

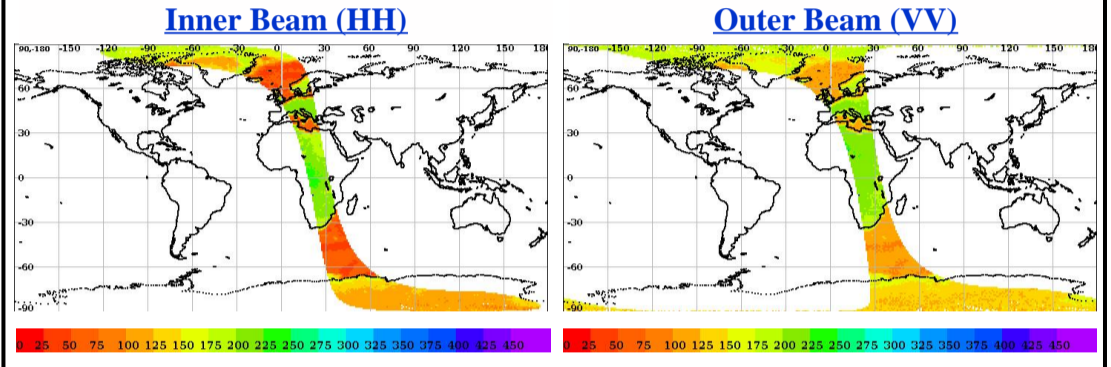
# SCATSAT-1 Scatterometer Level-1B Data Quality Evaluation Report

## Table of Contents

- Half-Orbit Coverage using BT & Sigma-0
- Invariant Site Sigma-0 Statistics (if Available)
- Half-Orbit Data Statistics
- Half Orbit wise - Dynamic Parameter (Sigma-0, Kp, SNR) Behaviour
- Dynamic Range (Data Histogram)
- Half Orbit Wise Behaviour - Static Parameters
- Doppler Variation (Across/Along Track for HH/VV Beam)
- LIB Parameter as a function of Latitude
- Half Orbit OAT Behaviour

<b>Satellite Id</b>	ScatSat-1	<b>Start Orbit</b>	14493	<b>Total Scans</b>	1015
<b>Sensor Name</b>	Scatterometer	<b>End Orbit</b>	14494	<b>No of Inner FootPrints</b>	281
<b>Processor Version</b>	v1.1.3	<b>Rev. Number</b>	14493_14494	<b>No Of Outer FootPrints</b>	282
<b>Half Orbit Direction</b>	SN	<b>Data Production Date</b>	23-06-2019	<b>No. Of Inner Slices</b>	9
<b>Equator Crossing Date</b>	22-06-2019	<b>Equator Crossing Time</b>	18:54:33.000	<b>No Of Outer Slices</b>	15

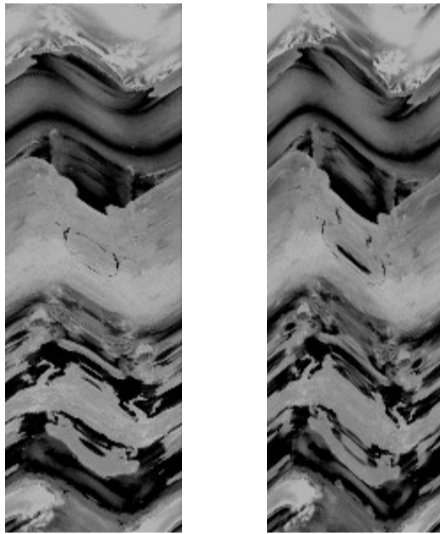
## Brightness Temperature(k) Footprint trace



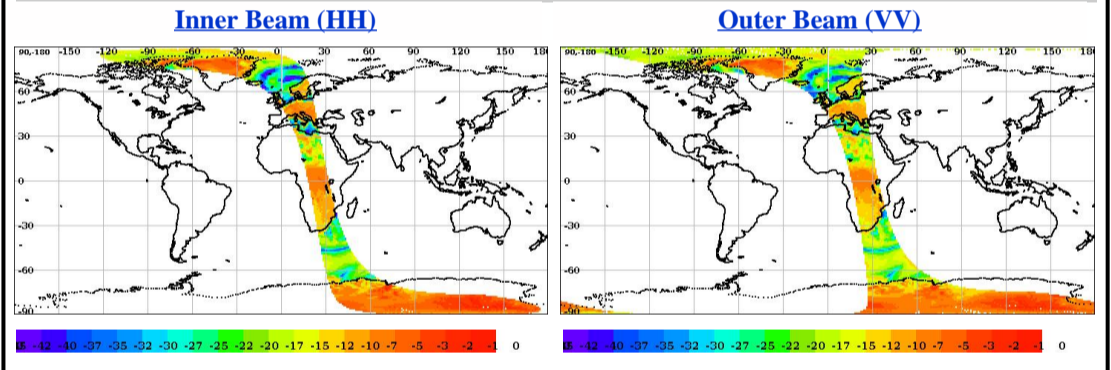
## Image Snapshot for Inner & Outer Beam

Inner (HH)

Outer (VV)



## Sigma0(dB) Footprint trace



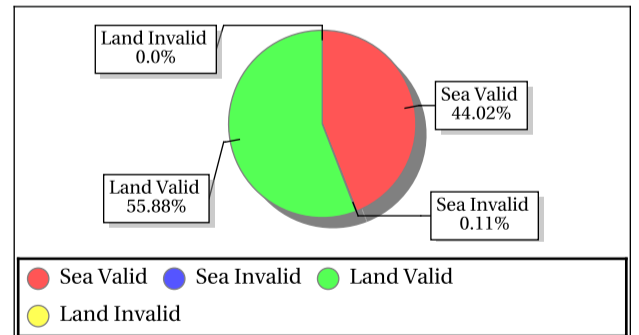
## Invalid and Poor Sigma-0 Quality Flag Statistics for Inner/Outer Slices\*

Sigma-0 Flags	Inner Beam	Outer Beam
<b>Invalid Sigma0(%)</b>	0.11	0.11
Data Not Available From Payload (%)	99.92647	99.00130
Slice not within sample array limits (%)	0.07	1.00
C(S+N) - C(N) < 0.1 (%)	0.00	0.00
<b>Poor Sigma0(%)</b>	22.23	13.34
Noise samples for blending Saturated	0.0	0.0
Count samp. for interpol. saturated (%)	0.00	0.00
Sigma0 < lower bound (-96dB) (%)	0.0	0.0
Sigma0 > upper bound (0 dB) (%)	0.00	0.00
SNR < -65 dB (%)	0.029271	0.067044

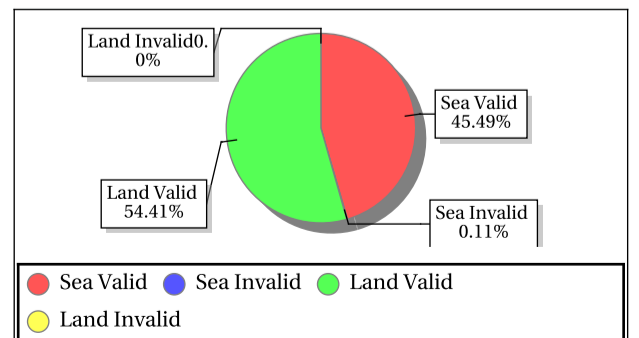
\*DP Format Document

## Sigma-0 Quality Flag Statistics for Inner/Outer Footprints

### Inner Beam (HH)



### Outer Beam (VV)



## Invariant Site Sigma-0 Statistics for Ascending/Descending, Fore/Aft in HH/VV beams

Site Name	Center Lat	Center Lon	Beam	Node	ScanDir	Sigma0 Min	Sigma0 Max	Sigma0 Mean	Sigma0 Std	BT Min	BT Max	BT Mean	BT Std
ANT_1	-75.00	121.00	Inner	ASC	Aft	-6.64	-4.98	-5.87	0.49	96.57	135.70	116.07	12.28
GreenLand_2	77.50	-41.50	Inner	ASC	Aft	-5.83	-5.34	-5.58	0.20	109.58	133.67	121.07	9.87
GreenLand_2	77.50	-41.50	Inner	ASC	Fore	-6.12	-5.05	-5.46	0.40	89.60	129.68	111.67	15.96
GreenLand_1	74.69	-42.50	Inner	ASC	Aft	-10.75	-7.91	-9.32	0.66	104.02	148.43	127.85	11.37
GreenLand_1	74.69	-42.50	Inner	ASC	Fore	-9.91	-8.16	-9.03	0.58	117.03	162.62	132.19	10.90
Sahara	19.10	14.30	Inner	ASC	Aft	-33.33	-18.80	-26.05	3.78	149.65	245.72	196.14	17.77
Sahara	19.10	14.30	Inner	ASC	Fore	-32.04	-17.82	-26.03	3.46	169.99	232.04	198.04	13.64
ANT_1	-75.00	121.00	Outer	ASC	Aft	-8.99	-6.56	-7.88	0.82	97.18	172.29	127.29	16.57
GreenLand_2	77.50	-41.50	Outer	ASC	Fore	-5.44	-4.41	-4.89	0.42	148.64	184.09	166.19	15.83
GreenLand_3	71.55	-42.45	Outer	ASC	Aft	-12.95	-11.00	-11.98	0.48	128.13	192.01	166.31	14.78
GreenLand_3	71.55	-42.45	Outer	ASC	Fore	-12.94	-10.79	-11.98	0.49	133.71	188.75	160.79	13.32
GreenLand_1	74.69	-42.50	Outer	ASC	Aft	-10.46	-8.46	-9.76	0.67	137.54	186.31	163.92	12.83
GreenLand_1	74.69	-42.50	Outer	ASC	Fore	-9.53	-7.68	-8.72	0.57	142.89	190.32	165.13	14.83
Sahara	19.10	14.30	Outer	ASC	Aft	-37.26	-19.45	-25.94	4.42	197.34	257.89	226.39	16.28
Sahara	19.10	14.30	Outer	ASC	Fore	-34.34	-19.90	-26.59	4.08	196.73	255.49	222.18	14.15



## Overall statistics for the Static Parameters (Footprint-wise)

Inner Beam (HH)																
	Sea Aft				Sea Fore				Land Aft				Land fore			
	Min	Max	Mean	Bad Occ. (%)	Min	Max	Mean	Bad Occ. (%)	Min	Max	Mean	Bad Occ. (%)	Min	Max	Mean	Bad Occ. (%)
<b>Kp</b>	0.12	264.62	0.45	4.425	0.12	226.16	0.34	3.540	0.12	30.90	0.12	0.005	0.12	11.46	0.12	0.003
<b>Kpa</b>	0.01	0.02	0.01	0.000	0.01	0.02	0.01	0.000	0.01	0.02	0.01	0.000	0.01	0.02	0.01	0.000
<b>Kpb</b>	0.02	0.02	0.02	0.000	0.02	0.02	0.02	0.000	0.02	0.02	0.02	0.000	0.02	0.02	0.02	0.000
<b>Kpc</b>	0.01	0.01	0.01	0.000	0.01	0.01	0.01	0.000	0.01	0.01	0.01	0.000	0.01	0.01	0.01	0.000
<b>SNR</b>	-34.36	23.53	4.60	0.010	-33.68	23.70	6.14	0.009	-25.02	28.94	17.76	12.365	-20.70	30.43	18.07	13.148

Outer Beam (VV)																
	Sea Aft				Sea Fore				Land Aft				Land fore			
	Min	Max	Mean	Bad Occ. (%)	Min	Max	Mean	Bad Occ. (%)	Min	Max	Mean	Bad Occ. (%)	Min	Max	Mean	Bad Occ. (%)
<b>Kp</b>	0.09	230.65	0.45	4.834	0.09	229.68	0.36	3.855	0.09	188.16	0.10	0.071	0.09	25.75	0.10	0.067
<b>Kpa</b>	0.01	0.01	0.01	0.000	0.01	0.01	0.01	0.000	0.01	0.01	0.01	0.000	0.01	0.01	0.01	0.000
<b>Kpb</b>	0.01	0.02	0.01	0.000	0.01	0.01	0.01	0.000	0.01	0.01	0.01	0.000	0.01	0.01	0.01	0.000
<b>Kpc</b>	0.01	0.01	0.01	0.000	0.01	0.01	0.01	0.000	0.01	0.01	0.01	0.000	0.01	0.01	0.01	0.000
<b>SNR</b>	-34.93	16.95	2.04	0.000	-34.91	17.26	3.20	0.000	-34.05	23.14	11.83	0.071	-25.40	23.10	11.87	0.034

Parameter Specifications					
Parameter	Kp	Kpa	Kpb	Kpc	SNR
Min	0.00	0.00	0.00	0.00	-65.00
Max	1.00	1.00	1.00	1.00	22.00

- Normal
- Deviations
- Alarming
- High Errors

## Overall statistics for static parameter (Footprint-wise)

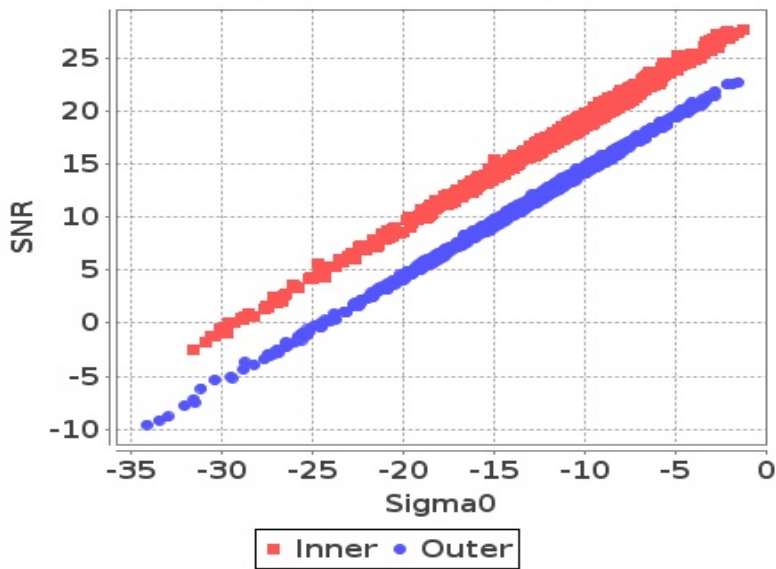
	Inner Beam (HH)				Outer Beam (VV)				Parameter Specifications		
	Min	Max	Mean	Bad Occ. (%)	Min	Max	Mean	Bad Occ. (%)	Parameter	Min	Max
<b>Incidence Angle (deg)</b>	48.75	49.38	49.04	0.000	57.44	58.24	57.94	0.000	Inci.(Inner)	47.10	49.90
<b>Azimuth Diff. (deg)</b>	0.0000	282.03	1.27	2.725	0.0000	285.61	1.27	3.917	Inci.(Outer)	57.30	58.90
<b>Range(Km)</b>	1033.53	1076.74	1051.55	0.000	1210.89	1264.82	1233.92	0.000	Azimuth Diff.	0.60	2.00
<b>X Factor(dbm)</b>	-91.76	-90.04	-90.56	0.000	-94.47	-92.07	-92.28	0.000	Range(Inner)	1025.00	1095.70
<b>Across Distance (Km)</b>	15.56	16.06	15.78	0.000	7.96	37.18	20.88	6.000	Range(Outer)	1210.00	1280.00
<b>Along Distance (Km)</b>	18.67	7583.22	44.67	6.000	8.02	7515.10	43.79	8.000	X-Factor	-100.00	-80.00
									Ac.Distance(Inner)	15.00	20.00
									Ac.Distance(Outer)	15.00	22.00
									Al.Distance(Inner)	15.00	30.00
									Al.Distance(Outer)	10.00	30.00
									<span style="display: inline-block; width: 15px; height: 15px; background-color: green; border: 1px solid black; margin-right: 5px;"></span> Normal	<span style="display: inline-block; width: 15px; height: 15px; background-color: orange; border: 1px solid black; margin-right: 5px;"></span> Alarming	
									<span style="display: inline-block; width: 15px; height: 15px; background-color: yellow; border: 1px solid black; margin-right: 5px;"></span> Deviations	<span style="display: inline-block; width: 15px; height: 15px; background-color: red; border: 1px solid black; margin-right: 5px;"></span> High Errors	



## Sigma0 Behaviour (Sigma0 Vs SNR)

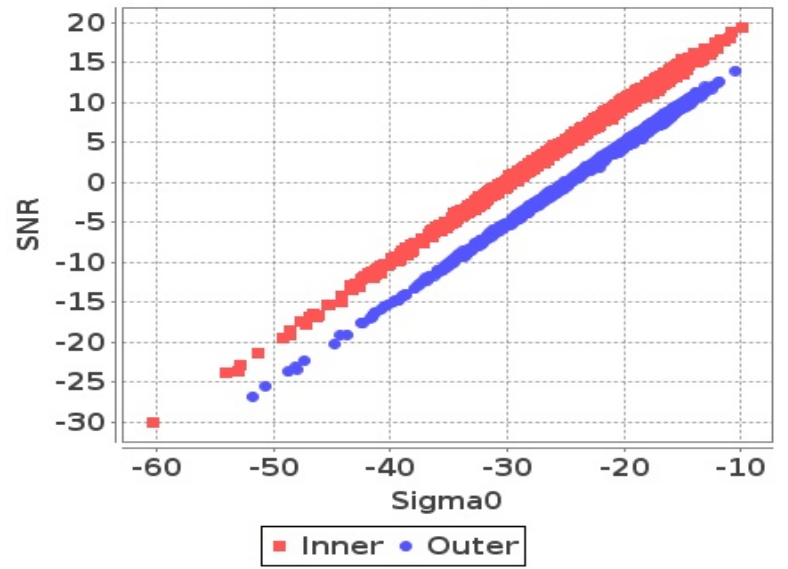
**Footprint-Land**

Sigma0 Vs SNR (Land)



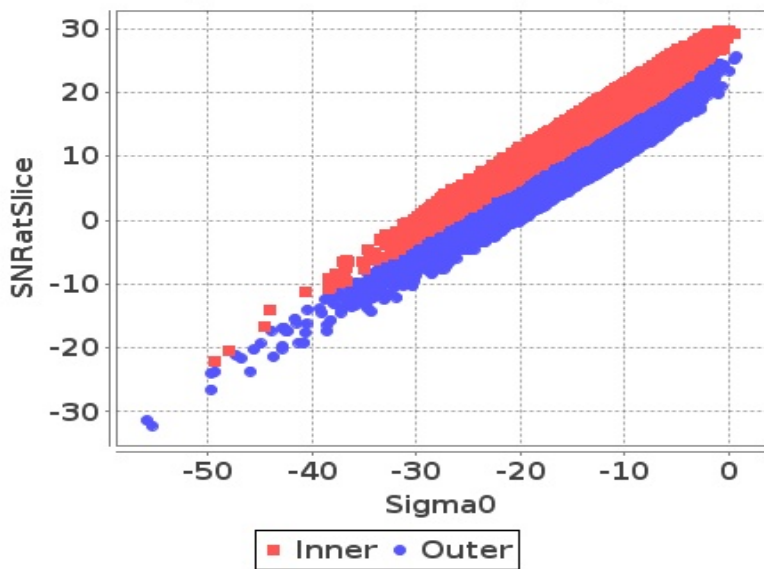
**Footprint-Sea**

Sigma0 Vs SNR (Sea)



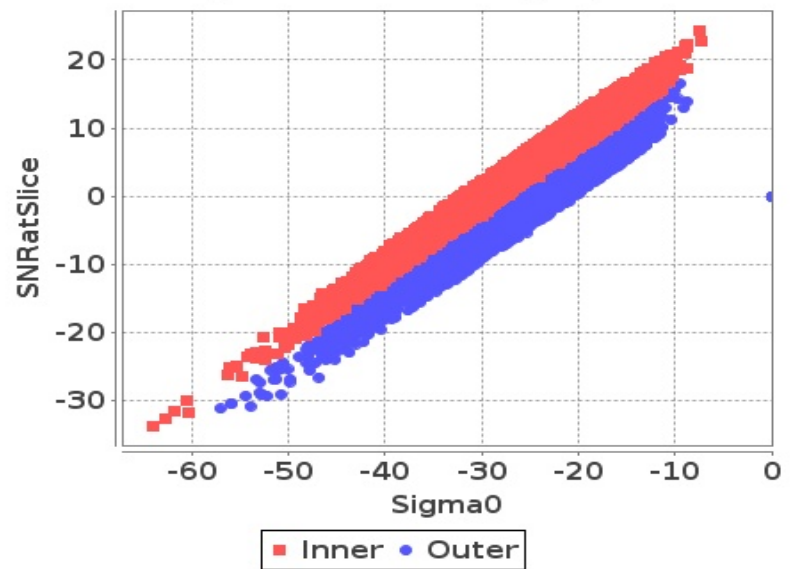
**Slice-Land**

Sigma0 Vs SNRatSlice (Land)



**Slice-Sea**

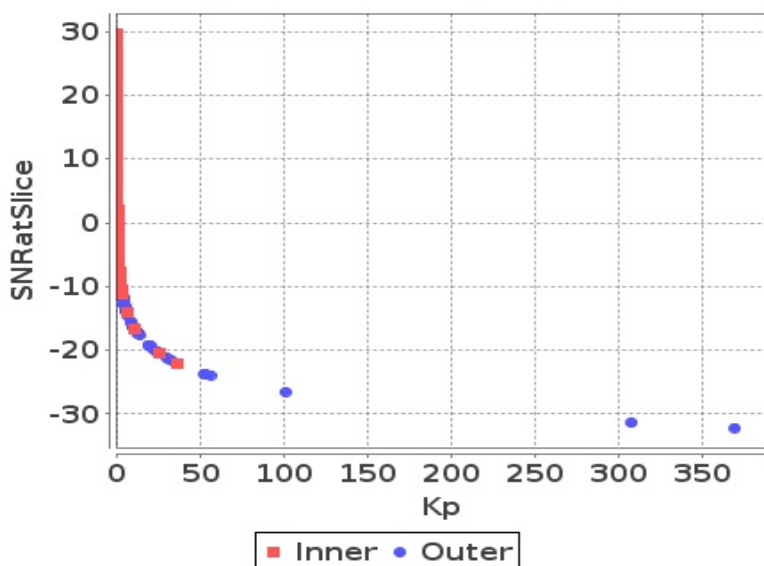
Sigma0 Vs SNRatSlice (Sea)



## Sigma0 Behaviour (Kp Vs SNR)

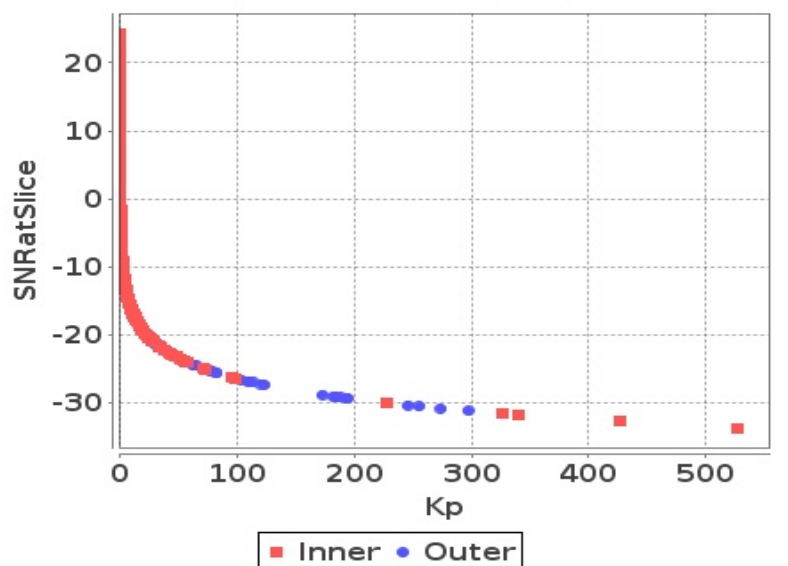
**Slice**

Kp Vs SNRatSlice (Land)



**Slice**

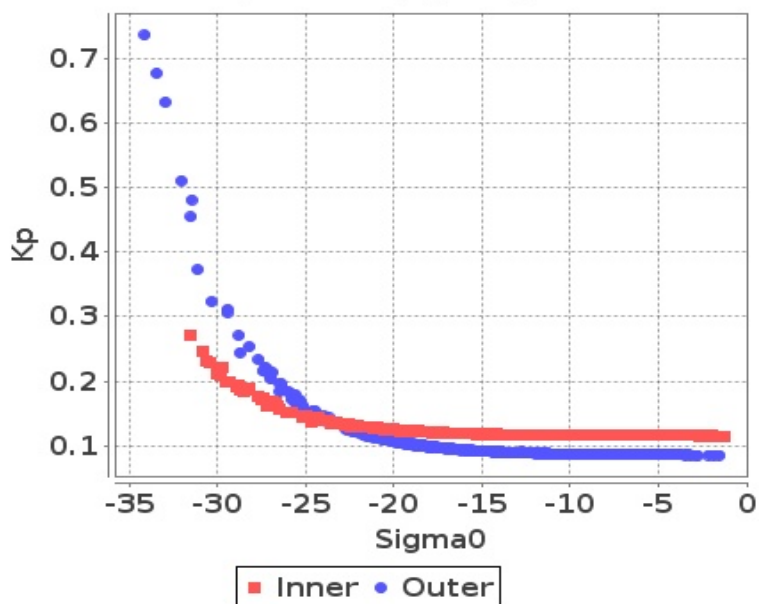
Kp Vs SNRatSlice (Sea)



# Sigma0 Behaviour(Sigma0 Vs Kp)

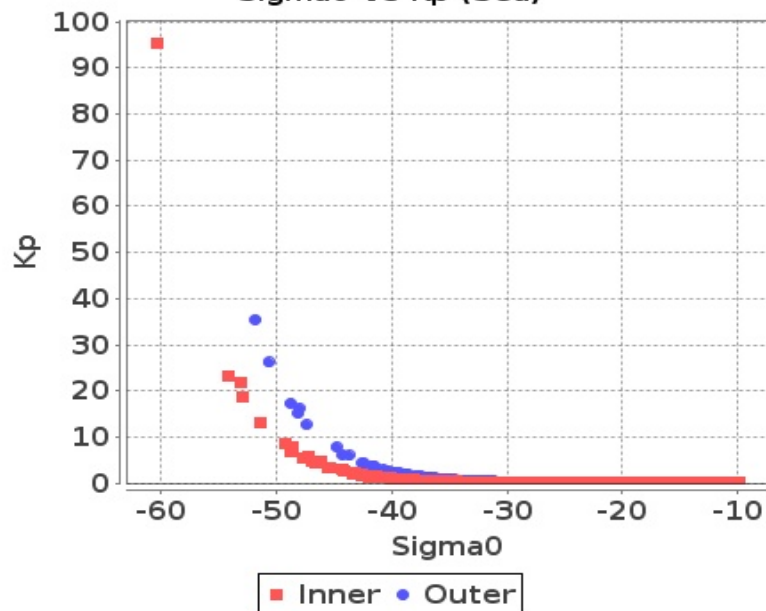
## Footprint-Land

### Sigma0 Vs Kp (Land)



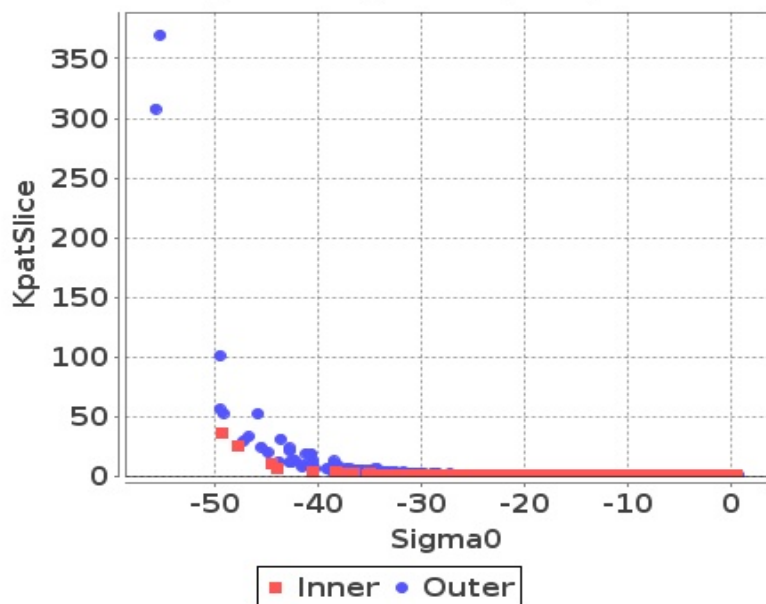
## Footprint-Sea

### Sigma0 Vs Kp (Sea)



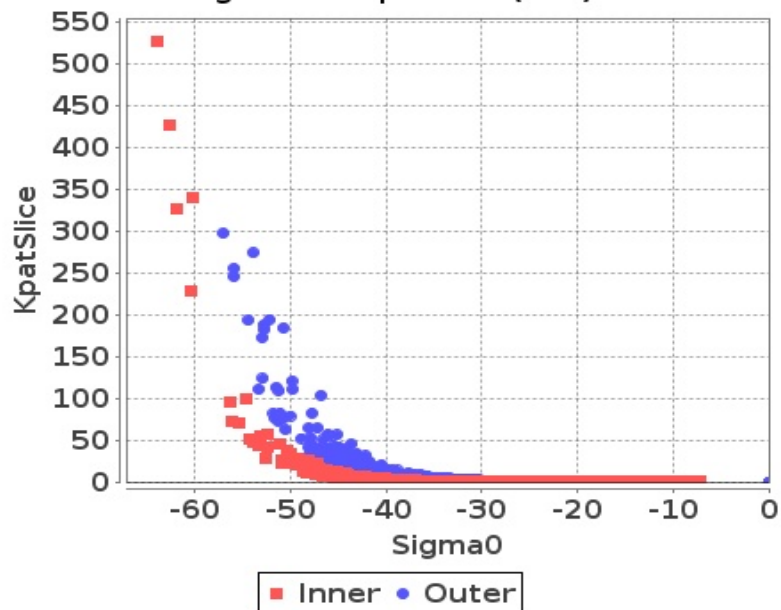
## Slice-Land

### Sigma0 Vs KpatSlice (Land)



## Slice-Sea

### Sigma0 Vs KpatSlice (Sea)

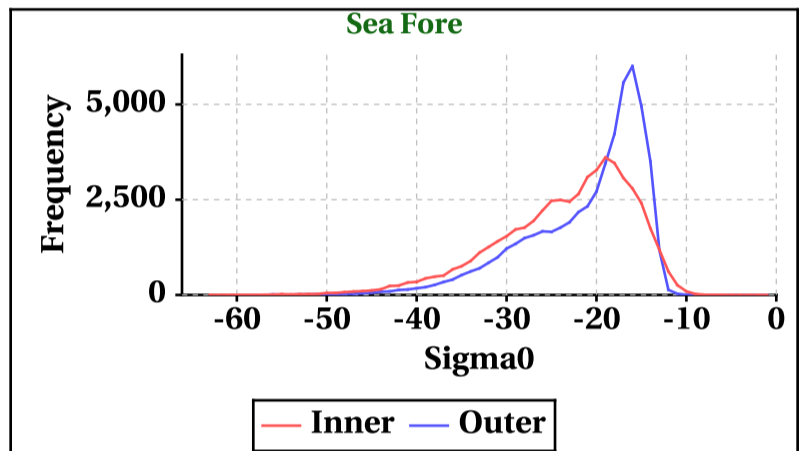
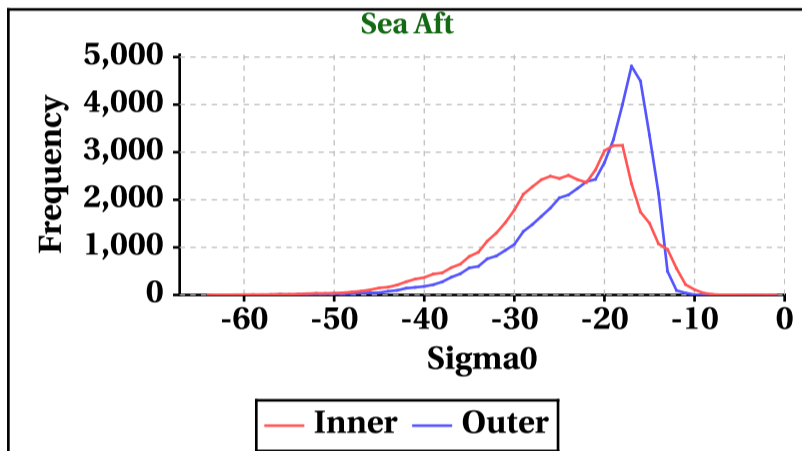
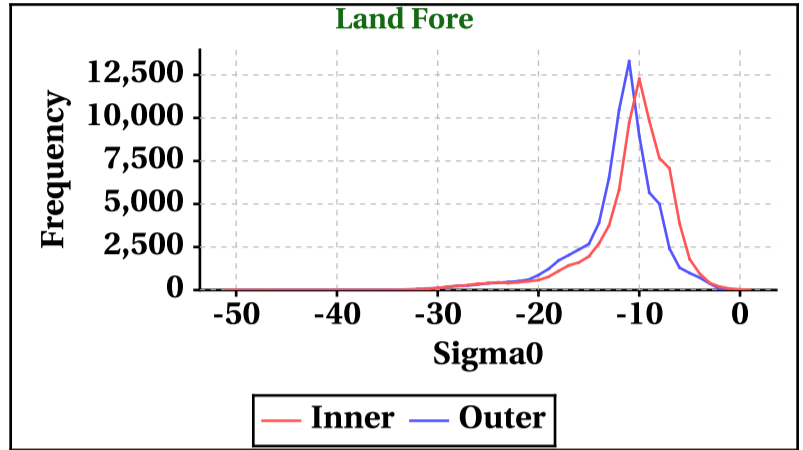
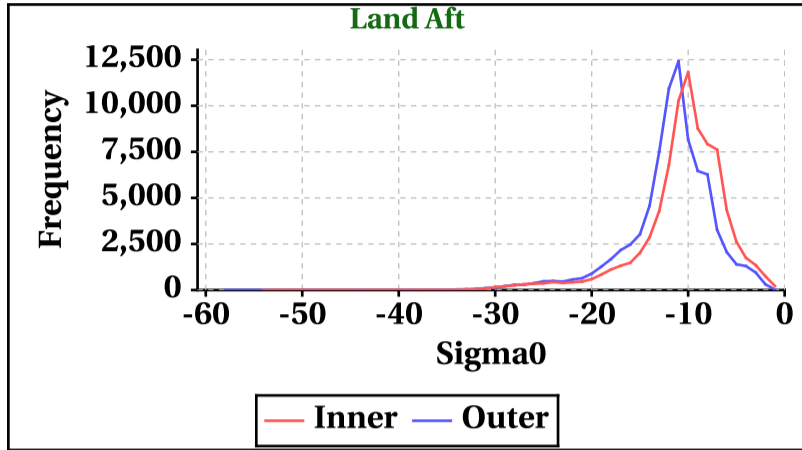


# Dynamic Range (Data Histograms)

## Sigma0(db)

Inner Beam (HH)				
	Land Aft	Land Fore	Sea Aft	Sea Fore
Min	-54	-51	-64	-63
Max	0	1	0	0

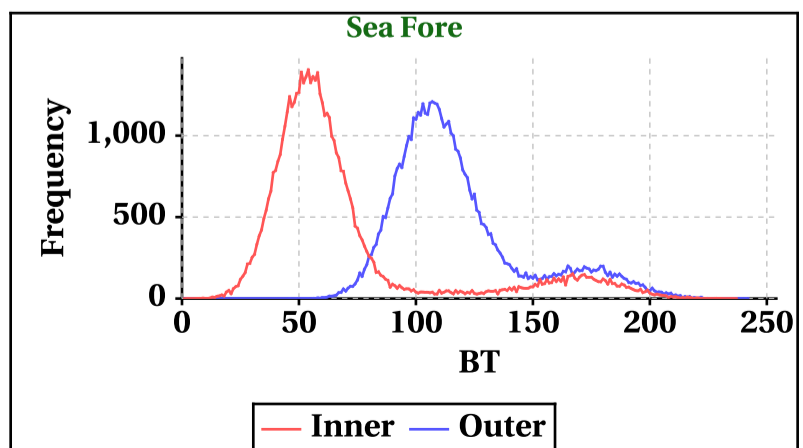
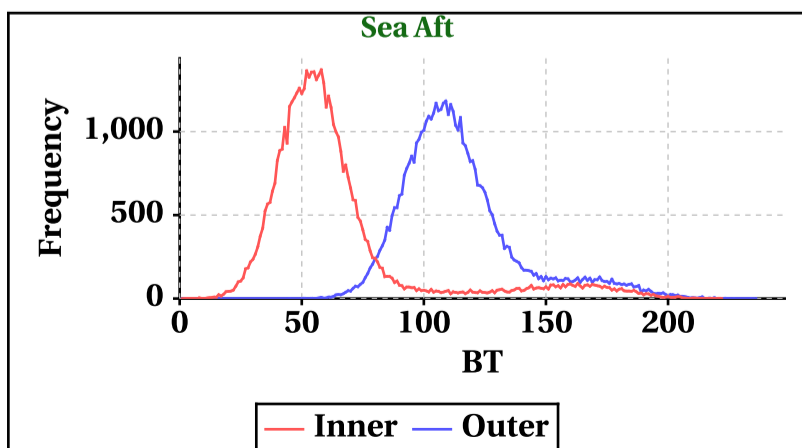
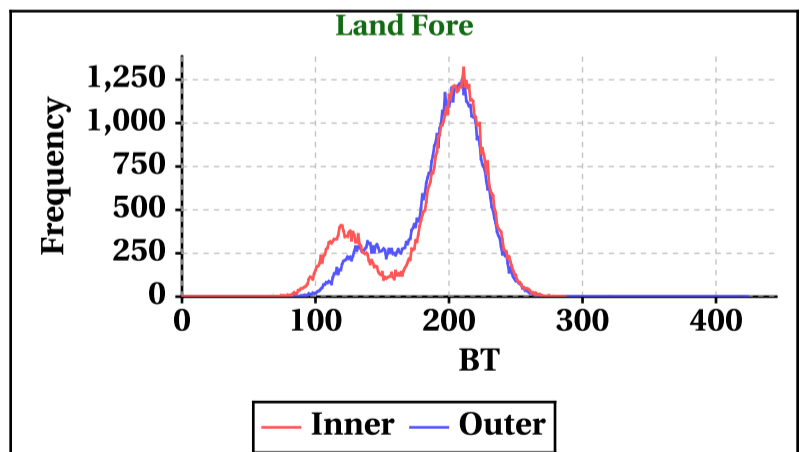
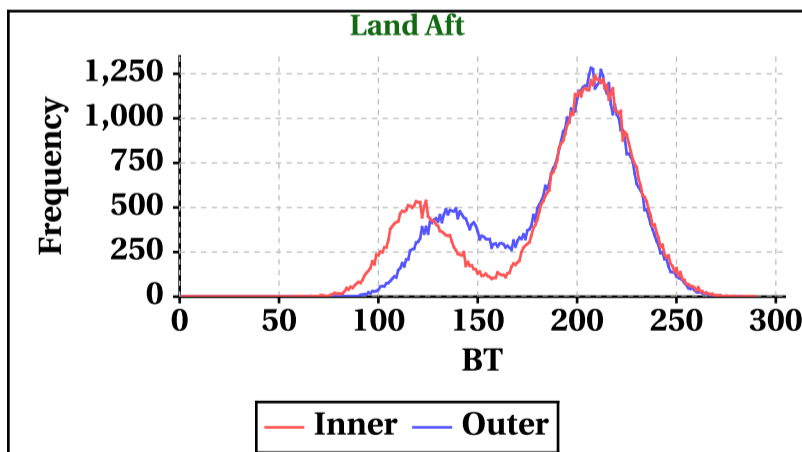
Outer Beam (VV)				
	Land Aft	Land Fore	Sea Aft	Sea Fore
Min	-58	-50	-59	-59
Max	0	0	0	0



## Brightness Temperature(K)

Inner Beam(HH)				
	Land Aft	Land Fore	Sea Aft	Sea Fore
Min	0	0	0	0
Max	290	287	222	237

Outer Beam(VV)				
	Land Aft	Land Fore	Sea Aft	Sea Fore
Min	0	0	0	0
Max	283	424	236	242

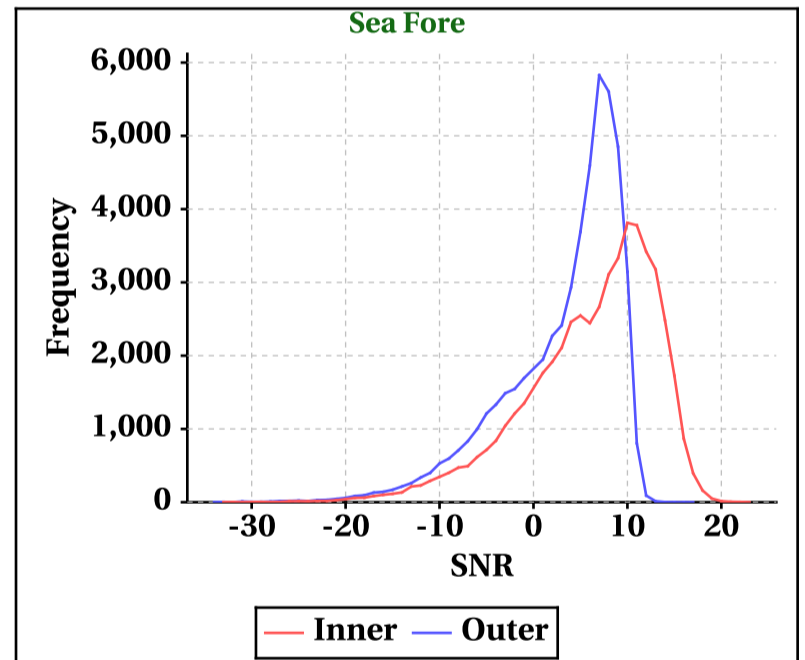
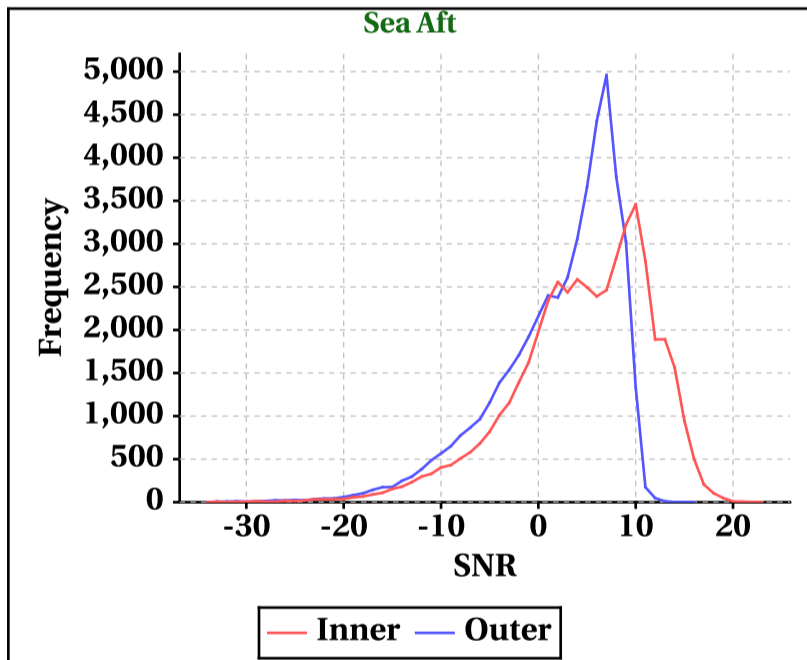
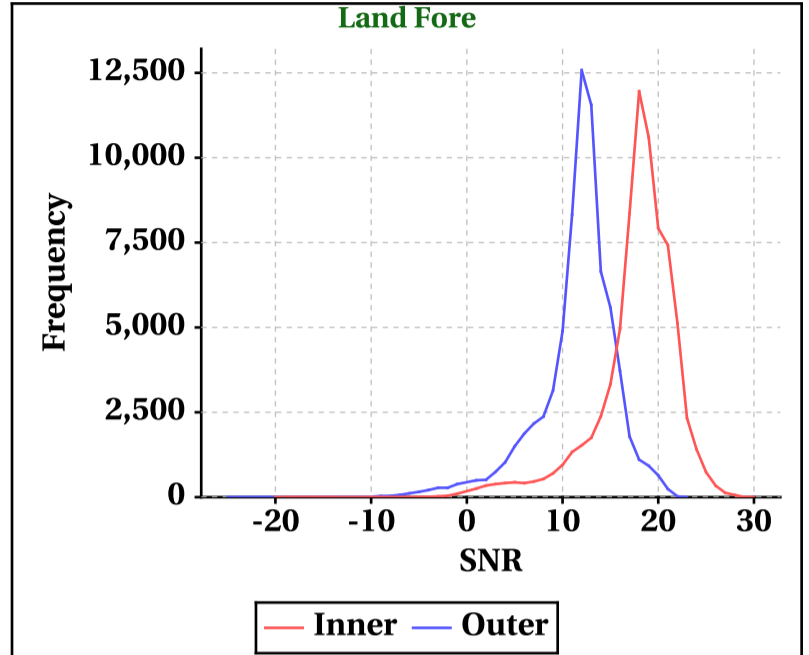
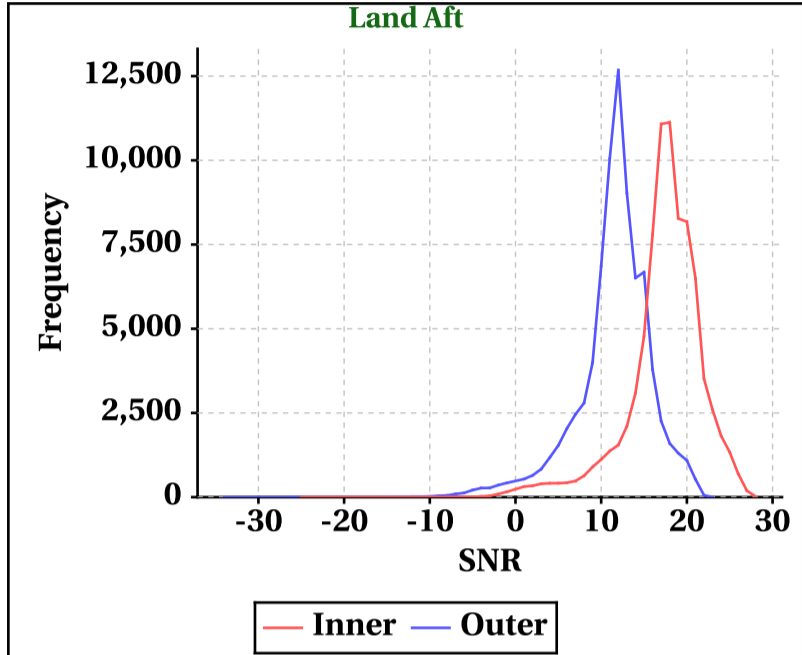


# Dynamic Range (Data Histograms)

## SNR(dBm)

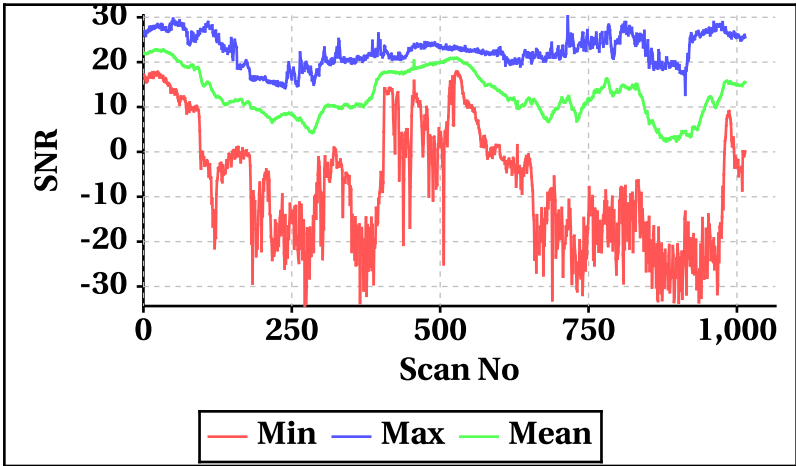
Inner Beam (HH)				
	Land Aft	Land Fore	Sea Aft	Sea Fore
Min	-25	-20	-34	-33
Max	28	30	23	23

Outer Beam (VV)				
	Land Aft	Land Fore	Sea Aft	Sea Fore
Min	-34	-25	-34	-34
Max	23	23	16	17

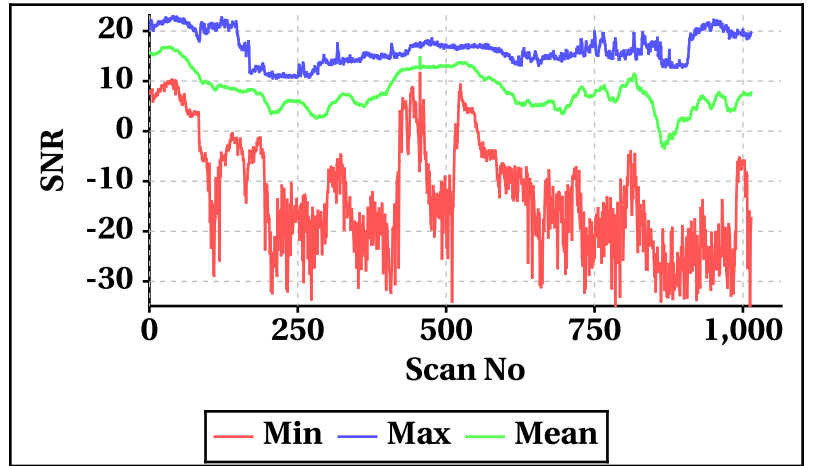


## Orbit-wise behaviour of SNR

**Inner Beam (HH)**

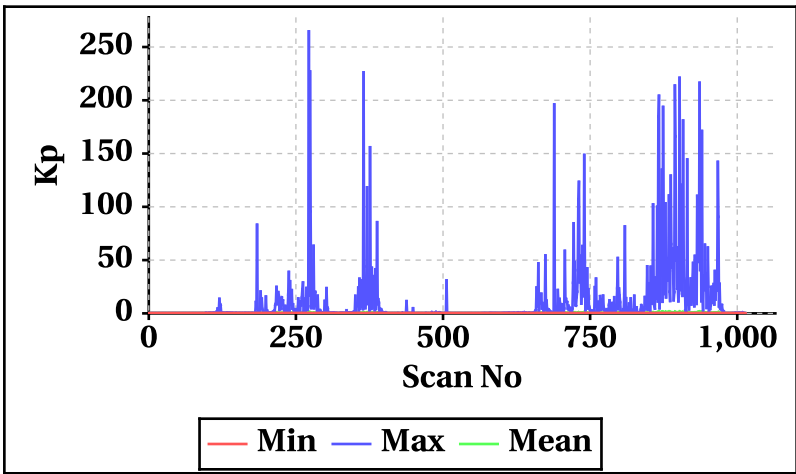


**Outer Beam(VV)**

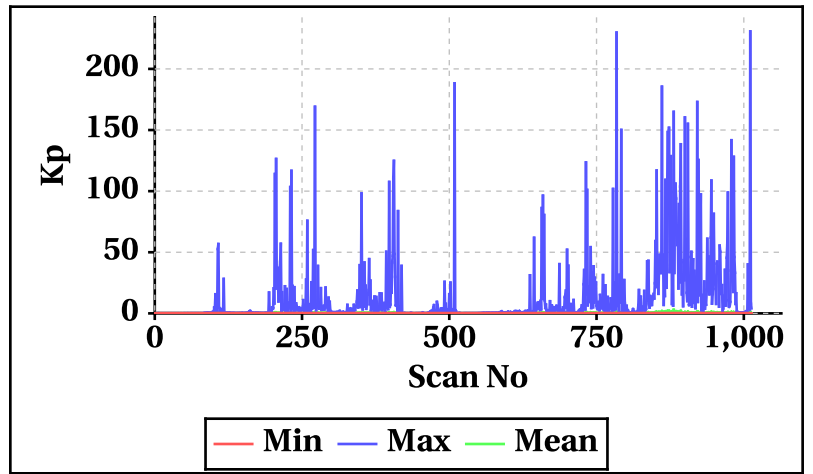


## Orbit-wise behaviour of Kp,Kpa,Kpb,Kpc

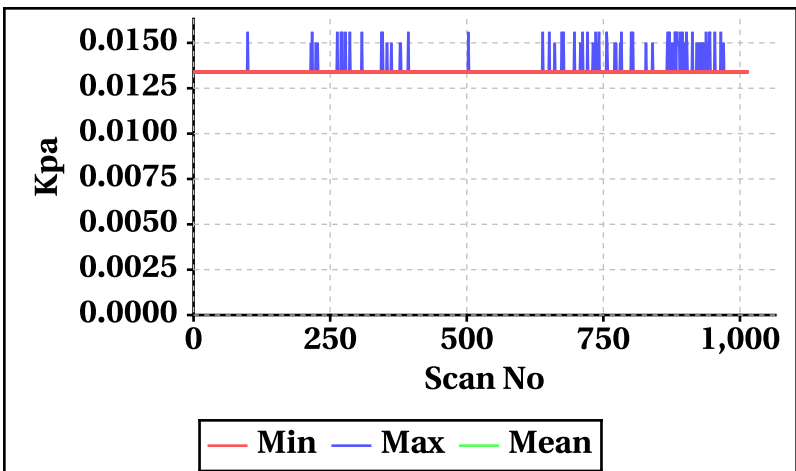
**Inner Beam(HH)**



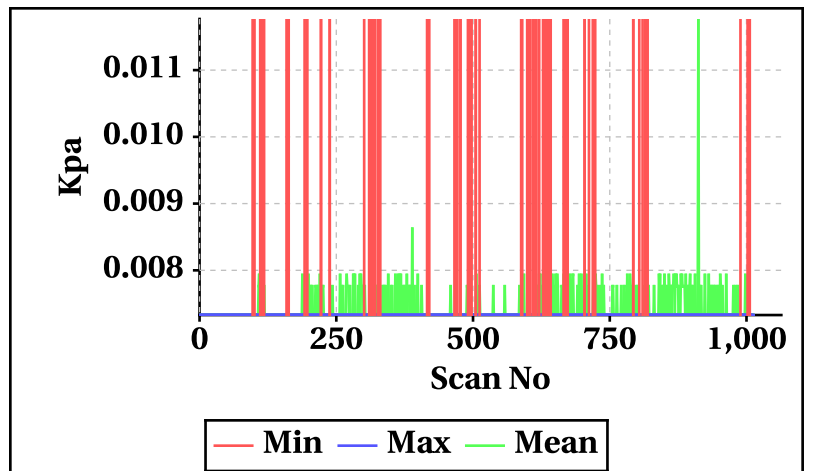
**Outer Beam(VV)**



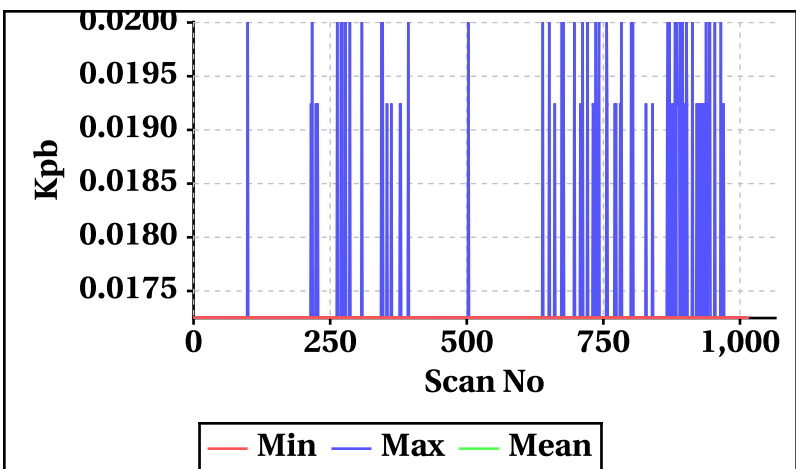
**Inner Beam(HH)**



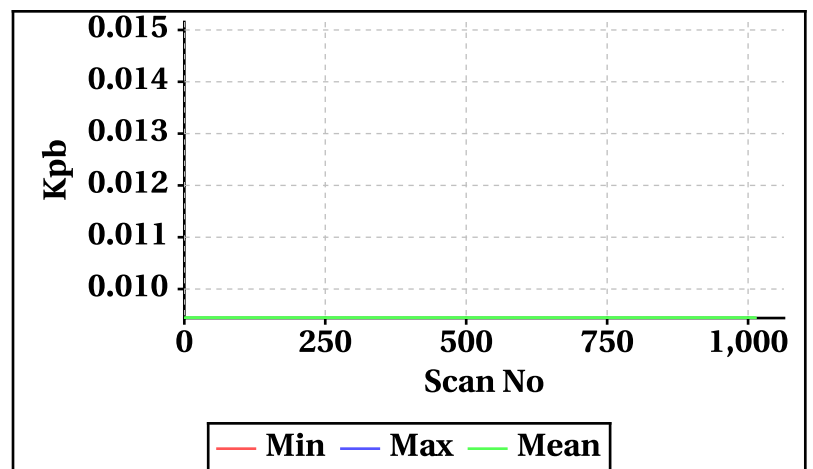
**Outer Beam(VV)**



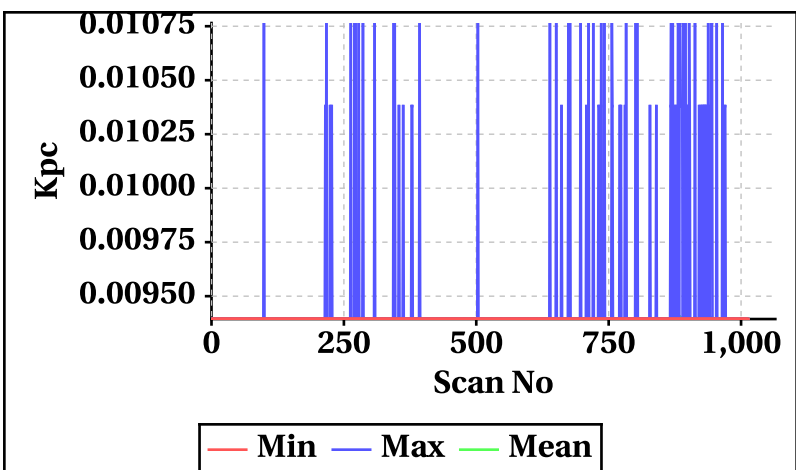
**Inner Beam(HH)**



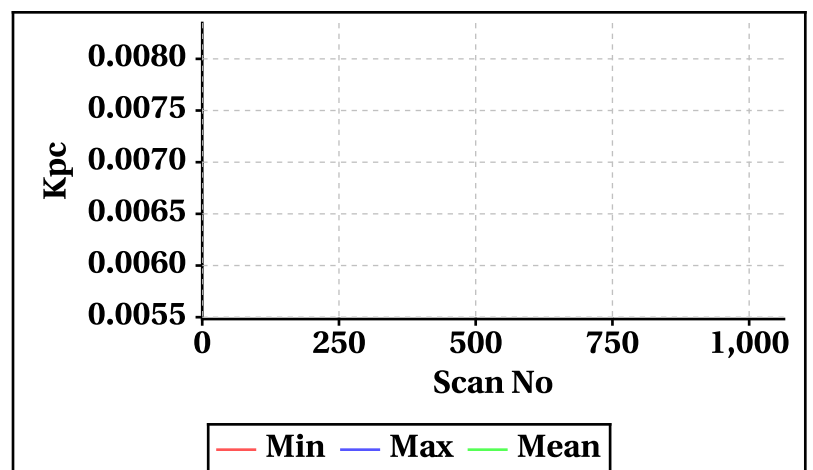
**Outer Beam(VV)**



**Inner Beam(HH)**



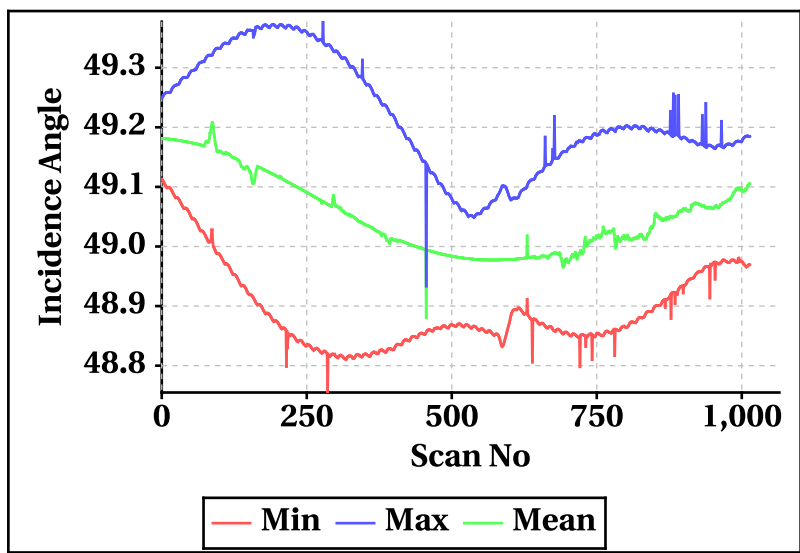
**Outer Beam(VV)**



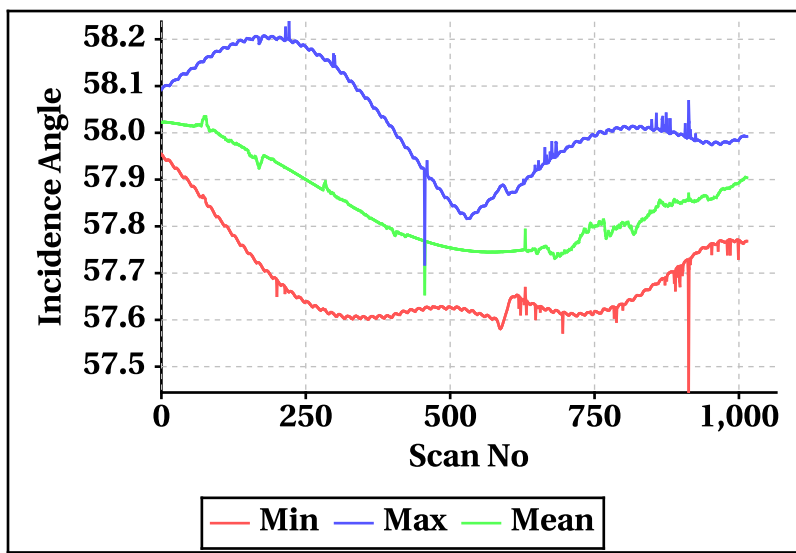


Orbit-wise behaviour of Incidence, Azimuth, Range, X-Factor

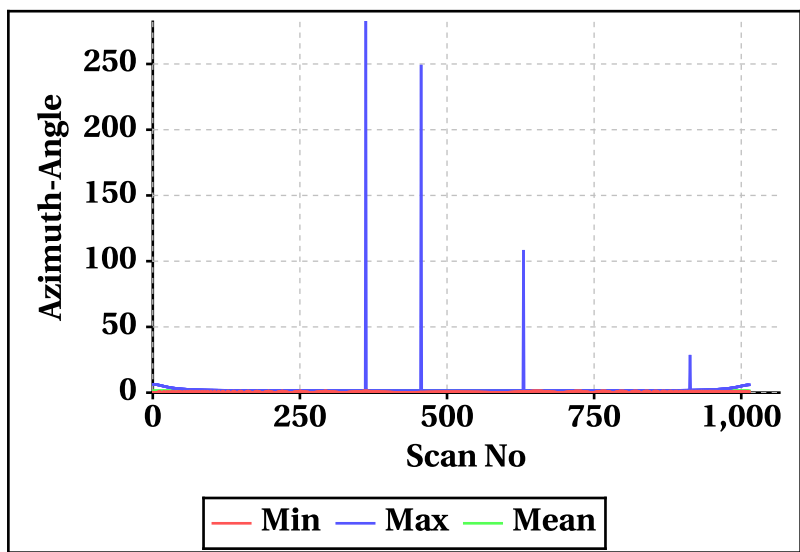
Inner Beam (HH)



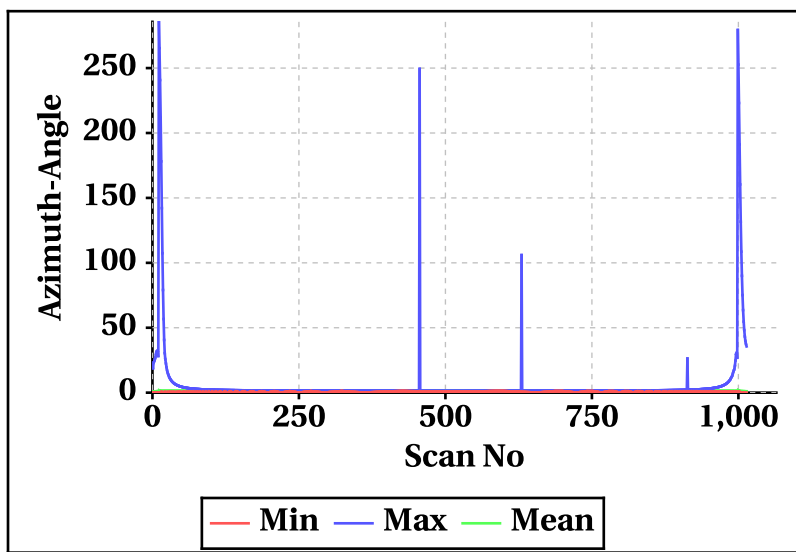
Outer Beam(VV)



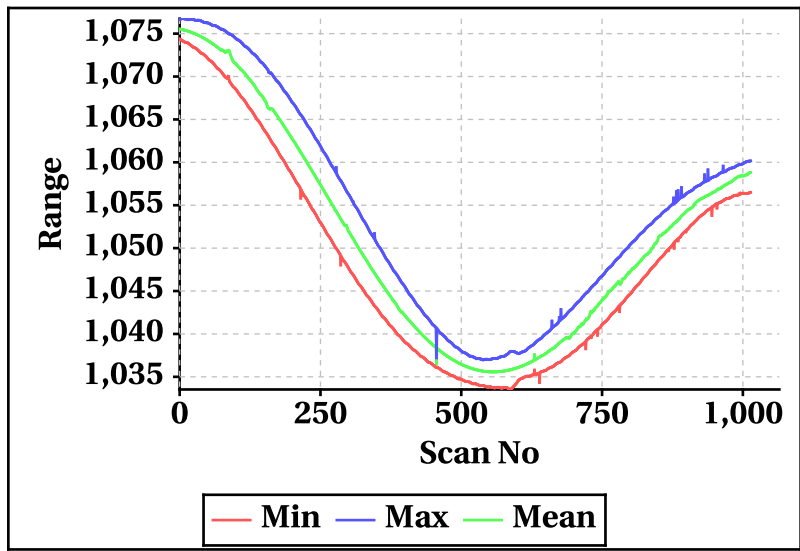
Inner Beam (HH)



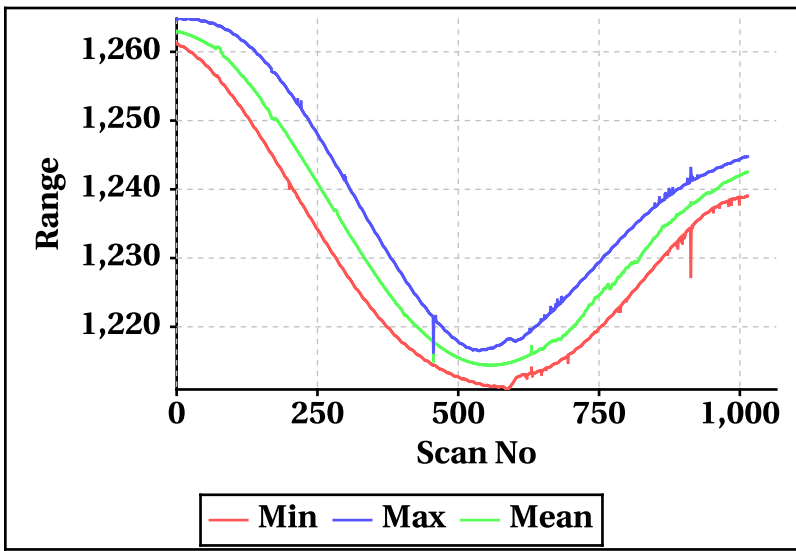
Outer Beam(VV)



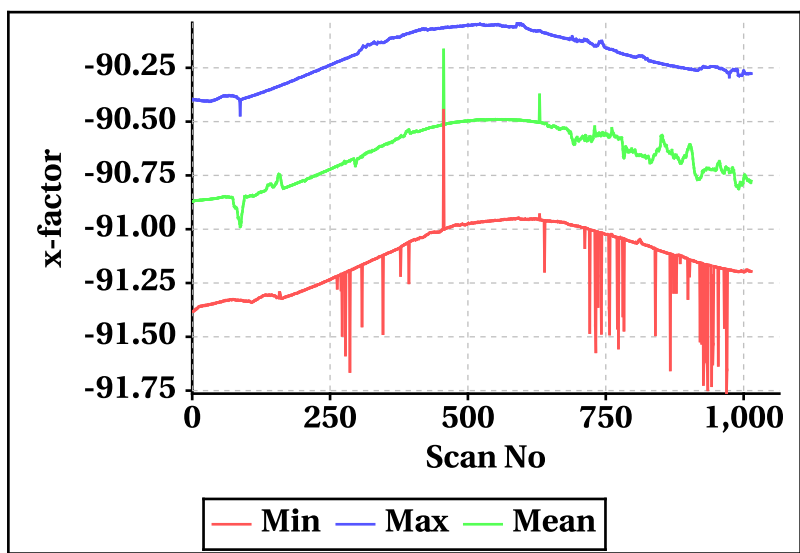
Inner Beam (HH)



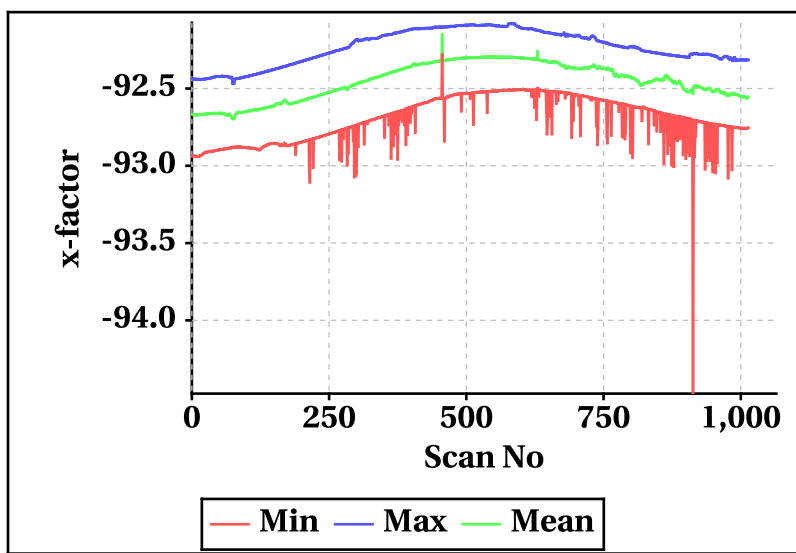
Outer Beam(VV)



Inner Beam (HH)



Outer Beam(VV)

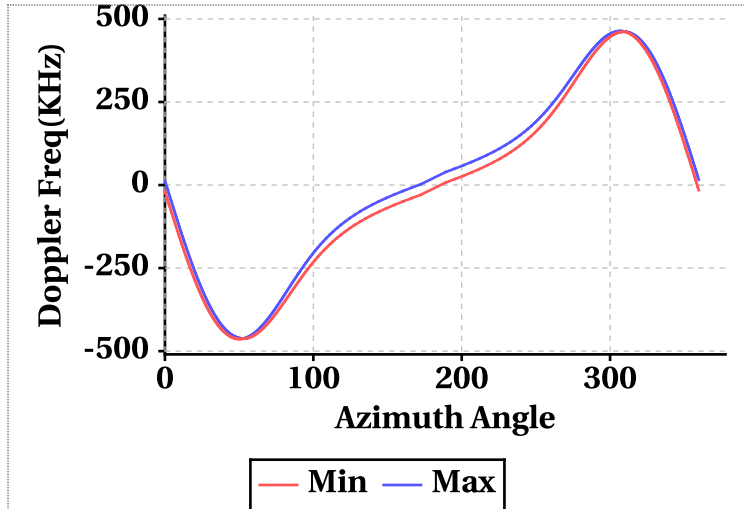


# Doppler Frequency Variation

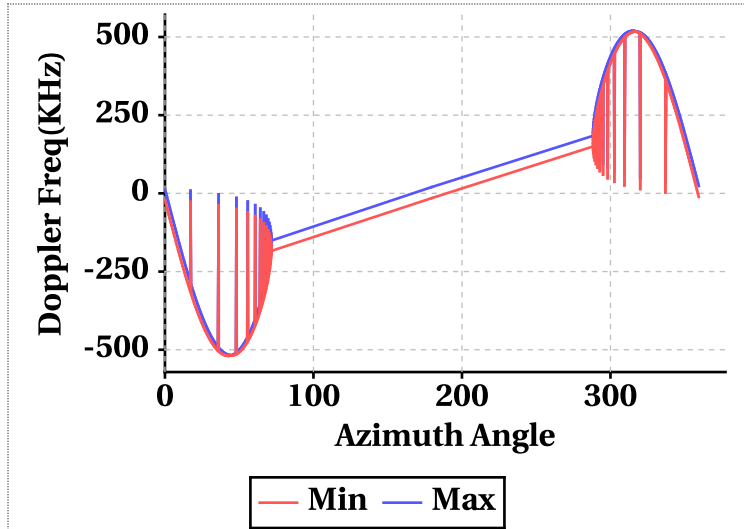
Doppler Frequency(KHz) variation statistics Over the half Orbit

	Inner Beam (HH)	Outer Beam (VV)
Min	-463.38	-519.32
Max	463.48	519.40

Footprint wise Doppler frequency variation Inner Beam (HH)



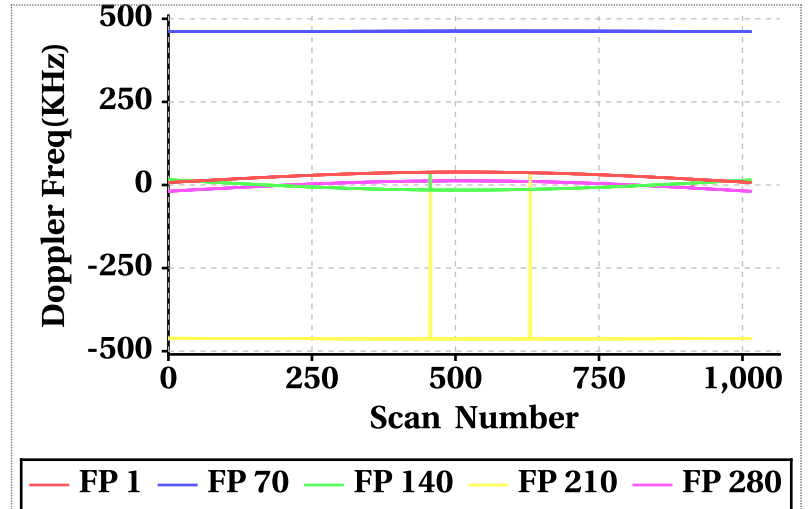
Footprint wise Doppler frequency variation Outer Beam (VV)



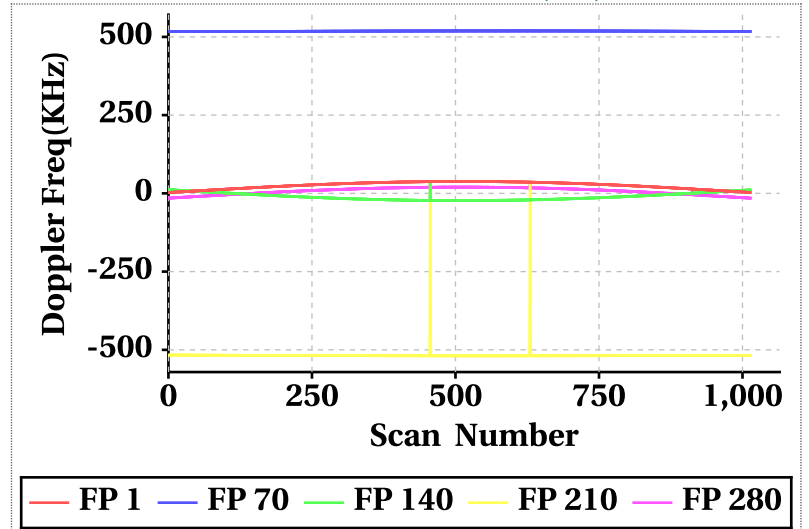
Doppler Frequency(KHz) variation

Doppler_FP	Inner Beam (HH)			Outer Beam (VV)		
	Min	Max	Mean	Min	Max	Mean
Doppler_1	7.36	38.92	27.50	2.64	37.96	25.19
Doppler_70	461.20	463.04	462.31	516.76	519.12	518.24
Doppler_140	-15.36	33.46	-4.13	-23.10	37.58	-10.47
Doppler_210	-463.30	33.42	-461.60	-519.10	37.54	-517.31
Doppler_280	-19.08	33.38	1.13	-15.42	37.50	7.14

Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Inner Beam (HH)

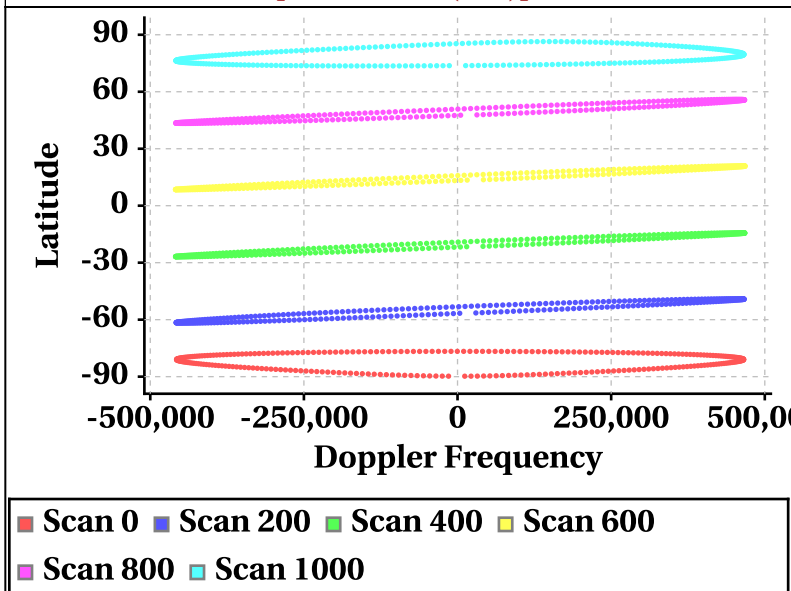


Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Outer Beam (VV)

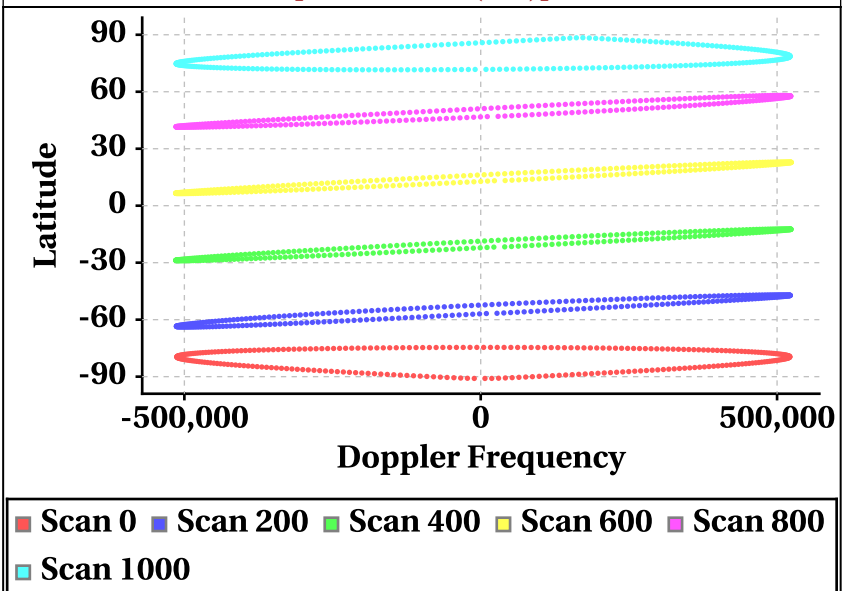


# Latitude Vs Doppler Frequency

Doppler Frequency at Scan Interval of 200 [Inner Beam(HH)]



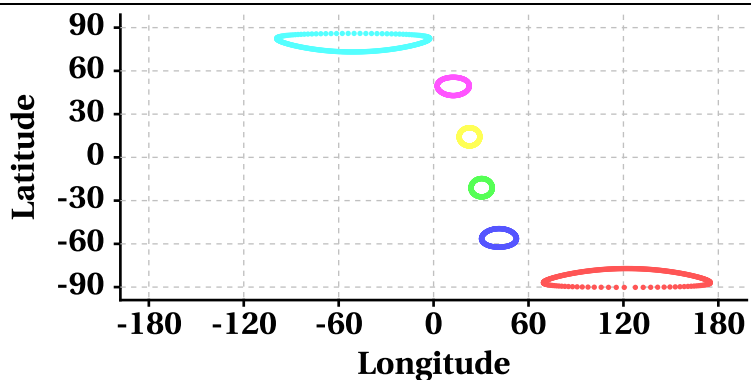
Doppler Frequency at Scan Interval of 200 [Outer Beam(VV)]



# Parameter as a function of Latitude

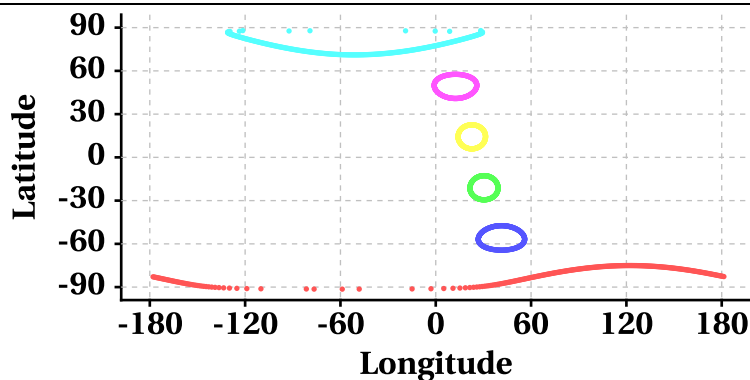
## Latitude Vs Longitude

Scan Trace [Inner Beam(HH)]



Scan 0 Scan 200 Scan 400 Scan 600  
Scan 800 Scan 1000

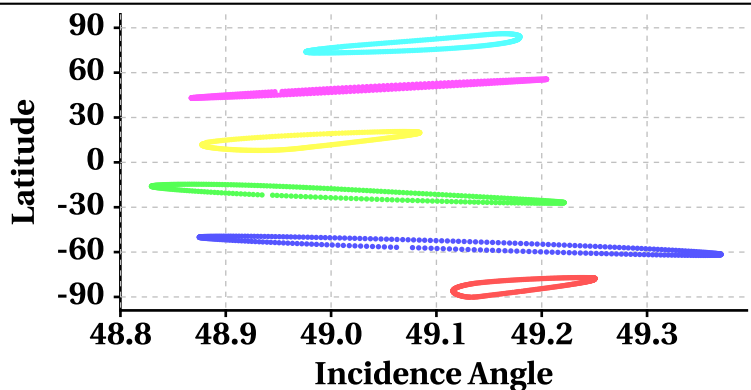
Scan Trace [Outer Beam (VV)]



Scan 0 Scan 200 Scan 400 Scan 600  
Scan 800 Scan 1000

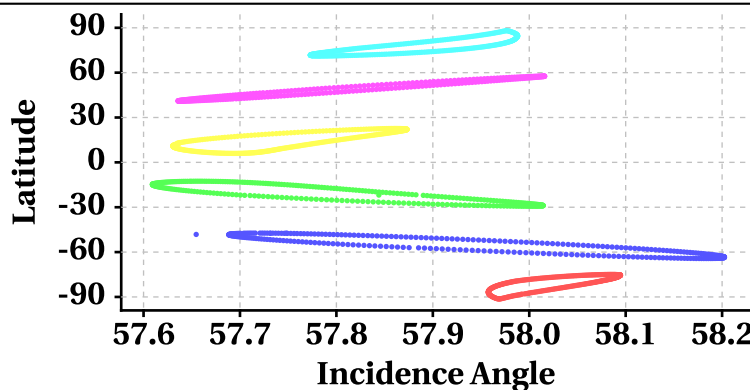
## Latitude Vs Incidence Angle

Incidence Angle at Scan Interval of 200 [Inner Beam(HH)]



Scan 0 Scan 200 Scan 400 Scan 600  
Scan 800 Scan 1000

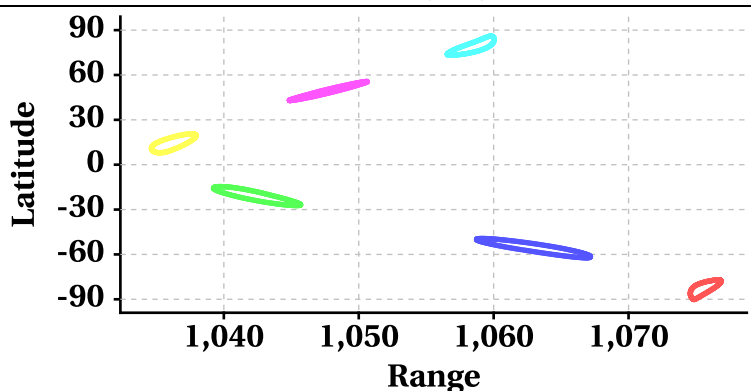
Incidence Angle at Scan Interval of 200 [Outer Beam (VV)]



Scan 0 Scan 200 Scan 400 Scan 600  
Scan 800 Scan 1000

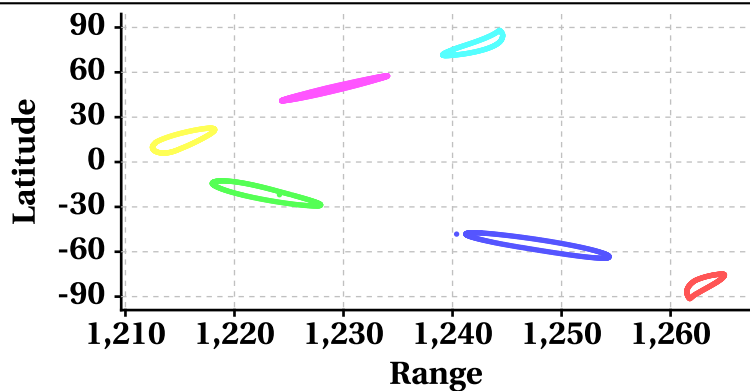
## Latitude Vs Range

Range at Scan Interval of 200 [Inner Beam(HH)]



Scan 0 Scan 200 Scan 400 Scan 600  
Scan 800 Scan 1000

Range at Scan Interval of 200 [Outer Beam(VV)]



Scan 0 Scan 200 Scan 400 Scan 600  
Scan 800 Scan 1000



# Variation in Orbit and Attitude Parameters

