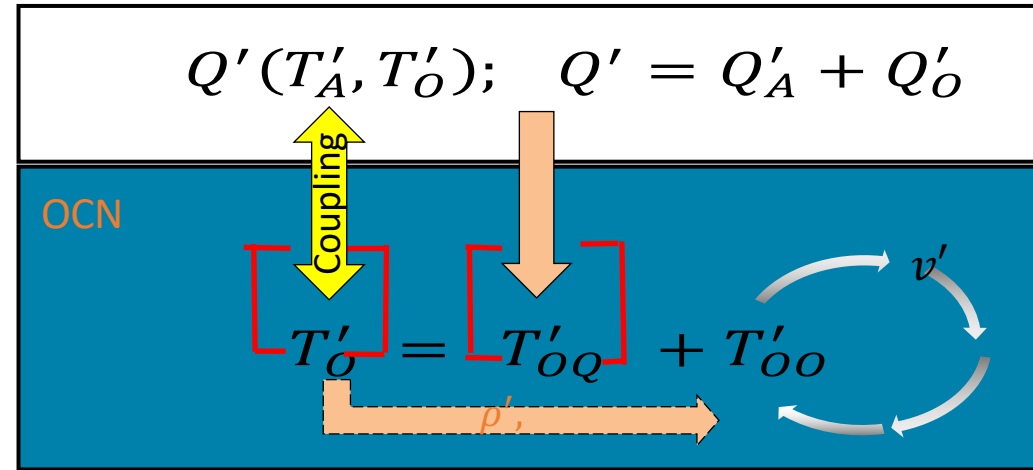


# Attribution of the SST and OHU changes using a partial coupling approach

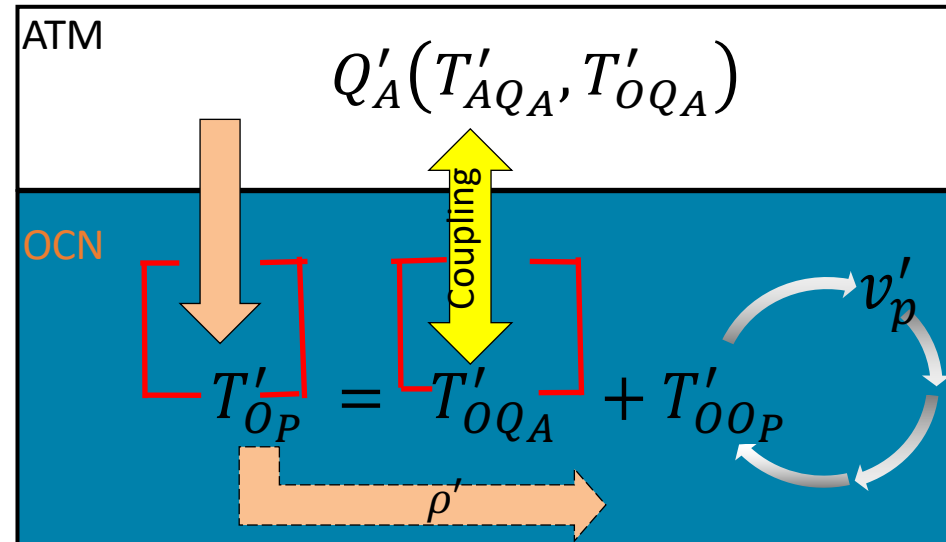
Oluwayemi Garuba<sup>1</sup>, Phil Rasch<sup>1</sup>, Jian Lu<sup>1</sup>  
Pacific Northwest National Laboratory

Fully coupled



**Fully coupled:**  
Anomalous surface  
Interaction is driven by  
atmospheric  
perturbation and  
Ocean circulation  
changes

Partially coupled (atmosphere-driven)



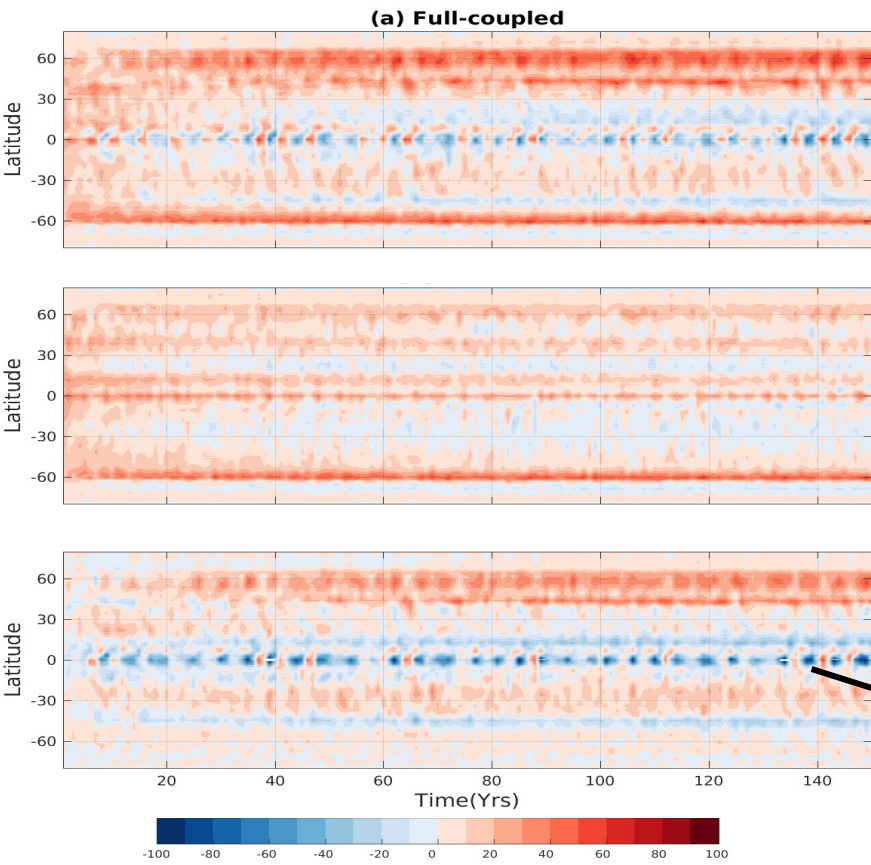
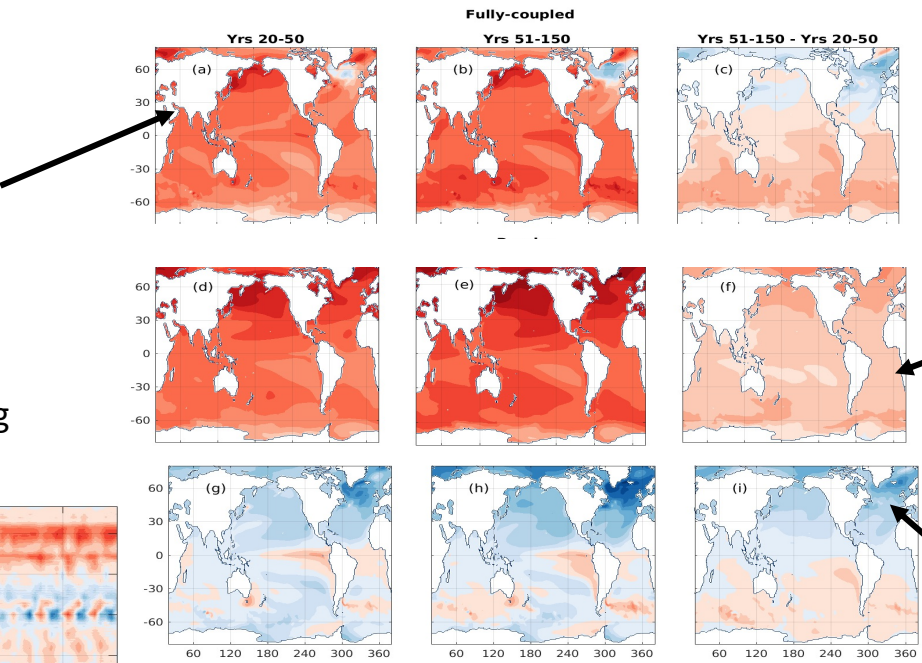
**Partially coupled  
(atmosphere-  
driven:**  
Anomalous  
surface  
Interaction is  
driven by  
atmospheric  
perturbation only

# Ocean heat uptake (OHU) and SST decomposition

Full coupled SST response features:  
Evolving, North Atlantic warming hole, El-Nino-like tropical warming  
Southern ocean warming

Atmosphere-driven component features:  
Warmer Northern Hemisphere-amplified pattern; Non evolving;  
Similar pattern to a slab ocean simulation

Ocean-driven component features: Cooler global surface and Northern Hemisphere cooling (Warming hole); El-Nino-like tropical warming; evolving pattern



Atmosphere driven OHU: Equatorial heat uptake, Southern Ocean heat uptake

Ocean-driven OHU: Tropical heat loss; Northern Hemisphere heat gain; evolving component

