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## 1. Introduction

- Objective : Precise Sea Surface Height Determination
- Application : Climate Prediction, Weather Forecasting, Ship Navigation, Fisheries etc.
- Waveform Retracking of Cryosat2 Level 1B Satellite Data
- Traditional Retrackerers work well in Open Ocean
- Traditional Retrackerers fail in Sea Ice, Coasts, Ice Margins etc.
- Development of Improved Empirical Retrackerers
- Two Retrackerers developed and tested in the Baffin Bay

## Test Area

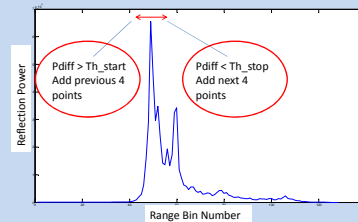


The Baffin Bay is located between Greenland and Canada

## 2. Leading Edge Extraction

- Traditional Retrackerers work on the Complete Power Waveform
- Reflection occurs at the First Leading Edge
- Improved Retrackerers work on just the First Leading Edge
- OCOG/Threshold method applied on this Leading Edge
- Start/Stop Thresholds based on Waveform Statistics
- Alternate Power Bins determine Start Location
- Consecutive Power Bins determine Stop Location

## Identification of the Leading Edge

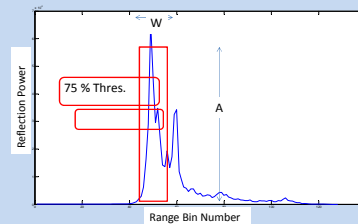


$Th\_start = k1 * \text{Standard Deviation of power diff of alternate bins}$   
 $Th\_stop = k2 * \text{Standard Deviation of power diff of consecutive bins}$

## 3. LE + OCOG/Threshold Retracker

- OCOG method finds the Centre of Gravity of the Leading Edge
- Rectangle Parameters – Amplitude (A), Width (W), Centre of Gravity (COG), Leading Edge Position (LEP)
- Threshold method applied with 75% Amplitude Level
- The required Power Bin is obtained using Linear Interpolation between the bins surrounding the Threshold Value
- Threshold Value differs for LRM, SAR and SARIN Data

## Leading Edge Position Computation



1. Application of Threshold retracker
2. Application of OCOG retracker

## 4. Retracker Performance Evaluation

- Sea Surface Height is used to compute the Gravity Field
- Compared with Marine Gravity Field
- Standard Deviation of Gravity Field difference between Marine Data and Computed Data is obtained
- Smaller the Standard Deviation is , Better the Retracker is
- Retracker Performance evaluated for OCOG, Threshold, LE + OCOG and LE + Threshold methods

## Results (Standard Deviation in mgal)

	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

The performance of the (LE + Threshold) Retracker is best