Application Development for Operations APOP

Session chairs:

Deirdre Byrne, Gerald Dibarboure, Gregg Jacobs, Carolina Nogueira Loddo (Wed, Nov 02 2022, 09:00 - 10:30)



Attendance & Presentations

- 5 Oral Presentations (+1 Forum)
- 15 Abstracts Posters \rightarrow 8 Posters displayed
- More than 50 participants to the session

ESTIMATING UPPER OCEAN HEAT CONTENT IN THE NORTH ATLANTIC OCEAN WITH THE NOAA NEXT-GENERATION ENTERPRISE OCEAN HEAT CONTENT ALGORITHM

Deirdre Byrne; Paige Lavin; David Trossman (NOAA)



- David presented a machine learning methodology to derive a sophisticated regression between a large historical database of temperature and salinity profiles with ocean topography from altimetry.
- This observation-based product gives a 3D view of the global ocean witch is useful for better Hurricane predictions.
- In the latest iterations, the methodology upgrades and in particular the use of machine learning led to a significant improvement when compared to earlier versions with in-situ data.
- Pre-operational products are available, beta testers are welcome!
- Goal: improve tropical storm predictions

THE 2022 HONGA TONGA TSUNAMI MONITORED BY SATELLITE ALTIMETRY AND SAR

Yannice Faugere (CLS); Romain Husson (CLS); Gerald Dibarboure (CNES)

- Findings on the analysis of altimeter data, and in particular of HY-2B and Sentinel-6, during the Tsunami event of the Tonga islands earlier this year.
- In addition to the **expected ocean wave** that is clearly visible with a sharp gradient of tens of centimeters, the **atmospheric wave is also clearly visible in the dual frequency content from altimetry**. The tsunami wave propagation was observed at different times by the 9 altimeters that are currently in operations, and the observed signatures and the mismatch with tsunami model prediction are likely to help uncover new findings on the event itself as well as help improve the propagation in the models.



5HZ RESOLUTION ALTIMETRY WAVE PRODUCTS FOR BETTER COASTAL APPROACH

Annabelle Ollivier (CLS, France) et. al



- 5 Hz wave product for better coverage in coastal regions, as well as wave¤t interactions and extreme events.
 - In global:+ 20% more valid data below 20km!
- This user-requested increase of the posting rate is made relevant even for LRM altimeters thanks to noise reduction techniques such as adaptive retracking, high-frequency adjustment and EMD noise removal.
- Their demonstration product also raises various questions such as the influence of wave groups and how nadir altimetry captures a wide range of signatures ranging from high-frequency instrumental noise to ocean waves and wave groups to small mesoscale.

TOWARDS A GLOBAL STOKES DRIFT PRODUCT FROM SWIM/CFOSAT

Charles Peureux (CLS, France) et. al

- First observed Stokes Drift product ever. Using 2D wave spectra from the SWIM instrument of CFOSAT, they retrieve the **Stokes Drift** which is a **missing component in existing surface current products from observations**.
- The comparison between their data with model-based Stokes Drift is already extremely promising when the instrument limitations are accounted for in the retrieval. Their **product is already available upon request** as they work on additional algorithm improvements and a formal release.



Mean over 2021

THIRTY YEARS OF ICEBERG AND ASSOCIATED FRESH WATER FLUX FROM ALTIMETER

Jean Tournadre (IFREMER, France) et. al



- Presentation on the updates of the 30-year Iceberg database named **ALTIBERG**.
- Explanation on how the database made it possible to infer the fresh water flux (of FWF) from iceberg basal melting as it often happens over hundreds of kilometers in the Southern Ocean. Accounting for the iceberg drifts from surface currents, the iceberg erosion from waves, and the basal melting induced by SST makes to possible to retrieve better fresh water fluxes statistics at regional and seasonal scale.
- Their findings are likely to **improve the polar fresh water fluxes in ocean circulation models** : it is indeed of the same order of magnitude as precipitations in these regions, and the altimetry-derived fluxes are different and more reliable than current iceberg models.

15 abstracts in the Posters Sessions

- 1. updates on operational systems that produce altimeter data: David Donahue et al. gave an update on the NOAA Level-2 system and Bruno Lucas et al. gave an overview of the Level-2 EUMETSAT system for Sentinel-3, Guillaume Taburet et al. described the recent updates of the DUACS/CMEMS multi-mission products, Sabine Philipps et al. and Cecile Kocha et al. reported the status and upgrades made on the EUMETSAT Level-2P products for Sentinel-3 and Sentinel-6. Lastly Cristina Martin-Puig et al. gave an early view of the EUMETSAT involvement and design for the marine part of the future CRISTAL missions.
- 2. update on operational system which actually use altimetry on a regular basis: Gregg Jacobs et al. gave an update on their ALPS system version2, and Jean-Michel Lellouche et al. an update on the European operational system from Mercator and the Copernicus Marine Service. Saleh Abdalah et al. gave an update of the ECMWF wave model. Lastly Hiroaki Asai et al. presented the upgrades the Japan operational system from JMA and the improvements they obtain when assimilating more altimeters in their 2-km nested system.
- **3. non-operational systems and applications which also benefit from altimetry** : Yang Gao et al. described how they use the nadir beam of CFOSAT to look at the integral length scale of surface waves. James Carton et al. presented the Blended Ocean Surface Currents with a new daily product. Remy Laxenaire et al. reported the upgrades made on their eddy atlas derived from altimetry. Lastly Marion Bocquet et al. presented their 30-year record of sea-ice freeboard which leverages new algorithms and products from recent missions as well as the recent reprocessing of ERS and ENVISAT by ESA.

Questions?



Backup slides

Seeds Questions APOP...

- No time to discuss them during the session itself, but we can recall past recommendations.
- Regarding the second tandem phase of Jason-3, or the Sentinel-6B tandem, there is no specific recommendation from the splinter. The general opinion is that they should be as short as possible (to reduce sampling loss) and to prioritize the interleaved orbit configurations. But the splinter also acknowledges that the tandems should be as long as needed for other uses and in particular for the Climate record.
- As far as recommendations for POE-G and GDR-G standards, most operational systems presented in the splinter would undoubtedly benefit from any improvement brought into NRT / OGDR or STC / IGDR products. In contrast, offline reprocessing and upgrades might be less critical for most of the application splinter.
- Lastly, there is no specific recommendation regarding the raw mode of sentinel-6 or a coastal retracker for Delay-Doppler instruments, although any user-demonstrated benefits would also likely be desirable to the operational systems discussed in the splinter.