



(a) **Orangeburg Scarp**, +35 ± 18m (Dowsett and Cronin 199(

(b) **Enewetak Atoll**, +20 to 25m (Wardlaw and Quinn 199

(c) **Atlantic Coastal Plain**, +25 to 35 (Krantz 1991

(d) **LR04 oxygen isotope stack**, +3((see Raymo *et al*. 2009)

(e) **Sites 925 and 926**, +15 to 30m (Dwyer and Chandler 200

(f) **Wanganui Basin NZ**, +10 to 30m (Naish and Wilson 2009)

USGS science for a changing world

Yorktown, Duplin & Raysor Formations