EPOC Roundtable Discussion Q&A's

Antonietta Capotondi's talk on marine heat waves

Julie Keister
8:55 AM
Interesting work, Antonietta!

Michael Jacox - NOAA Federal
8:57 AM
Antonietta, interested to hear you expand on the statement that the LIM is easier to understand. One advantage of the climate models is that you can quantify the heat fluxes to see the mechanisms generating/evolving anomalies.

Andrew Leising - NOAA Federal
8:59 AM
Wondering how the 6 month prediction would work when we get heatwaves that are only 3-5 months long (like some of the more recent ones)

Charles Hannah
hjfreeland
9:03 AM
Are you doing the standard linear regression? If so, I'd suggest you try a neutral regression as you have error/noise in both x and y axes

Jennifer Jackson
9:14 AM
For getting SST anomalies into deep water in fjords, wouldn't the sill of those fjords have to be shallower than 100 m (the maximum depth of mixing on the shelf)?

Julie Keister
9:14 AM
Very interesting, Charles. Big implications for overwintering organisms, and the fjords. On the shelf, is there any relationship between January bottom temp and the rest of the year?

charles hannah
9:16 AM
Julie - December and February are similar. I have not pursued long term correlations

Jim Christian
9:21 AM
If the dynamics of ENSO change over time, how do we choose the time period on which to train an empirical model?

Ryan Rykaczewski - NOAA Federal
9:23 AM
To compliment Jim's question, I think the LIM could be used (e.g., when it fails) to help identify anomalies with empirical evolutions that are much different than observed in the past.

Julie Keister
9:25 AM
Charles, I was thinking that since bottom temperatures change less and more slowly over the year that SST, that winter may set the stage for annual variance, or at least spring when the biology is ramping up.

charles hannah
9:26 AM
Julie: my initial thought was that once upwelling kicked in it would wipe out the bottom T anomaly. But that might be wrong

Noel Pelland
9:27 AM
Thanks Charles and Antonietta for awesome talks to kick us off!

Melanie Fewings
9:28 AM
Mike Jacox, don't you (and Sam Siedlecki and others) have some work on this?

Melanie Fewings
9:30 AM
@Julie: Sulagna Ray led the work

Julie Keister
9:31 AM
Nice! Missed this...https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2020JC016227

Jacqueline Long's talk

Tetjana Ross
9:52 AM
The float doesn't measure the surface very well. How biased is the satellite data to the very surface? (i.e. the single measure assumed to apply to the entire optical depth is probably not a true mean, but strongly influenced by the upper cms). I'm thinking about chl primarily, but this mismatch could apply to other variables as well.

Nathalí
9:52 AM
thanks, Jacki! super interesting work!

Tetjana Ross
9:52 AM

Yes, thanks, Jacki, for an interesting talk!

Andrew Leising - NOAA Federal
9:53 AM
could some of these changes be associated with shifts between "new" and "recycled" production during the heatwaves?

Antonietta Capotondi - NOAA Affiliate
9:56 AM
@Jacki. Thank you very much for your talk. Very interesting! Which consequences do you think that the increase in NPP during the MHWs may have on the rest of the food web?

Clarissa Anderson
9:58 AM
@Jacki, you may have mentioned this, so apologies if I missed it. Are other in the EXPORTS team or your team running PFT algorithms in conjunction with these NPP calcs?

Angelica Peña's talk

Clarissa Anderson
10:01 AM
@Angelica, increases in NPP in 2019 as shown by Jacki would argue for uptake rather than low nitrate waters, correct? Doesn't answer iron questions though, sorry.

Tetjana Ross
10:07 AM
@Clarissa, yes it would have been nice to see Jacki's work while Angelica was preparing her talk. Demonstrating the utility of this forum!

Clarissa Anderson
10:07 AM
Agreed, Tetjana. Thank you for making that point.

Clarissa Anderson
10:16 AM
@Angelica, do you have any stable isotope samples that could help discern if remineralization were fueling denitrification or at least fueling the nutrient availability?

Unknown
10:21 AM
Just a note that samples for the analysis of iron and other trace metals were collected along Line P during spring and summer cruises in 2019 and will hopefully be analyzed soon, which may help in understanding potential mechanisms (e.g. transport, remineralization) involving iron.

Andrew Leising - NOAA Federal
10:24 AM

is there any chance that the phytoplankton are responding to the higher temperatures and that their rates could be higher?

Albert Hermann - NOAA Affiliate
10:25 AM
Is it possible that changing oxygen levels are affecting the bioavailability of the iron?

hjfreeland
10:25 AM
Might I make one quick clarification about Argo floats?

Jacki Long
10:29 AM
Sure!

hjfreeland
10:30 AM
OK, Jacki said something like "pity Argo floats do not surface", they DO surface and transmit data to a satellite. They turn off the pump on the CTD at a depth, near surface. Early floats turned off the pump at 5 decibars, more recent floats typically at 2 decibars. So T and S are not recorded above that depth. But they do actually surface.

Jacki Long
10:33 AM
You're correct, that was poor wording on my part. They do not measure* to surface, I believe for the reasons you've outlined.

Jacki Long
10:35 AM
The chl and bbp sensors are usually located near the bottom of the float - so we still do not get a complete surface measurement even if they were still collecting, however it may be worth while to look more into the pre-QC'd data to see if there are nearer surface measurements to use. Good idea.

Chris Free's talk

Stephanie Moore - NOAA Federal
10:57 AM
Thanks Chris! Great work.

Chris Free
10:57 AM
Thanks Stephanie!

Louis Botsford
11:08 AM
Chris, how domoic acid closures of Dung crab in CA related to entanglement closure?

Also, what does "opaque communication in CA mean?

Chris Free
11:10 AM
Hugely related! The delayed opening of the season in 2016 meant fishing effort was high while the whales were around in the spring.

Clarissa Anderson's talk

Mark Ohman
11:13 AM
Clarissa- Is the high frequency variability in dO2 and pH related to diel periodicity in vertical migration/surface aggregation of G. polyedra?

Stephanie Moore - NOAA Federal
11:20 AM
Surfers really are the canary in the coalmine for exposure to aerosols! Clarissa, did you ask in the survey if those experiencing symptoms were tested for COVID - will you be able to get at that in your survey data?

Clarissa Anderson
11:21 AM
ugh, it was so early, Steph, that we did not
no one was getting tested then unless they were really sick, if I recall

Albert Hermann - NOAA Affiliate
11:21 AM
Clarissa, it sounded like someone is looking into feedback of HABs on the upper ocean heat budget. Any of that published?

Stephanie Moore - NOAA Federal
11:21 AM
Yes, testing was getting up to speed at that time.

Noel Pelland
11:22 AM
Does it make a big difference in the Bering Sea model AI?

Clarissa Anderson
11:40 AM
(I meant to say that we also worked with CICESE to translate the survey into Spanish and distribute to Spanish-speaking communities in CA and Baja)

Uwe Send's Talk

Drew Lucas
11:41 AM
notice that he doesn't mention the WIND when he talks about upwelling
we do things a little different in sourthern California.

Clarissa Anderson
11:41 AM
it's the Bight, baby!

Andrew Leising - NOAA Federal
11:42 AM
whats causing it then drew?

Drew Lucas
11:43 AM
"remote forcing"
bight-wide wind stress curl

Andrew Leising - NOAA Federal
11:43 AM
nice!

Drew Lucas
11:43 AM
poleward propagating coastal trapped waves could play a roll (pringle and rise 2001)
... but it isn't local wind
which is why "upweeling" can coexist with shallow MLs
and upwelling. upweeling and upwelling

Melanie Fewings
11:44 AM
Uwe, could the thin fresh layer also contribute to trapping the heat at the surface, or did you calculate that effect was small compared to trapping by Lpoly?

Drew Lucas
11:45 AM
hey Melanie... I don't think we have made that calculation yet, but it is a great idea
we have run some KPP simulations

Clarissa Anderson
11:45 AM
It wouldn't be EPOC without Melanie's insights. :)

Drew Lucas
11:45 AM
and the optical signatures make a *huge* difference to vertical divergence of heat flux

but the stratification definitely matters too in terms of the diurnal cycling
and there may be feedbacks

Melanie Fewings
11:46 AM
Off Oregon, river plumes contribute to trapping heat near the surface. (Alex Kurapov model and other studies)

Drew Lucas
11:46 AM
in the bay of bengal as well!!

Melanie Fewings
11:47 AM
Should work anywhere :)

Drew Lucas
11:47 AM
the beauty of physics
the biology isn't so well-behaved

Andrew Leising - NOAA Federal
11:48 AM
it was like the perfect set up for a migrating phytoplankton

Albert Hermann - NOAA Affiliate
11:48 AM
Do the strong concentrations of chl here affect the surface albedo itself?

Drew Lucas
11:49 AM
that i don't know... maybe?

Clarissa Anderson
11:49 AM
so much absorption, Al.... don't get that much fresnel reflection I don't think

Jim Christian
11:49 AM
Yes I think he said that. Surface heating is partly due to high chl.

Drew Lucas
11:49 AM
the attenuation is seriously abrogated and it was seriously sunny, my thought is that the attenuation is the first or effect but i'm not positive

Clarissa Anderson
11:49 AM
But that heating is not due to albedo, as far as I know

Drew Lucas
11:50 AM
first order
that is actual growth in surface L poly on diel cycle

Drew Lucas
11:51 AM
we see that in DCMs offshore
rare to see in the near-wurface because of the dominance of quenching normally
but at high concentrations, you can see the day night growth cycle
In principle this should be quantitatively related to NO3 drawdown when integrated over several day night cycles
we have not yet attempted that calculation

Kristen Alexis Davis
11:54 AM
Nice job, Uwe!

Yvette Spitz
11:56 AM
on one of the vertical section, it looked like the NO3 was higher in the near the surface than at 20m.. It was also near the surface where Chl was higher. If it is the case, would then be some river runoff that would be enough to maintain high biomass? Could not see well but the blue in NO3 plot was lighter than deeper.

Clarissa Anderson
11:57 AM
@Yvette, it was very dry in May when those measurements were made, so I doubt runoff could be contributing, although I would guess that runoff in April likely helped get the bloom going nearshore.

MaJo Marin
11:58 AM
What was happening with tides? I mean was there a weird overlap of spring/neap + river discharge + "upwelling"?

Caren Barceló's talk

Chris Free
12:08 PM

Hi Caren! Fantastic talk! I think this has important implications for the 10-year rebuilding requirement for overfished stocks required under the Magnuson-Stevens Act. I'd love to see what combinations of life history / pulse strength allow that rebuilding timeline and what don't. Really cool.

Mark Ohman
12:09 PM
For Caren: I'd like to ask about the integration of press with pulse disturbances.

Antonietta Capotondi - NOAA Affiliate
12:09 PM
@Caren: What is the minimum duration of the perturbation to create a significant impact of the various fish species?

Ted Strub
12:13 PM
Uwe or Drew: Might the precip runoff have also had darker optical properties to increase the absorption?

Drew Lucas
12:16 PM
Hi @Ted.. yes, this is very possible!.

Will White
12:16 PM
@Antonietta: if the main effect of the disturbance is on the recruit age class, then longer-lived species will require longer disturbances to cause the same effect on the age structure & biomass.

Julie Keister
12:16 PM
Eh hem. The species always matters!

Geno Pawlak
12:17 PM
Uwe, Drew - did you see any thermal inversions near the surface?

Julie Keister
12:18 PM
It is interesting to think about recovery post-disturbance in the context of inter-annual variability and generation time scales, especially in the context of the changing frequency of events.

Drew Lucas
12:18 PM
@geno ... I don't have the observations soon enough after the rain, not sure if UWe saw them on his moorings

Drew Lucas
12:20 PM

@julie great point, the influence on local chemical characteristics (DO, pH, etc) was severe

how does that "integrate" out to longer timescales?
i have no idea but we need to know!

Geno Pawlak
12:20 PM
@Drew - could be another mechanism for surface layer heating.

Indrani Silva
12:21 PM
@geno: we have not looked for those, but I think at least during the rain period there were some inversions between 1m and 5m

Ted Strub
12:22 PM
Loo and Caren. Given data on population levels after a fishery collapse, could you back out what the real level of fishing was that caused it - apply to small pelagics (Calif Sardine...)

Will White
12:23 PM
@Ted yes we have done this for nearshore fishes in MPAs. See method here: https://esajournals.onlinelibrary.wiley.com/doi/abs/10.1002/eap.1398

Andrew Leising - NOAA Federal
12:24 PM
sometimes they put coccoliths as a portion of the "small P" box. but many of the commonly used models, like NEMURO, and BEC, etc. don't typically include them at all.

Will White
12:24 PM
@Ted that method depends on length data; Loo and Mike O'Farrell have shown how to do it with age data as well. Works better for longer-lived species though, not sure about sardines

Andrew Leising - NOAA Federal
12:26 PM
the coccolithophores may be even more important for the ocean chemistry OA issues

Tetjana Ross
12:26 PM
@andrew, through carbon export as they sink out?

Andrew Leising - NOAA Federal
12:26 PM
that's the idea, as i understand it, yes

Clarissa Anderson
12:27 PM

@Tetjana, and they are susceptible to changes in pCO_2 bc need saturation of carbonate in system to form their coccoliths