

How Tibetan Plateau Affects the Global Meridional Overturning Circulation?

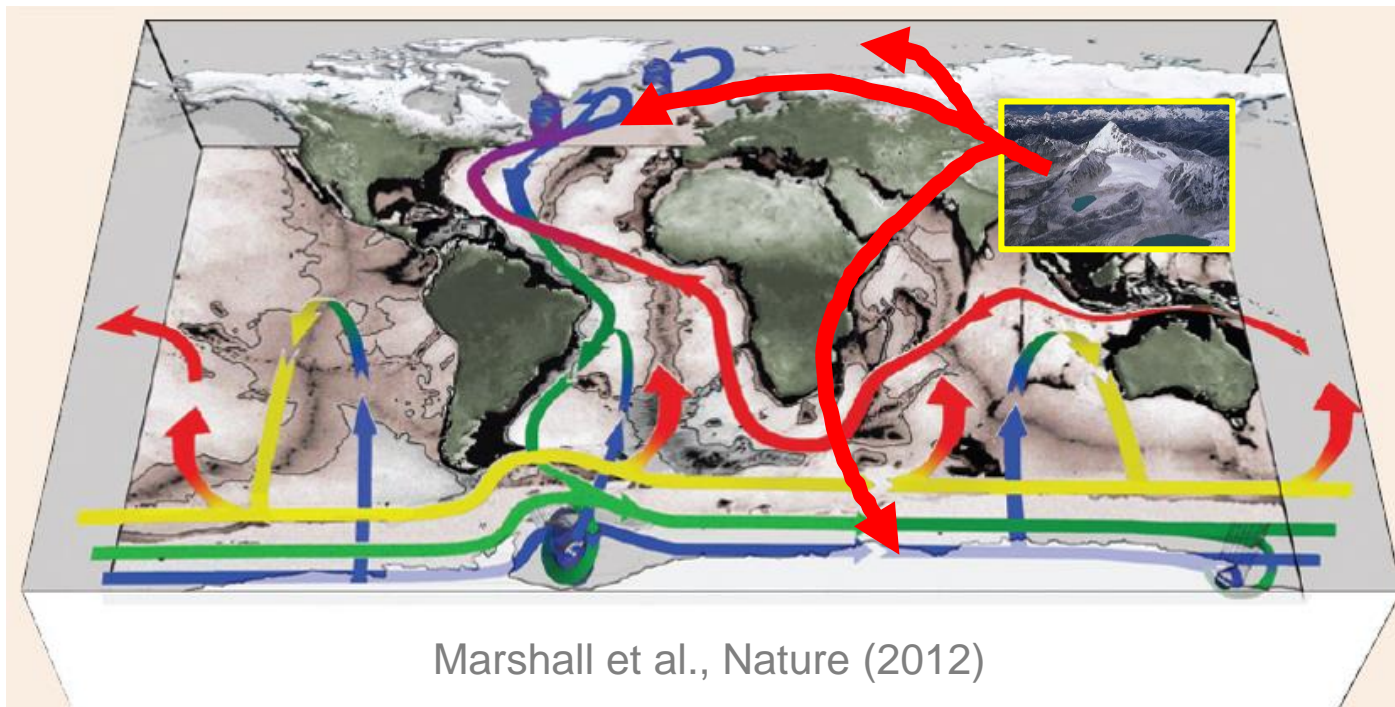
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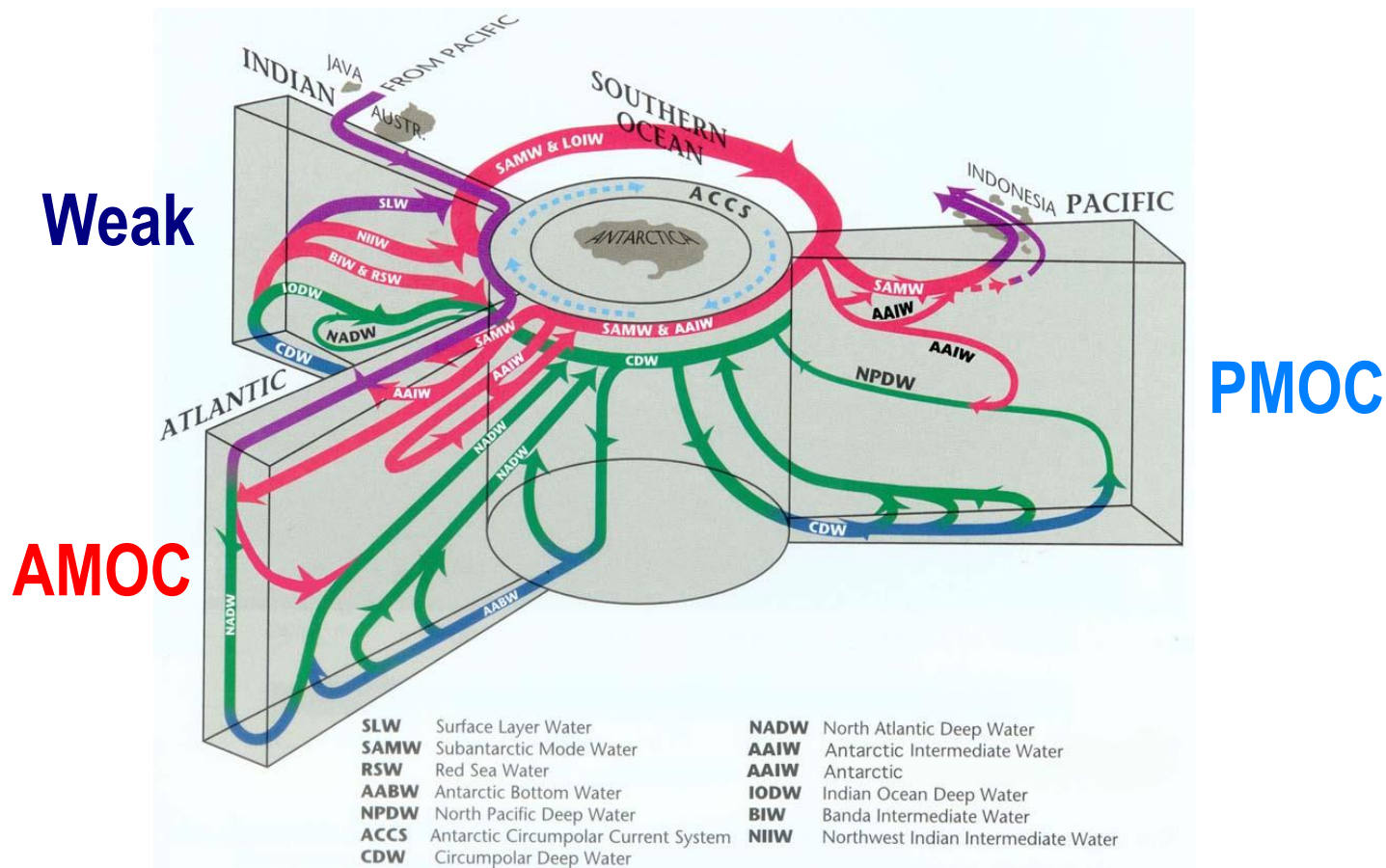
TP: A *Global* Perspective

How and to what extent?



Global Meridional Overturning Circulation

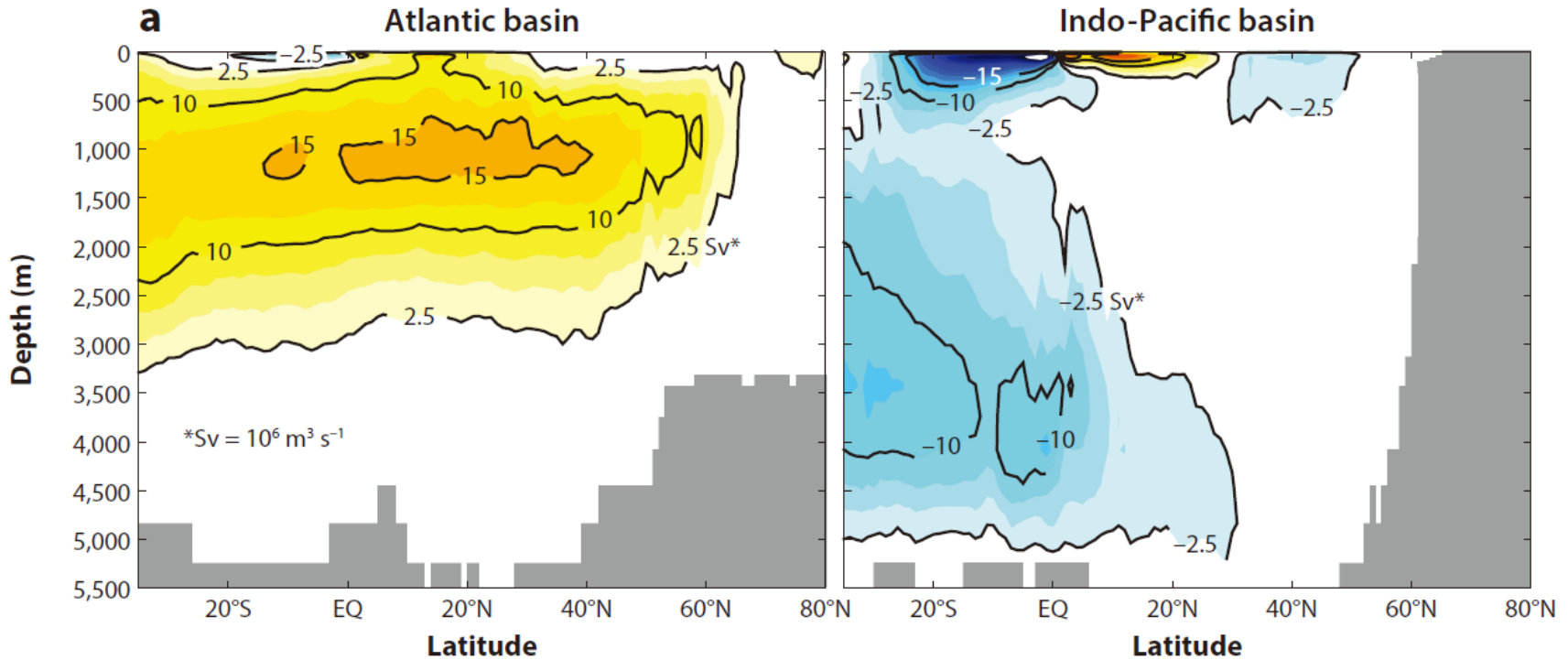
Energy and Freshwater Balance



Schmitz (1997) Overturning circulation: Southern Ocean View

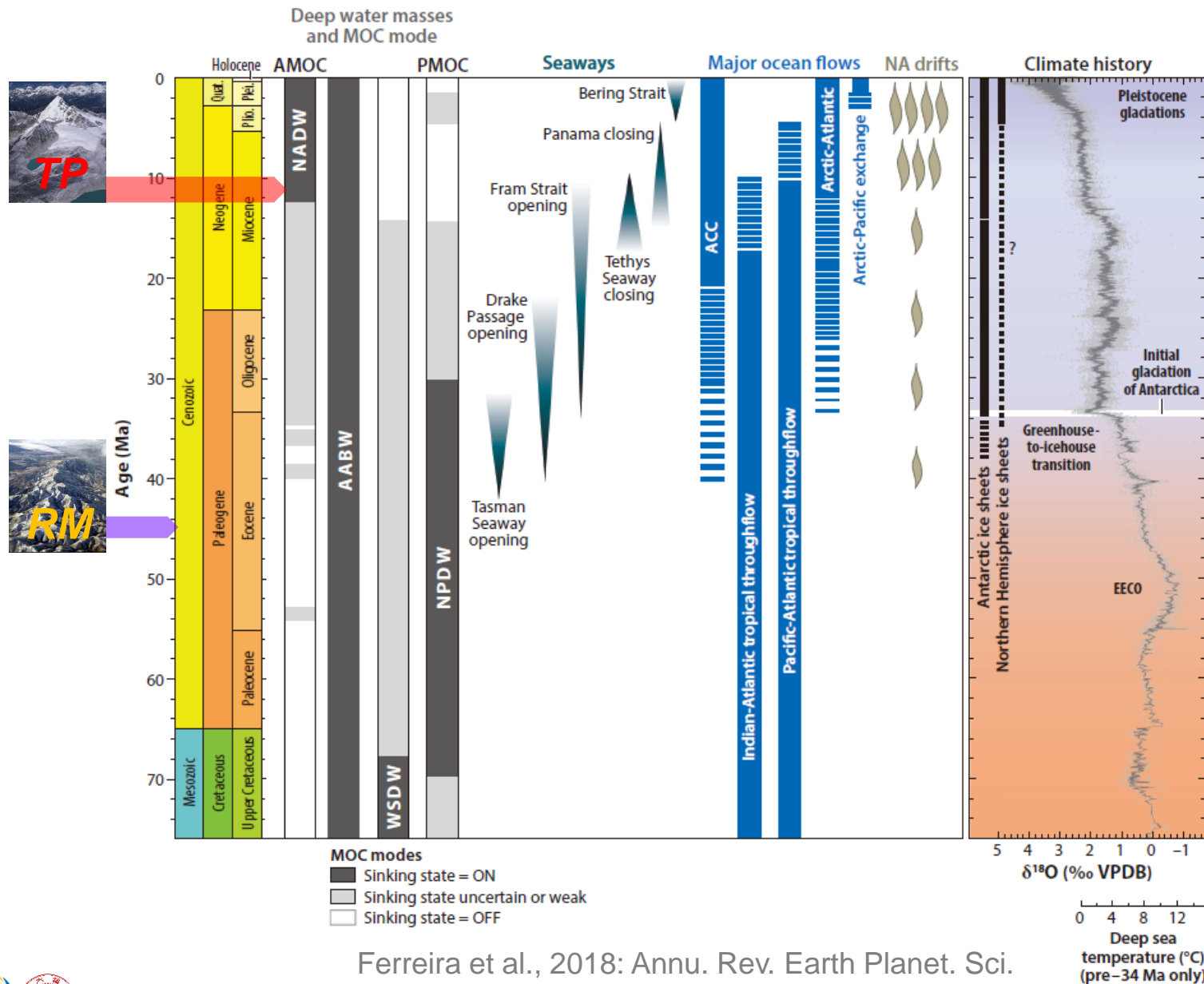
Strong AMOC

Weak PMOC



Ferreira et al., 2018: Annu. Rev. Earth Planet. Sci.

Geological History of *GMOC*

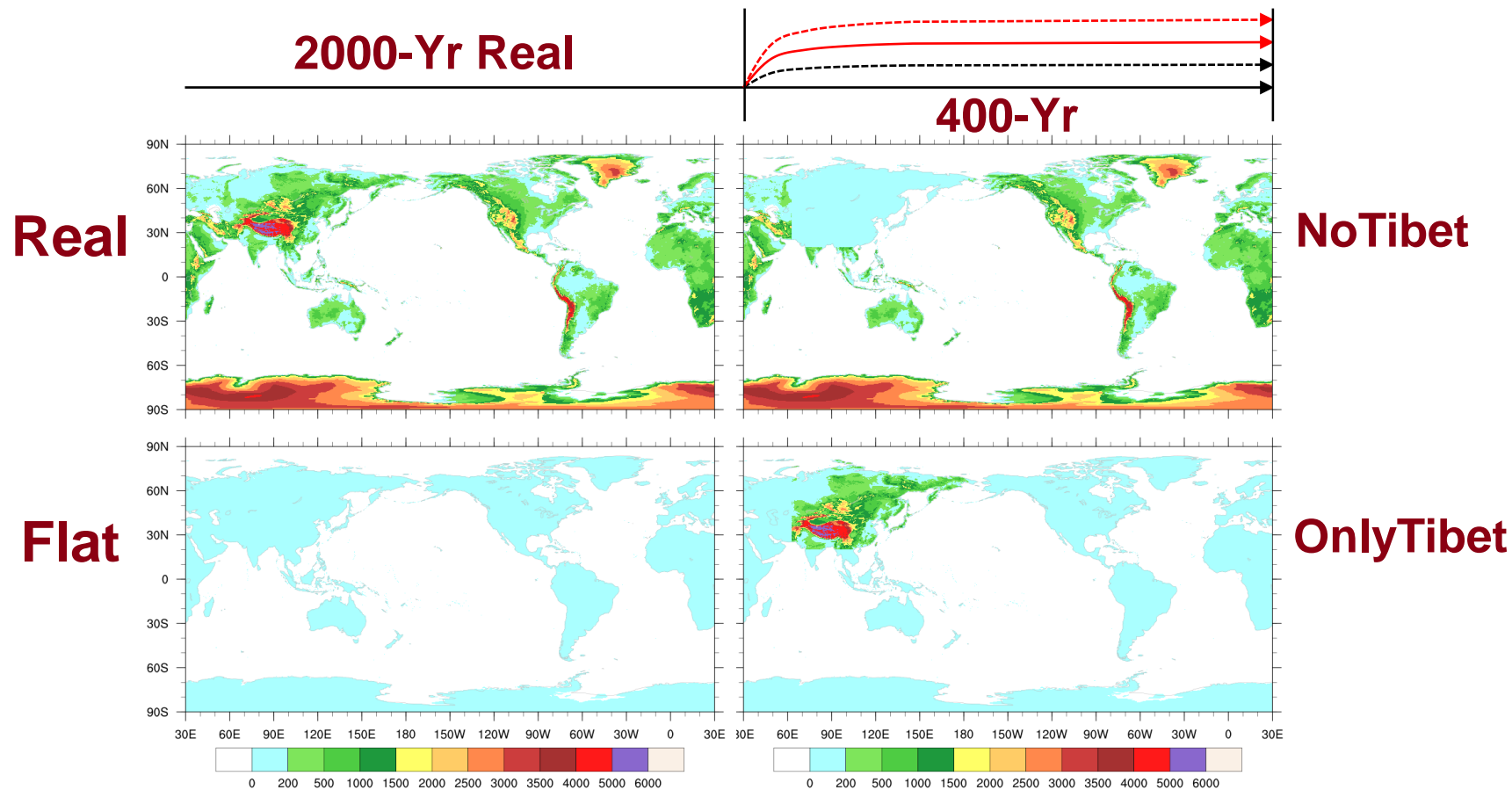


Ferreira et al., 2018: Annu. Rev. Earth Planet. Sci.

上海交通大学海洋学院思源海洋会议, 2019.06.29, 上海

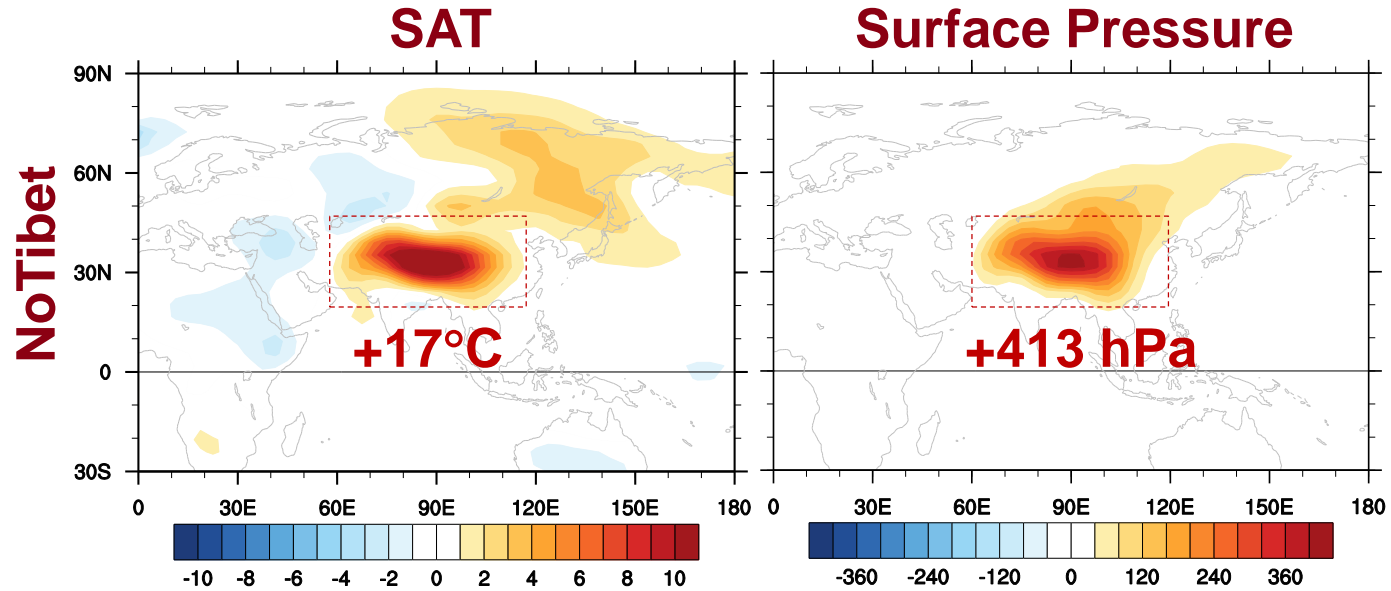


Coupled Earth System Model



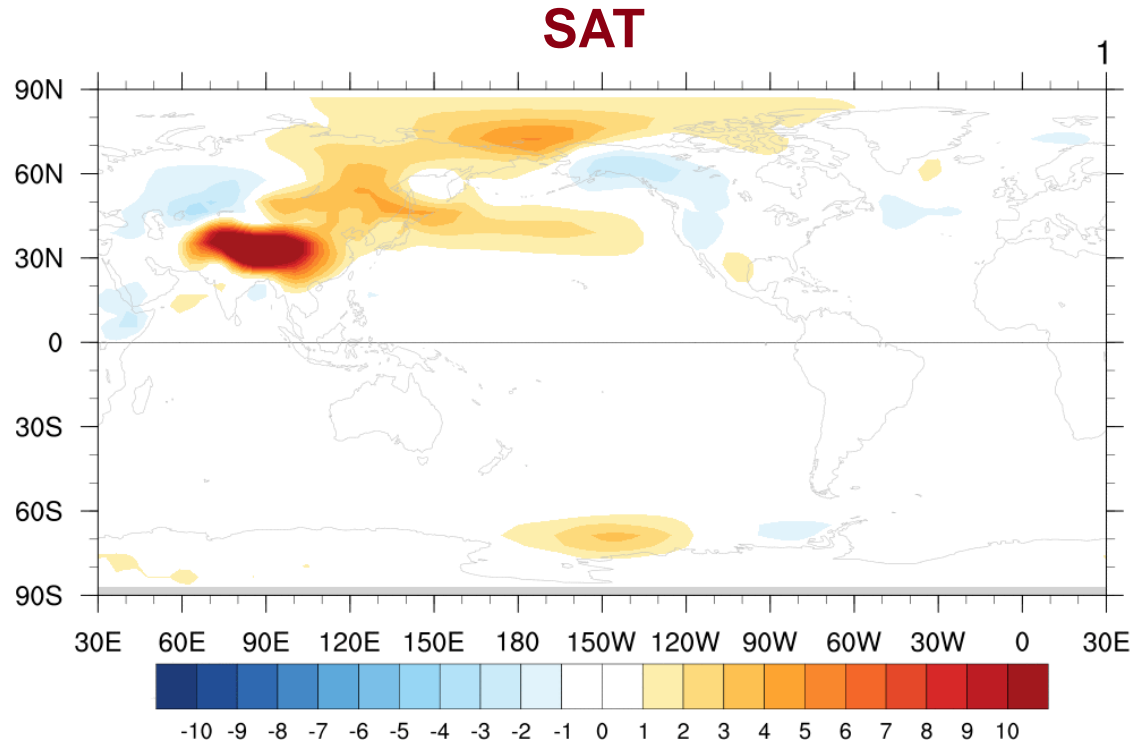
NCAR CESM1.0: CAM5 / POP2 / CLM4 / CICE4 / Glimmer-CISM

TP Forcing: *Thermal* and *Dynamical*



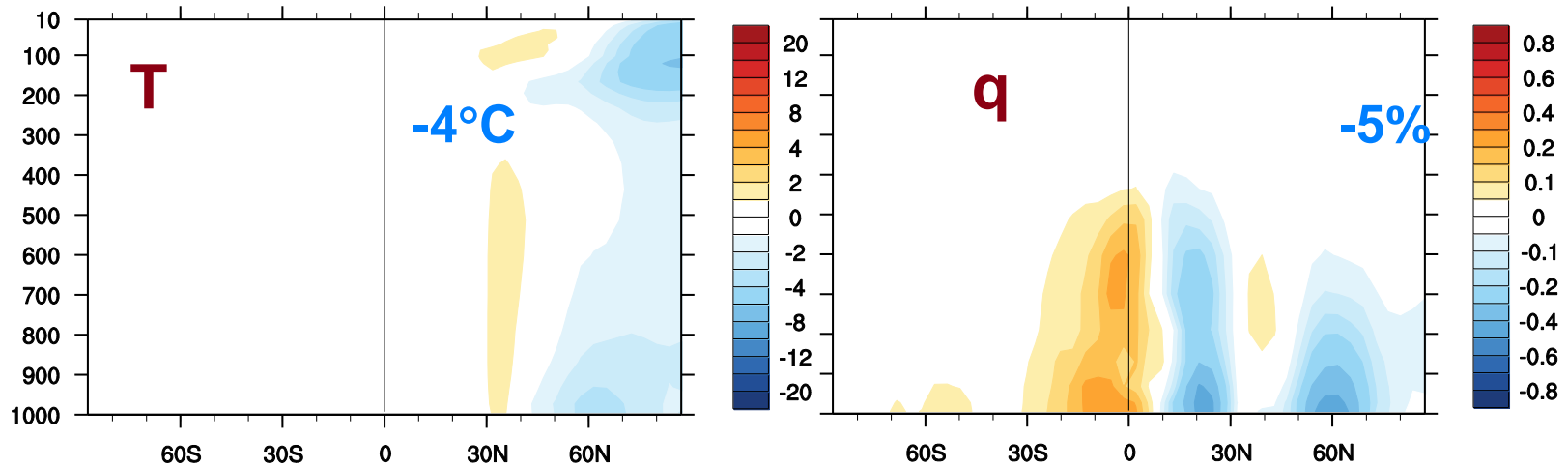
Lapse Rate $T \sim 4 \text{ km} \times 7 \sim 28^\circ\text{C}$

SAT Evolution w/o TP



Atmosphere T and Moisture

NoTibet



Cold and Dry without TP

Preliminary Results

		NoTibet	OnlyTibet
Atmos	TOA (PW)	+0.2	-0.04
	Air T (°C)	-4.0	+6.0
	SAT (°C)	-18.0	+19.0
	Air q (%)	-5.0	+10.0
	HC (%)	+13	-20
Ocean	SST (°C)	-8.0	+10.0
	SSS (psu)	-4.0	+6.0
	SSD (kg/m ³)	-3.0	+4.0

0 → 1 : Critical in Shaping Global Climate!

Summary

0 → **1** : Critical to **AMOC**, **PMOC**,

Energy and moisture transport

in / between SH and NH

1 → **∞**



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谢谢