Instrument Processing Corrections Splinter Summary

- Session focused on SSB correction wet tropo corrections
- Corrections for new altimeter modes (e.g. SAR mode, InSAR)

SAR mode altimetry and sea state bias, Bellingham et al

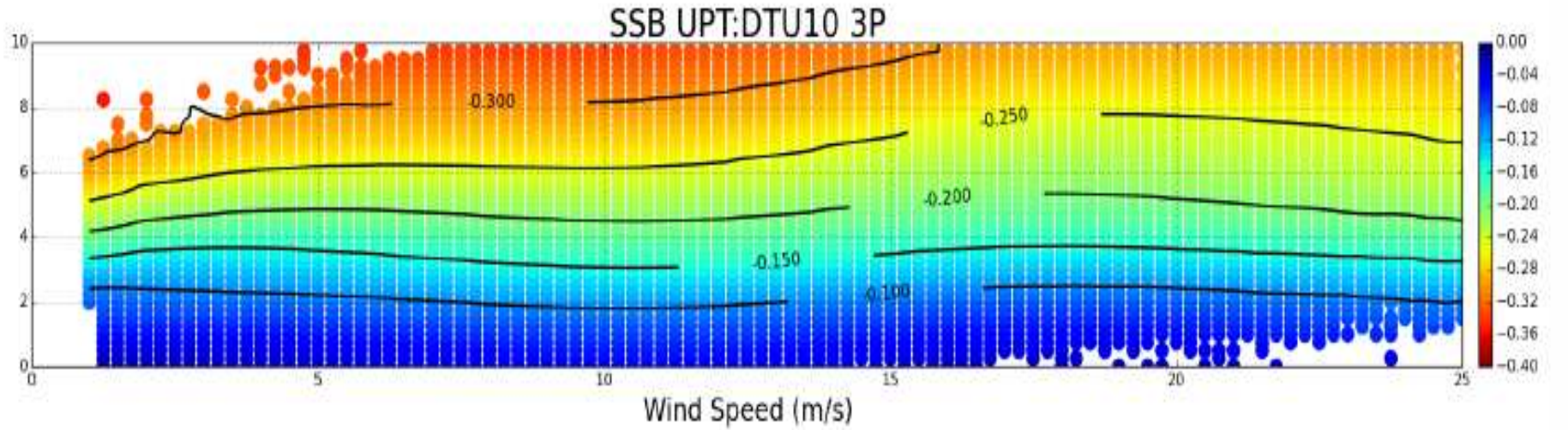
- No current SSB models developed for SAR
- SAR altimetry footprint is strongly asymmetric
  - LXT ~ O(2-10 km) & dAT ~ O(300 m)
  - introduces uncertainty as to possible effects on SAR mode waveforms by ocean swell and swell direction, and possible swell induced biases in SSH.
- 8 months study started 21 September 2015 to develop SAR SSB
  - Limited data available - Cryosat

A new proposal for SSB modelling with three parameters exclusively derived from altimetric data (Pires et al)

- Development of a new global and multi-mission SSB model based on parameters solely derived from altimetric data
- Regional studies of SSB for different sea state regimes
- Planned to implement in the forthcoming missions.

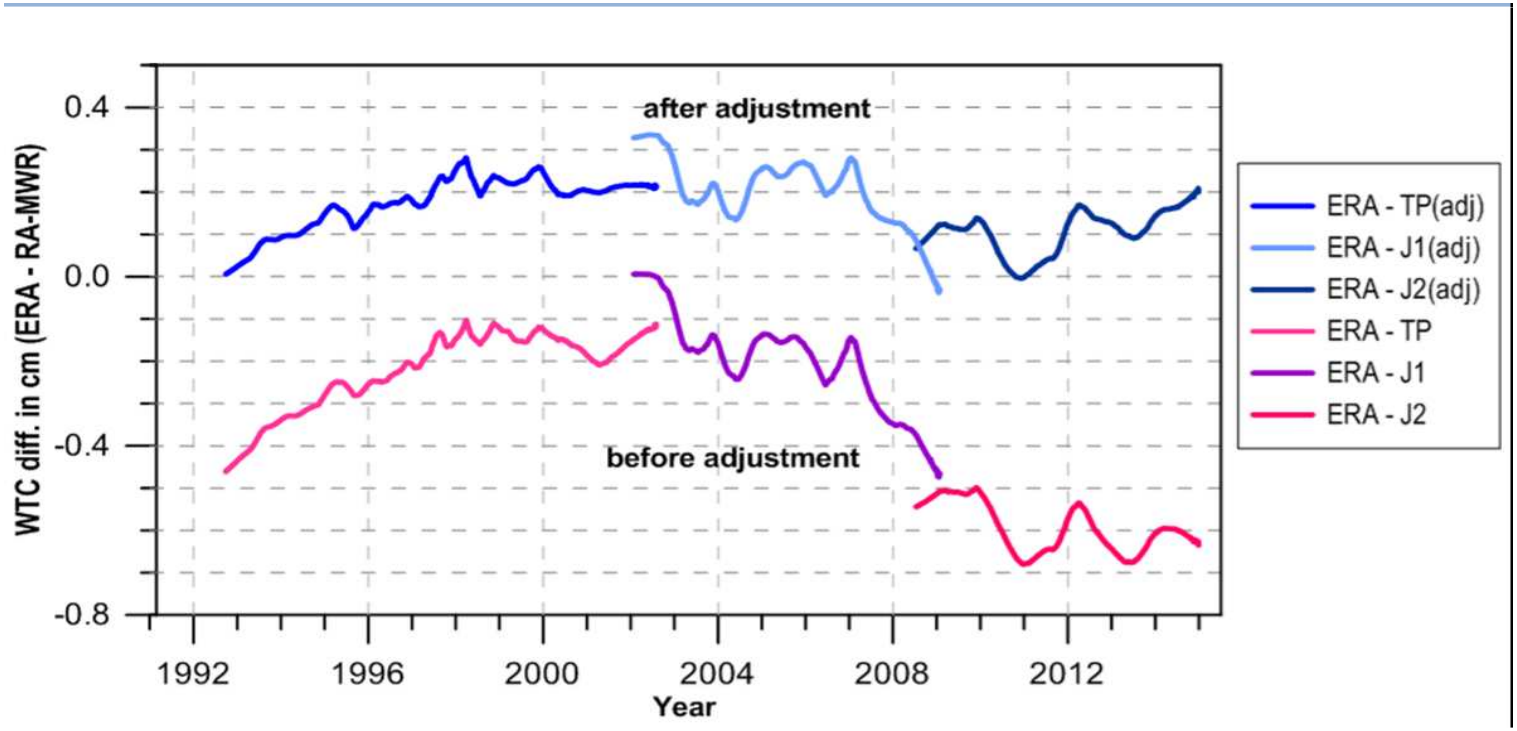
$$SSB_i = \beta_0 + f_1(SWH_i) + f_2(U10_i)$$

$$SSB_i = \beta_0 + f_1(SWH_i) + f_2(U10_i) + f_3\left(SWH_i, \sigma^0_{Ku}\right)$$



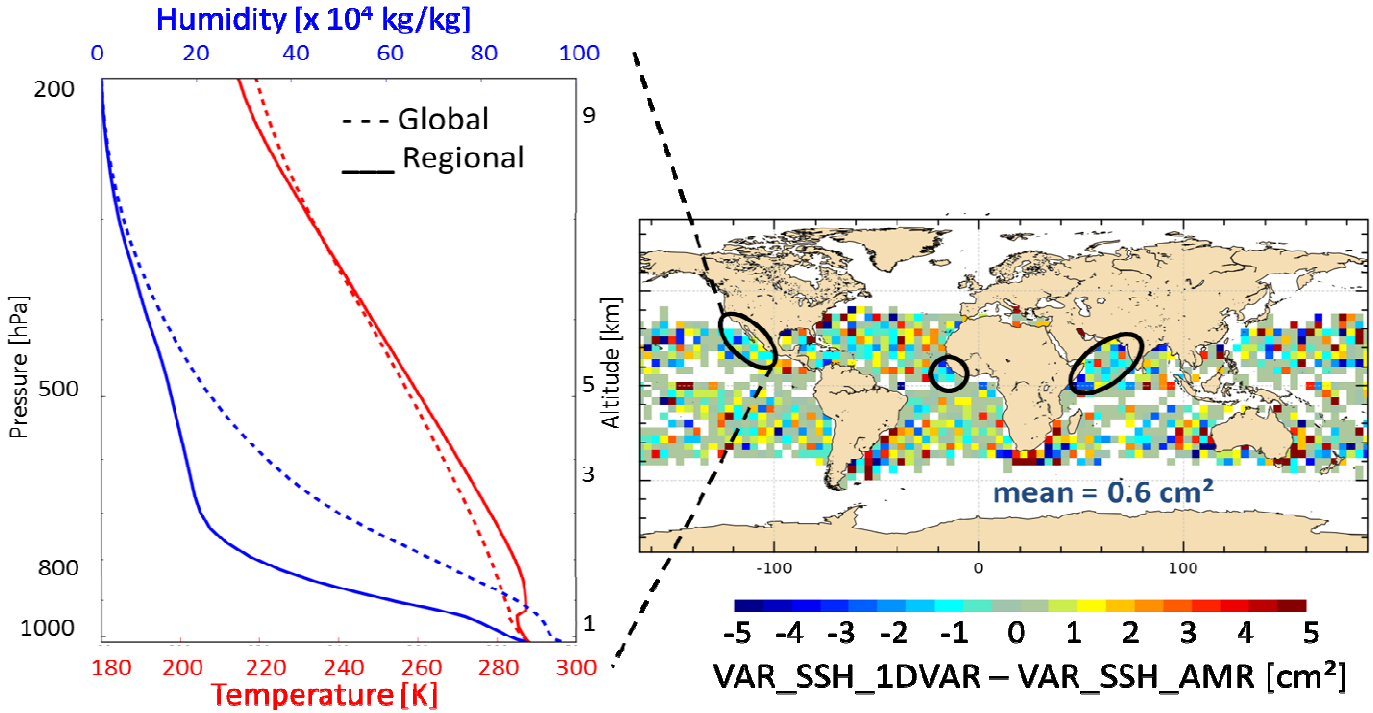
Inter-calibrated wet path delays for eight altimetric missions (Fernandes et al)

- GPD+, combines coastal GPS-based processing with open ocean objective analysis processing to provide global data for any altimeter mission
- All available microwave derived PD data inter-calibrated using SSMI sensors and applied to eight altimetry missions
  - Useful for missions without a radiometer and also for data gaps



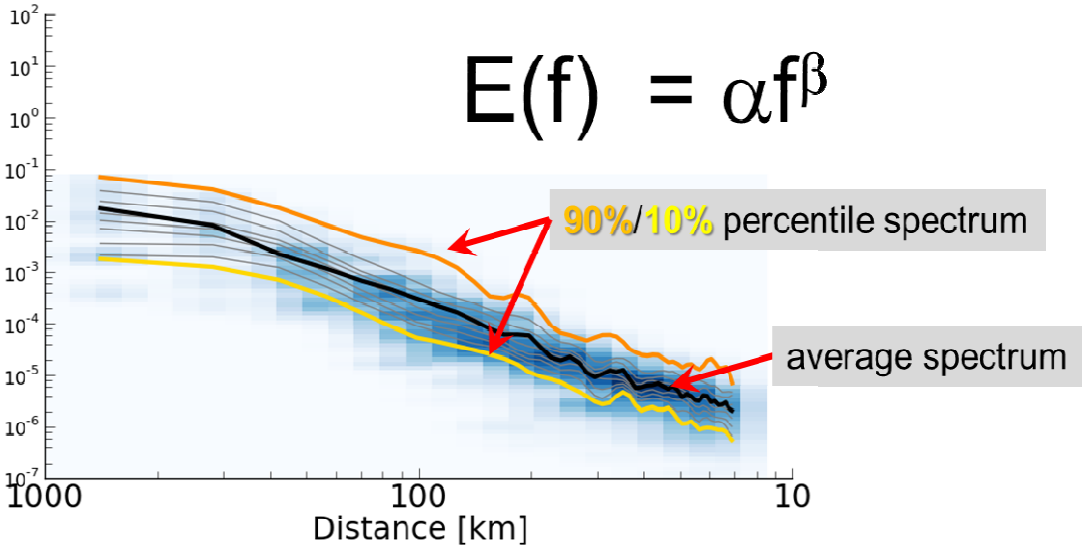
Towards a unique method for a global and multi-surface Wet Tropospheric Correction retrieval : a 1-D Variational approach (Hermozo et al)

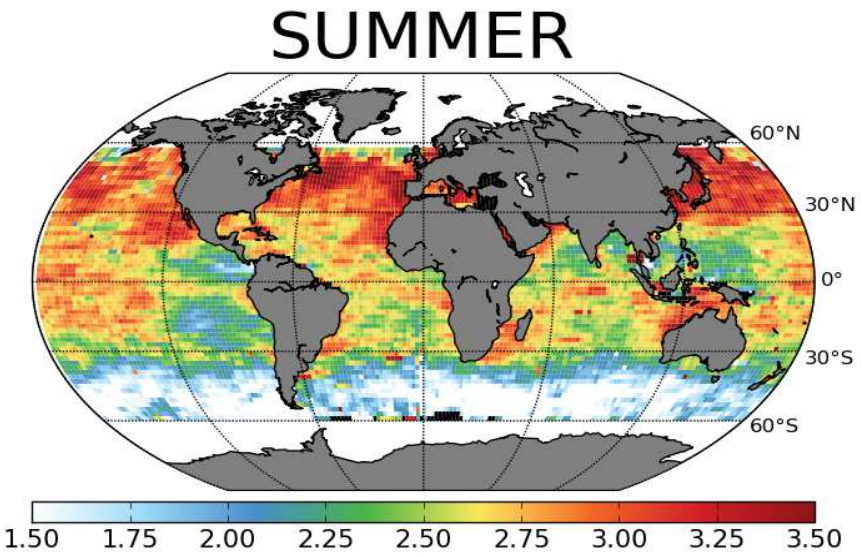
- Development of one single method for retrieval of WTC over all types of water covered surface
- Population of the background error covariance matrix for use of ECMWF inputs
- Earlier test show encouraging results over upwelling areas



Spatial and seasonal variability of the Wet Tropospheric Correction
Spectral characteristics (Picard et al)

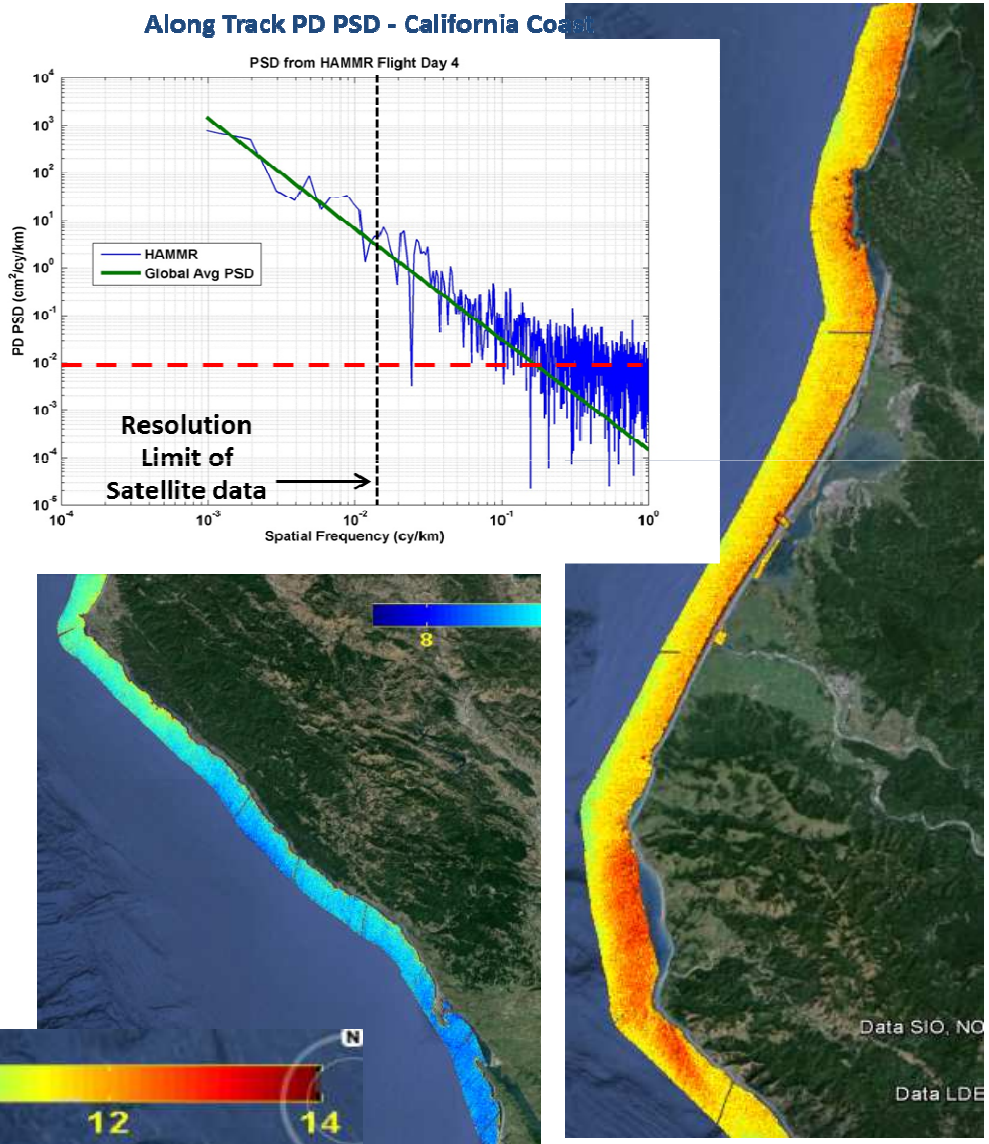
- To expand the « 1D » analysis of WTC spectra
  to a « 2D » geographical analysis
- To assess the impact of rain on the geographical patterns
  of the linear fit slope of the average spectrum = scaling exponent
- To quantify the seasonal and spatial variability of the scaling exponent





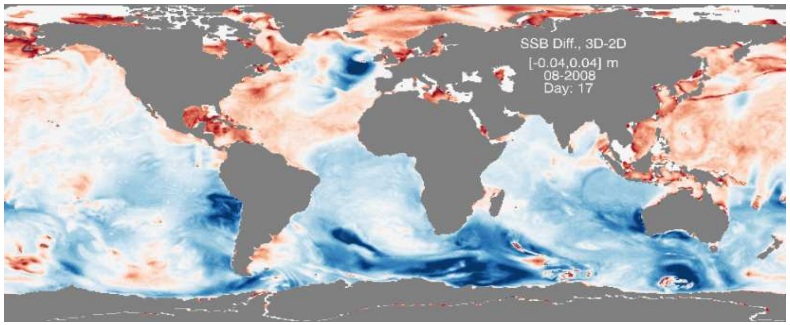
Evaluation of High-Resolution Path Delay Data from the Airborne HAMMR Instrument (Brown et al)

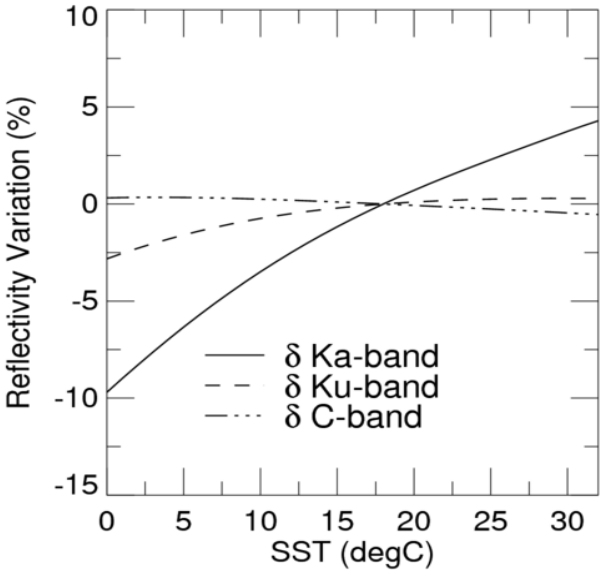
- Analyzed small-scale PD variability with high-resolution next-generation airborne radiometer for altimetry
- Evaluated improvement possible in coastal regions with high-frequency radiometers proposed for future missions

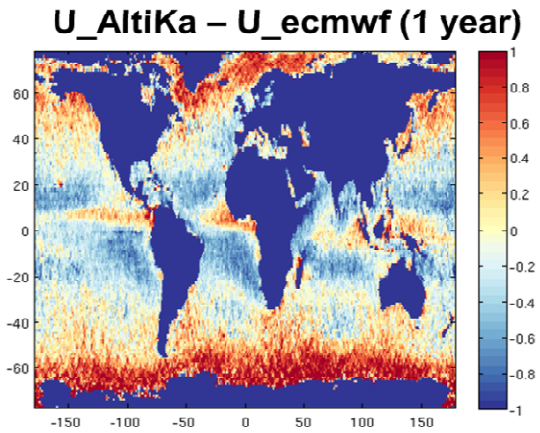


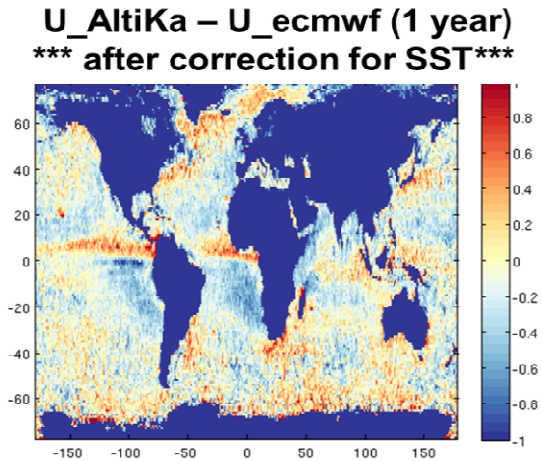
Issues involved in global wave model application to routine SSB range correction (Vandemark et al)

- 1-2 cm^2 of gain still possible in sea state geophysical corrections (SSB)
  - Work on-going to include wave information in SSB corrections
- Ka-band reflectivity varies with SST, not currently accounted for in AltiKa, results in regional bias









Recommendations/Key Points:

- Ka-band altimeter missions should account for the SST dependence of backscatter to avoid regional biases in products (e.g. wind speed)

- On-going and future altimeter projects should consider additional airborne measurements to study small-scale water vapor variability and test the performance of enhanced high-frequency radiometers under diverse weather conditions

- If wet path delay stability is critical to the Jason-2 EOL mission, then routine cold sky maneuvers should be considered