

DMU SAMOSA SUMMARY

By P.A.M. Berry & R.G. Smith

SAMOSA Final Meeting, ESA ESRIN

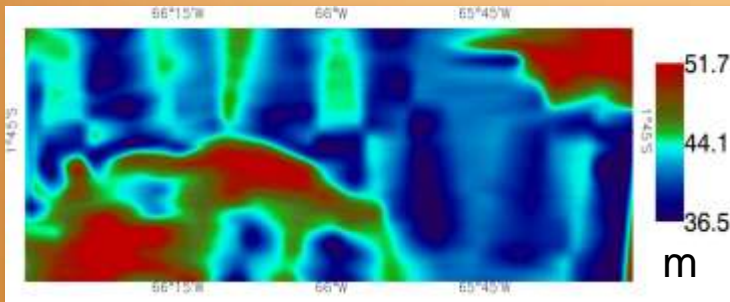
19/05/11

Overview

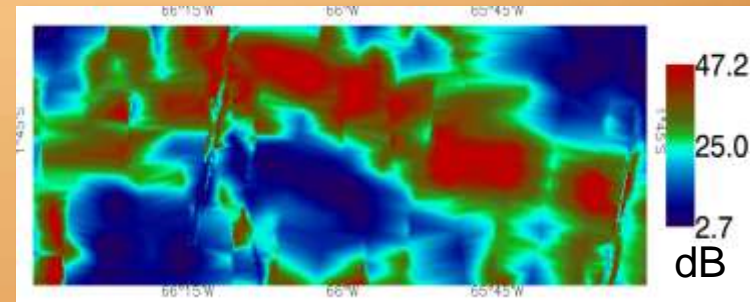
- Context
 - Inland Water
 - Coastal Zone
- DMU CryoSat-2 simulated data analyses
 - Amazon benchmark run
 - USA Lakes scenario
 - Estuarine scenario
 - Wetlands scenario
- CryoSat-2 first look
- Discussion

Amazon run

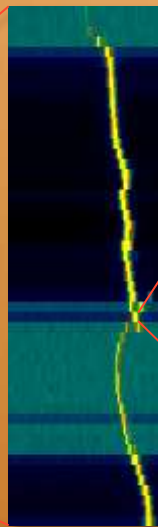
DEM



Sigma0



SAR Level
1-b



Summed SAR
FBR mode data

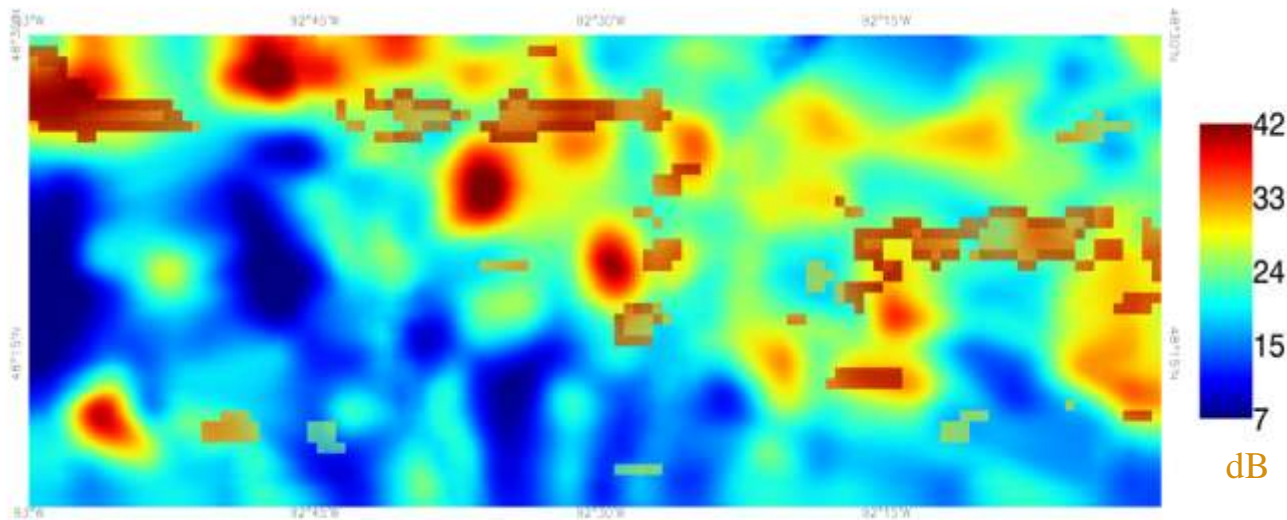
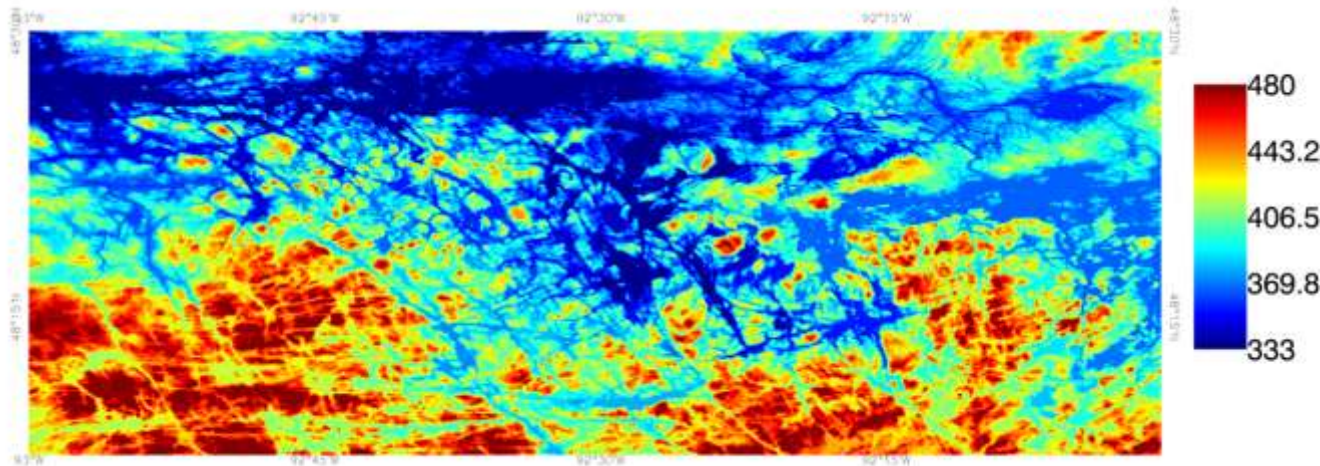


Full resolution
SAR mode
data

- Input scenario kept simple to provide baseline results
- SAR L1-b and SAR FBR results analysed
- SAR processing not fully implemented on scenario limiting results
- Two Polar angles used for different runs:
 - i) 0.26 Rads
 - ii) 0.001 Rads

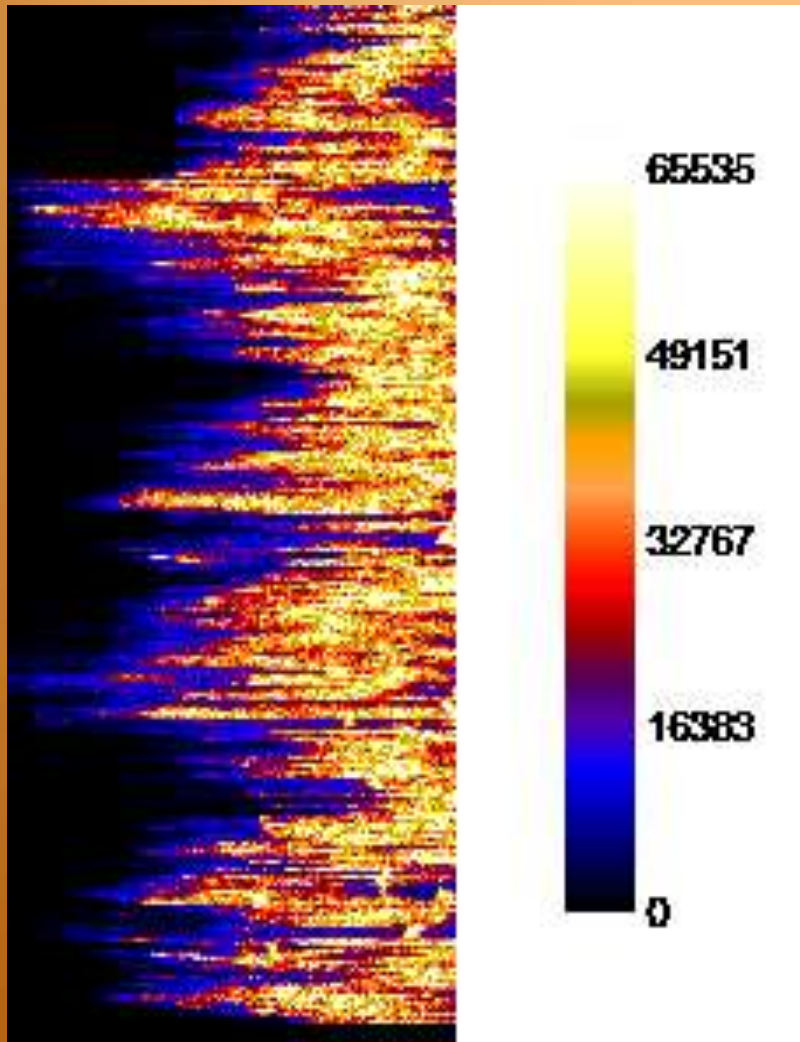
USA Lakes run

- Scenario over Northern USA lakes
- DEM generated using SRTM 1" dataset
- Polar angle response at 0.087 rads

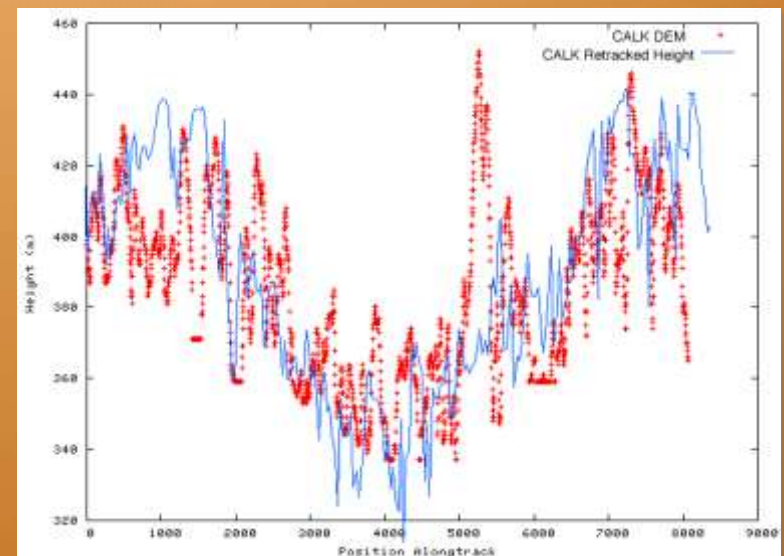
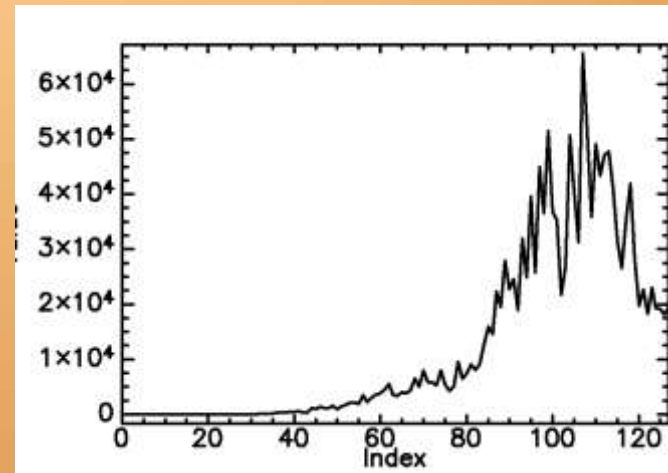


Lakes run results

Individual waveform

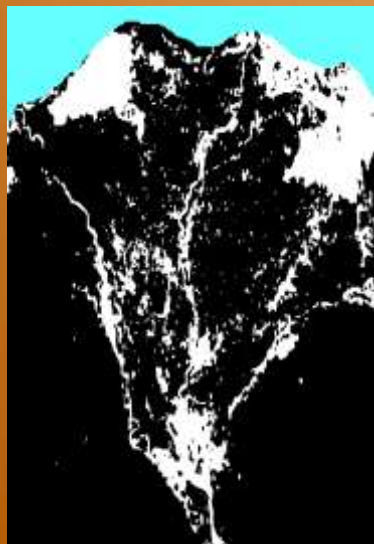
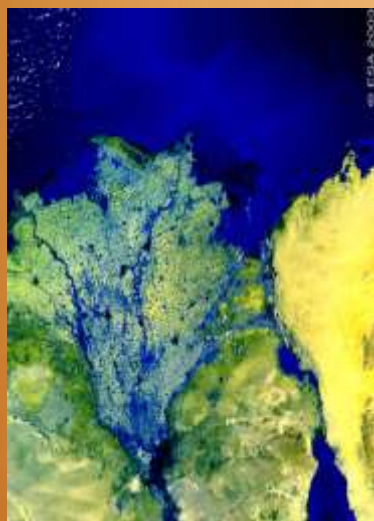


SAR Level 1-B waveforms

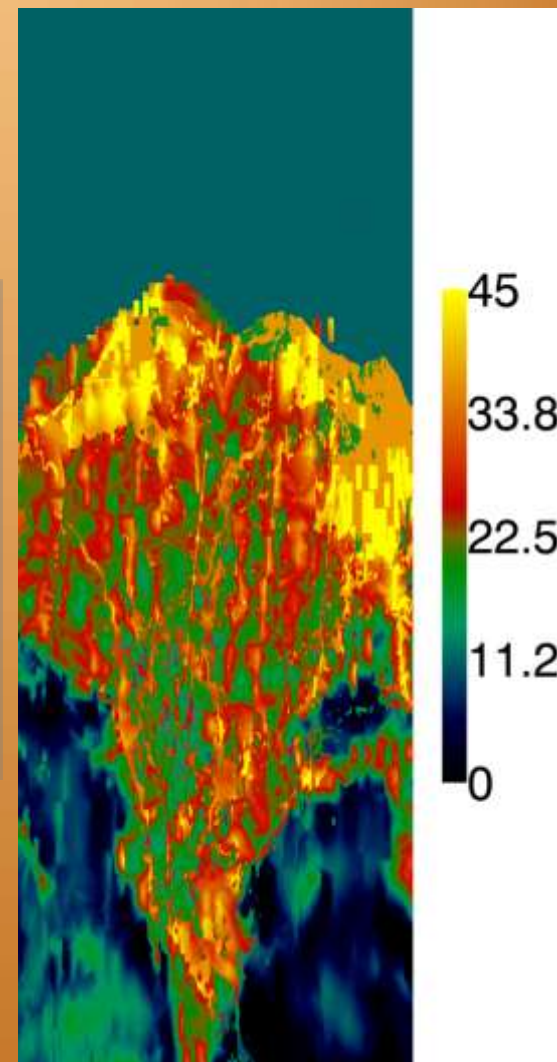
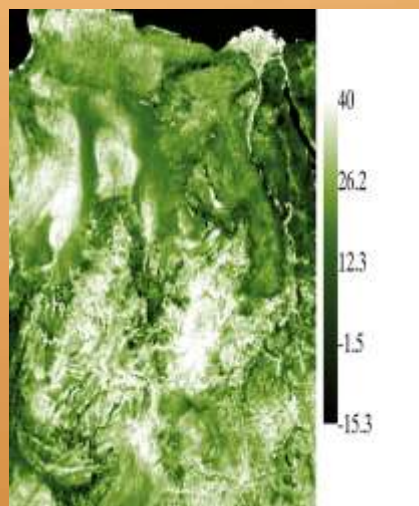
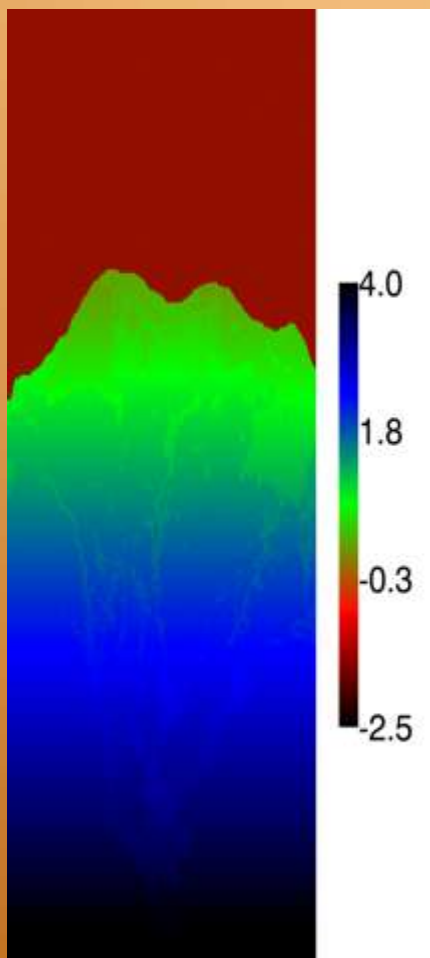


Retracked heights compared to DEM

Estuarine run

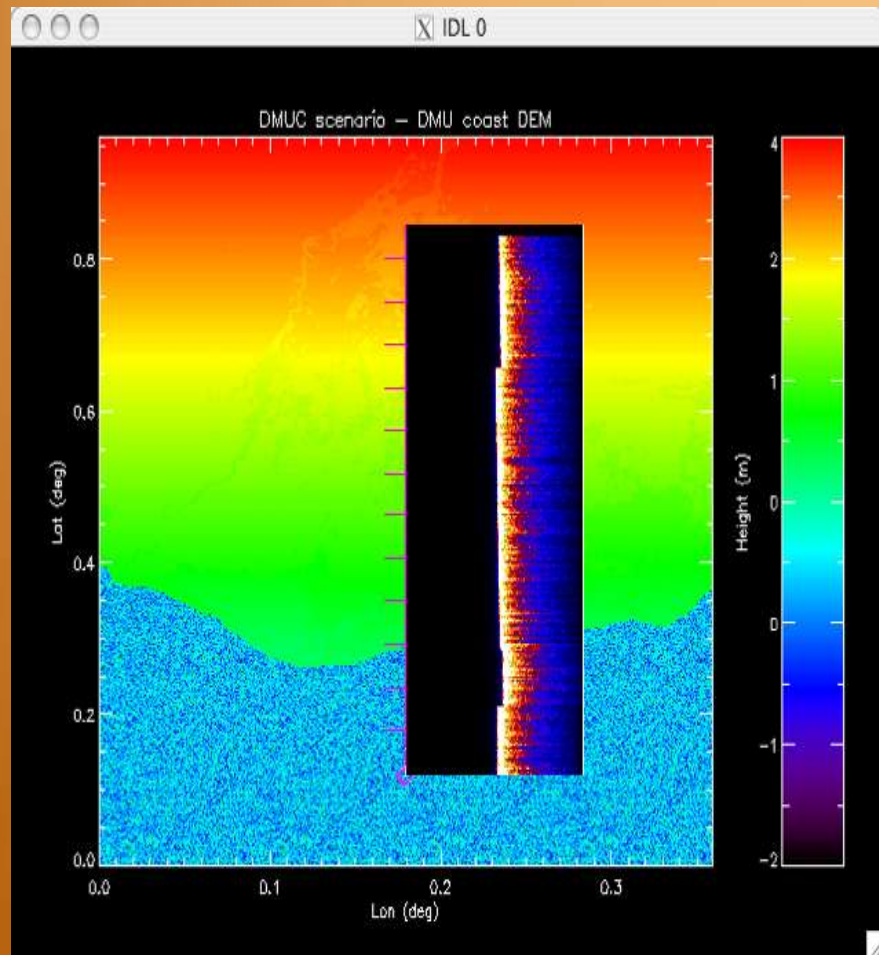


Creating the DEM

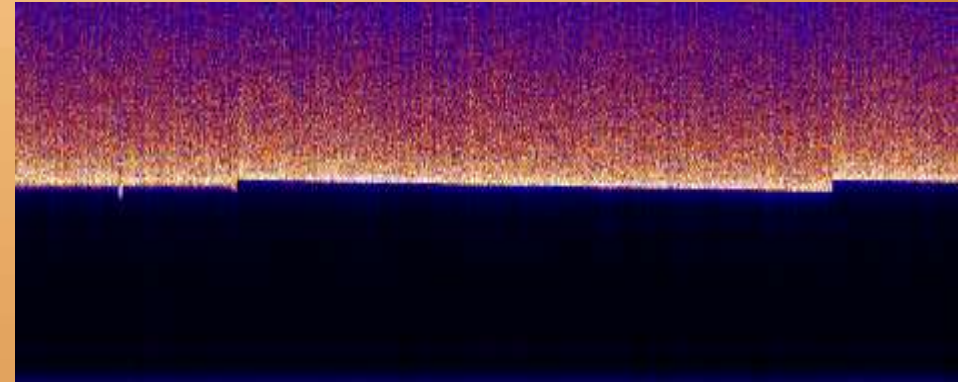


Creating the Sigma0 model

Estuarine results



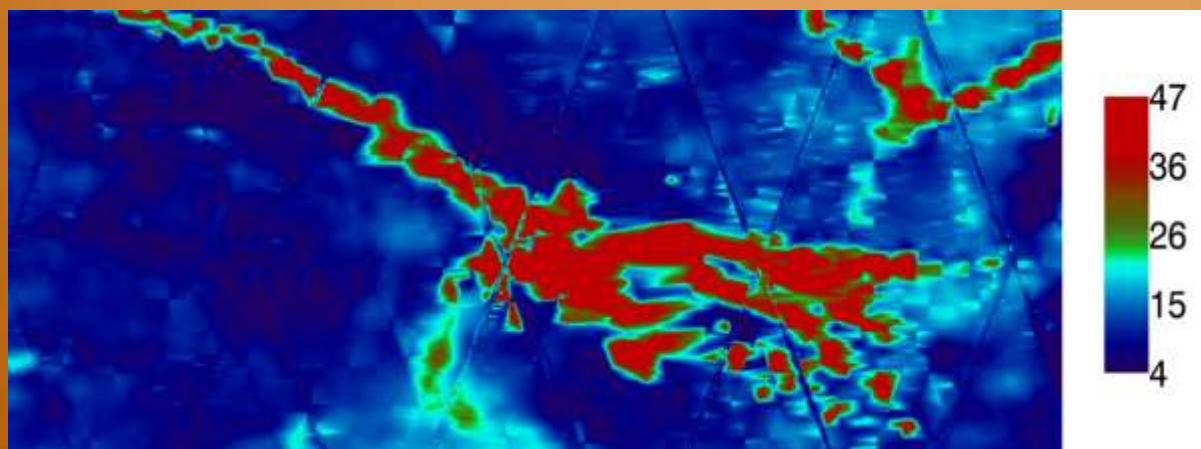
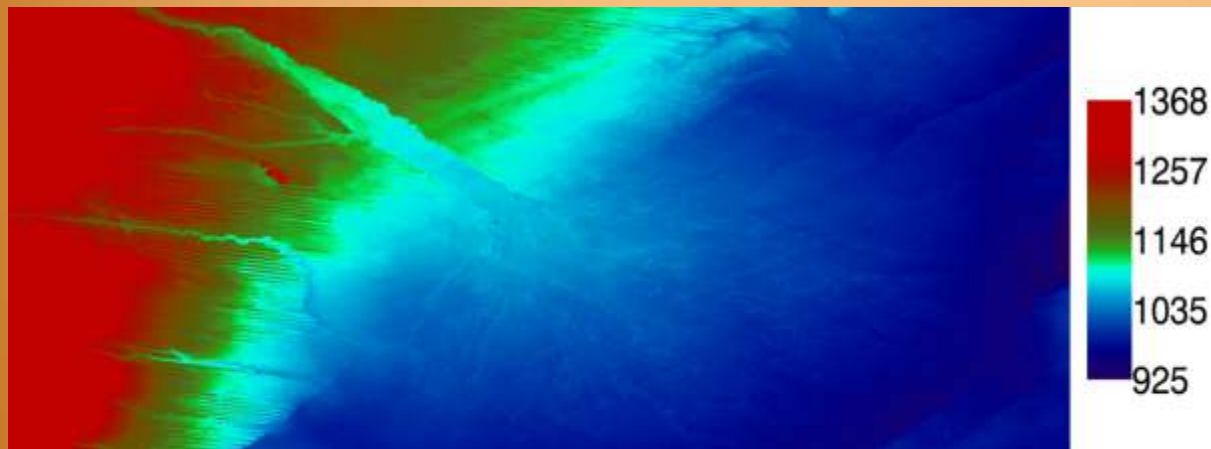
AFBR waveforms



Analysis AFBR	Waveform count
Input count	4080
No power	0
No leading edge	1032
Fatal retracking failure	0
Accepted and retracked	3048

N.B. Statistics refer to entire run

Wetlands Scenario

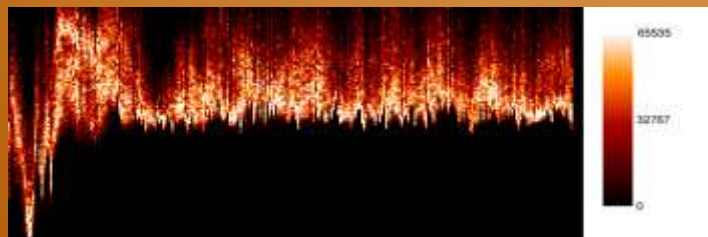


- Okavango delta used as 'blueprint' for this scenario
- DEM from ACE2: high frequency undulations in DEM included
- Detailed hydrological features delineated
- Polar Angle of 0.087 rads used
- Huge dynamic range of sigma0 included – 43dB
- River courses set high. Still pools of water peppered through Okavango delta, extremely high sigma0 values
- Set to test if CryoSat-2 simulated data responds to sigma0 variation

Wetlands Summary Statistics

Analysis LRM	Waveform count
Input count	260
No power	4
No leading edge	47
Fatal retracking failure	0
Accepted and retracked	209

Analysis FBR	Waveform count
Input count	65280
No power	0
No leading edge	24248
Fatal retracking failure	357
Accepted and retracked	40675



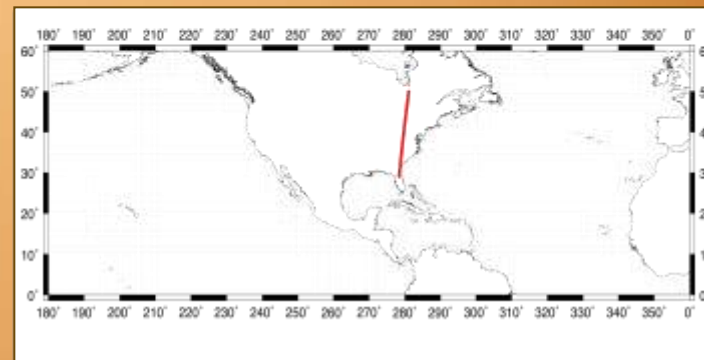
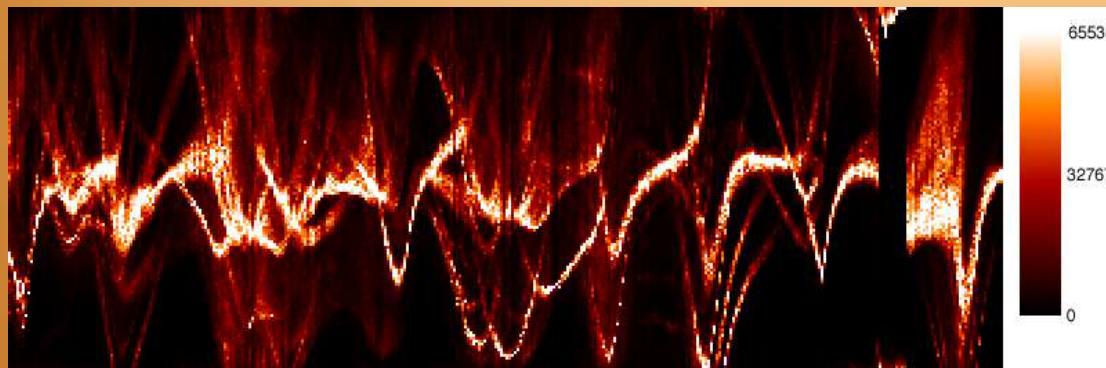
Low Resolution Mode



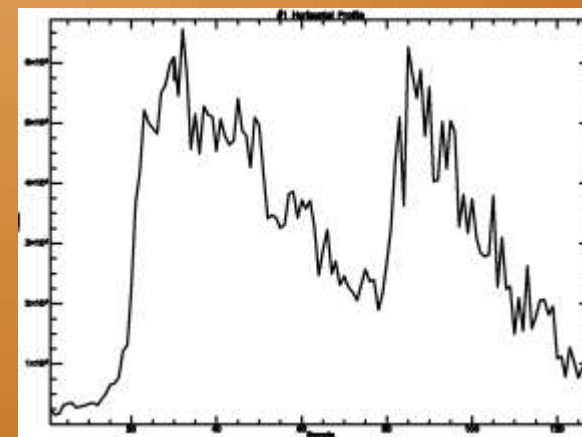
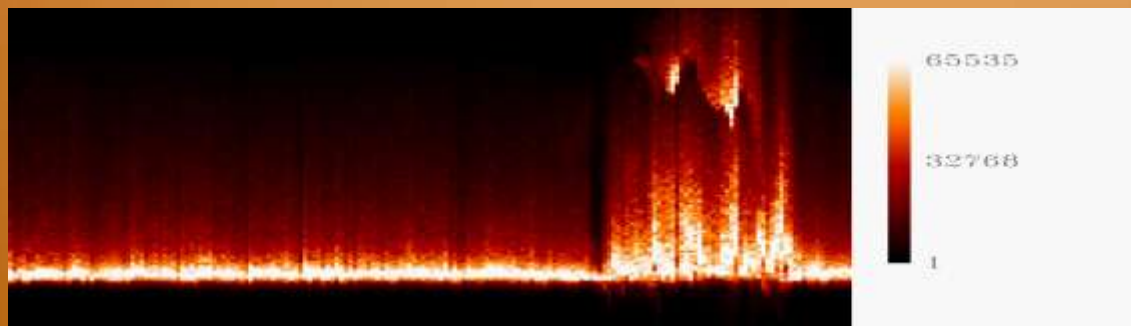
Full Bit Rate

Real CryoSat-2 data

LRM data



SAR L1B



- Simulations show recovery of viable waveforms from all scenarios
- LRM and SAR L1B waveforms successfully analysed and retracked: excellent recovery of input DEM profiles
- SAR AFBR dataset created by stacking & multi-looking in frequency domain (Gaussian filter not applied to trailing edge) and successfully retracked
- DEM scenario stressed CryoSat-2 data simulator as topographic expression greater than system was designed for (simulator created for cryosphere)

Discussion 2

- First analysis of CryoSat2 waveforms constrained by data availability/anomalies: however, waveform analysis and first retracking successful
- Overall conclusion: valuable data can be retrieved over inland water, high PRF of SAR FBR allows measurement of small water bodies with appropriate filtering, stacking and multi-looking and properly configured retrackers

Thank you for your attention

Any questions?