

M. Jain, O.B. Andersen and L. Stenseng, National Space Institute, DTU Space, Denmark (*jain@space.dtu.dk)

Improved Waveform Retracker

- Waveform Retracking is used for Precise Sea Surface Height Determination
- Traditional Empirical Retracker work well in Open Ocean
- Traditional Empirical Retracker fail in Sea Ice, Coasts, Ice Margins etc
- Improved Waveform Retracker work only on the First Leading Edge
- The Leading Edge is extracted using the Waveform Statistics
- The Start Threshold is determined by the Consecutive Power Bins
- The Stop Threshold is determined by the Alternate Power Bins
- Improved Retracker No.1 : Application of OCOG Method on the First Leading Edge
- Improved Retracker No.2 : Application of Threshold Method on the First Leading Edge

Waveform Processing

The application of Leading Edge Extraction, OCOG Method and Threshold Method

Comparison of Sea Surface Heights

Sea Surface Heights for the Leading Edge + OCOG Method, Leading Edge + Threshold Method and ESA Level2 Product are computed and compared

It is observed that the (LE + OCOG) and (LE + Threshold) Retracker are less noisy than the ESA Level2 products

Gravity Field Comparisons

- The sea surface height thus obtained is used to computed the gravity field
- The computed gravity field is compared with the marine gravity field
- The standard deviation of this gravity field difference is computed
- The smaller the standard deviation, the better the retracker is

	LE + OCOG	LE + Thres	OCOG	Thres
JAN	5,153	5,233	5,153	5,154
FEB	7,632	7,026	10,275	10,152
MAR	6,689	6,701	8,058	8,587
APR	6,294	5,940	8,579	8,587
MAY	8,905	8,882	9,806	9,859
JUN	9,099	7,470	9,555	9,574
JUL	10,395	7,799	10,461	10,607
AUG	6,208	6,010	6,206	6,241
SEP	4,980	5,047	4,968	4,968
OCT	5,375	4,924	5,336	5,327
NOV	8,173	7,683	8,593	8,540
DEC	9,692	8,444	6,022	6,019

Comparison of 7 Waveform Retracker

- R1 - Traditional OCOG Retracker
- R2 - Traditional Threshold Retracker
- R3 - 5 parameter Beta Retracker
- R4 - Leading Edge + OCOG Retracker
- R5 - Leading Edge + Threshold Retracker
- R6 - Maxima as Threshold - Retracker
- R7 - ESA Retracker

Performance of 7 Waveform Retracker

- The geoid is removed and various corrections are applied on the obtained heights
- The 20 Hz data is converted to 1 Hz data
- The mean of the standard deviation of this data of the retracked heights should be low
- The table below shows the mean of the standard deviation of height in metres

	SAR Summer	SAR Winter	SIN Summer	SIN Winter
R1	0,104	0,092	0,116	0,128
R2	0,104	0,092	0,116	0,128
R3	0,086	0,087	0,107	0,097
R4	0,071	0,067	0,087	0,100
R5	0,069	0,066	0,083	0,094
R6	0,069	0,064	0,083	0,044
R7	0,091	0,075	0,114	0,121

Standard Deviation of 1 Hz Sea Surface Heights

SUMMER DATA _ JUN,11 – OCT,11

WINTER DATA _ NOV,10 – MAY,11

CONCLUSION

The Improved Retracker R4, R5 show better performance as compared to the traditional retracker
 The performance of the 'Leading Edge' Retracker is also maintained in SARIN data along with SAR data
 It is also observed that the mean of the standard deviation in heights is lower in the winter months