Science Results from Satellite Altimetry Summary

Chairs: Ben Hamlington, Guy Woppelmann, Florence Birol, John Wilkin, Charon Birkett, Jean-Francois Cretaux

Session Summaries

- Science I: Current and past mean sea level observations
  - 6 oral, 9 posters
- Science II: From large-scale oceanography to coastal and shelf processes
  - 7 oral, 42 posters
- Science III: Two decades of continental water's survey from satellite altimetry - From nadir low-resolution mode to SAR altimetry, new perspectives for hydrology
  - 7 oral, 12 posters

Science I: Current and past mean sea level observations

- Several presentations on reconstructions of 20th century sea level – both global and regional.
  - Lack of consensus (1.1 mm/year vs. 1.6 mm/year; large spread in regional variability).
  - Disagreement comes from range of sources
    - Methodological
    - Tide gauge selection and correction (VLM)
- Discussion on GMSL from satellite altimetry.
  - Similar issues related to correcting TGs for VLM for validation purposes.
  - Is the record now long enough to estimate a statistically significant and meaningful acceleration?

Science I: Current and past mean sea level observations

- Conclusions/Roundtable Discussion:
  - Lack of consensus in terms of 20th century sea level .
  - Need concerted efforts both for historical and modern GMSL to narrow the uncertainty, understand differences and determine best practices.
  - More transparent/easy-to-reproduce techniques should allow for better understanding of differences.
  - Extend the 60-day requirement to 90 days for GDR latency (Jason-3 but also Jason-2) to improve the AMR stability thanks to the cold sky calibration → overall concurrence with this.

Science II: From large-scale oceanography to coastal and shelf processes

- Presentations showed sustained synergies:

  – Through merging multiple satellites, in situ data (mooring arrays, the Florida Current cable, CalCOFI shipboard ADCP and CTD, CODAR HF-radar), and proxies to study ocean and climate processes - AMOC, past sea level variability, polar processes, submesoscale vorticity/strain and divergence.

  – Through renewed analysis founded on dynamical principles (coastal-trapped waves, infra-gravity waves, internal waves, QG and SQG dynamics) to extract coherent signals at increasingly smaller scales that reveal ocean dynamic signals that were previously unresolvable with earlier altimeters.

Science II: From large-scale oceanography to coastal and shelf processes

- Conclusions/Roundtable discussion
  - Contemporary coastal and high resolution data (both altimetric and in situ) could be used to develop robust methods for downscaling conventional open deep ocean mesoscale and longer scale variability to coastal zones.
  - Methods could then be applied to historical altimeter data sets to infer more reliable estimates of coastal variability over the past 25 years that is possible with direct observations alone.
  - Could add value to tide gauge time series, or other coastal monitoring time series data, for numerous retrospective coastal scientific studies.
  - This effort would make better synergistic use of existing in situ networks; it would be facilitated by greater regional and international coordination in making coastal data sets to available for analyses of more global scope based on satellite missions.

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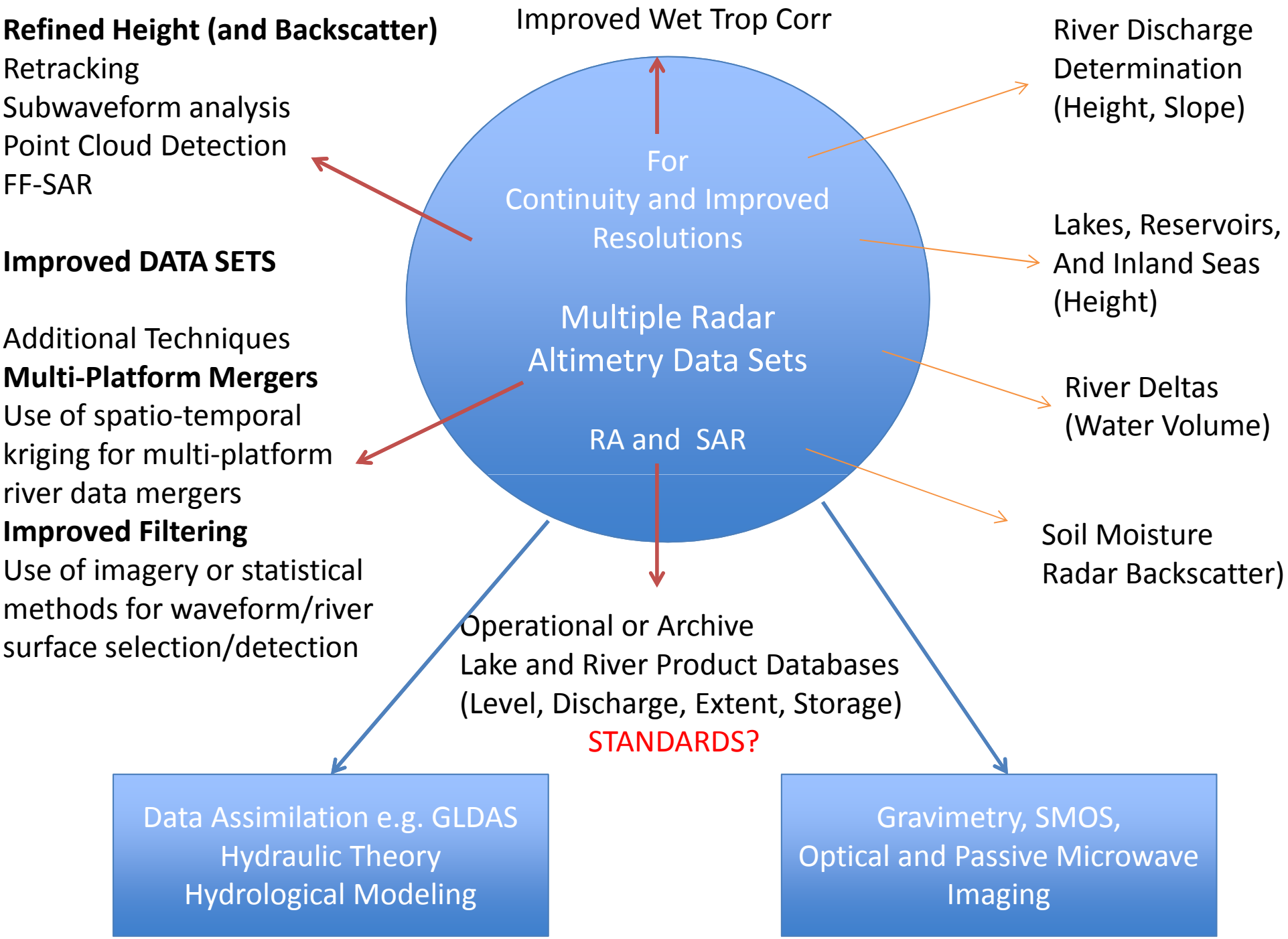
Science III:
Two Decades of Continental Waters Survey from Satellite Altimetry
From nadir low-resolution Mode to SAR Altimetry

New Perspectives for Hydrology

19 submitted abstracts

7 Oral Presentations

12 Poster Presentations


Refined Height (and Backscatter)
Retracking
Subwaveform analysis
Point Cloud Detection
FF-SAR
Improved DATA SETS
Additional Techniques
Multi-Platform Mergers
Use of spatio-temporal kriging for multi-platform river data mergers
Improved Filtering
Use of imagery or statistical methods for waveform/river surface selection/detection
Improved Wet Trop Corr
For Continuity and Improved Resolutions
Multiple Radar Altimetry Data Sets
RA and SAR
River Discharge Determination (Height, Slope)
Lakes, Reservoirs, And Inland Seas (Height)
River Deltas (Water Volume)
Soil Moisture Radar Backscatter)
Operational or Archive
Lake and River Product Databases
(Level, Discharge, Extent, Storage)
STANDARDS?
Data Assimilation e.g. GLDAS
Hydraulic Theory
Hydrological Modeling
Gravimetry, SMOS,
Optical and Passive Microwave
Imaging

Requested Feedback

- **Should Jason-2 switch to DIODE/DEM mode? Little feedback – but noting that the J-2 DEM had greater number of failures over lakes/reservoirs than J-3 DEM**

- **Jason-2 in interleaved or drift orbit? Data users in favor of interleaved orbit for as long as possible, to follow on from applications already looking to the T/P and J-1 interleaved phases with their 10-day repeatability, also noting drift data potentially available from Cry-2)**

- **Jason-3 performance? Where data is available J-3 performing as well as J-2**

- **Jason-3 DEM? Working very well over lakes/reservoirs (very few failures). BUT there are large data gaps over some of the major river basins. Is this DEM failure? Requesting all Hydrology group members to report successes/failures. Need to identify a point of contact for DEM investigation feedback……**

Size Limitation…Can the DEM be modified?