

NIWs in CCSM

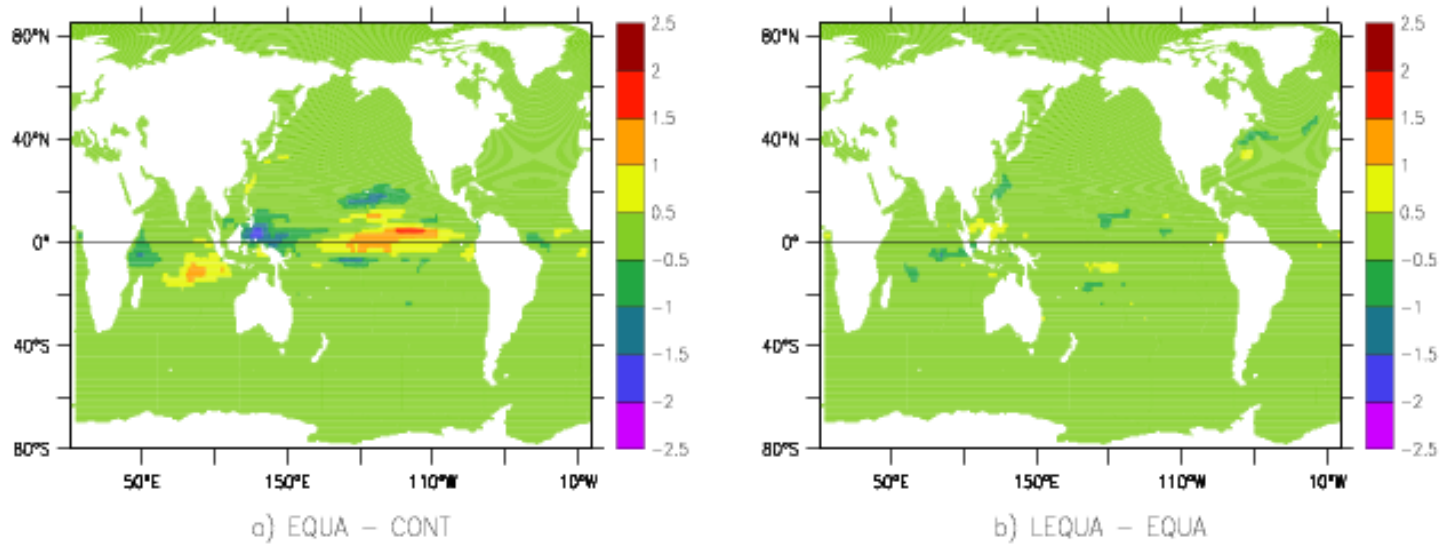
A climate process team together with
SIO, UW, Univ. Mich. & Alaska, GFDL, FSU and WHOI

Jochum, Briegleb, Danabasoglu,
Bryan, Gent, Large (NCAR)

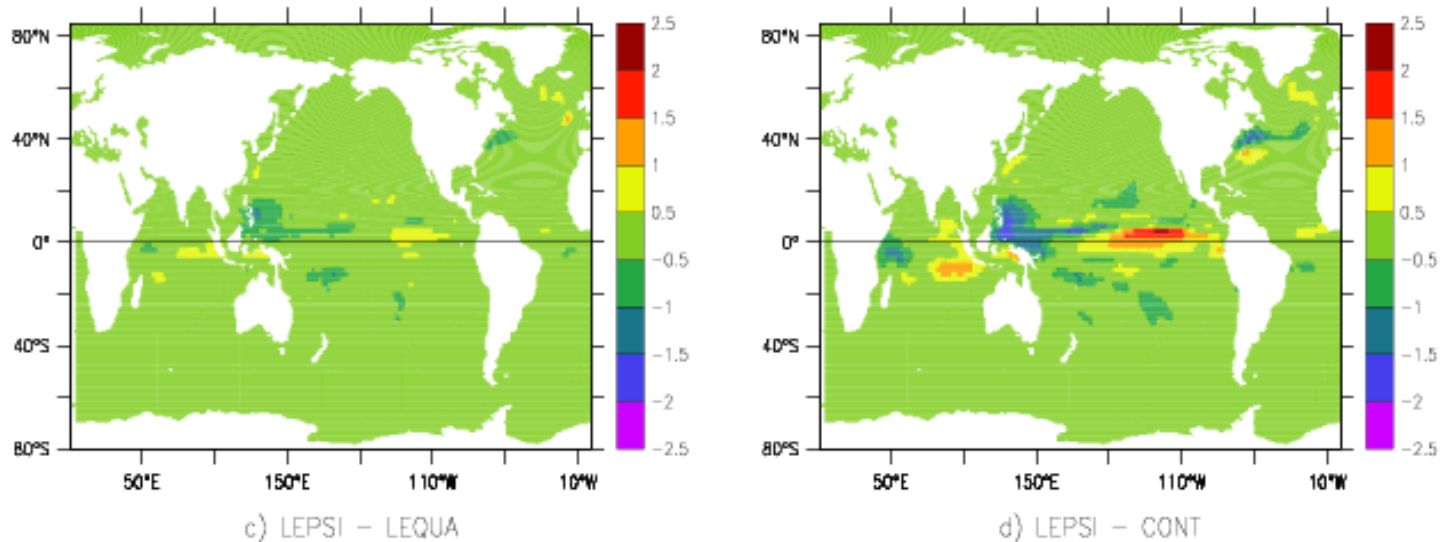
&

Alford (APL)

Impact of changing from 0.1 cm²/s to observed diffusivity

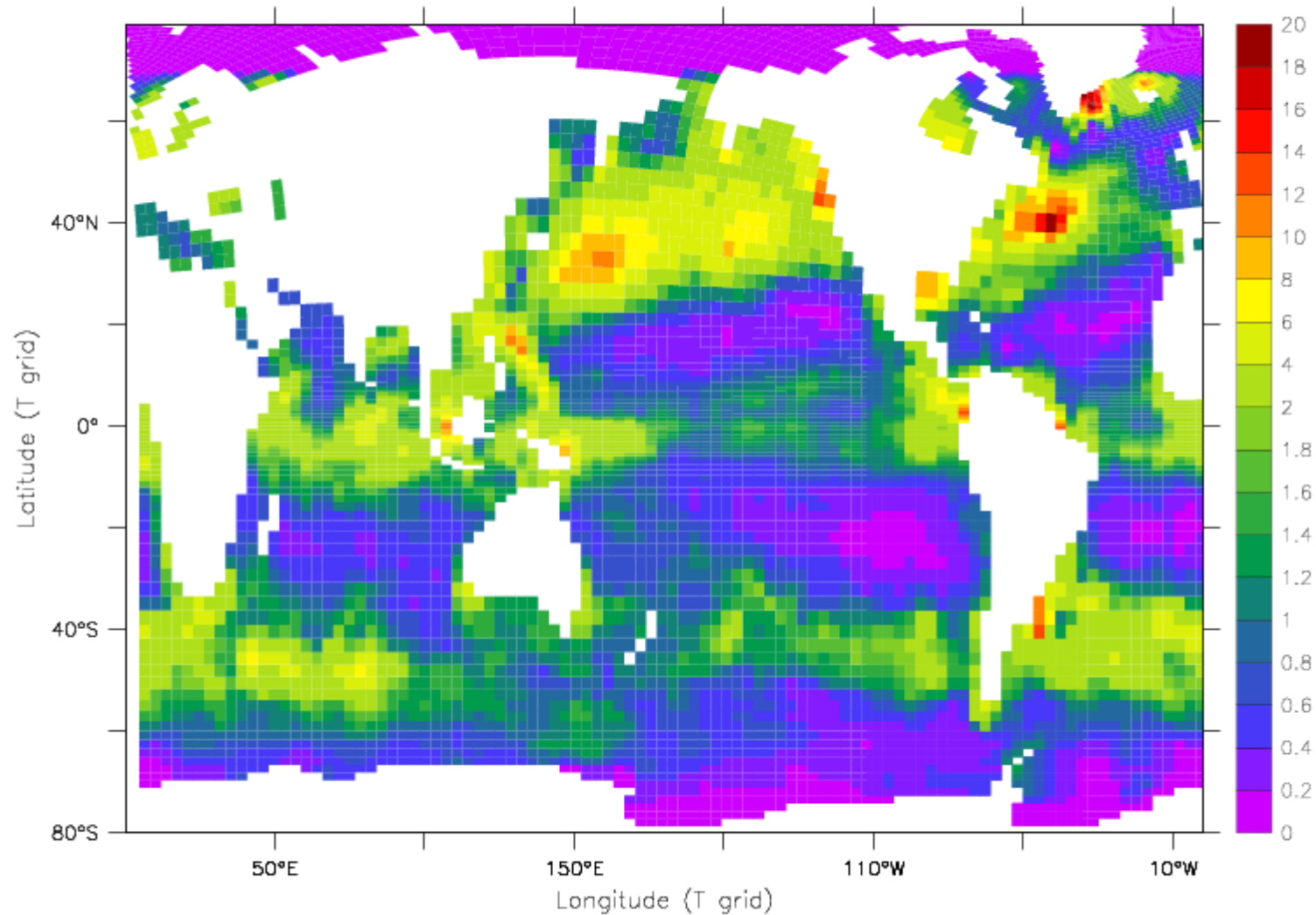


Difference in mean precipitation [mm/day], based on 100 yr coupled CCSM3.5

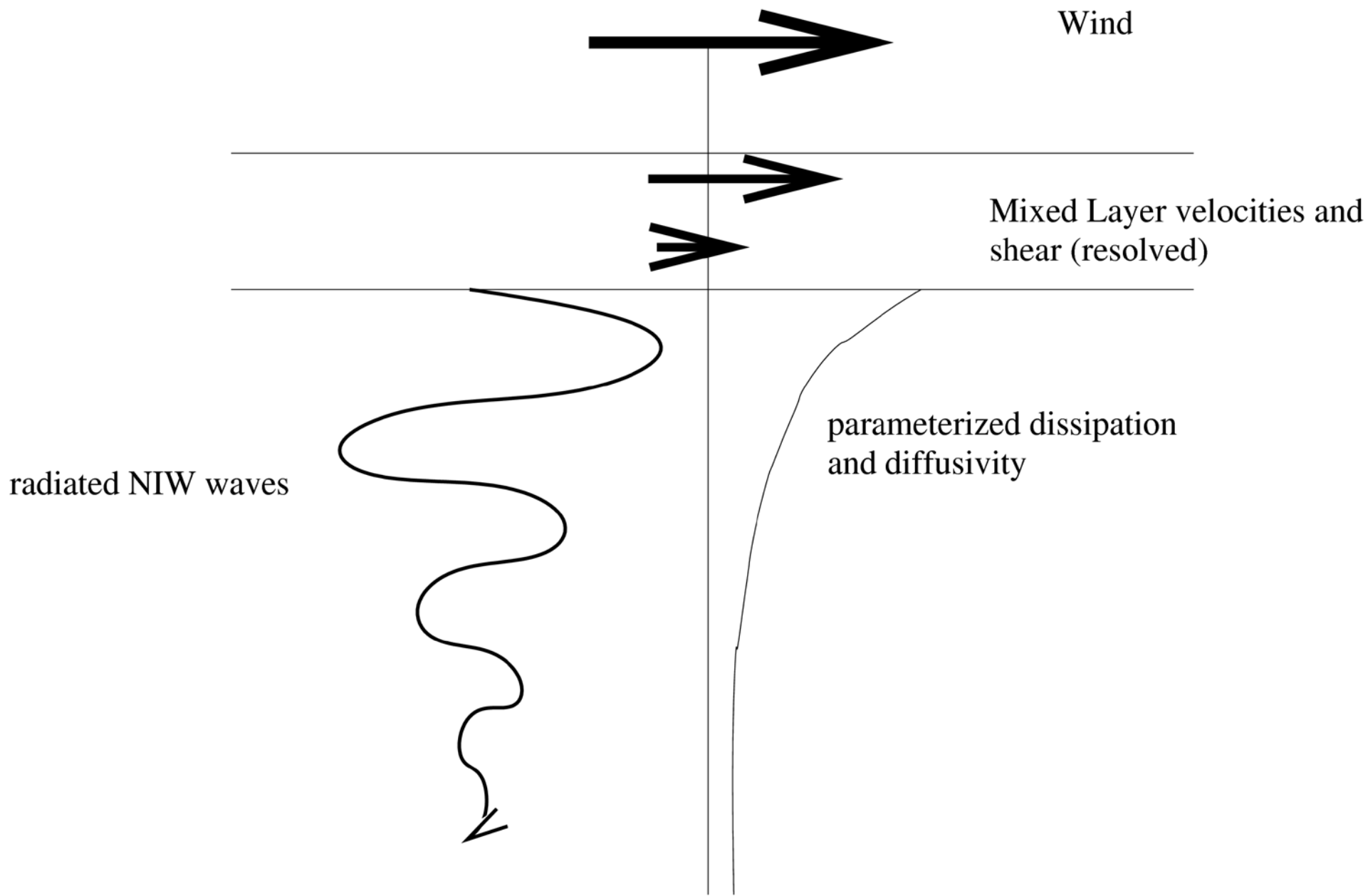


'Observed' NIW flux into the ocean (NCEP + slab ocean)

DATA SET: niwm_gx3v7

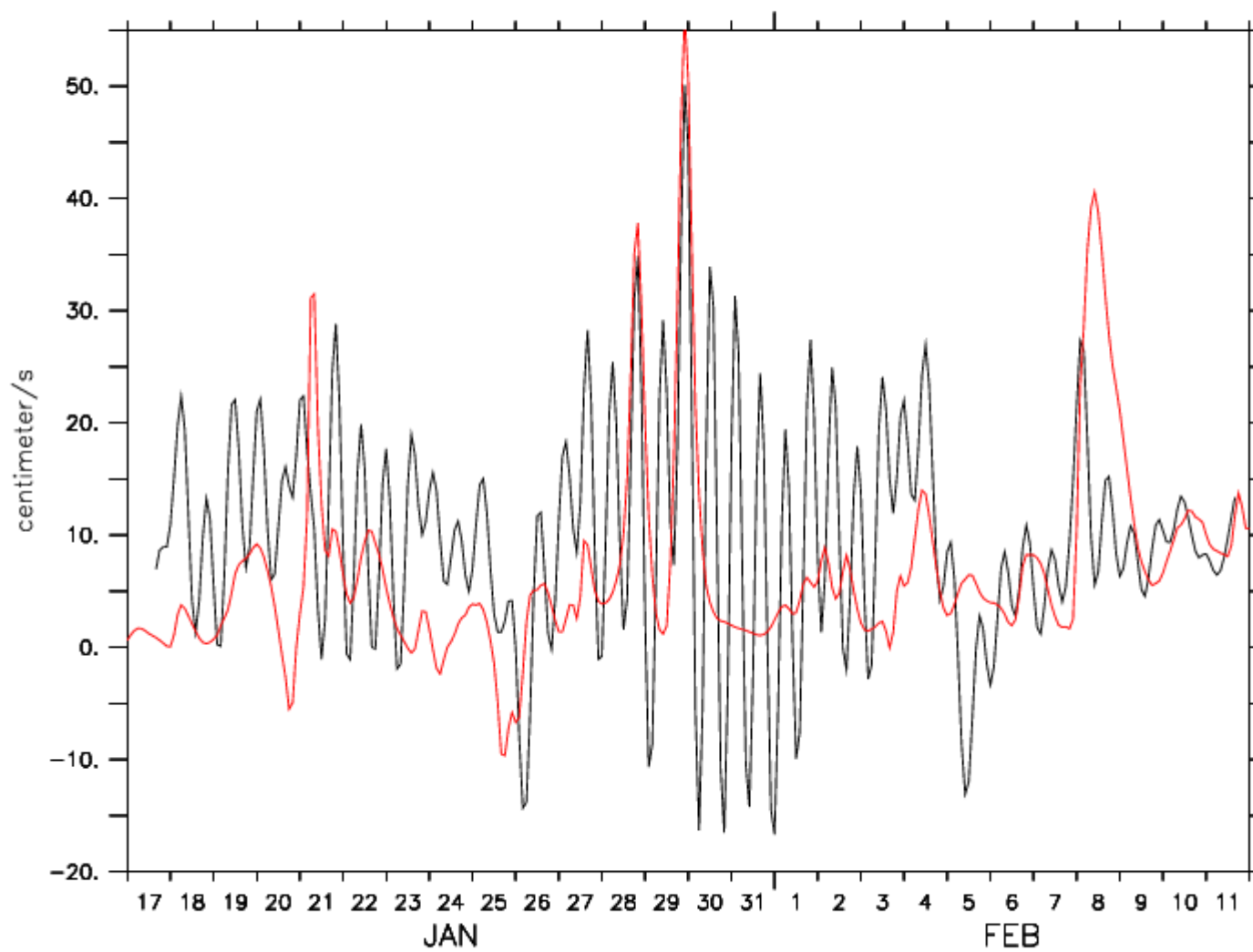


NIW energy flux into the ocean (mW/m², Alford, 2003)



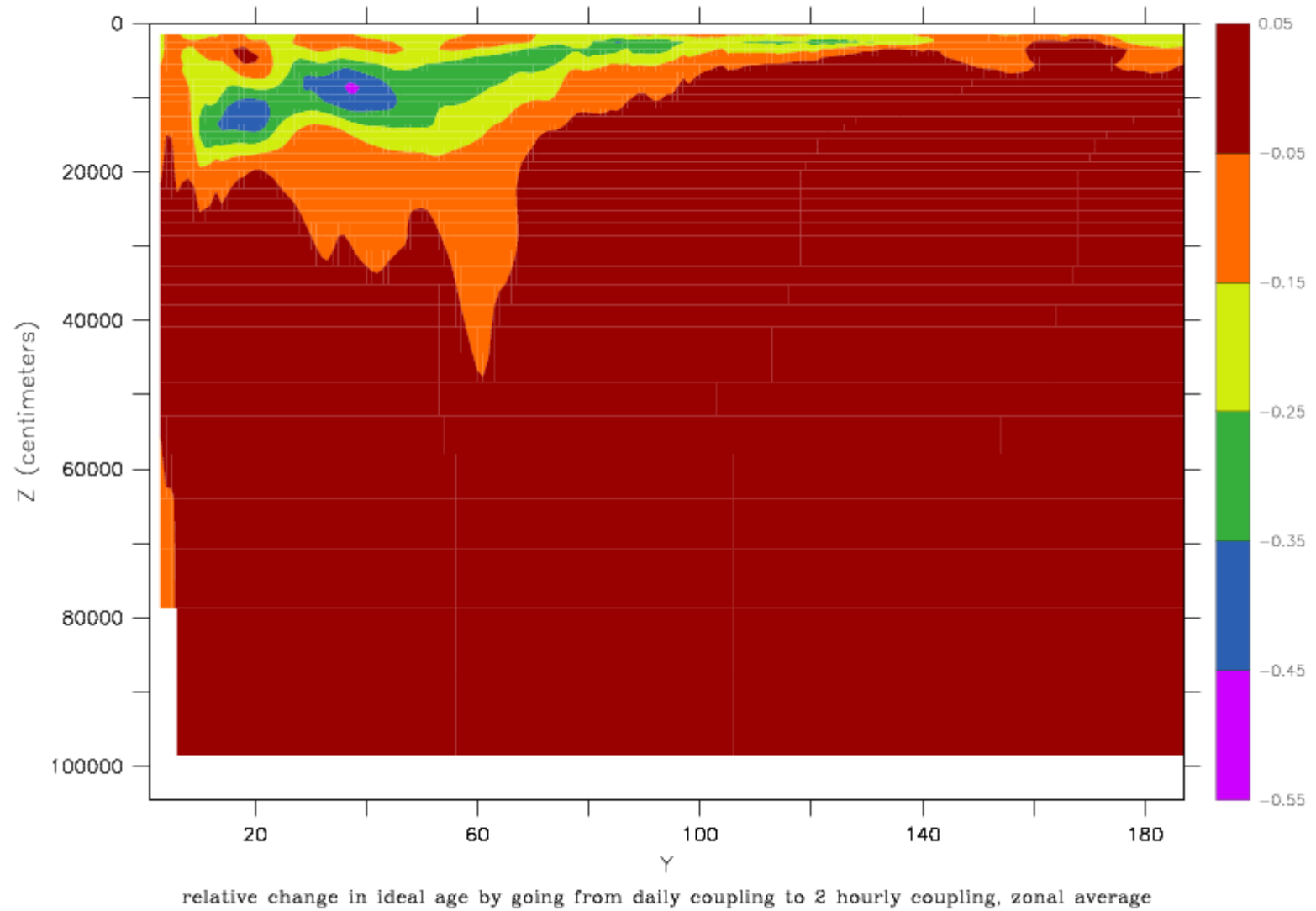
Conceptual framework for NIW parameterization

NIW motions in CCSM4

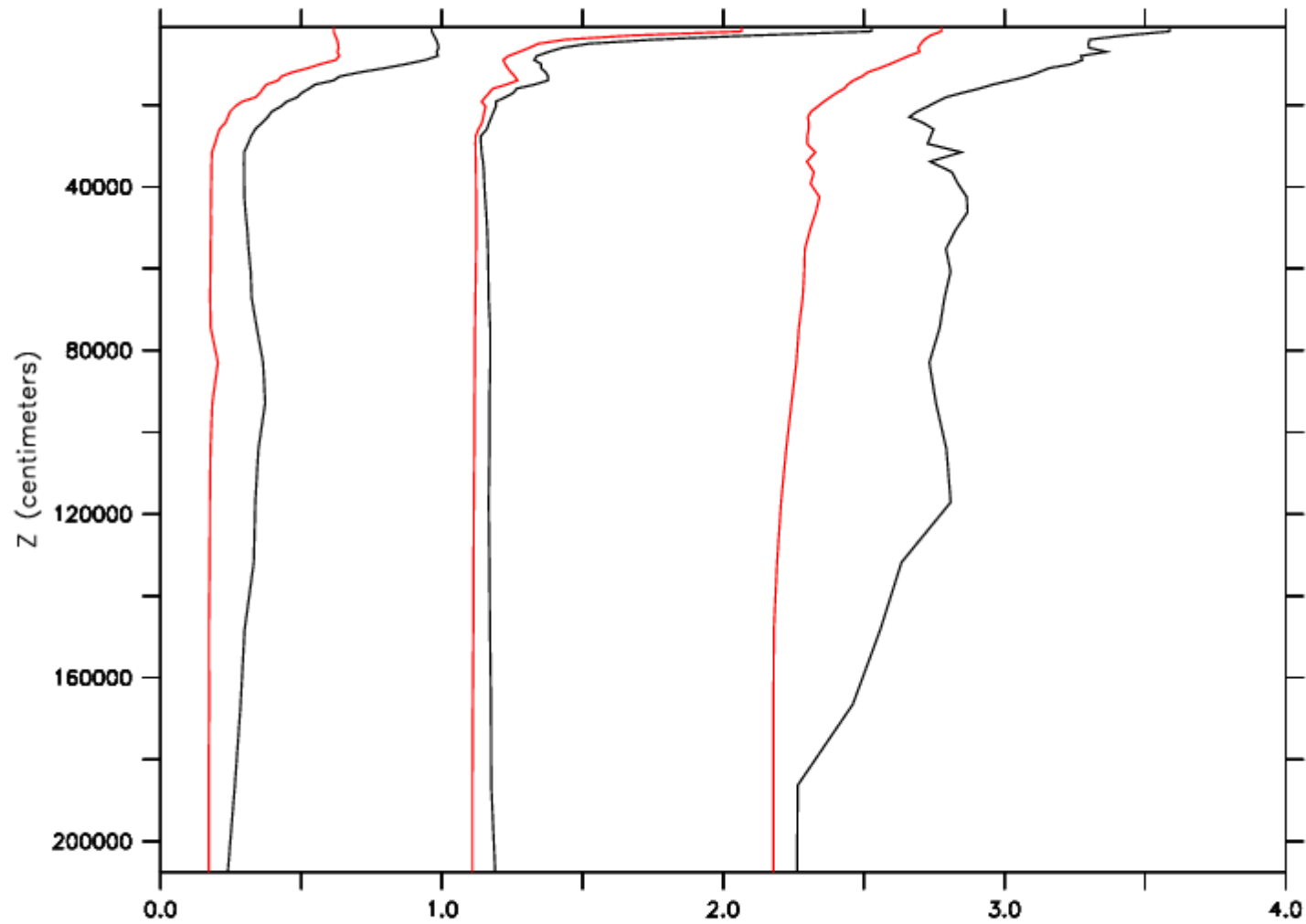


zonal velocity and stress (x5) at the Ocean Storms site in CCSM4

Impact of mixed layer resonance

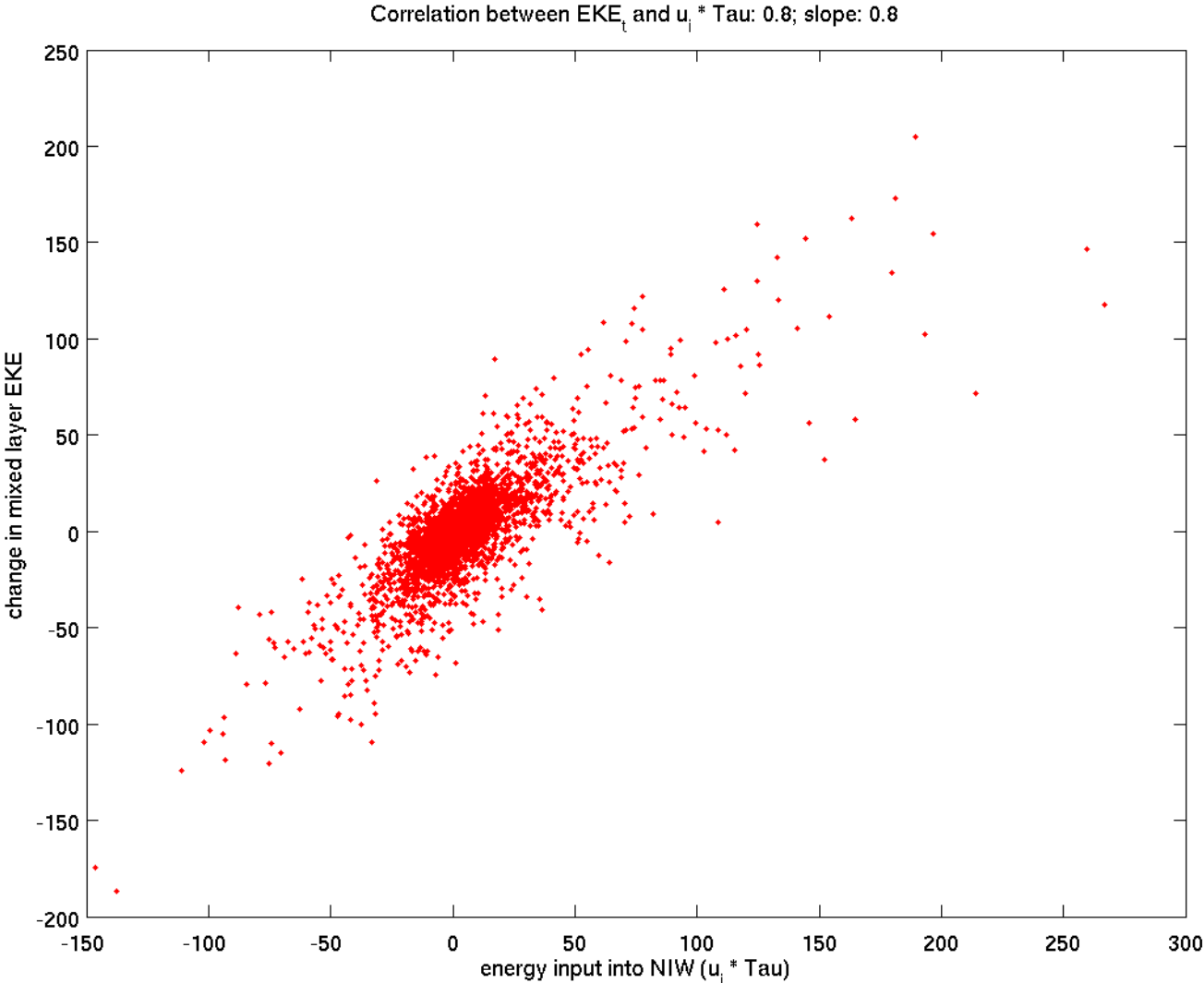


Impact of parameterized NIW radiation



NIW diffusivity (cgs units) for SO (left), Arctic (right) and Middle (center)

Connecting the surface NIW energy flux to interior mixing



Conclusion

- Preliminary implementation is benign, affordable, and suggest modest increase in subthermocline ventilation
- Next steps:
 - compute CCSM4 NIW flux and understand difference to observed estimate
 - reduce Arctic background diffusivity
 - add 2 hourly coupling
 - add interior diffusivity
 - assess impact on BGC