IOVWST 2025
Discussion of Goals from Yesterday

Input from Mark, Session Chairs, and the IOVWST organizing Committee

Suggested Action: Comparison data recommendation

- We continue to need comparison (meaning calibration) data
  - We'd like to continue to have data from the open ocean
    - And to be notified when there are
      - Changes in metadata
      - Changes in calibration
  - We need data in near coastal regions, for extremes, and for rare conditions.
    - Extreme winds and rain are still conditions for which we believe there is greater room for improvement, and higher impact for societal applications.
    - We recommend continued data collection associated with tropical cyclones
    - We recommend, if possible, correction and reprocessing of the SFMR data record (Zorana, Heather)
    - We recommend increased use of Doppler radar to obtain near surface wind profiles (winds and multiple heights near the surface)
      - We recommends continued work to improve adjustment of these winds to 10 m winds (Mark, Ralph, Zorana)
    - Absolute calibration (even if indirectly from sensor to sensor) (EUMETSAT)

Suggested Action: Comparison data recommendation

- We strongly recommend intercalibration of remotely sensed winds
  - Coastal winds from SAR, HF radars and scatterometers
    - Aircraft data would be welcome
    - Check for impacts of proximity to the coast and shallow water
  - Satellite to satellite calibration under as wide a range of parameter space as possible

- We recommend continued work and improvements of near-coastal products
  - Bryan, Giuseppe,
- We recommend collaborating across sensors to improve retrievals at multiple polarizations
  - Ad, Chris Jackson
  - Ad to share polarization ratios with Chris

Suggested Action: Surface Currents

- Summary of the situation:
  - In the oceanography community, there is a strong interest in surface currents
    - Many oceanographers in this group are working on surface current modeling, with a wide variety of approaches
      - Luc Lenain's approach looks very interesting (in a good sense of this phrase)
      - SMODE provided invaluable data
    - However, the community is limited by a lack of open ocean surface truth

- What can we do to get more surface truth?
  - How useful are currents from high frequency radar data?
    - Can the capabilities be better communicated to help make this assessment?
    - Can these capabilities be tested (e.g., with triple collocation)?
  - How useful are single vector component SAR data?
    - Higher resolution current data from other sources would seem ideal for such comparisons.

Suggested Action: Suggestions for better linking efforts on modeling processes with Remotely Sensed Data

- We've seen some exciting progress in modeling processes related to wind/wave/ocean coupling.
- We're seeing progress in remote sensing that might be informative regarding these processes
- Can we help each other move forward?
  - Can the observations be used to inform theory?
  - Can theory be used to improve observations?
  - Can comparisons between two types of observations provide additional information?

Suggested Action: Winds Validation

- Statement:
  - We can intercalibrate wind most remotely sensed wind to a truly remarkable degree of accuracy!
    - However, there are some sensors (or processed datasets) that are noticeably dissimilar to other data sets
      - CYGNSS due to calibration to neutral winds rather than Equivalent neutral winds.
      - CFOSat's scatterometer's dependence on wind speed
      - Can we identify the causes of these inconsistencies and make improvements?
    - Differences in spatial scale, noise and consequently variability are going to be important for the interpretation of extremes and sampling requirements of calibration for extremes
- How to do move forward with 'truth' for extremes?
  - IWRAP seems good, but there are sampling issues impacting 10m winds (Ralph, Mark, Zorana)
  - How does sampling impact links between mean winds and 1-minute maximum winds?
    - Note: it shouldn't – otherwise interpretation is impractical. (Heather, Mark)

Suggested Action: How can surface wind data by more useful for Tropical Cyclone forecasts?

- Mark suspects that we are under utilizing the measurements.
  - Shineng proposed to apply his AR reconstruction algorithm to reconstruct TC-related moisture transport from satellite-observed column water vapor and surface wind data.
- However, we also need better modeling of the extreme winds to better understand how to use information in satellite winds.
  - Mark looking into this with large number of collaborators (Yang et al. team)
- We also need better wind remotely sensed wind data
  - Zorana, Heather, others??
- There seems to be progress on both these topics.
  - How can remotely sensed winds, and other data, help modelers?
  - There are many aspects of physics in hurricanes that need to be assessed to see if the theory for these processes extends to hurricane conditions. Can remote sensing be used to test some of these theories?
    - At this stage, it appears the need is to make more connections between people developing models and people with understanding of the observations, with a goal of assessing what can be tested.

Suggested Action: Put limits on how much stress (or U10EN or U10SE) depends on sea state

- There is a wide variety of parameterizations of how friction velocity and the drag coefficient depend on sea state. Stress can be determined from either of these parameters.
  - Extreme differences in the functional dependence on sea state (e.g., wave age and difference between wind and wave directions of propagation).
- Since satellites seem to respond to stress, this seems like a plausible means to test for dependencies of sea state on stress, provided that we have sea state data for these studies.
  - Provided that we can demonstrate that unaccounted for errors in scatterometer U10EN, U10SE, or stress are tiny relative to observed dependencies
    - It isn't clear we can make this statement at this time, but this seems like a good goal.
- How do we proceed?
  - CFOSAT – Marco L. working on this
  - Systematic errors in retrievals
    - Ray – update work based on feedback
    - Ad – Examine if there is a systematic change in cone statistics (residuals)
    - Others?

Suggested Action: The links between winds, Marine Heat Waves, and Atmospheric Rivers

- These are high impact events for which surface wind data appears to be very useful.
  - Can we do a better job communicating the value of surface winds for these applications?
  - Volunteers?
    - Shineng's team is working on MHW-AR interaction. Observational assessment on ARs' impacts on MHWs are completed. Investigation on MHWs' impacts on ARs is in progress. Modeling test is coming next.

- Several of the mission updates point to data that could be used to further such studies.
  - E.g., COWVR-TEMPEST
  - Who are the points of contact on this topic?
    - Dean Henze is willing to help people obtain COWVR data from JPL

Suggested Action: Reconsider metric for value of winds to NWP

- Are we using a reasonable metric for the impact of winds on NWP?
  - It appears to be ‘What gives the greatest improvement?’
- Is this metric largely focused on synoptic scales and ‘good’ weather conditions?
  - The result is then what is the smoothest good wind, which means a larger spatial scale average of well calibrated winds.
  - Would it be more reasonable to focus on high impact weather?
- Discussion suggested that we do have better metrics.
  - What are these metrics?
  - Can someone present on these metrics at the next IOVWST meeting?

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