US CLIVAR Workshop: Ocean Mesoscale Eddy Interactions with the Atmosphere WELCOME!







Organized by CLIVAR: Atlantic Regional Panel Scientific Organizing Committee Ping Chang, Texas A&M University Eric Chassignet, Florida State University Walt Robinson, North Carolina State University Sabrina Speich, Ecole Normale Supérieure Program Organizing Committee Jing Li (International CLIVAR) Mike Patterson (US CLIVAR) Jill Reisdorf (UCAR) Kristan Uhlenbrock (US CLIVAR)





Rapporteurs

- Paige Martin (U Michigan) this afternoon's panel discussion
- Priya Sharma (U Penn) WG 1: Observations
- Vera Oerder (IMO) WG 2: Ocean only models
- *Rhys Parfitt* (WHOI) WG 3: Atmospheric impacts
- Qian Li (Penn State) Sunday morning WG report out
- Sophia Ashby (Reading) Sunday morning synthesis

Questions:

How to represent atmospheric feedbacks on ocean eddies in ocean-only models?

Observational needs?

How do atmospheric weather and climate respond to the ocean eddy field?

WG questions/outcomes

Working group 1 (Sabrina Speich): *Observational requirements* for addressing open questions about eddy-scale air-sea fluxes

<u>Questions</u>

- What is not known about air-sea fluxes on the ocean-eddy scale? What are the leading sources of error & uncertainty in these fluxes?
- What new analyses of existing observational data would address these gaps & uncertainties?
- What new observations or emerging observational technologies would address these gaps & uncertainties?

<u>Outcomes</u>

- Shared approaches for diagnosing fluxes from observational data (*in situ* and remote),
- Possible development of virtual (or real) field campaigns

WG questions/outcomes

• Working group 2 (Eric Chassignet): Representation of eddyscale air-sea fluxes for ocean only models

<u>Questions</u>

- What are the current methods for representing air-sea fluxes on the ocean-eddy scale?
- What are the known errors or biases introduced by current methods?
- What new approaches are under development?

<u>Outcomes</u>

 Plans for a coordinated experiment comparing the impacts of different flux representations in a suite of eddy permitting/ resolving ocean models

WG questions/outcomes

Working group 3 (Ping Chang): Atmospheric weather/climate impacts of the ocean eddy field and its variability

<u>Questions</u>

- How do ocean-eddy-scale variations in SST influence the atmosphere on atmospheric meso-, synoptic, and climate scales?
- Are intraseasonal-interannual variations in ocean eddy activity a potential source of atmospheric predictability on these timescales?
- What are the resolution and physics requirements for atmospheric models capture the influences of ocean eddy activity?

<u>Outcomes</u>

- Plans for coordinated sets of model experiments:
 - applying different representations of ocean-eddy SST to atmosphere-only models
 - with full or filtered ocean-eddy SST within coupled models with eddy resolving/permitting oceans

Schedule for today:

Half-hour talks by:

- Meghan Cronin
- Dudley Chelton (change)
- Lionel Renault
- Justin Small

Each followed by 15 minutes of questions & discussion

- Lunch at noon eat first, then viewing posters
- Panel discussion (morning's speakers) at 1:30 p.m.
- Break out into WGs
- No organized dinner convene at bar at 5 or 5:30
- Breakfast tomorrow at 8

Kushnir, Y., W.A. Robinson, I. Bladé, N.M. Hall, S. Peng, and R. Sutton, 2002:

<u>Atmospheric GCM Response to Extratropical SST Anomalies:</u> <u>Synthesis and Evaluation.</u> J. Climate, **15**, 2233–2256

"First, we can now say with confidence that the extratropical ocean does indeed influence the atmosphere outside of the boundary layer, but that this influence is of modest amplitude compared to internal atmospheric variability. Taking a linear perspective, we can think of the response as scaling with the strength of the SST anomaly, and ask, how many meters of geopotential perturbation do we expect for each degree of SST anomaly? A reasonable value for this parameter is 20 m K^{-1} at 500 hPa, though deficiencies in model climates and variability may weaken the response. A response of this size is also consistent with the absence of a robust, extratropical SST-forced signal in atmospheric observations, and with the fact that atmospheric models forced with climatological SST do not appear to be significantly deficient in their interannual variability We expect that the most interesting future research will address how the relatively weak, but not zero, influence of the ocean on the overlying atmosphere, together with the very strong influence of the atmosphere on the ocean, determines the variability of the extratropical, coupled system."

Ground rules for WG & plenary discussions

• *Everyone* here has something to contribute

 If old white guys had all the answers, we'd already have it sorted (see previous slide)

- Listen!
- Don't interrupt!

