OSTST 2022

1. Proposed splinters

This list will be used for the splinter selection in the abstract submission process

- Application development for Operations
- CFOSAT
- Coastal altimetry
- Instrument Processing
    1. Instrument Processing: Measurement and Retracking
    2. Instrument Processing: Propagation, Wind Speed and Sea State Bias
- Outreach, Education and Altimetric Data Services
- Precision Orbit Determination
- Quantifying Errors and Uncertainties in Altimetry data
- Regional and Global CAL/VAL for Assembling a Climate Data Record
- Sentinel-6 Validation Team (S6VT) feedbacks
- Science Results from Satellite Altimetry
    - Science I: Climate data records for understanding the causes of global and regional sea level variability and change
    - Science II: Large Scale Ocean Circulation Variability and Change
    - Science III: Mesoscale and sub-mesoscale oceanography
    - Science IV: Altimetry for Cryosphere and Hydrology
- The Geoid, Mean Sea Surfaces and Mean Dynamic Topography
- Tides, internal tides and high-frequency processes

2. Splinters description

Application development for Operations

Deirdre Byrne, Gérald Dibarboure, Greg Jacobs and Carolina Nogueira-Loddo

Advancement of near Real-Time (NRT) satellite altimeter products, and their incorporation into forecast systems, have enabled extensive development of products for oceanography, hydrology, ice, and surface waves. Many of these products have been recently drafted into service to provide information for applications ranging from search and rescue to environmental management. This session calls for abstracts that examine development and future challenges at all the steps along this chain from the satellite sensor, through the computation of NRT data sets, incorporation into numerical forecast models, to the final delivery of forecast information.

Several satellites now provide ocean surface topography, wave height, and wind speed measurements in near real time. Jason-3, Jason-2 in the interleaved orbit, and Sentinel-3a form the high accuracy reliable observations. In addition, AltiKa, CryoSat-2, and HY-2 in drifting orbits extend spatial resolution. In the near future the Sentinel-3b and Jason-CS satellites will add to these. Further into the future is the Surface Water / Ocean Topography (SWOT) mission. The skill of operational products is highly critical on the observation density, and we call for examinations of present and expected accuracy under scenarios of these varying systems.

The new NRT data streams will enable new and enhanced products and applications using the NRT observations to construct analyses, synoptic forecasts, and long term to climatological forecasts. The analyses considered include all the returned geophysical information from altimeters: surface topography, waves, and wind speed. In addition, the use within operational centers of expanded NRT products is a critical component to continued support for the observational capability, and thus we seek examples of observations in action and decision-making.

The satellite ocean surface topography is the critical observation required in many applications. Other data sets certainly have complementary roles, and we call for examinations demonstrating altimetry working with these additional data sets. These include in situ observations from Argo, WOCE drifters, TOGA/TAO and PIRATA, river and lake gauges, and others in addition to other satellite sensors providing sea surface temperature, salinity, visible imagery, biological activity, and synergistic observations such as wave field properties and surface winds.

Coastal altimetry

Florence Birol, Marcello Passaro and Ted Strub

The Coastal Altimetry splinter welcomes abstracts that deal with improvement and exploitation of satellite altimetry in the coastal zone. In February 2020 the Coastal Altimetry Workshop (CAW) series celebrated its 12th yearly edition, held in Frascati (ESA/ESRIN), Italy. The CAW was initiated by a small and lively community of altimetry specialists and has quickly developed into a broader network that includes oceanographers and modelers. The reprocessing of standard altimetry missions and the newer techniques used in AltiKa, CryoSat-2, Sentinel-3 and, in the near future, Jason-CS/Sentinel-6 are bringing the field to a more mature stage, where the different datasets available are starting to be used in oceanographic applications, while constant improvement and validation are still ongoing.

New challenges have to be faced concerning the abatement of noise to allow the observations of smaller scales of variability typical of the coast and the integration with coastal models and in-situ observing systems. The new data from Sentinel-3 are bringing Delay-Doppler altimetry on repeated tracks around the global coastline, providing also simultaneous sea surface temperature and ocean color observations. The Delay-Doppler measurements are less noisy and less influenced by signal contamination from land. Consequently, fitting techniques, geophysical corrections, tidal and mean sea surface models need to be tested and adapted to the new features. Several specific coastal altimetry datasets are now available. With altimetry now providing 25 years of measurements and Jason-3 continuing the successful TOPEX/Jason reference series, there is a need of merging the coastal time series into user-friendly products to exploit the full records and observe the coastal sea level change at both global and regional scales..

The broad areas of interest for this session are:

1) Integration of Coastal Altimetry databases: A user guide to the many Coastal Products

2) Integration of coastal altimetry in regional and coastal models

3) Applications of coastal altimetry alone or in synergy with other measurements to observe coastal currents, wind and waves, sea level and extremes

The session will be structured around an invited talk for each of these areas, drawing material from authors of submitted contributions, which will appear as posters. Those three talks will be preceded by a concise review of the technical aspects of processing of altimetry data in the coastal zone and of the available datasets, but please note that papers focusing on those technical aspects should be submitted to one of the two Instrument Processing Splinter sessions (Measurement and Retracking, or Propagation, Wind Speed and Sea State Bias), which will contain significant discussions on similar topics.

CFOSAT

Lotfi Aouf, Danièle Hauser and Doug Vandemark

CFOSAT is a new oceanographic satellite mission which has been successfully launched on October 29th 2018. Its embarks two Ku-Band radar payloads (https://cfosat.cnes.fr/fr/):

- SWIM – Surface Waves Investigation and Monitoring – (French contribution) which includes a nadir beam (like standard altimeters) and five off-nadir beam (2 to 10° mean incidence) which illuminate the surface with a rotating geometry. SWIM is dedicated to the measurement of wave properties: directional spectra of ocean waves from the off-nadir beams, and significant wave height (and wind speed) from the nadir beam.

- SCAT (Chinese contribution), which is a fan-beam rotating scatterometer dedicated to provide winds at the ocean surface

Thanks to this design, CFOSAT offers the opportunity to develop new studies, such as joint analysis of space evolution of wind and waves, detailed analysis of the spectral properties of the wave field (in particular its directionality). The spectral information on waves will also be of great interest to study wave/current wave/sea-ice interactions and to feed the coastal studies with sea state boundary conditions.

Presently several groups contribute to the calibration and validation of the geophysical products. They have already shown the excellent quality of the data. The intense CAL/VAL phase should be completed by July 2019.

During OSTST meeting, i.e. about one year after the launch, the splinter session is dedicated to report on the first studies carried out using the CFOSAT geophysical products (radar cross-section, ocean surface wind and waves) and to let know the scientific community about the potential of CFOSAT observations, first for ocean and air/sea interactions studies, but also for sea ice and continental research studies.

For this splinter session, contributions are expected on:

- geophysical CAL/VAL (calibration/validation) of the CFOSAT products
- synergetic use of CFOSAT products with data from various missions and sensors (altimeter, SCAT, SAR,..) or in-situ measurements
- ocean wind and waves analysis using CFOSAT or combined observations
- sea ice, continental ice shelf; bare soil or vegetation using CFOSAT or combined observations
- CFOSAT data assimilation in numerical models,

Instrument Processing (Measurement and Retracking)

Francois Boy, Phil Callahan, Robert Cullen, Jean-Damien Desjonqueres, Alejandro Egido, Cristina Martin-Puig and Walter H.F. Smith

It is envisioned that, depending on the number and quality of presentations received, this splinter may occupy two oral splinter sessions, rather than just one.

The Instrument Processing: Measurements and Retracking splinter aims to understand the altimeter instrument's interaction with the scattering surface, as well as the algorithms and processing steps that transform raw instrument data into calibrated science products useful in a variety of applications in coastal and open ocean (primarily), but also inland water, snow and ice applications. Topics appropriate for this splinter may include, but are not limited to:

- Understanding the differences between Ka and Ku band backscatter, penetration, volume scattering, rain effects, etc.
- Understanding, exploiting, or mitigating correlations in high-rate (20, 40, or 80 Hz) geophysical retrievals, for example to detect internal waves, reduce correlated noise in the spectral bump, or improve the precision and resolution of altimetric signals.
- Exploiting or mitigating heterogeneous ocean backscatter within the field of view of the altimeter, for example to detect internal waves, manage sigma-0 blooms or very low SWH, edit rain events, etc. Are the answers different for LRM and for SAR?
- Understanding or improving multi-mission inter-calibration issues stemming from the performance of various altimeters and retracking algorithms, including: retracker biases, correlated errors, and the effects of these on sea state bias.
- Understanding the similarities and differences between LRM and SAR altimetry, and the inter-calibration of the two, including: sensitivities to mis-pointing, direction of winds and waves, etc.
- Understanding the similarities and differences between the different SAR altimetry operational (open-burst processing or interleaved vs closed-burst processing) and measurement modes (on board processing RAW or RMC), including: effects of the different modes on fully focused processing, sensitivities to geophysical retrievals if any, Doppler aliasing and its impact, etc.
- Algorithm improvements, including general improvements and also specialized algorithms for particular applications (coastal zone, leads in sea ice, inland water, internal wave detectors, etc.) What can be done and what is gained by it?
- Innovative uses of stack files ("looks" sorted by look angle or Doppler frequency), and how can they best be exploited?
- Does fully-focused processing add significant value? Is there some in-between hybrid processing that optimizes the mix of coherent and incoherent processing? Are there any studies to optimize its computational efficiency?
- What can simulations and empirical studies with existing data tell us about algorithm design or optimal exploitation of future missions? Collection and dissemination of test data sets spanning a large range of conditions.
- What additional data elements should be added to data structures to enhance the accuracy or utility of the data?

Instrument Processing (Propagation, Wind Speed and Sea State Bias)

Shannon Brown and Estelle Obligis

The Instrument Processing splinter for propagation, wind speed and sea state biases addresses the calibration, validation and improvement of the various corrections and data products in the altimeter processing, not including the radar altimeter processing itself (which has a separate splinter).

Ideas for additional data elements, either directly derived from the instruments or from external sources, that will enhance the accuracy or utility of the data are encouraged.

Characterization of Jason-2 and Jason-3 processing and errors will be of great interest, particularly differences from previous missions.

Contributions on how to best utilize the planned instrument enhancements on Jason-CS are sought, including the high frequency radiometer and the calibration system for the radiometer.

Particular areas for contribution:

- High-frequency radiometer algorithms for path delay or value added products, such as new flagging algorithms
- Updates on Jason-3 sea state bias
- Improved wind speed or path delay retrieval algorithms for altimeter missions past, present and future
- Correction products for SWOT and understanding their spatial power spectra

Outreach, Education and Altimetric Data Services

Jack McNelis, Vinca Rosmorduc and Margaret Srinivasan

The international collaborations in outreach, education, and applications have celebrated 25 years of cooperation over the multi-mission lifetimes. A fruitful partnership has developed, which includes participation by NASA, CNES, Eumetsat, NOAA, and ESA. Joint products and activities have been fostered and continue to develop. This session will present current outreach activities to educational groups and the general public, the ever popular 'Showcase', and data services by each of the previously mentioned agencies and scientists. As altimetry encompasses multiple organizations, sciences and groups this session is an opportunity to collaborate with each other, share our respective and joint activities and outcomes, and to involve the scientists in the education and public outreach (EPO) process.

An overarching goal is to enhance understanding in the general population and across scientific disciplines of the value of ocean science research and, ultimately, public funding of space agencies. In order to maximize the 'reach' of altimetry outreach, a closer collaboration with the science teams, scientists from other disciplines, and other outreach professionals is necessary. The Outreach session at the annual OSTST meeting is a key steppingstone on the path to achieving this goal as we meet and interact with scientists in the time leading up to and during the meeting.

The 'Showcase' element of the Outreach session has become a popular forum for members of the OSTST to share their outreach activities. It also provides a means to demonstrate the breadth of outreach being done to the larger OSTST, and perhaps spur ideas for more participation by team members.

Altimetric Data Services is an important element of this splinter. It provides a way for exchanging information and linking projects and users together so users can benefit from the wide variety of altimetry-derived data and services available. Exchanges with science team members are highly valuable, as experiences and solutions are shared in this splinter.

This session will also focus the relevance of altimetric science to climate issues, support of training new users on the use of altimetry data, sharing resources and outreach products with a wide audience (and in multiple languages), focus on existing and potential collaborations between data centers to better serve users, and addressing long-term data management scenarios outside of project funds (and within data centers).

Precision Orbit Determination

Sean Bruinsma, Alexandre Couhert and Frank Lemoine

Precision orbit determination underpins the accuracy and quality of the data for all altimeter missions.

With a twenty-five-year long altimeter record from three missions on the reference orbit

(TOPEX/Poseidon, Jason-1, Jason-2/OSTM and Jason-3) and from several others on lower orbits (ERS, Envisat, CryoSat-2, HY-2A, SARAL/AltiKa), the focus is now on the long term stability of the orbit solutions and on the impact of geographically correlated errors on both the global and regional Mean Sea Level estimates.

The most critical issues concern the stability of the reference frame for computing the orbits, the accuracy and fidelity of the force models that underpin the POD computations and the overall quality of the available tracking data. We monitor closely the performance of the tracking systems onboard the current flight missions (especially Jason-2, Jason-3) but we are also concerned with the general performance of the SLR, DORIS, and GNSS networks used for orbit determination.

We are especially concerned with the stability of the reference frame and the tracking systems, and the consistency between the orbits produced by the different geodetic techniques. The new reference frames realizations for ITRF2014 show improvement with respect to ITRF2008, and we are especially interested in its application to satellite altimetry POD for each of the techniques. Each of the geodetic techniques has systematic errors that impact the measurements which affect the POD stability and accuracy on both the short- and the long-term. For SLR this includes the range biases revealed by analyses to geodetic satellites, and potential time biases shown by the Jason-2 T2L2 experiment. For DORIS this includes DORIS Ultra Stable Oscillator variations due to radiation (specifically passage through the SAA) and due to variations in temperature. For GNSS this includes ionosphere perturbations at high latitudes (Sentinel-3A receiver), observed differences between the Jason-2 and Jason-3 GPS receivers and new error structures due to the possibility of fixing ambiguities on Jason-3.

This year, we specifically solicit presentations on the performance of the GNSS receiver on Sentinel-3A, which will be the primary GNSS receiver on the follow-on Jason-CS missions scheduled in the next decade.

The accurate modeling of time-variable gravity and the geocenter is now a requirement of altimetry POD. We encourage papers that discuss the latest models that are applicable for satellite altimetry POD given the operational constraints of latency and timely delivery of GDR products.

The POD splinter brings together POD specialists with altimetry users so that the two communities can interact. POD specialists gather during the splinter to discuss their latest results but they are also there to answer questions from the community. The goal of the POD splinter is to ensure that spurious orbit-related signals do not contaminate the altimetric products on medium-term or long-term time scales, and to help ensure that altimetric data across different missions from different orbits can be compared and combined in a seamless fashion.

Quantifying Errors and Uncertainties in Altimetry data

Michael Ablain, Joel Dorandeu and Remko Scharroo,

Although altimeter data provide an accurate estimation of sea-level over the last 25 years, they are impacted by errors at different time and spatial scales as any measurement system. Some are known to exist but have not been resolved, some are not even known to exist. This is the bane of our constantly expanding knowledge about a complex measurement system that does not only depend on the altimeter instrument, but also on radiometer data for the wet tropospheric delay correction, orbit determination and its associated reference frame, model data for atmospheric pressure, dynamic atmospheric correction, tides and alike. With a measurement system this complex it is often very difficult to identify even the cause of an error, like the 59-day signal observed between sea levels determined by Jason missions and TOPEX.

Obviously, the identification and determination of new errors in altimeter data is an activity of crucial importance to improve and correct the whole altimeter datasets. This also allows us to provide users the error budget of altimeter data for a dedicated altimeter mission or for applications. However this activity makes sense only if the need of those applications is well defined. This means that the formulation of errors is as relevant as their identification. Thus the way of the error budget is presented (standards, classification of errors, wavelength, frequency, etc.) has to continue to be formalized better.

In this session we invite presentations and posters dealing with the following two themes:

- **new insights about errors in the altimeter system as a whole** (all contributions are to be taken into account in a systemic approach). This is from altimeter specialists towards applications. Contributions on improvements and resolutions to long-lasting uncertainties, errors, and data anomalies are particularly encouraged. Topics of particular interest are: a) the high frequency signals in the altimetry data in preparation to forthcoming higher resolution measurements; b) the long-term stability of altimeter missions for climate studies for new missions (e.g., Jason-3 and Sentinel-3) and also reprocessed missions (e.g. TOPEX/Poseidon-1); c) the ability of SAR mode data from the Sentinel-3a mission to measure accurately the sea level height.
- **the needs from applications in terms of error formulation**: what is lacking in the current situation? This is from applications towards altimeter specialists. Contributions from climate change experts, oceanographers, assimilators, etc., are encouraged.

Regional and Global CAL/VAL for Assembling a Climate Data Record

Pascal Bonnefond, Shailen Desai, Luisella Giulicchi, Bruce Haines, Eric Leuliette and Nicolas Picot

Determining the random and systematic errors in the fundamental instrument observations and in the Level-2 geophysical data products is a continuing process that involves participation of both the project teams and the OSTST investigators. The principal objectives of joint verification are to: 1) assess the performance of the measurement system, including the altimeter and orbit-determination subsystems; 2) improve ground and on-board processing; 3) enable a seamless and accurate connection between the current (OSTM/Jason-2 and Jason-3) and legacy (TOPEX/Poseidon and Jason-1) time series and 4) enable the development of Level 3 and Level 4 products by an accurate analysis of any regional bias between the Reference mission and the other flying altimeters (currently SARAL, Sentinel-3A, CryoSat, HY-2). To succeed in these objectives, the general approach is to pool the talents and resources of the project and science teams. Engaging the science team in the continuous CALVAL effort has been one of the hallmarks of success for the TOPEX/Poseidon and Jason altimeter programs. The CNES and NASA research announcements have consistently emphasized CALVAL, recognizing that the science investigators conducting research in some of the most demanding applications (e.g., mean sea level) are often positioned to offer the most innovative CALVAL solutions.

During the first 6 months of each new mission, an intensive verification effort is conducted by all members of the Verification Team in order to verify the integrity of the system—and to make adjustments where necessary—before starting the routine GDR production. However, the verification effort continues afterwards on a routine and permanent basis. These ongoing efforts are essential for ensuring the integrity of the long-term climate record at the 1-mm/yr level.

CALVAL activities are conducted based on dedicated in-situ observations, statistics, cross comparisons between models, different algorithms and external satellite data. The studies go well beyond validation of the overarching error budget underlying the mission requirements. They focus in particular on the temporal and geographically correlated characteristics of the errors. Reduction of this class of errors is critical, since they are conspicuously damaging to estimates of ocean circulation and sea level. CALVAL activities also encompass issues related to data return, such as data editing and flagging. We also encourage CALVAL presentations on specialized topics, such as the characterization of SSH in Arctic Ocean sea ice leads, and the examination of the impacts of SWH, swell ,and roughness on SSH data quality.

Because of the usual large number of contributions the CALVAL splinter is separated into two parts: Local CALVAL (focusing on in-situ bias estimates) and Global CALVAL (focusing on the assessments of correction terms and error budget).

Sentinel-6 Validation Team (S6VT) feedbacks

Pascal Bonnefond, Craig Donlon, Eric Leuliette, Remko Scharroo and Josh Willis

The "Sentinel-6 Validation Team (S6VT) feedbacks" oral presentations are reserved for high level summaries from S6VT members and agencies (but you can submit abstracts "Posters" or "Forum only").

Science Results from Satellite Altimetry

Pascal Bonnefond, Craig Donlon, Eric Leuliette, Remko Scharroo and Josh Willis

General science results based on data from satellite altimetry will be included in this session. Although this session will primarily focus on ocean surface topography observations, we also welcome science contributions that make use of the ancillary observations such as wet path delay, significant wave height, wind speed, or any results that do not fit into any of the other splinter sessions. This year 4 main themes have been selected that will correspond to dedicated oral sessions:

- Science I: Climate data records for understanding the causes of global and regional sea level variability and change

Benjamin Hamlington and Benoit Meyssignac

Understanding of sea level variability and change requires quantification of the contributions from all relevant climate-related processes and identification of their natural or anthropogenic causes. Such knowledge is crucial for development of projections and forecasts useful for impact and risk analyses, as well for understanding the Earth's energy imbalance and hydrological cycle. This session seeks data analyses and modeling that address in detail causes of sea level variability and change on timescales of years to centuries at the regional and global levels. Topics of particular interest include the mass and steric contributions to sea level budgets and respective uncertainties, the differences between coastal and large-scale sea level variability, the importance of climate modes and internal variability in general on sea level, and the attribution of regional sea level change to natural and anthropogenic radiative forcing agents.

- Science II: Large Scale Ocean Circulation Variability and Change

LuAnne Thompson & Thierry Penduff

The over two-decade altimetry record along with expanding in situ observational data sets now allows unprecedented examination of variability and changes in all components of the large-scale ocean circulation. This session invites contributions that use altimetry and other data sets, as well as simulations or reanalyses to understand changes in all components of the three-dimensional large-scale ocean circulation, including boundary currents, gyre-scale and overturning circulations. We also seek contributions that use altimetry to understand the linkages between ocean circulation and heat content changes with changes in the atmosphere, and the interactions between large and shorter spatio-temporal scales of the oceanic variability (e.g. mesoscale turbulence).

- Science III: Mesoscale and sub-mesoscale oceanography

Lee Fu, Rosemary Morrow and Heather Roman-Stork

Recent reprocessing of alongtrack altimeter data has led to lower alongtrack errors and smaller space scales being revealed in Jason Ku-band class altimeters, as well as the Saral-Ka and Cryosat-2 and Sentinel-3 –SAR data. New mapped products also have smaller space scales and higher eddy energy levels. This session will address the recent progress in observing the smaller ocean mesoscale signals in recent alongtrack data, and in observing the eddy dynamics with mapped altimeter data. Studies are encouraged that address the synergy between altimetry and other satellite data (SST, SSS and ocean colour), in-situ data or models in order to reveal the mesoscale or sub-mesoscale fields. The interaction between the mesoscale and large-scale circulation via the eddy effects on ocean transport, water mass modification and mixing are also encouraged. A new topic concerns the interaction of high-frequency internal tides and internal waves with the mesoscale eddy field, and their imprint in SSH. We also welcome results that will help pave the way for high-resolution swath altimetry, in particular on the merging of the anticipated SWOT observations with conventional altimetry database.

- Science IV: Altimetry for Cryosphere and Hydrology

Charon Birkett, Jérôme Bouffard, Jean-Francois Crétaux and Sinead Farrell

Over the past 25 years, satellite radar altimetry has shown its ability to revolutionize our understanding of the ocean and climate. Early advances were limited to the open-ocean and ice-free regions, neglecting large portions of the Polar regions and inland water. Thanks to the continued efforts of the space agencies and the scientific user community, the long term monitoring of the ice thickness variations (ice sheets, glaciers and sea ice) and inland water levels (lakes, reservoirs, rivers and floodplains) have been made possible, opening a wide range of emerging applications.

With more than two decades of pulse-limited historical measurements (ERS-1/2, Topex/Poseidon, ENvisat,, Jason-1/2/3, HY-2A, AltiKa), the development of processing algorithms and validation approaches targeted for the Cryosphere and Hydrology are becoming mature. The new generation of higher resolution altimetry instruments based on SAR (CryoSat-2/Sentinel-3), SARin (CryoSat-2), laser (IceSat-1, IceSat-2) and interferometry (SWOT) technics, will permit a breakthrough in the monitoring of ice and hydrological surface parameters. The science and operational application communities are in "readiness" preparing for the change in technology and the inflow of new data. The community also looks to significantly improve modeling and forecasting skills through assimilation of these altimetry observations within hydrological and ocean-ice coupling models.

We encourage contributions that utilize past and present altimetry missions, focusing on the cross-calibration of multiple data sets, or which look to the next generation of sensors for research or emerging operational applications. The session also welcomes presentations that provide new insights into the cryospheric and hydrological processes, and those that explore the effects of climate change on these processes.

The Geoid, Mean Sea Surfaces and Mean Dynamic Topography

Ole B. Andersen and Yannice Faugere

Geoid / MSS / MDT are key products for referencing altimetry. The quality of the altimetric sea level products (Sea Level anomaly, Absolute Dynamic topography) and the derived ocean surface currents directly depends on the quality of these surfaces. With the successful launch and availability of data from new satellites (CryoSat-2, AltiKa and Hy-2 and in the near future Sentinel-3 and SWOT) both SAR and Ka-band altimetry are becoming available for updated geoid, MSS and MDT products. This is a challenge for operational oceanographic application ingesting both new types of altimetry but also altimetry away from the "well revisited" ground tracks.

Both Cryosat-2 and Jason-1 have successfully provided new geodetic mission data to improve the resolution and accuracy of both the geoid and MSS. At the same time the availability of SAR and Ka-band altimetry opens for new challenges. One challenge being accurate MSS and geoid determination along the coast. Another challenge is to determine and enhance the accuracy of MSS along the new ground tracks for i.e Sentinel-3A/B and SWOT.

In this splinter we invite presentation in various aspects this research fields, both on developing new geoid/MSS/MDT, but also on the use of these for novel oceanographic and geophysical research.

Tides, internal tides and high-frequency processes

Loren Carrere, Florent Lyard and Richard Ray

Under the subject of tides, contributions are suggested on new global models and their accuracies, on comparisons and residual weaknesses of existing models (especially the two models on the GDRs), on radiational tides and interactions with the other High-Frequency corrections.

Contributions are also suggested on internal tides signals and the ways to remove this signal from altimeter measurements.

Under the subject of High-Frequency aliases, a discussion is intended on (non-tidal) sea level variability at frequencies poorly sampled by the altimeter and on ways to "de-alias" the records. Of particular interest are contributions on the impact of current de-aliasing products on data analysis and interpretation and on possible improvements to those products (new model or data filtering developments, quality assessments of relevant atmospheric forcing fields, etc.).

Contribution on new coastal tides and storm surges models is also suggested as such approach will allow improving regional altimetry accuracy.