

## Small-scale air-sea interaction at western boundary currents Minutes of telecom on 5<sup>th</sup> October 2007.

### Pacific simulations

Nick described his proposed simulations with WRF (control run nearly complete). They are analyzing the transition of typhoon Tokajai in October 2004, using an inner grid of 15km in the western Pacific. He is interested in the sensitivity to SST and questions what SST perturbations to use (see below). Bo raised interest in the Fall as a good time to study sensitivity to SST.

Simulations of the Kuroshio and Extension: as well as Nick's work, Bunmei Taguchi and Hisashi Nakamura are analyzing winter 2003-2004 (pre-KESS sounding) whilst the Tokinaga group is also investigating KESS simulations. Tokinaga-san has just joined IPRC (by coincidence) so we should be able to get him involved.

### Atlantic Simulations

Kathy wondered about the possibility of analysing circumstances with similar synoptic storms but in different SST regimes, over the Gulf Stream. Jimmy is analyzing a storm from Feb 10 2003. *Action for Justin – look at the IPRC RCM simulation from that period.*

For control simulations, Justin and Mike recommended a new NOAA SST reanalysis which uses AVHRR or AVHRR/AMSR combined. Richard Reynolds et al have come up with a new, daily, 1/4 degree SST analysis (reanalysis) using AVHRR, AMSR, and shorter decorrelation lengths. The data looks quite impressive and probably comparable to the ECMWF RTG product.

Go to

<http://www.ncdc.noaa.gov/oa/climate/research/sst/oi-daily.php>

or see the Reynolds et al 2007 paper

<http://www.ncdc.noaa.gov/oa/climate/research/sst/papers/daily-sst.pdf>

The advantage of this data is that it is “error-free”, good for models. The disadvantage of the AVHRR-only data is the cloud cover over western BCs.

As for dates of control simulations of the North Atlantic, a suggestion was to look at periods with different polarities of the NAO. Another, hopefully complementary consideration is to analyse the CLIMODE dates for the GS (Jan-Feb 2006, especially Jan 26-28 and March 2007 especially 8-9 March). Attached are figures showing the NAO from the CPC website (Figs. 1,2). Their index is obtained by projecting the 500mb height onto the NAO loading pattern (1<sup>st</sup> EOF). For reference, the JFM values of the index for 2003, 2006, 2007 are

Yr	Jan	Feb	Mar
2003*	0.16	0.62	0.32
2006*	1.27	-0.51	-1.28
2007**	-0.5	1.5	0.1

\*from CPC tabular data \*\*estimated from graph.

Thus these years contain good examples of NAO positive (Jan 06, Feb07), negative (Mar 06) and several neutral months (Jan 03, Mar 07).

### **Sensitivity to SST.**

It was mentioned that Hisashi and others have proposed the idea of SST preconditioning being important. Preconditioning may apply to the few days prior to a storm, by setting up the atmosphere to be particularly moist or unstable. Perhaps this happens more often under certain WBC/SST states in the climate sense?

What SST perturbations to use? Discussions are ongoing as to how to determine SST anomalies. Kathie showed GS and KE paths for each month, grouped by year, to illustrate the stable and unstable mode of the KE, and similar (but not so pronounced) effects in the GS extension. She suggests that larger SSH differences are linked to more stable paths. She also presented some plots that regress SST anomalies onto the SSH difference or gradient perpendicular to the path (proxy for the current strength) of the GS extension. The idea is that the SST field can be reconstructed based on the climatological mean plus a constant times the SSH difference anomaly. Recent communications between Kathie and Bo are expanding on this idea.

**What are the processes of interest to large-scale scientists that can be investigated by small-scale scientists?** Mike answered this question by suggesting that the precipitation and diabatic heating response to SST anomalies is of crucial importance to studies of the large-scale.

**Some aspects of broader interest:** Mike added that studies of sensitivity to SST could be extended to include global change scenarios. Some methods of obtaining global change SST perturbations were discussed (leading EOF of global SST? Trend?)

Mike and Nick are considering a mini proposal to CLIVAR to assess how well the WBCs are represented in IPCC-class models.

Best wishes.

Justin

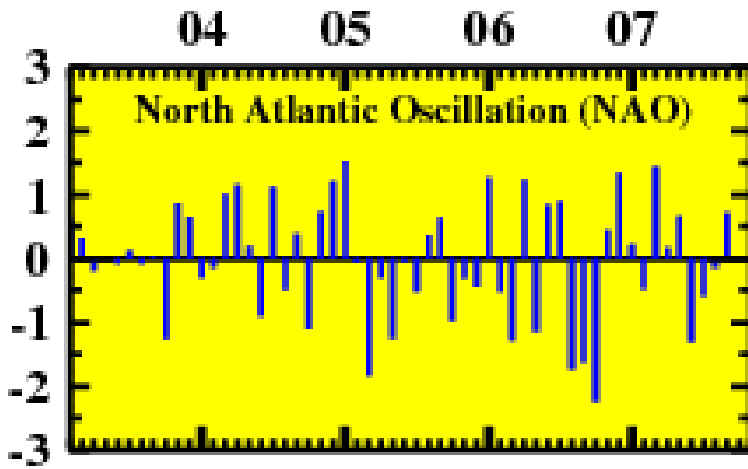


Figure 1. NOA index average for each month, from CPC website.

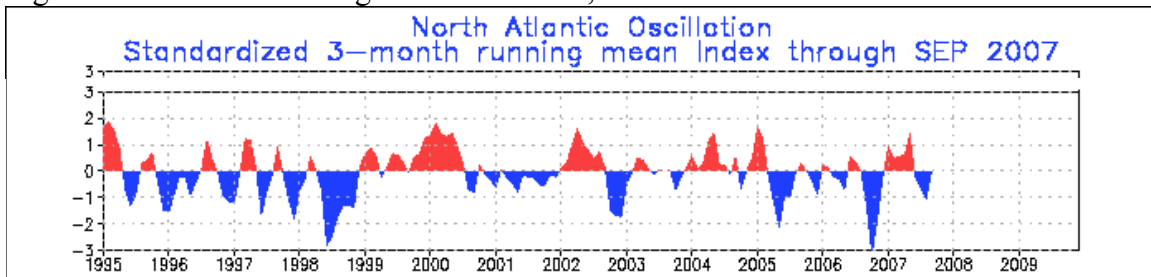


Figure 2. As Fig. 1, 3 month running mean.