

SARAL/AltiKa Science & Applications from ISRO: Status

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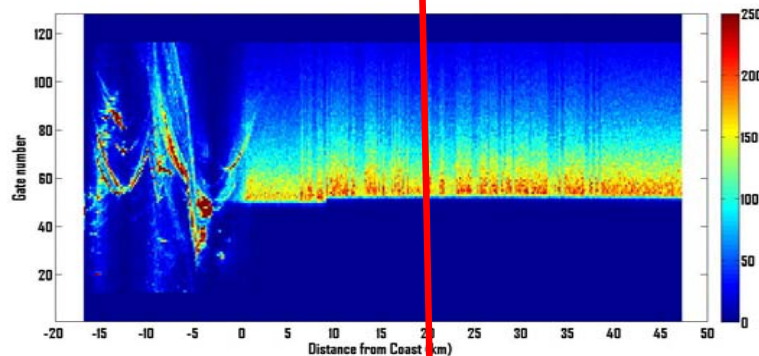
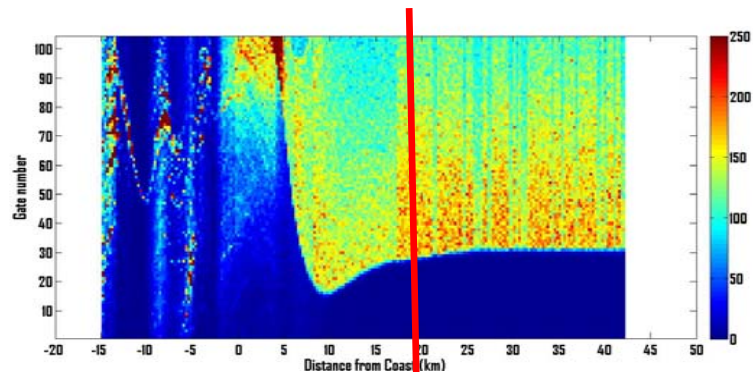
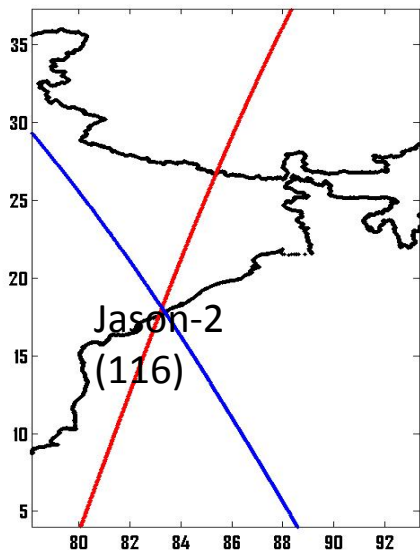
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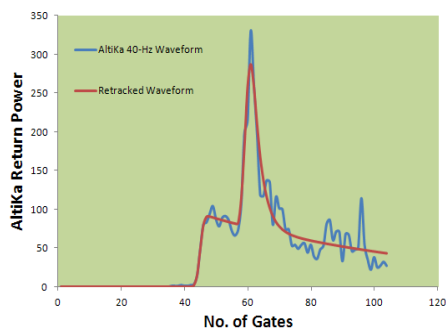
SARAL/AltiKa Science & Applications:

1. How much near to the coast one can go with SARAL?

SARAL (728)



Coastal Retrieval : From AltiKa



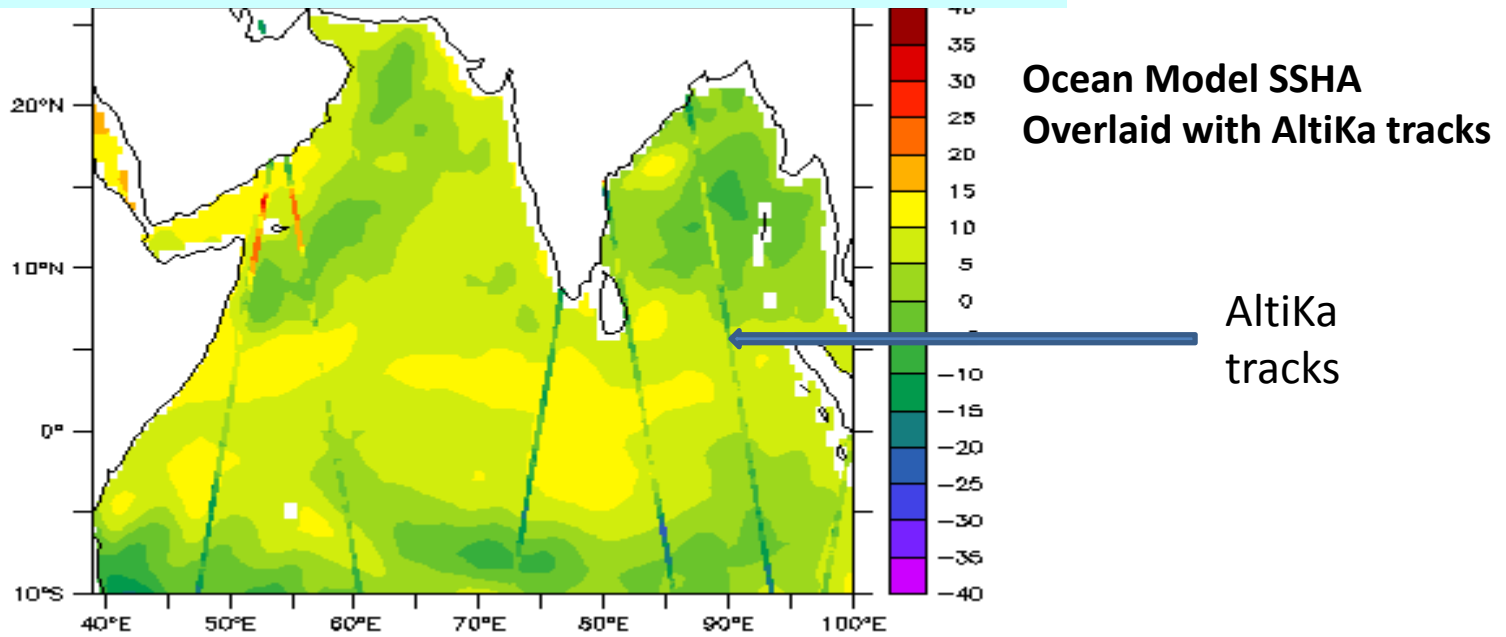
A typical 40-Hz AltiKa waveform for coastal region (~ 6.5 km from Indian coast)

Geophysical Parameters retrieved (Beta Retracker):
 SWH = 1.67 m
 SSH = 86.25 m
 Sigma0 = 19.7 dB

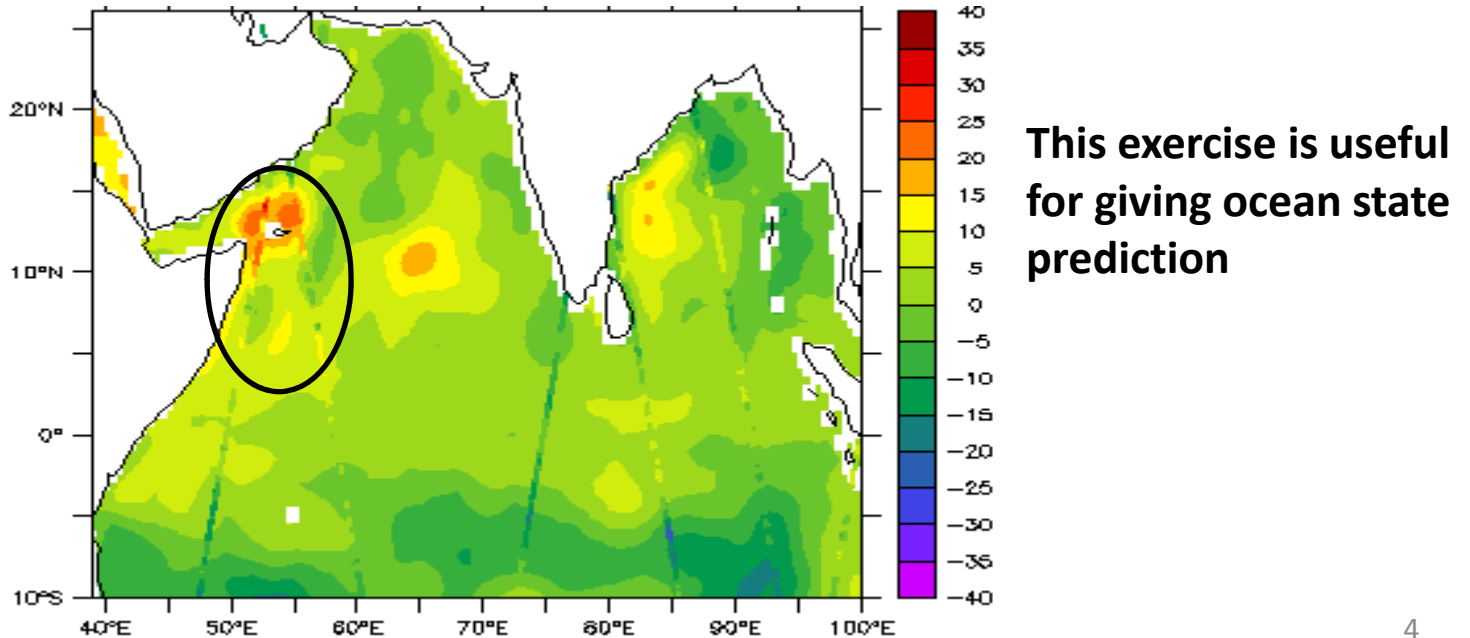
In the case of ascending tracks: Jason-2 (20-Hz data) one can be away 8-12 km from the coast, while the same with SARAL/AltiKa it is possible to get useful data within 2-3 km from the coast.

2. SARAL/AltiKa SSH: Impact of data assimilation in circulation model using Ensemble Optimal Interpolation

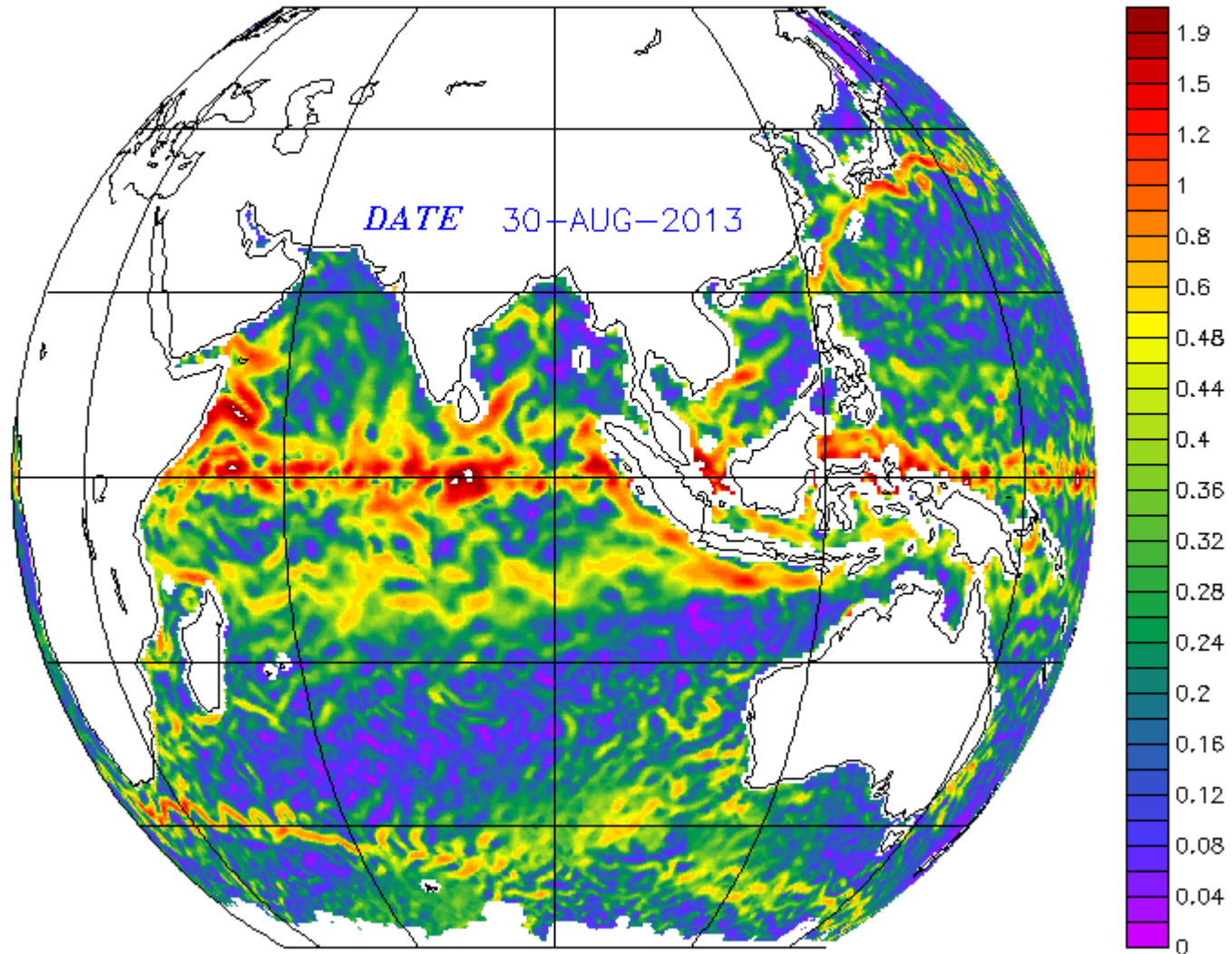
Before Assimilation



After Assimilation

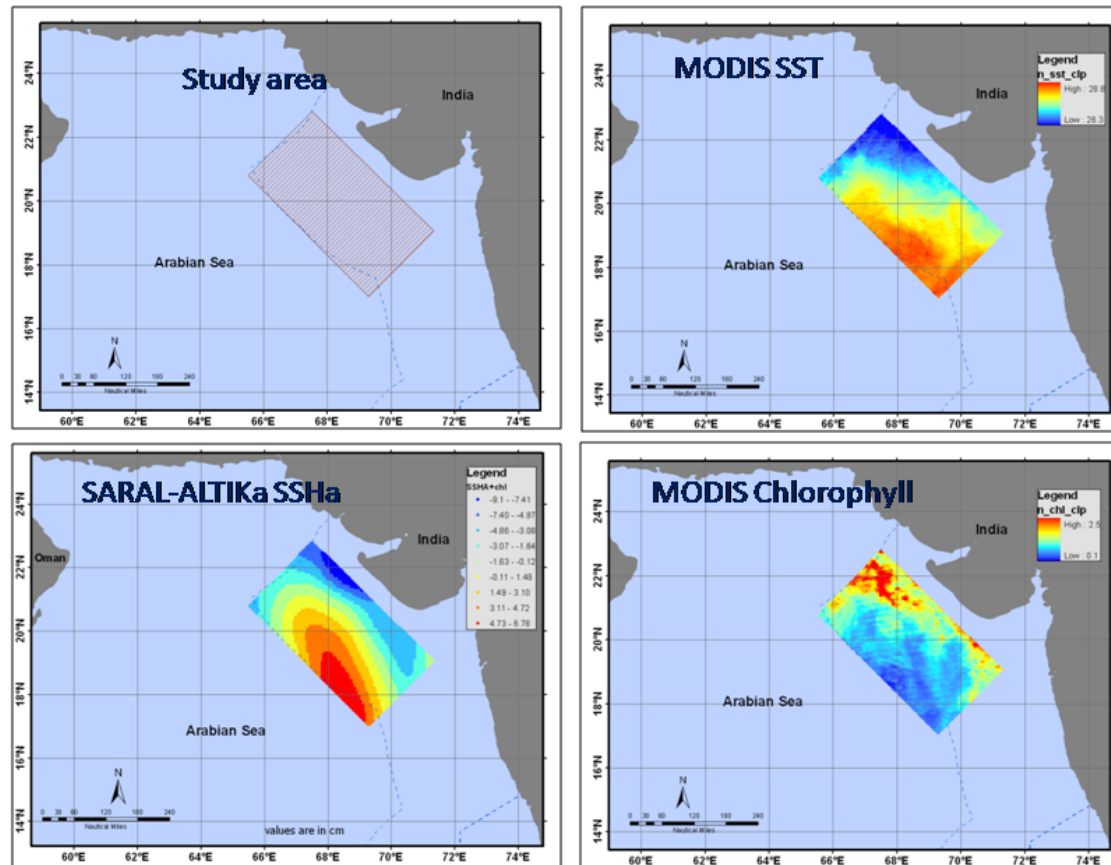


3. Ocean Surface Current: SARAL/AltiKa SSH +Oceansat-2 winds + AVHRR SST



4. AltiKa SSH: Role in Fishery Exploration

Comparison of SSHa, SST and Chlorophyll Month: April 2013



Inter-linkage between SARAL AltiKa derived SSHa with MODIS derived SST and Chlorophyll

5. SARAL-ALTIKA - INLAND WATER APPLICATIONS

Retrieval of water level fluctuations over the major water bodies of India Deriving discharge and flow volumes

Data:
Jason-2
In-situ data: water level & discharge (source: CWC)

SARAL-ALTIKA

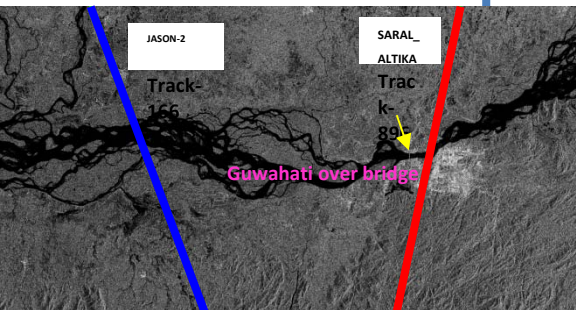
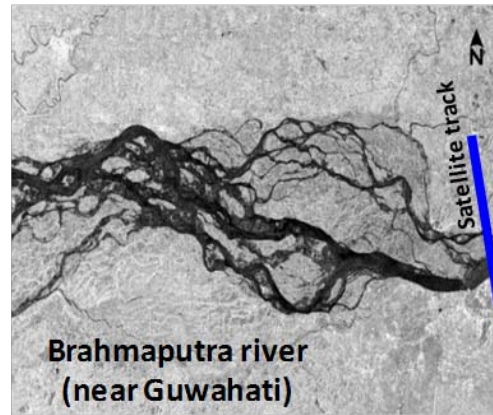
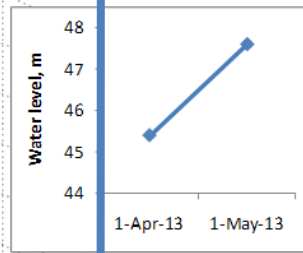
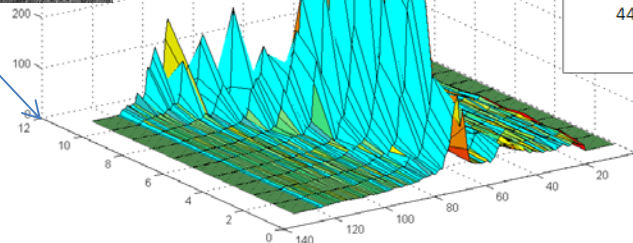


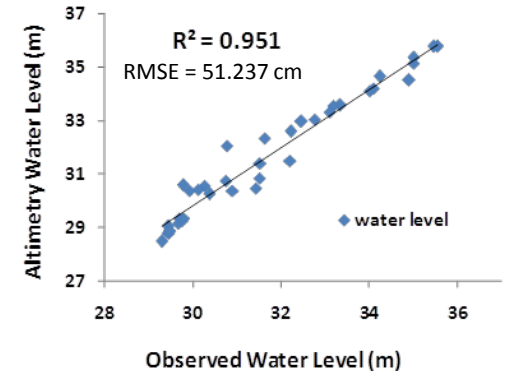
Fig. 1 Brahmaputra river reach with altimeter tracks



Waveform across the river transect (SARAL_TRACK 896)



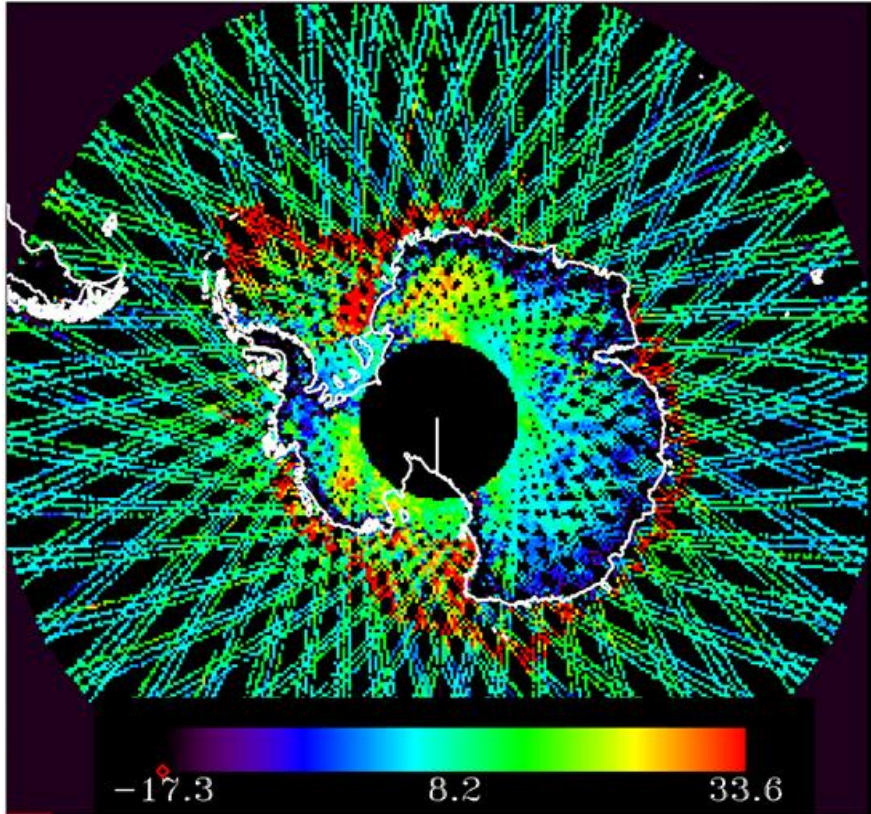
Water level estimation using Jason-2 data and different retracking algorithm)



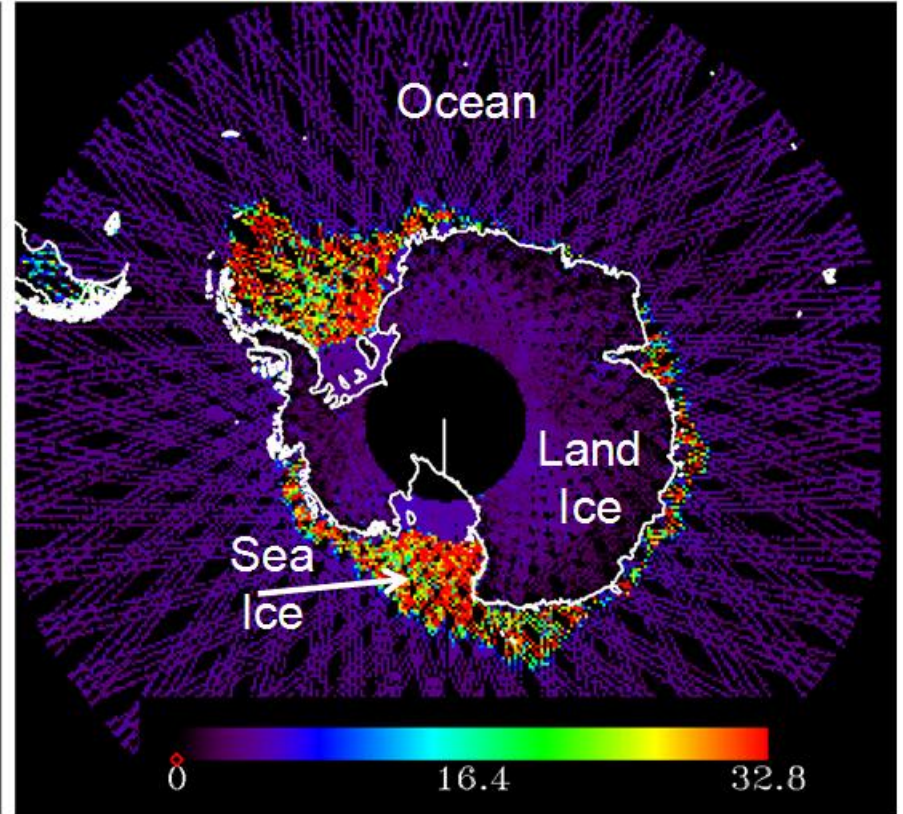
Summary: Different retracker were used and tested over the Brahmaputra river using the Jason-2 data. In situ measurements for river water level is being done to test the retrackers using the SARAL-ALTIKA data.

6. AltiKa Signature of Polar Ice Features: Antarctic Region

10-Day Average: March 19-28, 2013



Sigma-0 (40KHz)



Peakiness (40KHz)

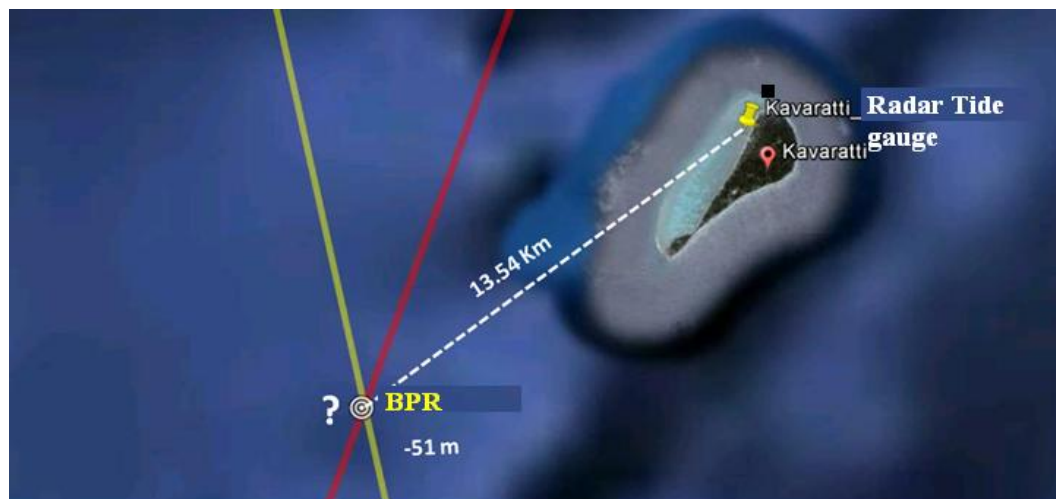
- Significant difference in peakiness of sea ice from that of Land ice & ocean
- Land ice & ocean are not showing significant difference in Peakiness
- Sigma-0 varies within land ice area; needs further investigation
- Sigma-0 of ocean is not significantly different from that of ice features

8. SARAL AltiKa: Calibration at Indian Site

Data Used:

✓ In-situ tide gauge measurements of SSH at absolute calibration site in Kavaratti (March-June, 2013).

Absolute Calibration Site in India is located at Kavaratti which is 13.5 Km away from the cross-over points of SARAL/AltiKa and Jason-2. In this location there are two tide gauges located in open ocean where absolute calibration of SARAL/AltiKa has been performed.



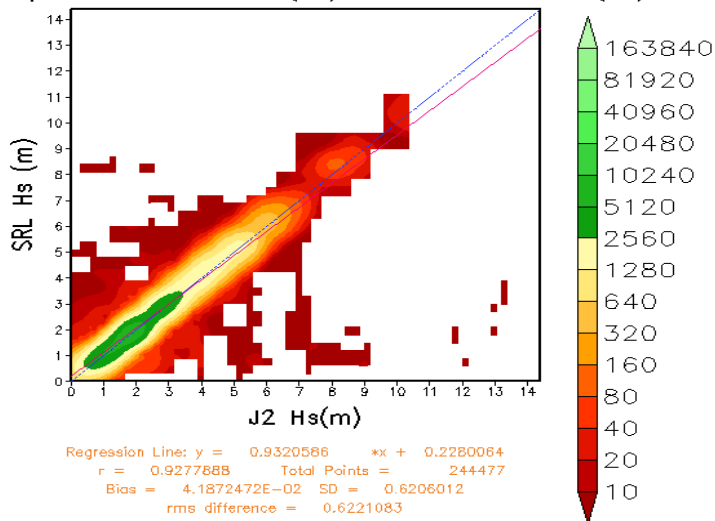
The absolute sea surface height bias of AltiKa over Kavaratti double site

Cycle # (day of pass)	Absolute bias in AltiKa sea surface height (cm)					
	OGDR		IGDR		GDR	
	Main jetty	NIOT Jetty	Main jetty	NIOT Jetty	Main jetty	NIOT Jetty
1 (02/04/13)	2.66	2.49	-3.01	-3.18	No data	No data
2 (07/05/13)	-2.87	-1.28	-2.09	-0.50	-----	-----
3 (11/06/13)		-0.56		2.33	-----	-----

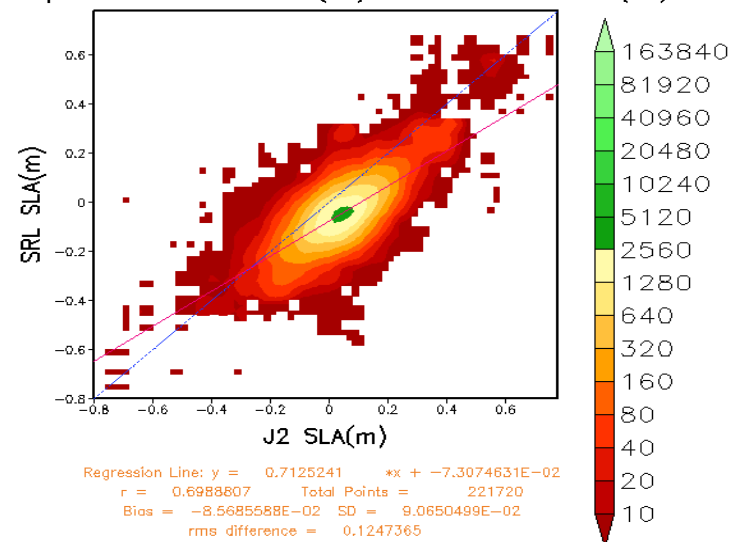
Results show the absolute sea surface height bias between AltiKa and tide gauge observations are meeting the specifications for the AltiKa OGDR and IGDR products over Kavaratti double site.

The inter-comparison of SARAL/AltiKa products are carried out at all levels using Jason-2 data in an operational basis.

Comparison of J2 Hs(m) versus SRL Hs (m)

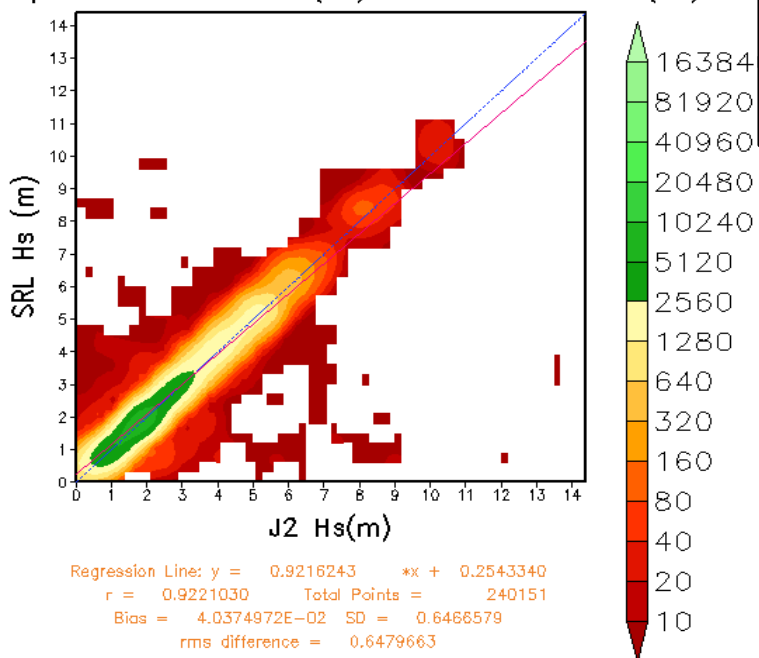


Comparison of J2 SLA(m) versus SRL SLA(m)

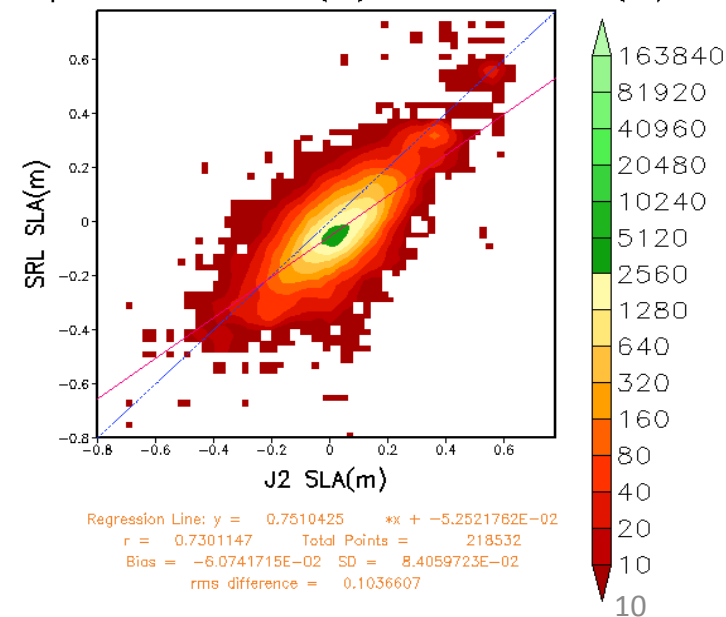


Sample Validation results for July, 2013

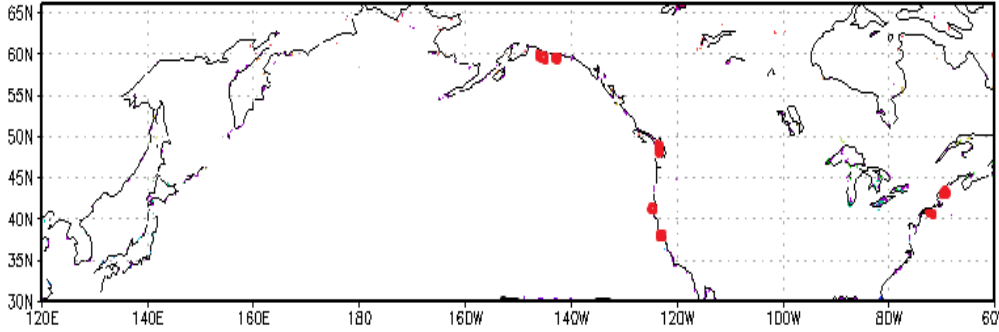
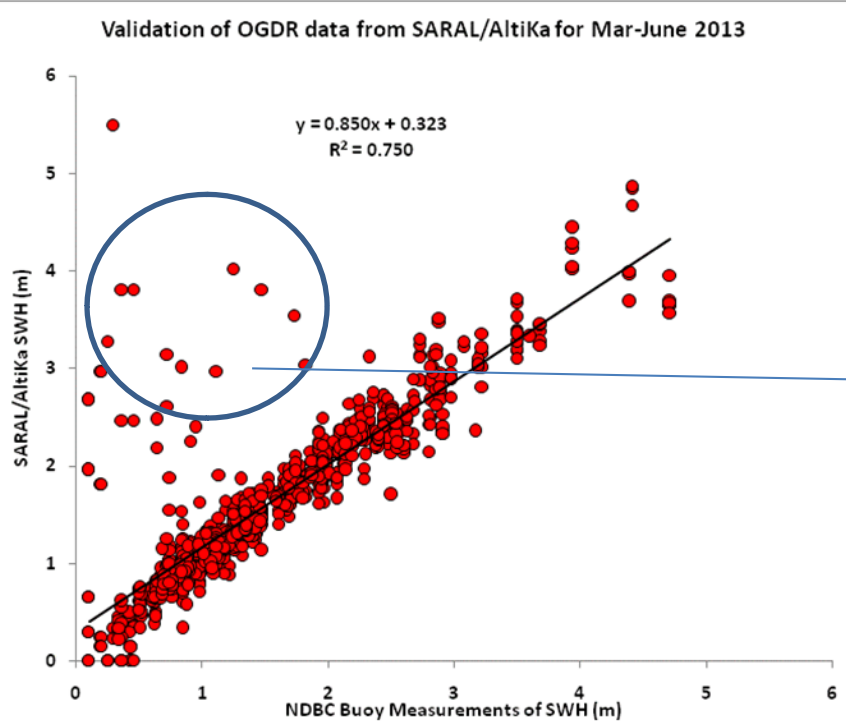
Comparison of J2 Hs(m) versus SRL Hs (m)



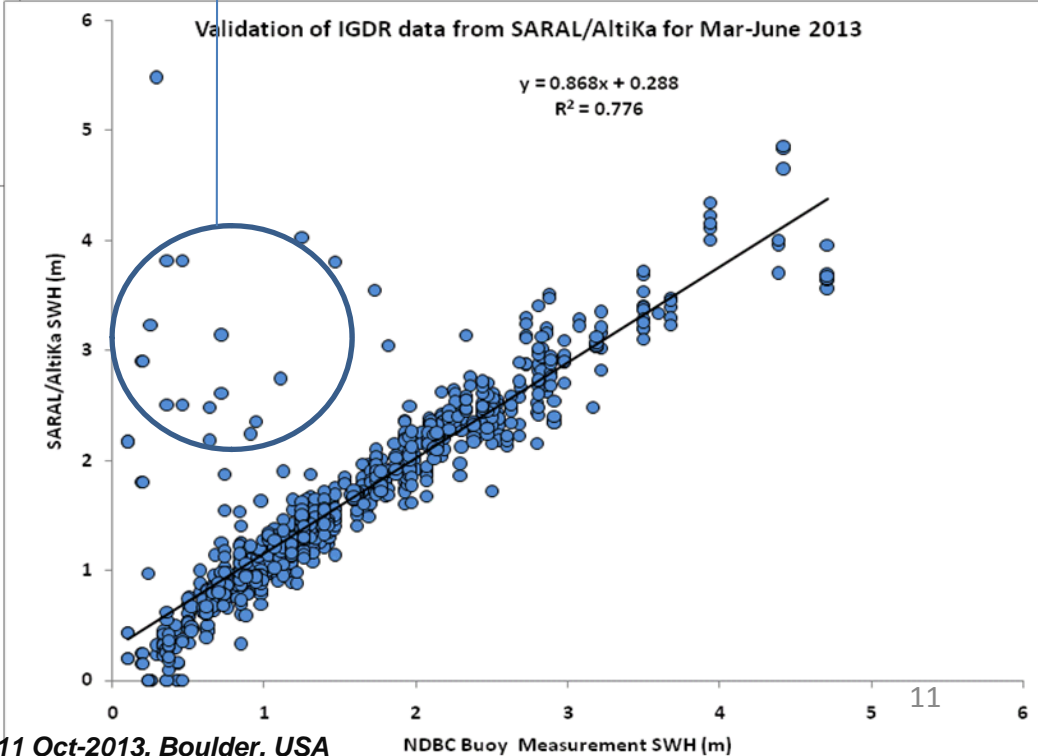
Comparison of J2 SLA(m) versus SRL SLA(m)



Validation of SARAL/AltiKa SWH with NDBC Buoys for month of March, 13 to Jun, 30 2013



What about these outliers?



Products	OGDR	IGDR
Parameters		
BIAS (m)	0.328	0.288
RMSE (m)	0.436	0.417
CORREL	0.86	0.88

Conclusions:

- 1. A clear indication is noticed for deriving useful geophysical parameters near coastal regions due to lesser contamination of waveform in AltiKa 40-Hz data.**
- 2. High potential of improving ocean state forecast by assimilating AltiKa track data in ocean models.**
- 3. Synergistic application of AltiKa with OSCAT and NOAA-AVHRR for deriving ocean currents.**
- 4. Inter-linkage between SARAL AltiKa derived SSHA with MODIS derived SST and Chlorophyll suggests potential use of AltiKa for fisheries exploration.**
- 5. Better possibility for the Retrieval of water level fluctuations over the major water bodies of India.**

Thanks