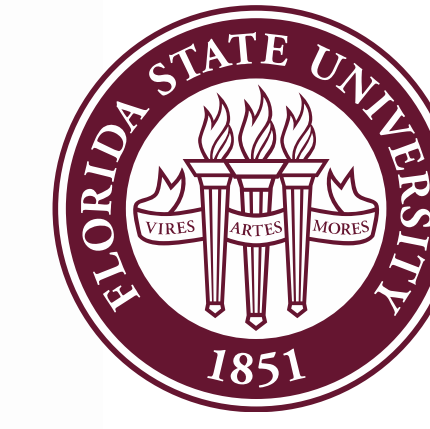


Fast Warming of the Surface Ocean Under a Climatological Scenario

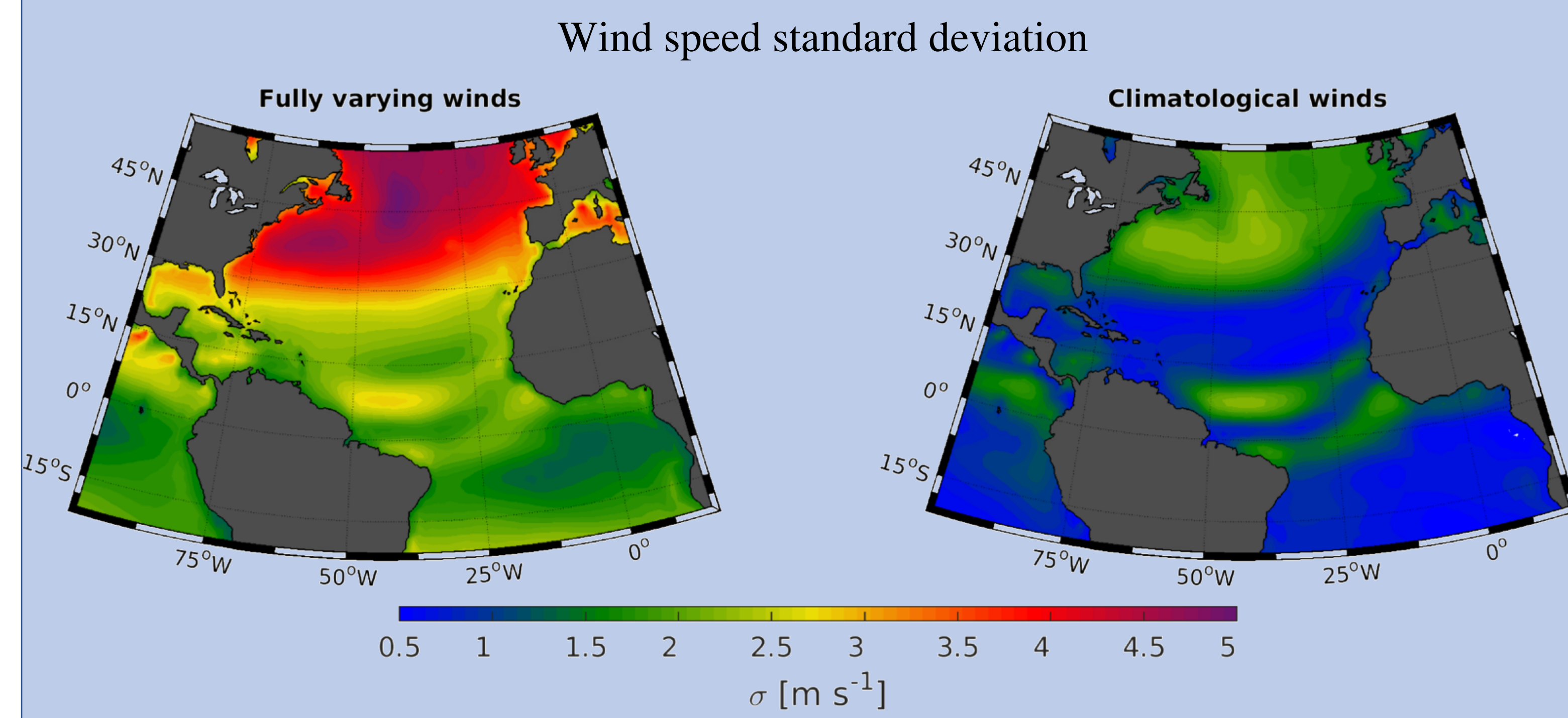
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OBJECTIVE

Isolating the ocean dynamics from the atmosphere

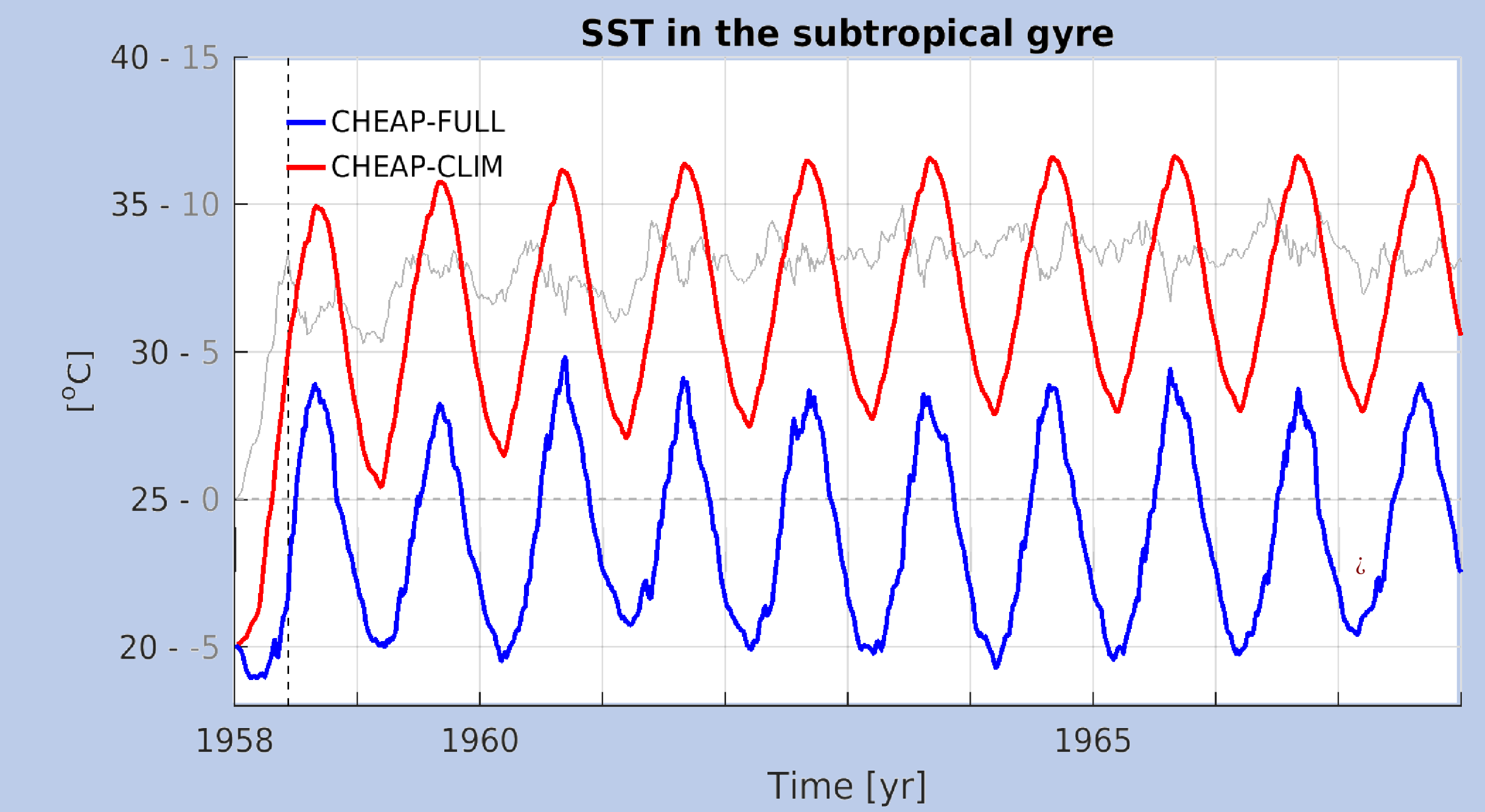
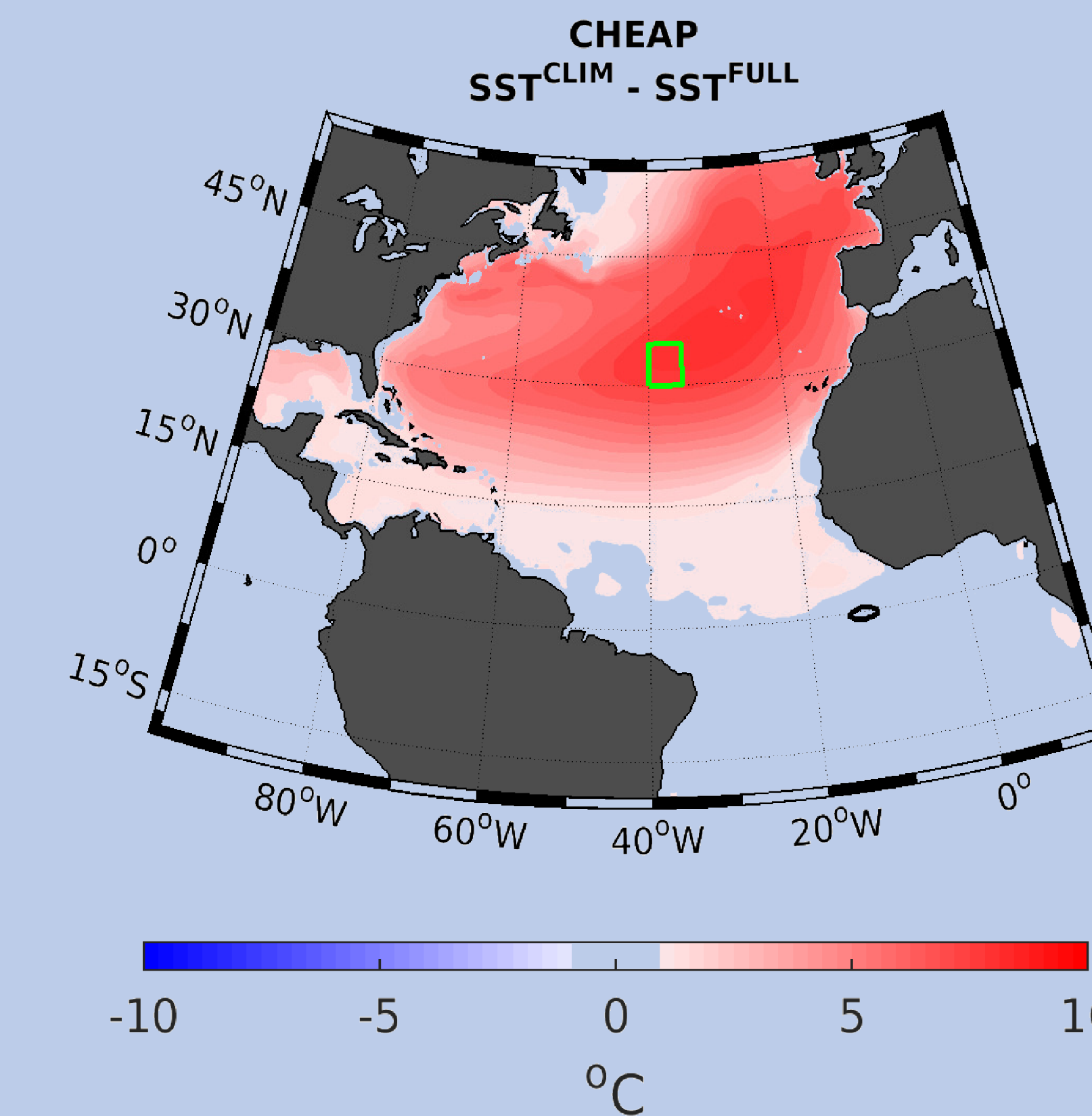
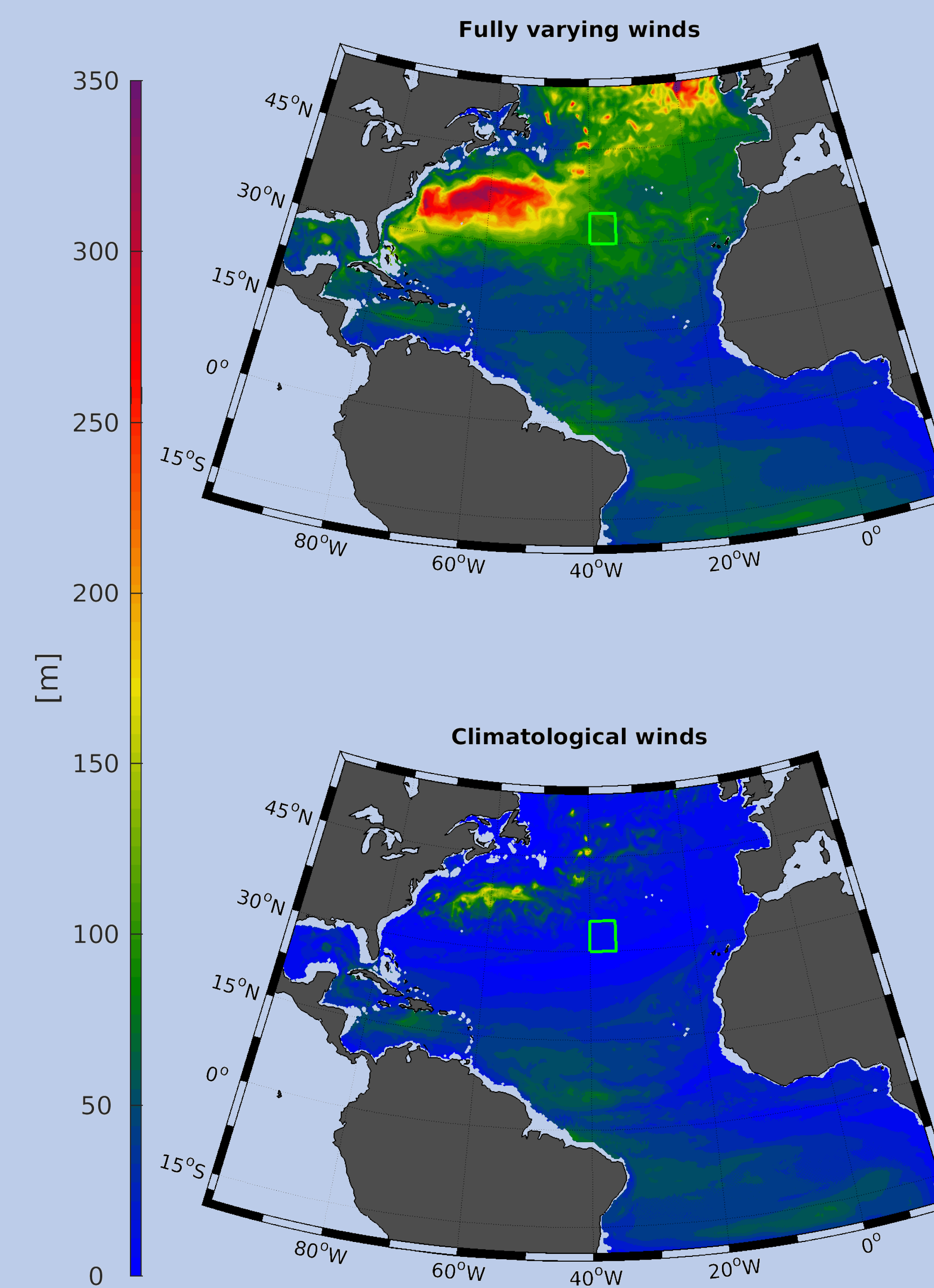


Procedure:

- Companion experiments driven by fully varying or climatological winds
- Ocean model coupled to an atmospheric boundary layer model (cheapAML)
- Regional configuration of the North Atlantic at 1/4° of the MITgcm

RESULTS

Maximum depth of the mixed layer (KPP)

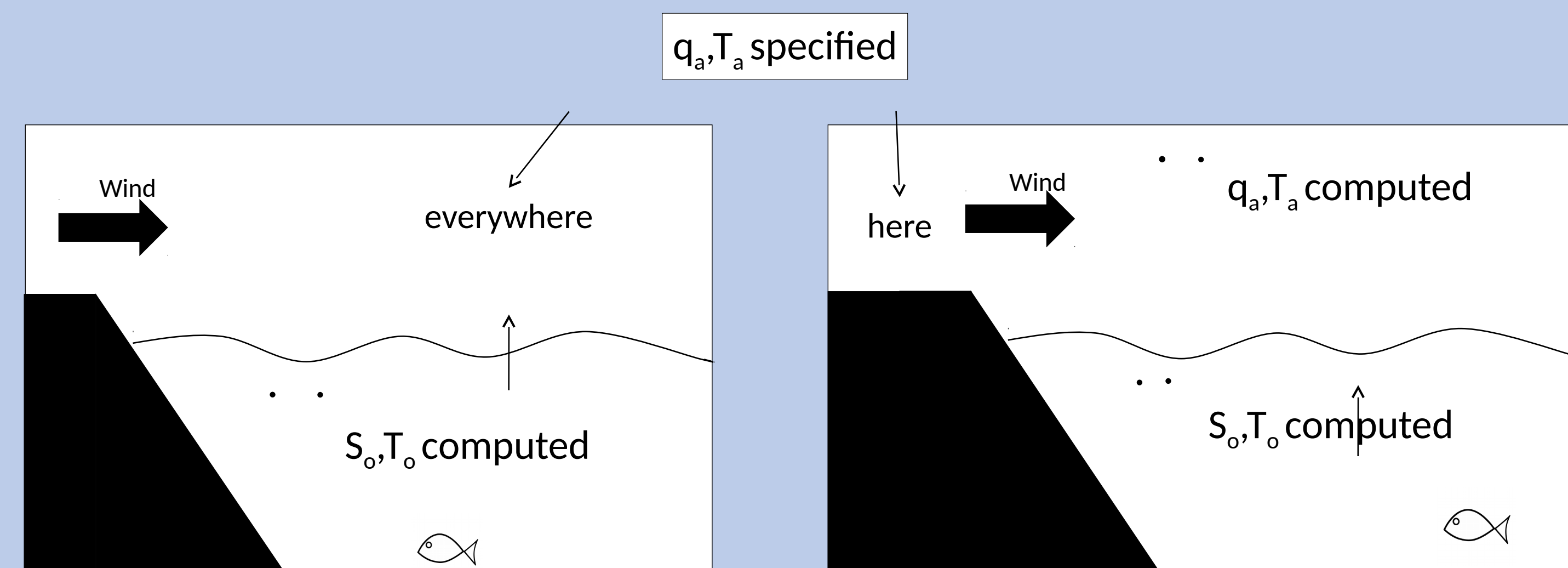


- Fast warming of the oceanic upper layers
- Weak surface ocean vertical mixing
- Outgoing longwave radiations ($\propto SST^4$) balance the weaker turbulent air-sea heat fluxes induced by climatological winds

CHEAPAML (TOOL)

Why do we use CheapAML?

- To relax the assumption of an infinite heat capacity for the atmosphere
- Avoid suppression of SST variability



SUMMARY

- Upper ocean vertical mixing associated with fast varying wind speeds maintains a realistic cooler surface ocean
- The use of artificial climatological wind has dramatic consequences often disregarded (usually damped by a prescribed atmosphere)
- An alternative strategy:
‘Normal’ year definition (minimizing low frequency atmospheric variability)