Draft Action Items POS Panel 2017

1. **Entrain the US Coastal Observing System and Long-Term Ecological Research (LTER) coastal network (NSF-LTER 15 year long funding) in investigating climate and ecosystem variability & predictability (West Coast focus) - [Manu/Aneesh]**
   a. **Integrate their observations in the study of climate signals according to US CLIVAR objectives.**
   b. **Leverage also ongoing efforts on EUBS in CLIVAR international, and ecological forecasting working groups in ICES and PICES**
   c. **Propose workshop or webinar series to bring together coastal and open ocean observationalists and modelers**
   d. **Entrain younger scientist (ref. 4) to revitalize the current establishment (west coast)**
   e. **Marginal seas workshop proposal (POS/PSMI joint?)**
   f. **Send POS member to CERF (Coastal & Estuarine Research Federation) 2017**
   g. **Explore NSF-Research Coordination Networks (RCN) ideas (e.g. ecological forecasts, integrated modeling of CCS)**
      i. **Scan currently funded proposals from NOAA and NSF that are related to this effort**

2. **Entrain coastal observing community for regional climate impact assessment (East Coast focus) - [Shane/Manu/Alison]**
   a. **Integrate their observations in the study of climate signals according to US CLIVAR objectives.**
   b. **Sea level regional resilience plans and interdisciplinary exchange, promote efforts e.g. Sea Grant case studies US East Coast**
      i. **Better define connections between mean SL state and local changes, including extremes like tides/storm surges**
      ii. **SL highly multi-disciplinary, need to integrate data from different fields within the same framework**
      iii. **NOAA US Climate Resilience Toolkit now contains this case study**
      iv. **Resilience planning for SL in New Jersey (e.g. Matt Campo's talk)**
      v. **Training modules to showcase the case examples**

    c. **Examine the observational link between AMOC and Coastal Sea Level (Shane)**

    d. **Explore NSF-Research Coordination Networks (RCN) ideas**

3. **Early career and diversity scientists engagement folded into all of our efforts (All)**

    a. **Early career webinar series**

    b. **Workshops**

4. **Deep Ocean and Subsurface Observations & Modeling - [Alison, Manu] (joint with PSMI or PPAI?) (still deciding on actionable items)**

    a. **Important source of decadal predictability**

    b. **Connecting large-scale to coastal dynamics in upwelling regions**

    c. **Climate model ensemble initialized with different oceanic also lead to important changes in the first 10-20 years of integration suggesting an important role for deep and subsurface ocean low frequency variability**

    d. **Recommend that the development of a Deep Ocean Argo float network be supported**

    e. **Stay engaged in external review of GOSHIP, carry on of last year's action item [Fred]**

5. **Legacy of US AMOC observations and POS panel involvement - [Shane/Renellys]**

    a. **Promote access to data and uncertainties as the in situ programs mature.**

    b. **As AMOC observational systems mature and have long enough records, US AMOC Science Team can facilitate comparisons between observing systems. Each array computes the MOC volume transport differently, so careful attention must be given to the metrics that we can better compare.**

    c. **We need to leverage global in situ, satellite, and satellite-in situ synthesis products to help connect between latitudes with time series measurements**

6. **Consider white paper for OceanObs '19 in collaboration with Intl CLIVAR [Tony/Fred/Jamie/Drushka]**

    a. **Focus on regions that need the most help - polar oceans and deep ocean**

    b. **Stay tuned with the OceanObs'19 white paper process - and get involved with papers**

    c. **Solicit white papers- after AGU - draft ideas for white papers at the Fall AGU meeting (maybe take lead on Arctic and/or Polar Ocean)**

    d. **Tony Lee will keep us updated on the solicitation process**

    e. **Suggesting / nominating one of POS panel members to OceanObs'19 committee (use Tony!)**

7. **Involvement with Observing System Planning and Review - [Drushka/Renellys/Aneesh/Jamie]**
    a. **Suggest Drushka to be involved as POS panel reference in the IndOOS and Tropical Atlantic Observing System review process (contact Lisa Beal), as we were involved in the TPOS2020 process.**
    b. **Degradation of Arctic observing system, need in situ data for satellite validation, Ice thickness, surface salinity and temperatures (satellite SST, SSS data not very good), ARGO floats to be deployed (??), snow depth,**
    c. **Opportunity to synthesize discussions here at US CLIVAR, Fall AGU, Ocean Sciences and make recommendations for in situ observations in Arctic (and Antarctic?) (science communication, EOS?, OceanObs white paper)**
    d. **Include and promote Isotope Measurements in various observing system (e.g. useful for precipitation dynamics and model validation, paleoclimate proxy) [Sam]**
    e. **Involvement with US fleet redesign - As a long term priority, the POS panel be involved in future efforts to redesign the US Fleet and contribute to "Best practices" for field data or why do we need the fleet. Many climate related observational programs require global class research vessels.**
8. **Connect DA/CDA and Observing System community to revisit OSSE-like information for observation network planning - [Aneesh/ Stevenson] (in some cases better integration of DA/CDA with new field process studies, e.g. US AMOC Science Team)**
    a. **Biggest observational needs for the data assimilation community is fluxes at the boundaries (air-sea fluxes, riverine input to oceans, ocean-ice fluxes) and deep ocean observations. Deep ocean observations can be used to initialize the deep ocean. Collocated observations.**
    b. **Consults/interact with ongoing PSMI panel activities to explore possible synergies and avoid overlapping efforts**
    c. **Observational community can inform DA/CDA on important processes that need to be accurately modeled.**
9. **Leveraging new data streams - [Yolande/Manu]**
    a. **Consider a webinar series on underutilized climate-quality time series (e.g., coastal, weather satellites (e.g., COSMIC satellite array), EBUS-fisheries)**

b. Writing a data sharing plan for observing networks for observing systems that become commercialized/privatized (Yolande)

c. Radio occultation (COSMIC) gets water vapor, dry temperature, a complex profile that needs to be processed to derive surface pressure and other climate information

d. Engage international CLIVAR member and seek new POS member

10. Challenge to observe Air-Sea Fluxes - [Yolande/Stevenson/Carol Anne] (actionable items still to be identified)

   a. Include in observing system

   b. Ocean/Land

   c. More resources could be allocated to evaluation, error uncertainty, and improvement of existing data sets

   d. Lack of air-sea flux data in Southern Ocean (true everywhere, but particularly in Southern Ocean)

   e. We need satellites with high vertical resolution in the atmospheric boundary layer

   f. Engage with US CLIVAR working group (talk to Janet)

11. Characterizing uncertainty in the different components of the observing system, where we are and where we want to be - [Kyla/Shane].

   a. Best practices for characterizing uncertainty and providing it to the community

   b. Errors are as important as the measurements themselves

   c. Promote people to use uncertainties

   d. Have someone from IQUOD community

   e. Engage the satellite community

   f. Next POS panel meeting have a session devoted to this topic.

Recommendations from the Sessions

Session 1: POS Panel Introduction
- **Review of external program, additional recommendations**

Session 2: Teleconnection
- **Focus on looking at precipitation/teleconnection extremes and emergent signals**

- **POS panels should provide suggestions on observations and/or simulations that might resolve this disagreement between CESM and GFDL ESM2M ENSO variance trends**
- **Look at climate models to see where it would be useful to put a global air-sea flux buoy**
- **Multi-model vs. Inter-model ensemble: what can we learn from these? Learn about regional processes and interaction with large-scale in inter-model ensemble, given that regional dynamics are also an important source of uncertainties (e.g. land surface processes). Come of with metrics to diagnose the interaction between regional/large-scale. (Stevenson, write commentary, go back to diagnosing processes in single model ensembles, with specific mechanistic frameworks.)**
- **Stationary wave trains: from a regional perspective, capacity for decision making comes from our ability to predict these features. What if the teleconnection dynamics are non stationary? How to diagnose that? (Swain write commentary)**

Session 3: Sea Level
- **Entrain Ice-Sheet modelers into CLIVAR and broader Arctic community**
  - **How are people modeling Greenland, Antarctic ice sheets? Relies heavily on ocean, atmospheric forcing; roadblock is to improve OA modeling. Within CESM land ice sheet models are being incorporated, can be run interactively or not. Discussion of details of CESM ice sheet implementation**
- **Promote efforts of interdisciplinary local sea level resilience plans (e.g. Sea Grant case studies US East Coast)**
  - **Better define connections between mean SL state and local changes, including extremes like tides/storm surges**
  - **SL highly multi-disciplinary, need to integrate data from different fields within the same framework**
  - **NOAA US Climate Resilience Toolkit now contains this case study**
  - **Resilience planning for SL in New Jersey (e.g. Matt Campo's talk)**
  - **Training modules to showcase the case examples**
- **No real plan to continue observations needed to reference the geoid for sea level satellite referencing**

Session 4: High-latitude, ocean-ice interactions

- Refine our understanding of balance between outgassing of natural Carbon and anthropogenic Carbon uptake in the Southern Ocean
- Look at the role of eddies in the Southern Ocean ? Are floats the proper tool?

Session 5: AMOC
- As AMOC observational systems mature and have long enough records, US AMOC Science Team can facilitate comparisons between observing systems. Each array computes the MOC volume transport differently, so careful attention must be given to the metrics that we can better compare.
- We need to leverage global in situ, satellite, and satellite-in situ synthesis products to help connect between latitudes with time series measurements
- We need to facilitate engagement between the data assimilation community and the AMOC community

Session 6,7: Health of observing system 1,2
- POS should be involved in the IndOOS and Tropical Atlantic Observing System review process (contact Lisa Beal), as we were involved in the TPOS2020 process. Suggest Drushka to be involved as POS panel reference. (*Renellys*)
- Suggest and provide rationale to funding agencies to perform OSSE to better design observing systems (e.g. TPOS2020 may benefit)
- TAOS (Tropical Atlantic Observing System) Walt Robinson and Sabrina Speich
- Ensure that the TFlex mooring data is being properly quality controlled for the delayed-time product (e.g., rainfall)
- After presentation of many different coastally focused programs or instrument types the discussion became about how to get different groups to talk to one another.
- Coastal and global modelers, observations groups along the coasts and suggestion that the west coast might be the place to start, although there was also the suggestion that the west coast programs have their own issues and difficulties in playing well together
- Requirements for better boundary layer vertical profile measurements both in the atmosphere and ocean (temperature, salinity, humidity, winds, ocean velocities)
- Gaps in satellite records (e.g. scatterometer winds) could have an impact on our analysis of long term records
- Recommend that the development of a Deep Ocean Argo float network be supported

- **If one observation network degrades, it impacts the health of other dependent observation networks and has a big impact on overall science being done.**

Special session: polar
- **Polar observing system has decreased after being pretty healthy from 2000-2015**
- **Need in situ measurements to reduce uncertainty in satellite measurements (snow/ice thickness, SST, SSS)**
- **Lack of air-sea flux data in Southern Ocean (true everywhere, but particularly in Southern Ocean)**

Special session: data assimilation
- **Biggest observational needs for the data assimilation community is fluxes at the boundaries (air-sea fluxes, riverine input to oceans, ocean-ice fluxes) and deep ocean observations. Deep ocean observations can be used to initialize the deep ocean.**

Types of Impacts from POS Panel Activities
- Influence research programs (observational or modeling, insights on ongoing our new research initiatives)
- Provide guidance and inspiration for new science directions (and funding)
- Promote new forums for the exchange of ideas (e.g., new working groups, new workshops, publications, syntheses)
- Science communication (#scicomm)
- Flag current anomalies and programmatic and knowledge gaps of the climate system (e.g., science with high societal relevance, the health of observing systems)
- Engage and promote early career and a diversity of scientists