

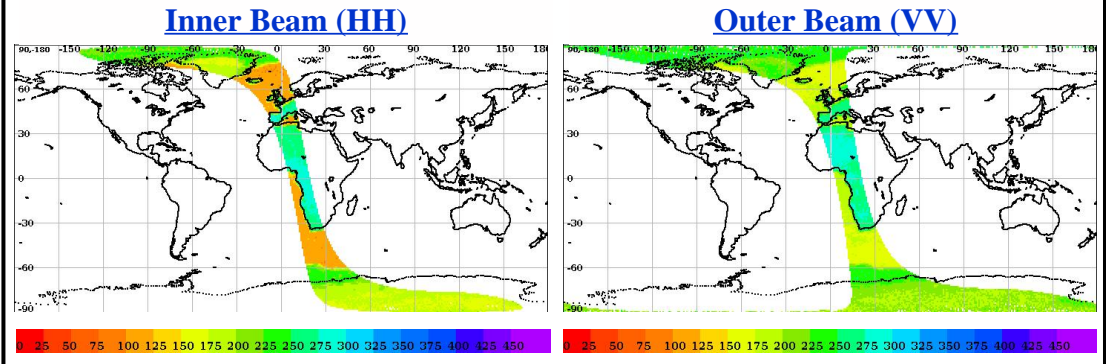
# SCATSAT-1 Scatterometer Level-1B Data Quality Evaluation Report

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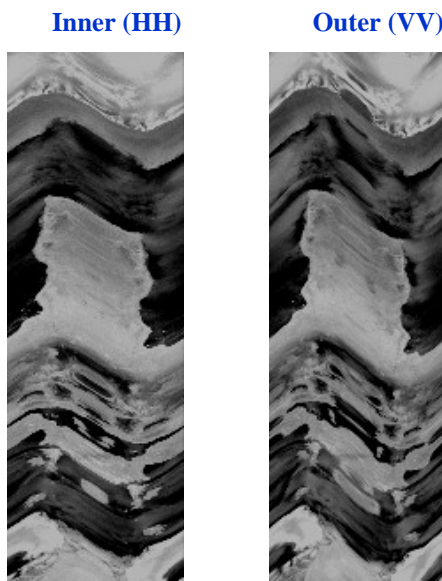
- Half-Orbit Coverage using BT & Sigma-0
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<b>Satellite Id</b>	ScatSat-1	<b>Start Orbit</b>	16103	<b>Total Scans</b>	1017
<b>Sensor Name</b>	Scatterometer	<b>End Orbit</b>	16104	<b>No of Inner FootPrints</b>	281
<b>Processor Version</b>	v1.1.3	<b>Rev. Number</b>	16103_16104	<b>No Of Outer FootPrints</b>	282
<b>Half Orbit Direction</b>	SN	<b>Data Production Date</b>	11-10-2019	<b>No. Of Inner Slices</b>	9
<b>Equator Crossing Date</b>	11-10-2019	<b>Equator Crossing Time</b>	19:40:42.000	<b>No Of Outer Slices</b>	15

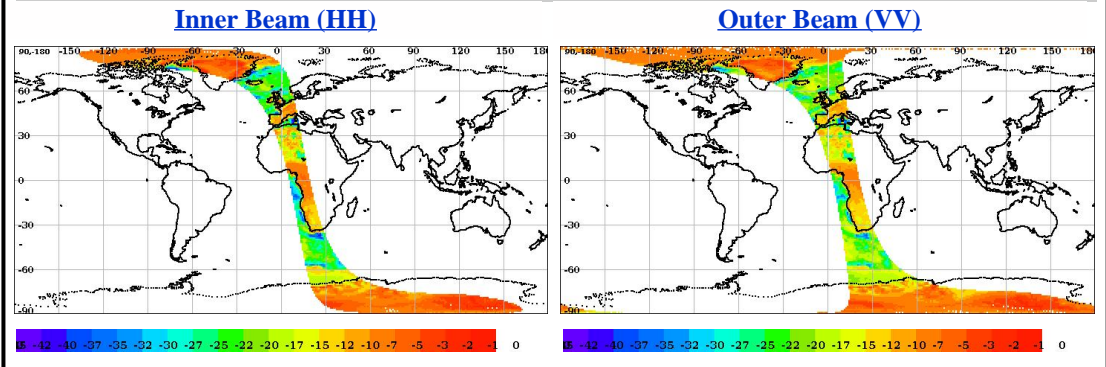
## Brightness Temperature(k) Footprint trace



## Image Snapshot for Inner & Outer Beam



## Sigma0(dB) Footprint trace



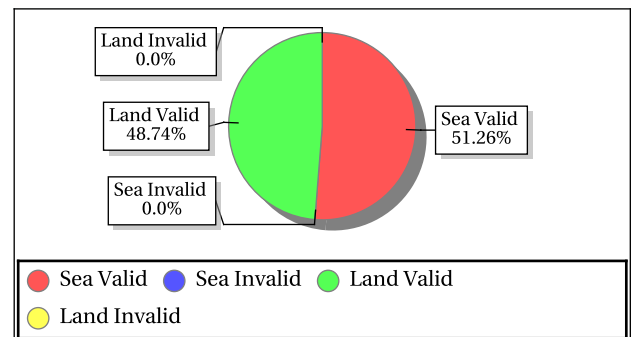
## Invalid and Poor Sigma-0 Quality Flag Statistics for Inner/Outer Slices\*

Sigma-0 Flags	Inner Beam	Outer Beam
Invalid Sigma0(%)	0.00	0.00
Data Not Available From Payload (%)	90.00	97.22222
Slice not within sample array limits (%)	10.00	2.78
C(S+N) - C(N) < 0.1 (%)	0.00	0.00
Poor Sigma0(%)	22.22	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 (%)	0.021868	0.052981

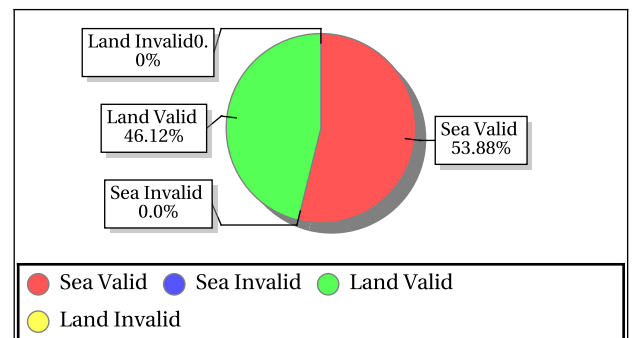
\*DP Format Document

## 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
GreenLand_2	77.50	-41.50	Inner	ASC	Aft	-4.95	-4.52	-4.75	0.18	143.21	179.39	166.09	16.25
GreenLand_2	77.50	-41.50	Inner	ASC	Fore	-5.83	-3.99	-4.75	0.68	147.83	159.27	154.25	3.68
GreenLand_3	71.55	-42.45	Inner	ASC	Aft	-9.34	-7.04	-8.30	0.69	154.52	213.86	185.00	12.82
GreenLand_3	71.55	-42.45	Inner	ASC	Fore	-11.28	-6.68	-8.93	0.83	171.76	215.60	188.33	9.97
GreenLand_1	74.69	-42.50	Inner	ASC	Aft	-10.00	-7.77	-8.76	0.62	159.07	208.19	184.05	15.79
GreenLand_1	74.69	-42.50	Inner	ASC	Fore	-9.68	-7.86	-8.67	0.51	147.47	200.01	176.21	15.35
Sahara	19.10	14.30	Inner	ASC	Aft	-31.54	-20.34	-26.12	2.75	224.76	327.83	264.59	18.33
Sahara	19.10	14.30	Inner	ASC	Fore	-32.03	-21.09	-26.65	2.69	224.11	306.35	262.39	15.10
ANT_1	-75.00	121.00	Outer	ASC	Aft	-8.84	-6.58	-7.82	0.69	172.77	212.25	190.47	13.18
GreenLand_2	77.50	-41.50	Outer	ASC	Aft	-5.83	-5.83	-5.83	0.00	221.68	221.68	221.68	0.00
GreenLand_2	77.50	-41.50	Outer	ASC	Fore	-5.15	-3.91	-4.37	0.55	205.21	249.53	222.50	19.36
GreenLand_3	71.55	-42.45	Outer	ASC	Aft	-11.06	-9.16	-10.28	0.49	181.09	241.69	223.43	16.87
GreenLand_3	71.55	-42.45	Outer	ASC	Fore	-11.52	-9.95	-10.75	0.52	211.61	245.65	232.90	9.15
GreenLand_1	74.69	-42.50	Outer	ASC	Aft	-9.74	-7.96	-8.86	0.62	199.15	263.37	230.50	18.37
GreenLand_1	74.69	-42.50	Outer	ASC	Fore	-9.66	-7.17	-8.50	0.73	217.06	264.55	234.83	12.26
Sahara	19.10	14.30	Outer	ASC	Aft	-32.01	-20.72	-25.41	2.66	257.40	318.19	287.22	13.70
Sahara	19.10	14.30	Outer	ASC	Fore	-48.94	-21.40	-28.02	4.44	252.91	333.17	287.46	18.15



## 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	302.29	0.32	2.514	0.12	262.51	0.27	2.153	0.12	0.49	0.12	0.000	0.12	0.39	0.12	0.000
<b>Kpa</b>	0.01	0.02	0.01	0.000	0.01	0.02	0.01	0.000	0.01	0.01	0.01	0.000	0.01	0.01	0.01	0.000
<b>Kpb</b>	0.02	0.03	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	0.02	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>SNR</b>	-34.94	24.14	5.22	0.414	-34.33	24.67	6.71	2.051	-6.15	29.15	18.00	16.326	-4.75	31.05	18.29	17.787

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	213.52	0.25	1.932	0.09	108.38	0.22	1.767	0.09	5.86	0.09	0.007	0.09	20.45	0.09	0.013
<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	0.01	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>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>	-34.60	17.29	2.68	0.000	-31.65	18.23	3.83	0.000	-18.93	23.01	12.29	0.074	-24.40	22.89	12.29	0.095

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>	48.35	49.66	49.05	0.000	57.07	58.49	57.93	0.283	Inci.(Inner)	47.10	49.90
<b>Azimuth Diff. (deg)</b>	0.0027	29.10	1.27	2.590	0.0000	299.39	1.27	3.822	Inci.(Outer)	57.30	58.90
<b>Range(Km)</b>	1031.50	1077.78	1051.29	0.000	1206.98	1266.33	1232.95	1.196	Azimuth Diff.	0.60	2.00
<b>X Factor(dbm)</b>	-92.95	-89.97	-90.48	0.000	-93.19	-92.02	-92.22	0.000	Range(Inner)	1025.00	1095.70
<b>Across Distance (Km)</b>	15.49	17.08	15.77	0.000	4.10	36.81	20.83	6.000	Range(Outer)	1210.00	1280.00
<b>Along Distance (Km)</b>	18.88	20.65	19.75	0.000	9.84	34.76	19.67	2.000	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

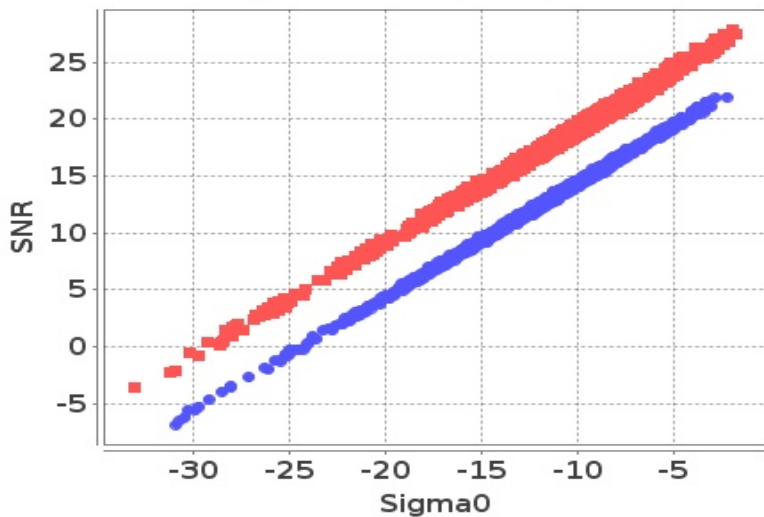
- Normal
- Deviations
- Alarming
- High Errors



## Sigma0 Behaviour (Sigma0 Vs SNR)

Footprint-Land

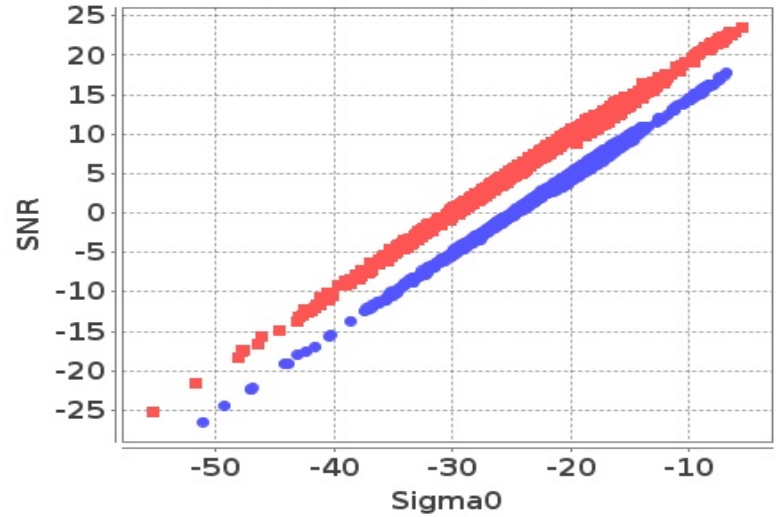
Sigma0 Vs SNR (Land)



■ Inner ● Outer

Footprint-Sea

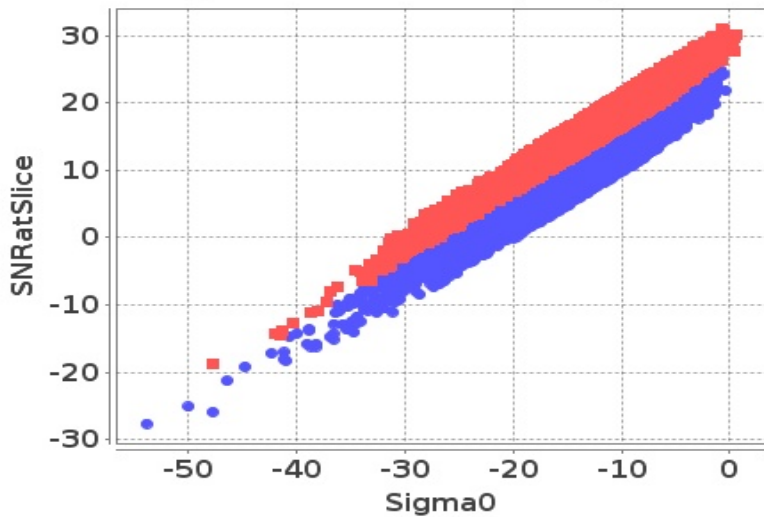
Sigma0 Vs SNR (Sea)



■ Inner ● Outer

Slice-Land

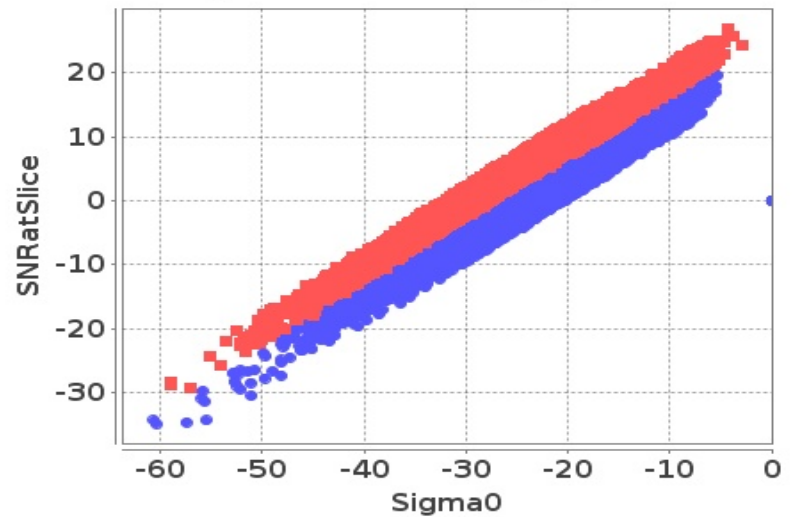
Sigma0 Vs SNRatSlice (Land)



■ Inner ● Outer

Slice-Sea

Sigma0 Vs SNRatSlice (Sea)

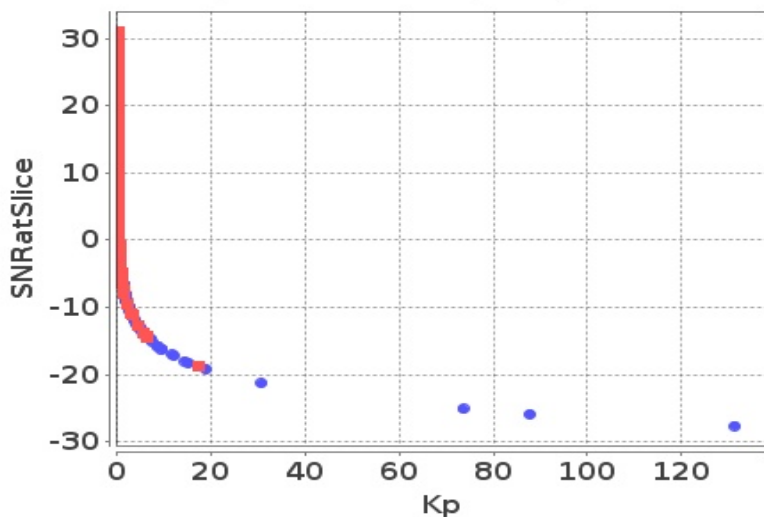


■ Inner ● Outer

## Sigma0 Behaviour (Kp Vs SNR)

Slice

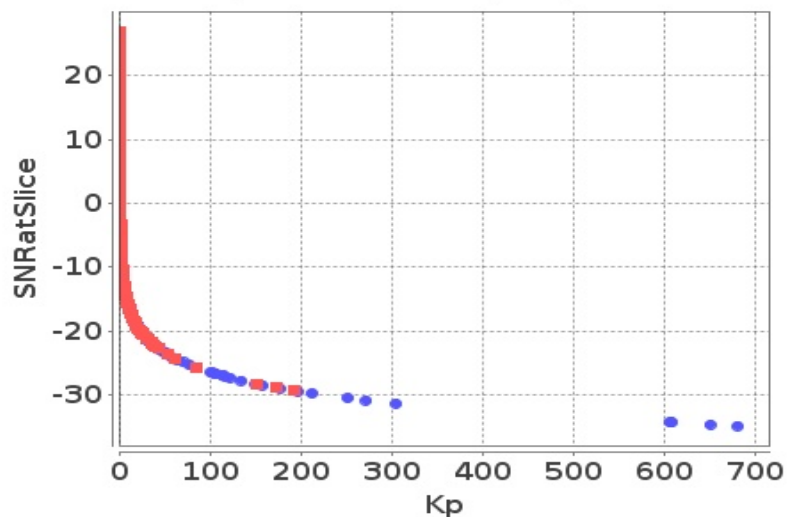
Kp Vs SNRatSlice (Land)



■ Inner ● Outer

Slice

Kp Vs SNRatSlice (Sea)

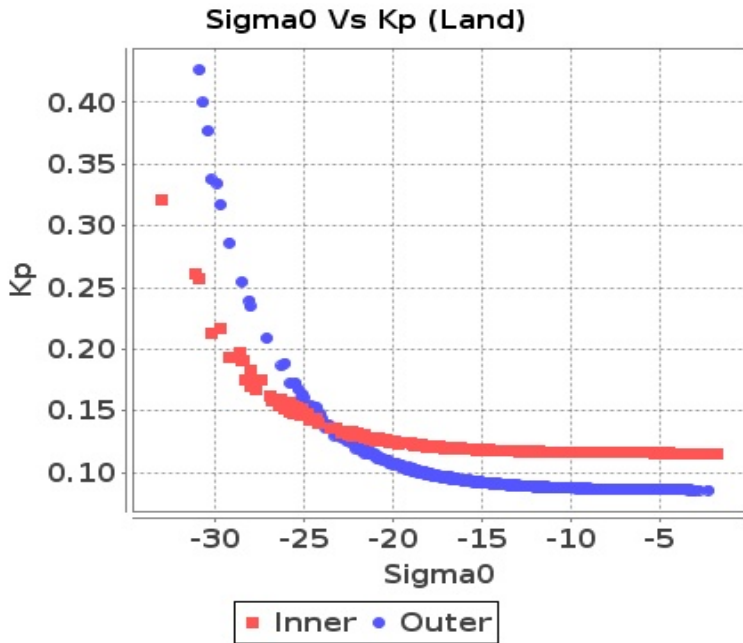


■ Inner ● Outer

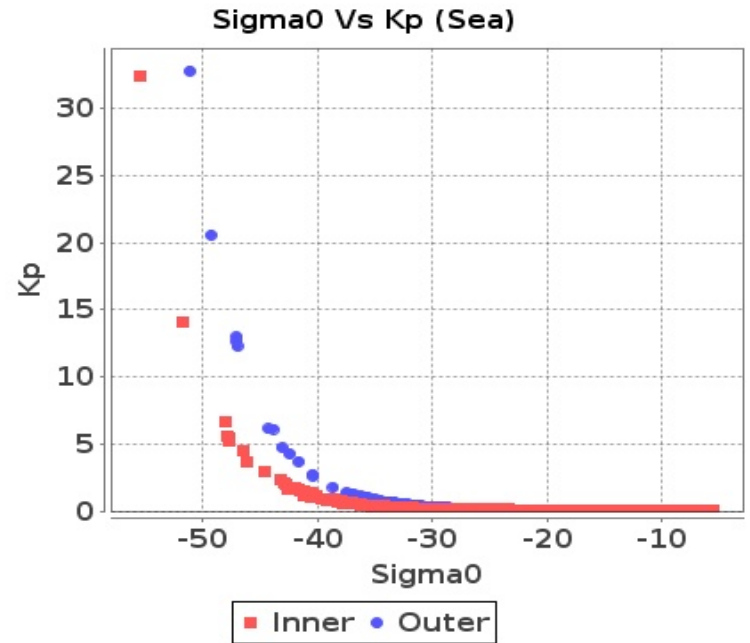


# Sigma0 Behaviour(Sigma0 Vs Kp)

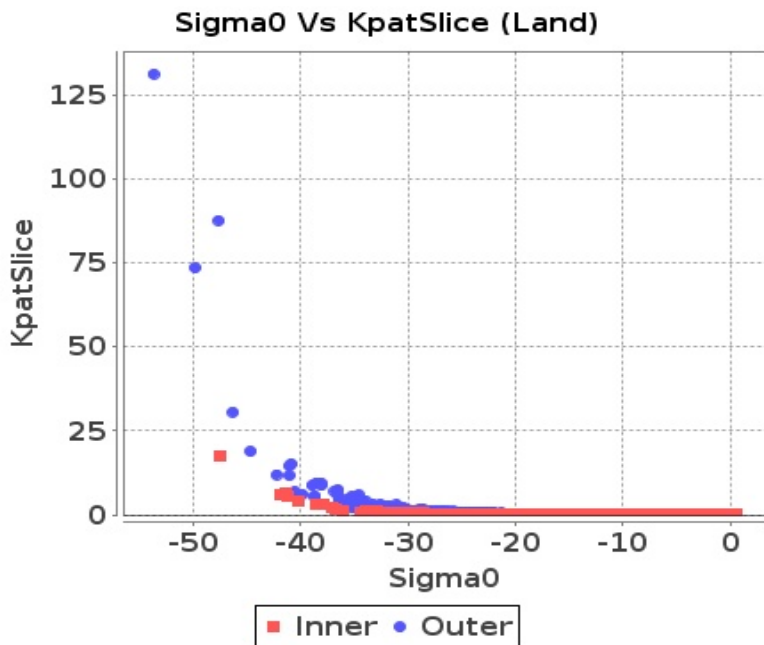
## Footprint-Land



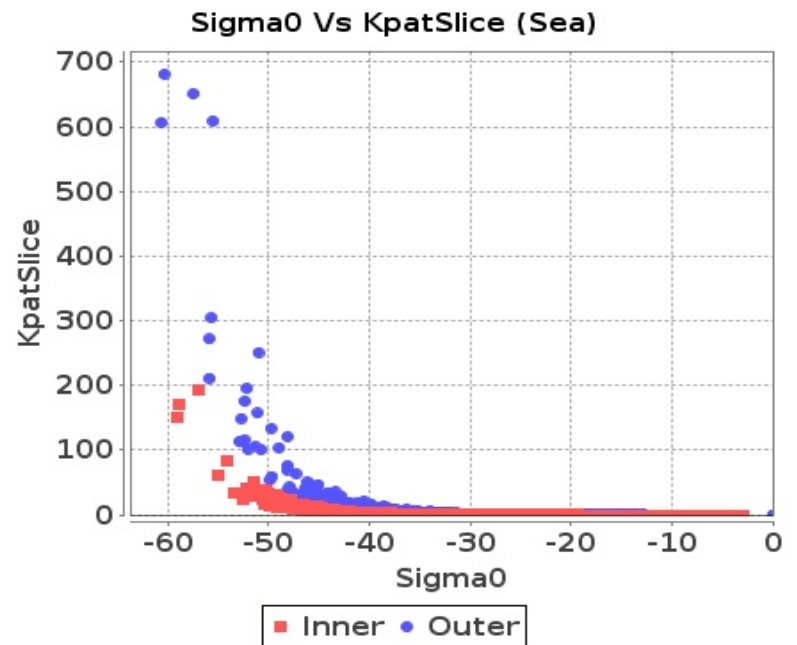
## Footprint-Sea



## Slice-Land



## Slice-Sea



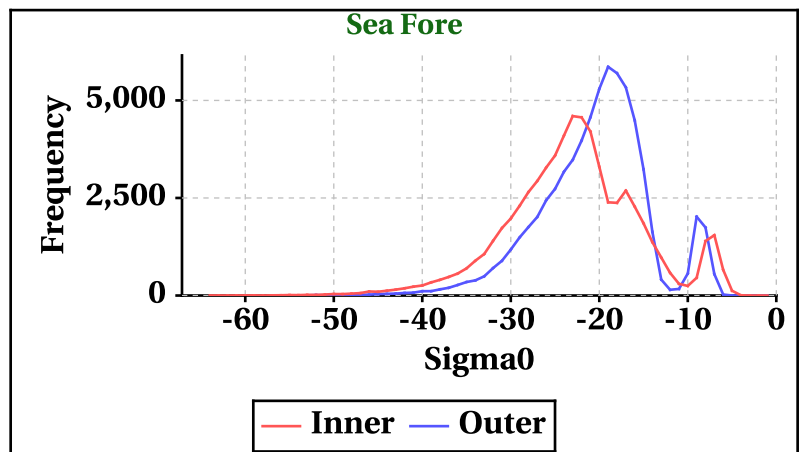
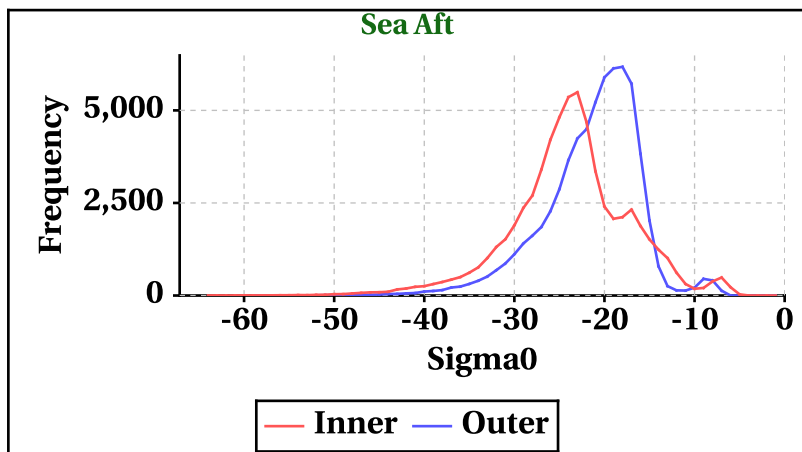
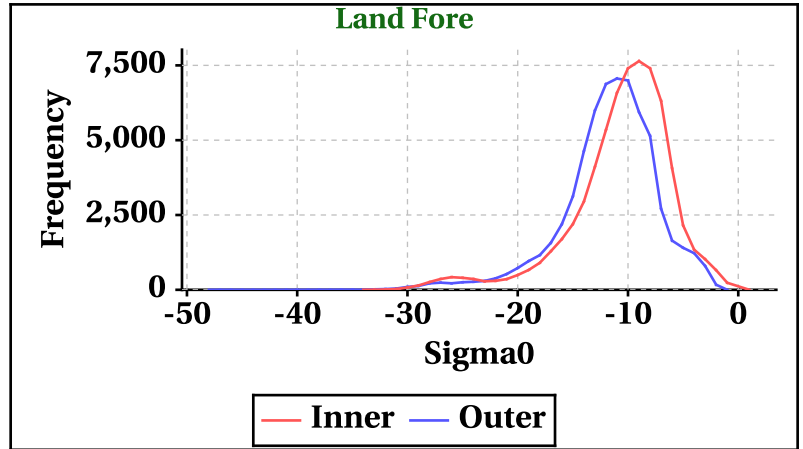
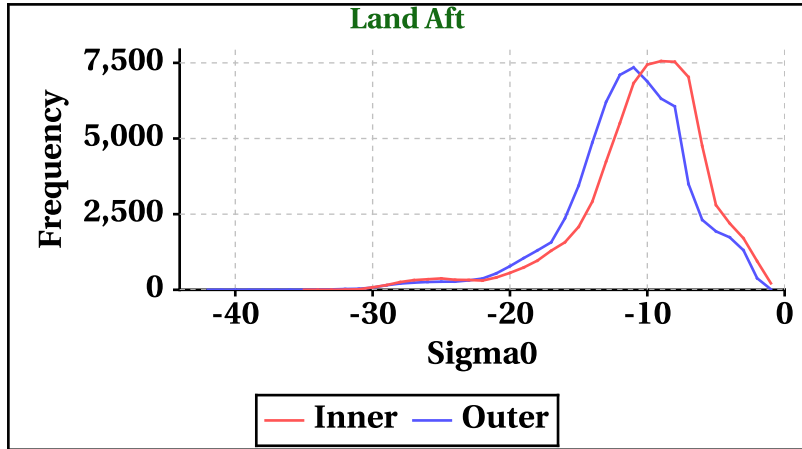


# Dynamic Range (Data Histograms)

## Sigma0(db)

Inner Beam (HH)				
	Land Aft	Land Fore	Sea Aft	Sea Fore
Min	-35	-34	-64	-64
Max	0	1	0	0

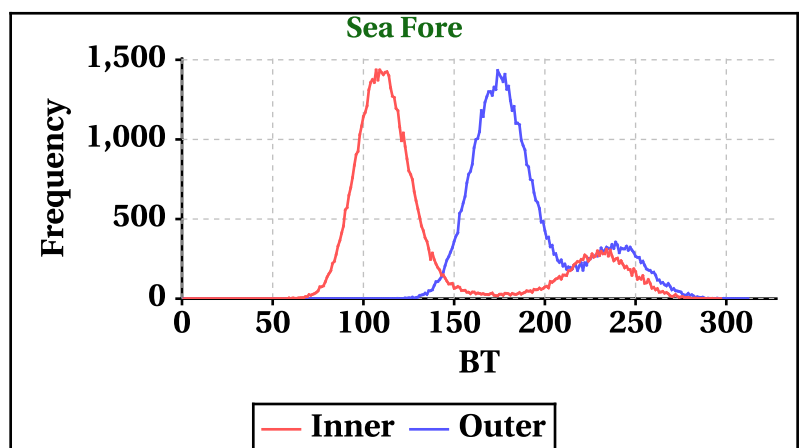
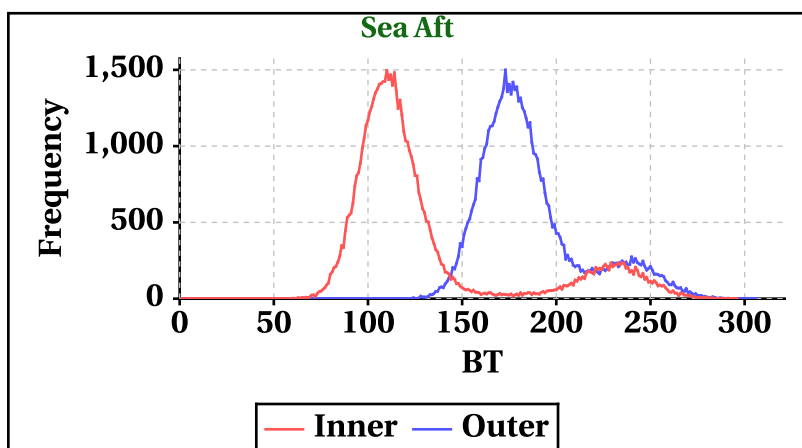
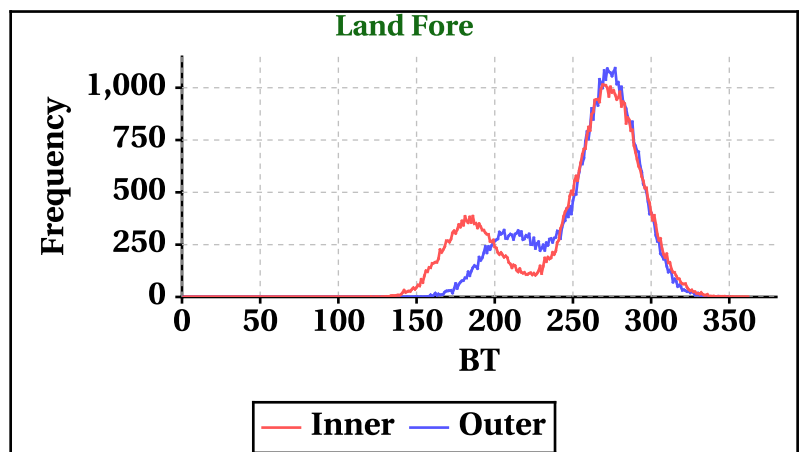
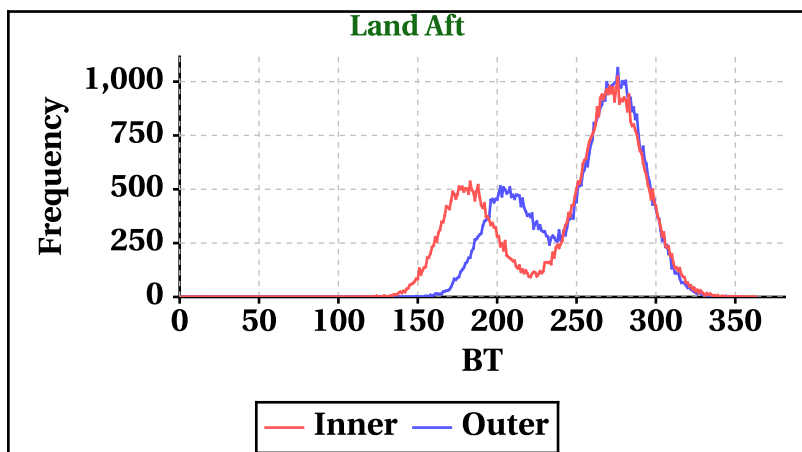
Outer Beam (VV)				
	Land Aft	Land Fore	Sea Aft	Sea Fore
Min	-42	-48	-59	-56
Max	0	0	0	0



## Brightness Temperature(K)

Inner Beam(HH)				
	Land Aft	Land Fore	Sea Aft	Sea Fore
Min	0	0	0	0
Max	363	362	296	297

Outer Beam(VV)				
	Land Aft	Land Fore	Sea Aft	Sea Fore
Min	0	0	0	0
Max	354	349	306	312

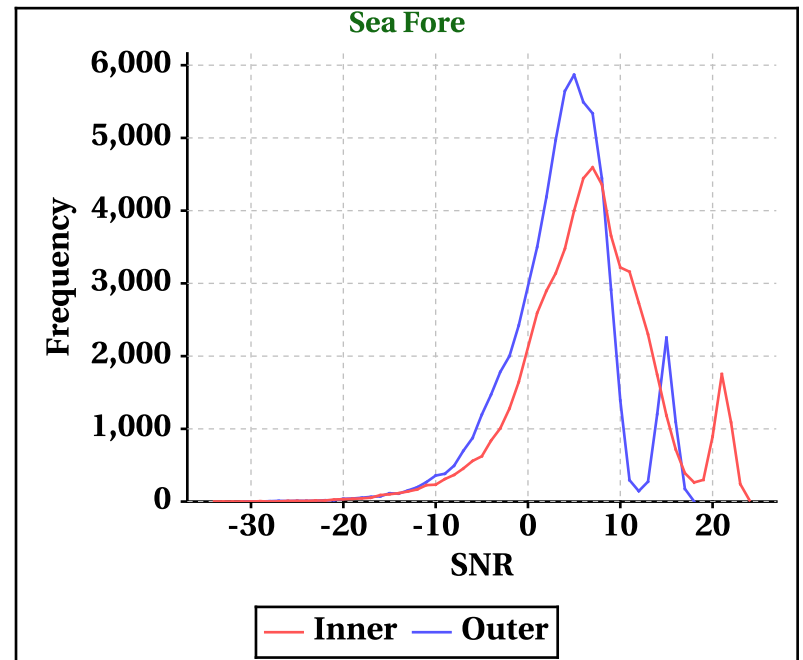
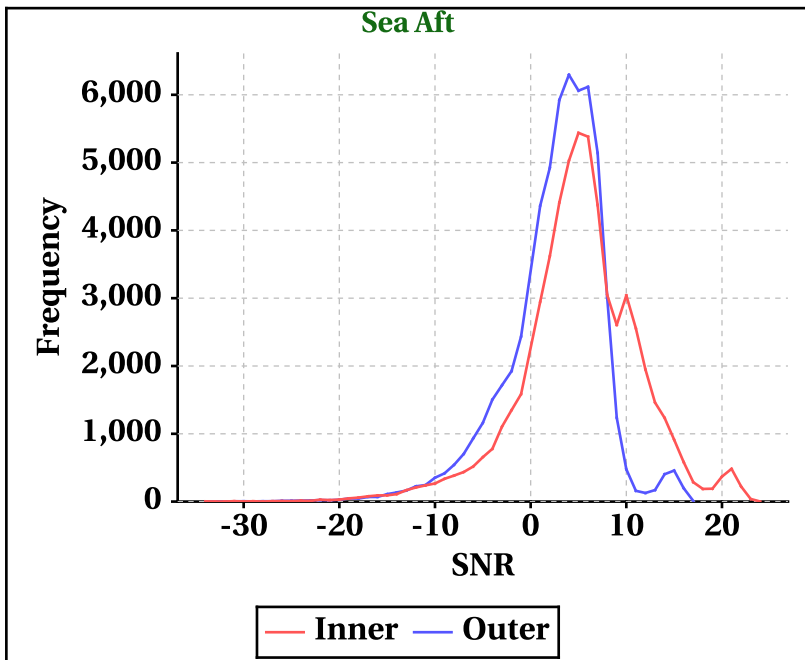
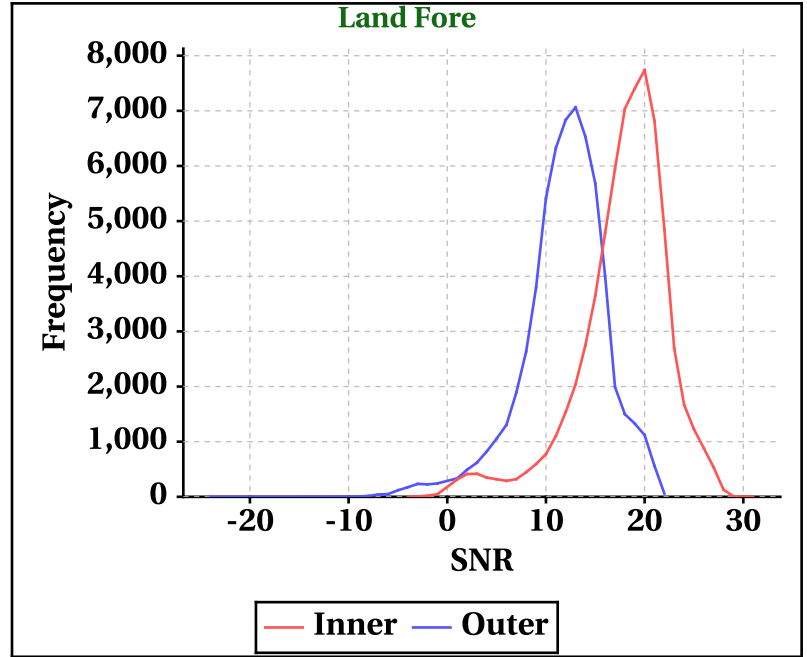
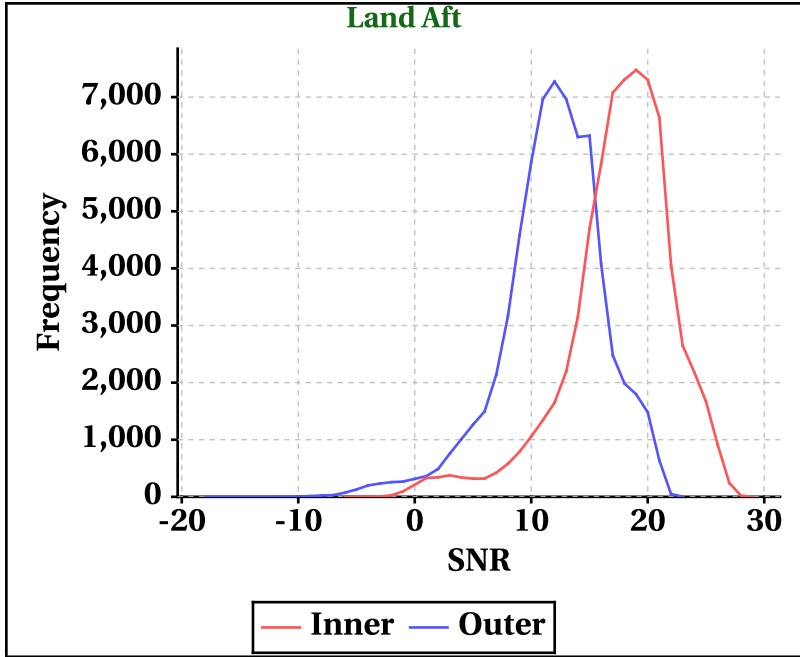


# Dynamic Range (Data Histograms)

## SNR(dBm)

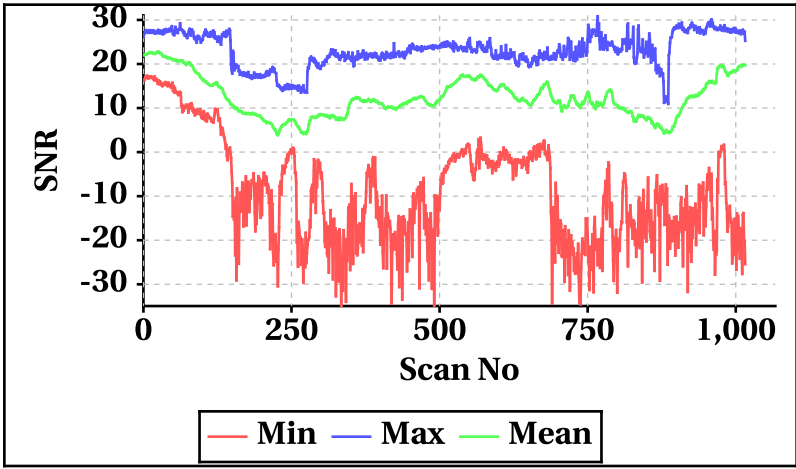
Inner Beam (HH)				
	Land Aft	Land Fore	Sea Aft	Sea Fore
Min	-6	-4	-34	-34
Max	29	31	24	24

Outer Beam (VV)				
	Land Aft	Land Fore	Sea Aft	Sea Fore
Min	-18	-24	-34	-31
Max	23	22	17	18

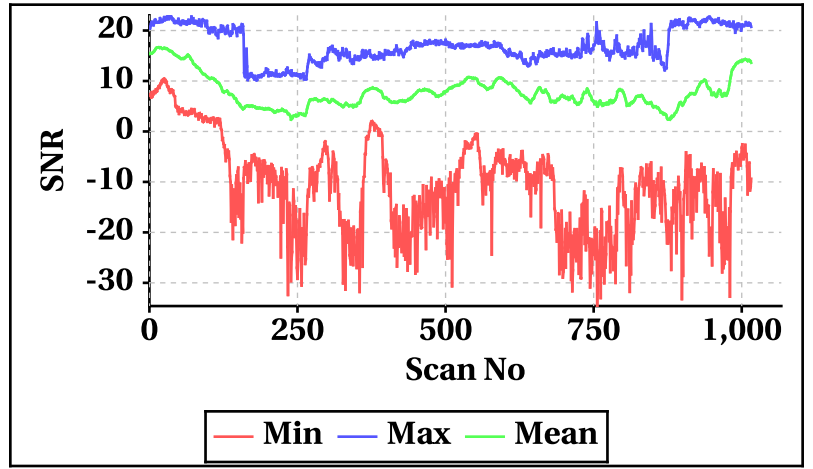


## Orbit-wise behaviour of SNR

Inner Beam (HH)

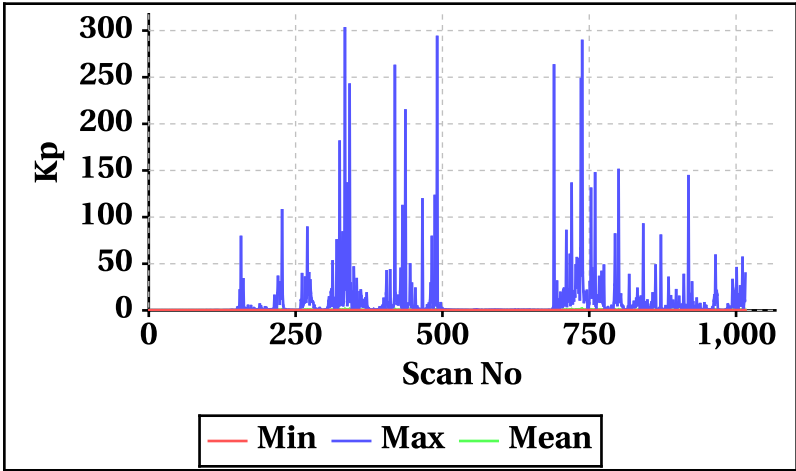


Outer Beam(VV)

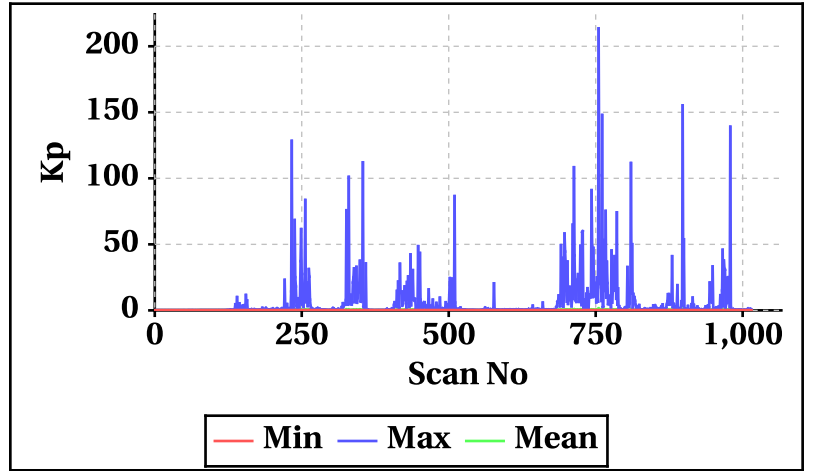


## Orbit-wise behaviour of Kp,Kpa,Kpb,Kpc

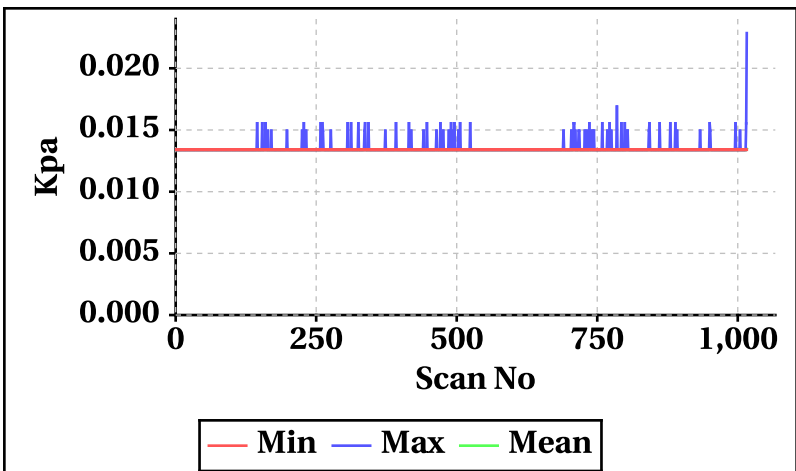
Inner Beam(HH)



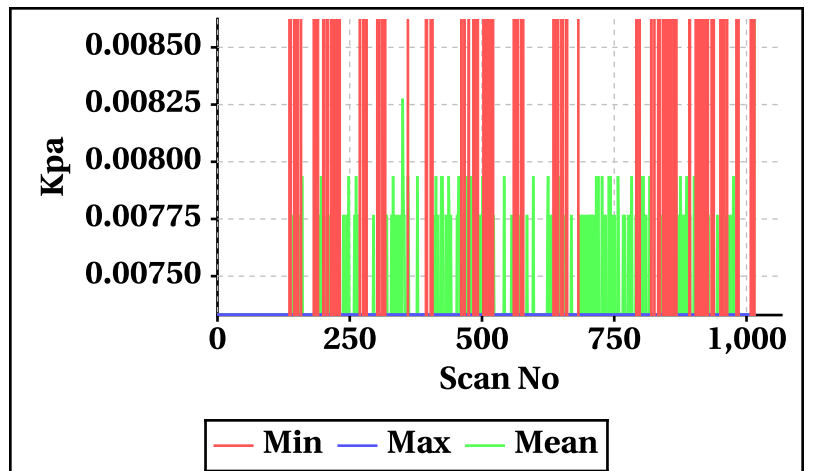
Outer Beam(VV)



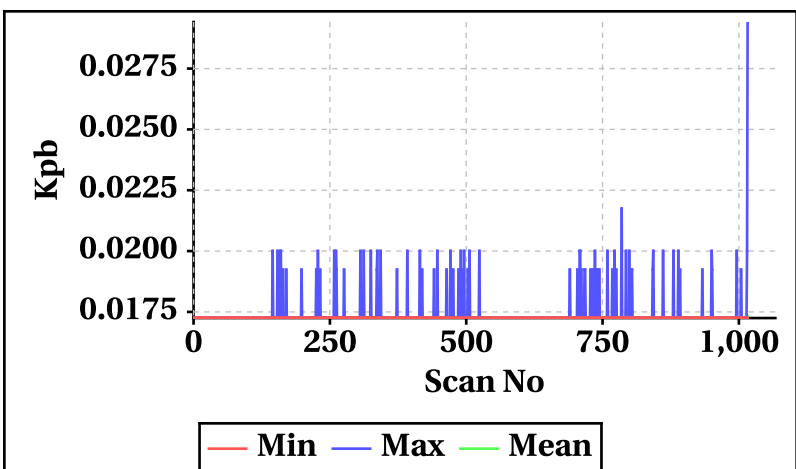
Inner Beam(HH)



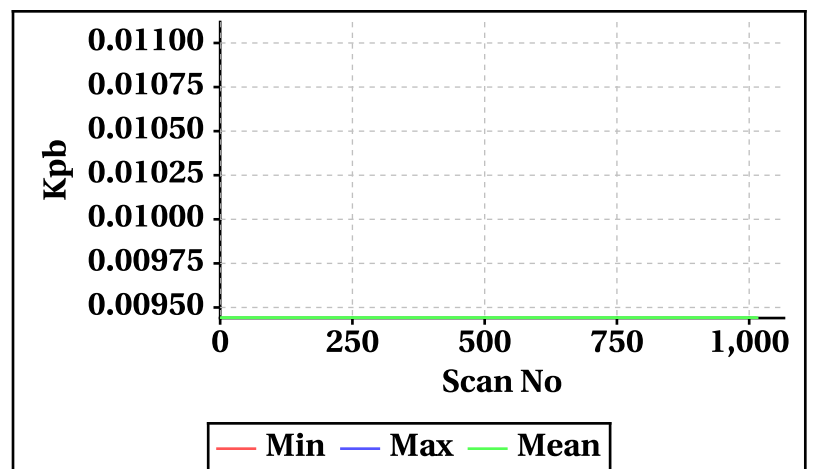
Outer Beam(VV)



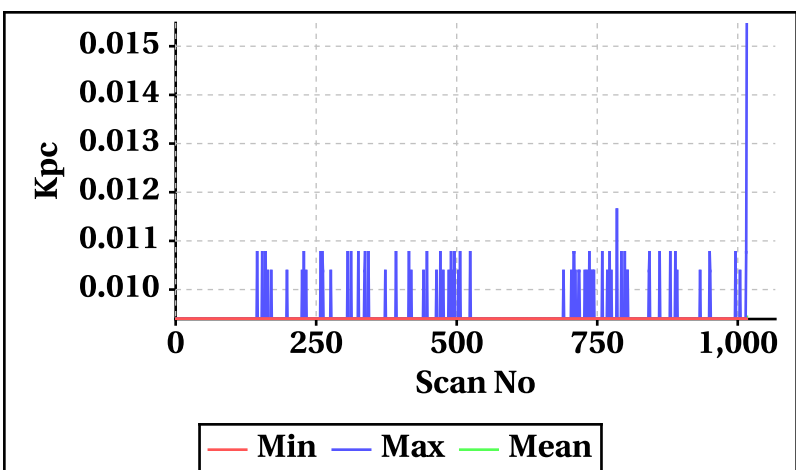
Inner Beam(HH)



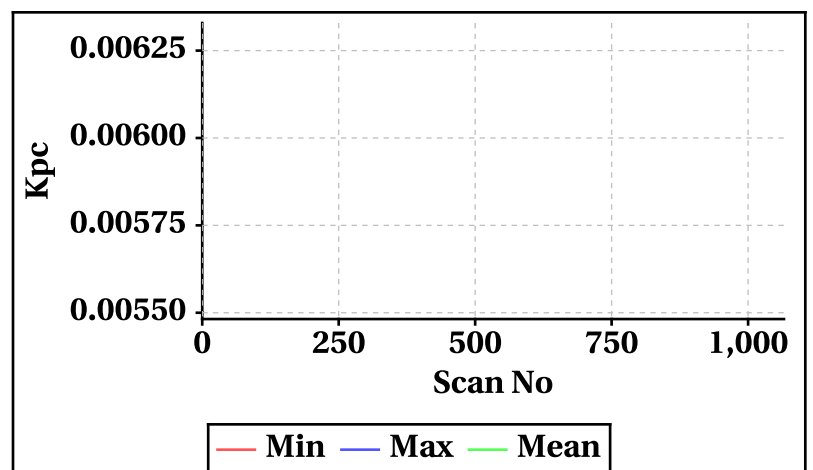
Outer Beam(VV)



Inner Beam(HH)



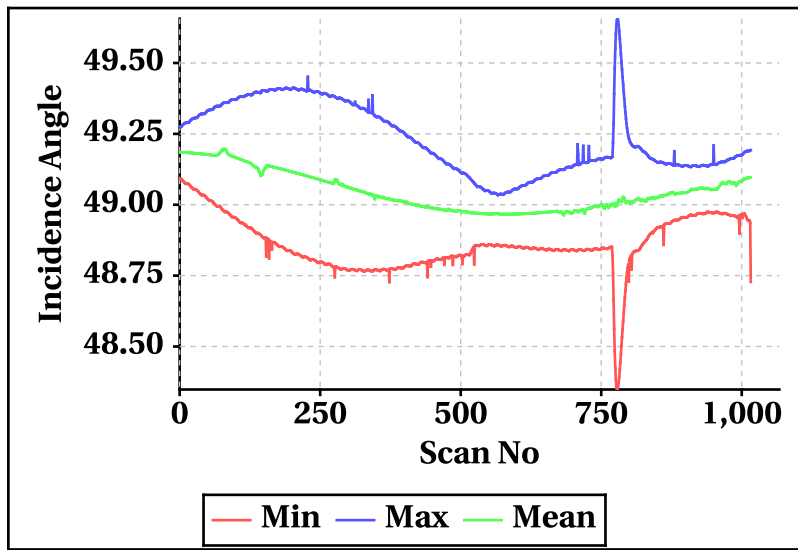
Outer Beam(VV)



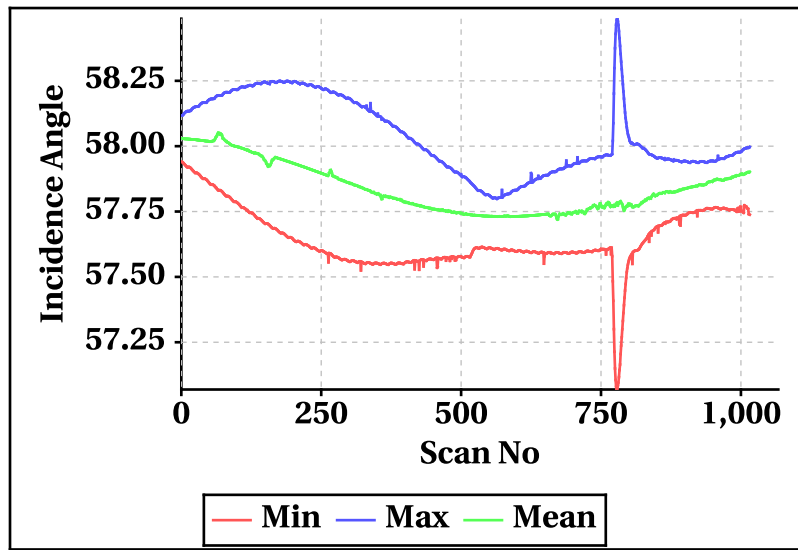


Orbit-wise behaviour of Incidence, Azimuth, Range, X-Factor

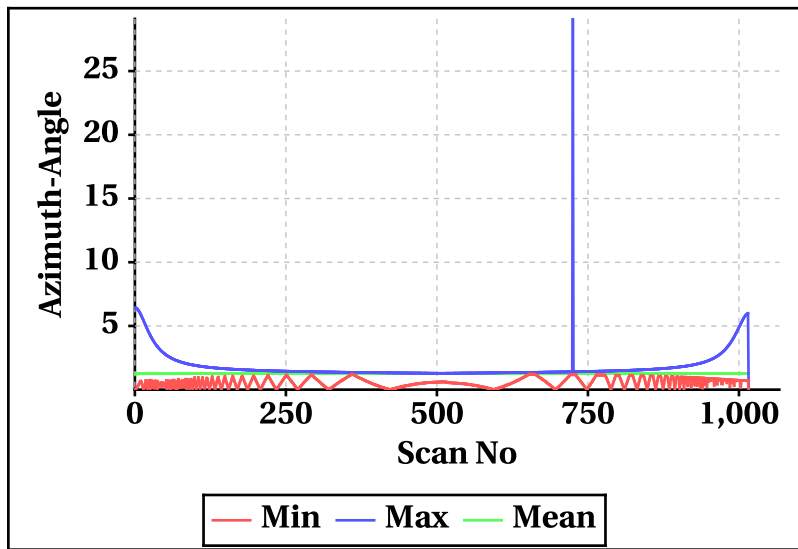
Inner Beam (HH)



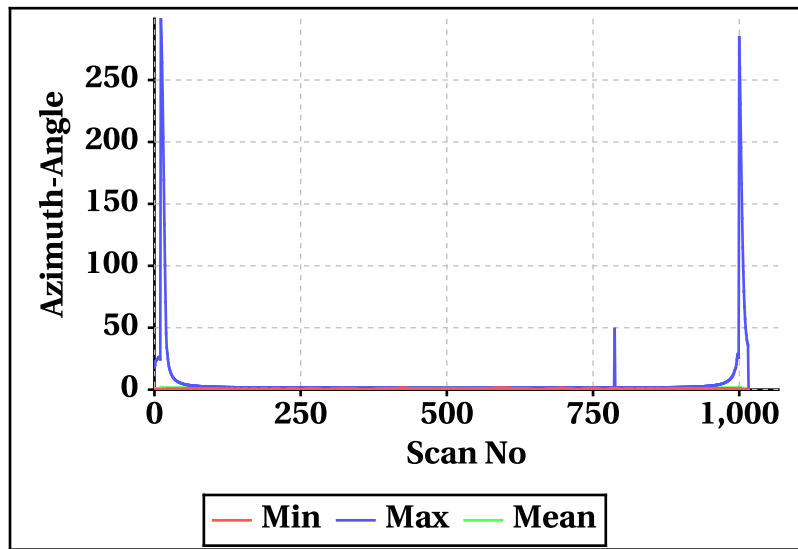
Outer Beam(VV)



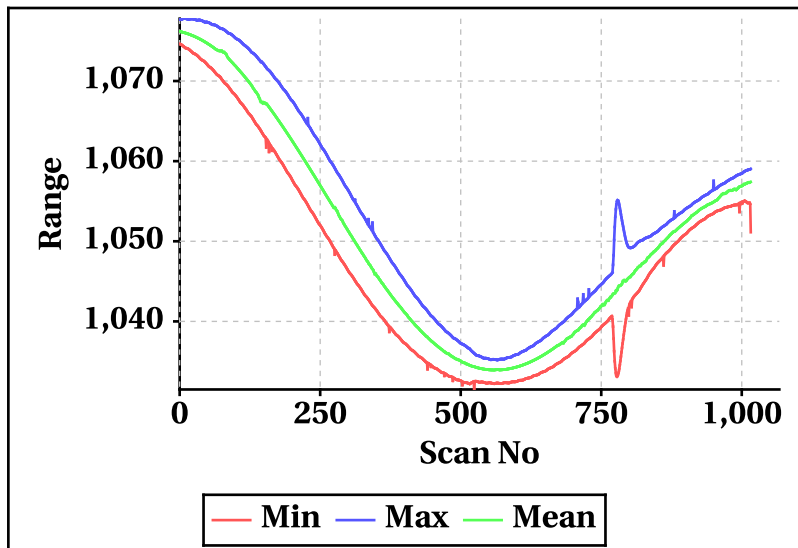
Inner Beam (HH)



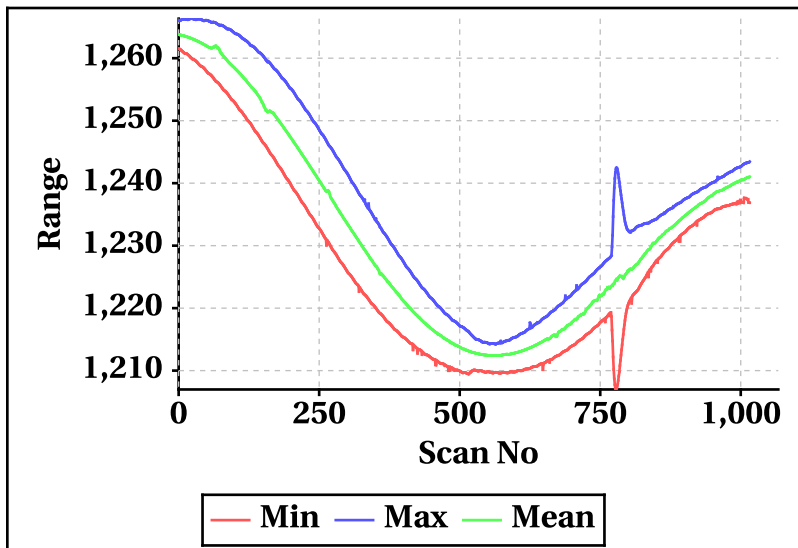
Outer Beam(VV)



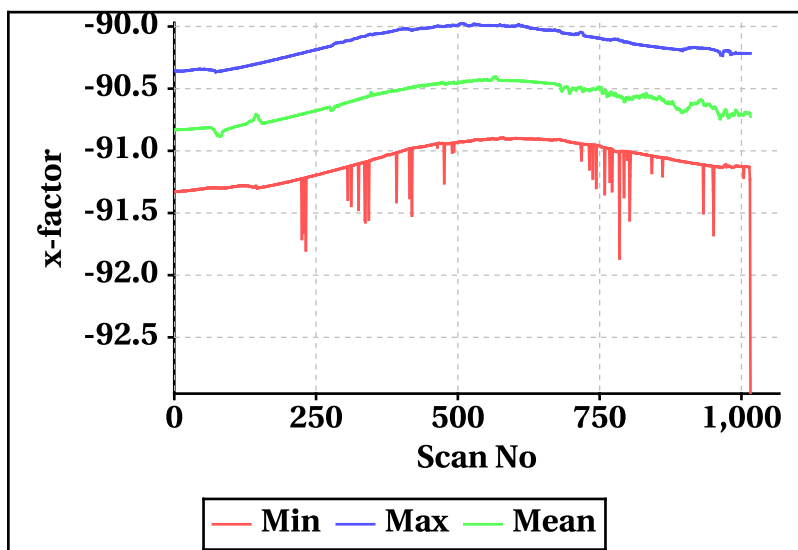
Inner Beam (HH)



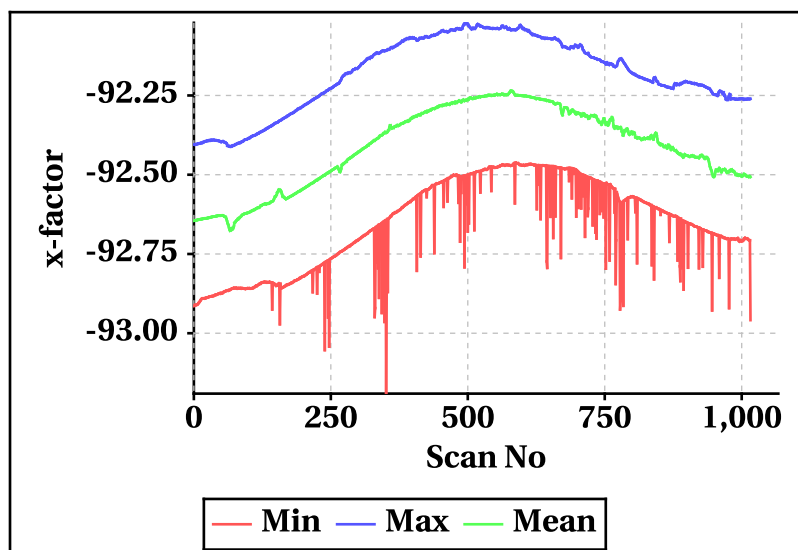
Outer Beam(VV)



Inner Beam (HH)



Outer Beam(VV)

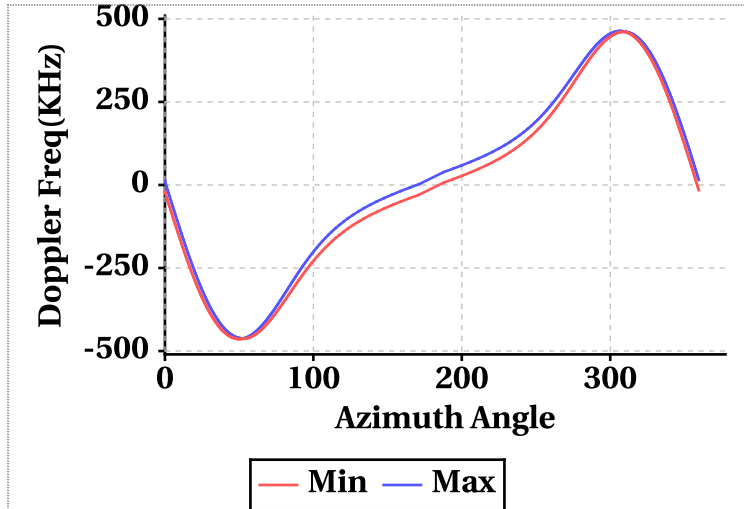


# Doppler Frequency Variation

**Doppler Frequency(KHz) variation statistics Over the half Orbit**

	Inner Beam (HH)	Outer Beam (VV)
<b>Min</b>	-463.66	-519.58
<b>Max</b>	463.30	519.26

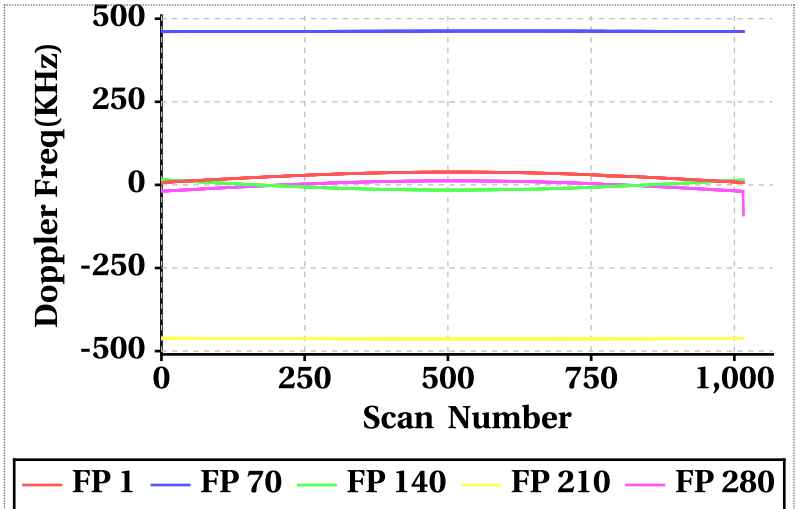
**Footprint wise Doppler frequency variation Inner Beam (HH)**



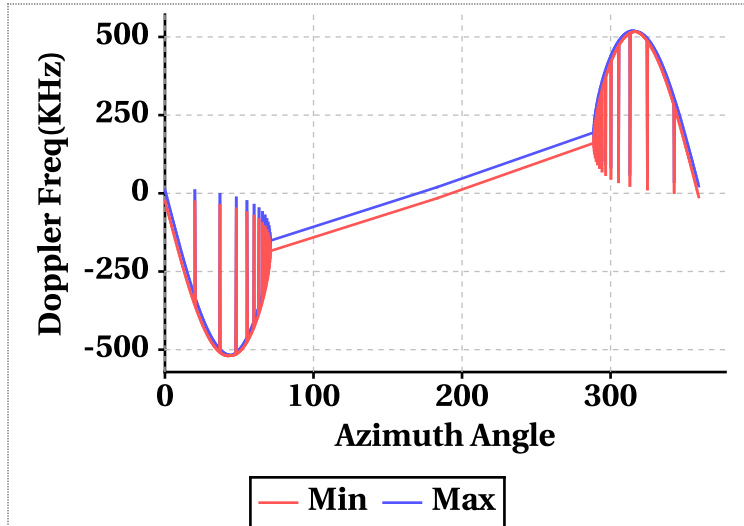
**Doppler Frequency(KHz) variation**

Doppler_FP	Inner Beam (HH)			Outer Beam (VV)		
	Min	Max	Mean	Min	Max	Mean
Doppler_1	7.00	38.66	27.19	2.38	37.74	24.90
Doppler_70	460.92	462.82	462.08	516.52	518.96	518.04
Doppler_140	-15.62	15.40	-4.38	-23.32	11.50	-10.70
Doppler_210	-463.58	-461.20	-462.87	-519.36	-517.04	-518.67
Doppler_280	-90.84	12.30	0.69	-95.84	19.72	6.73

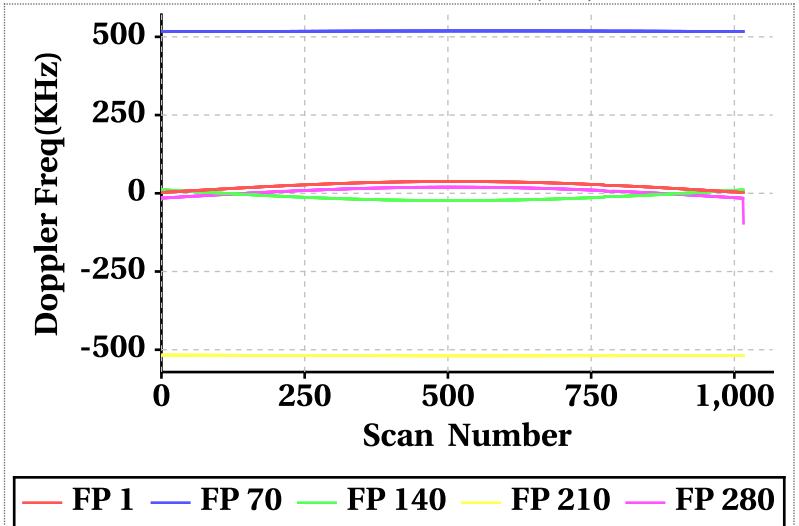
**Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Inner Beam (HH)**



**Footprint wise Doppler frequency variation Outer Beam (VV)**

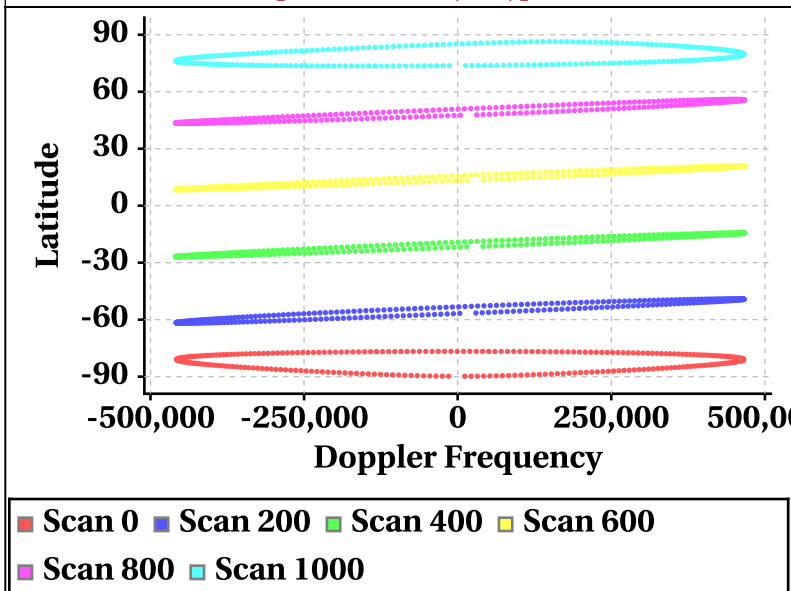


**Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Outer Beam (VV)**

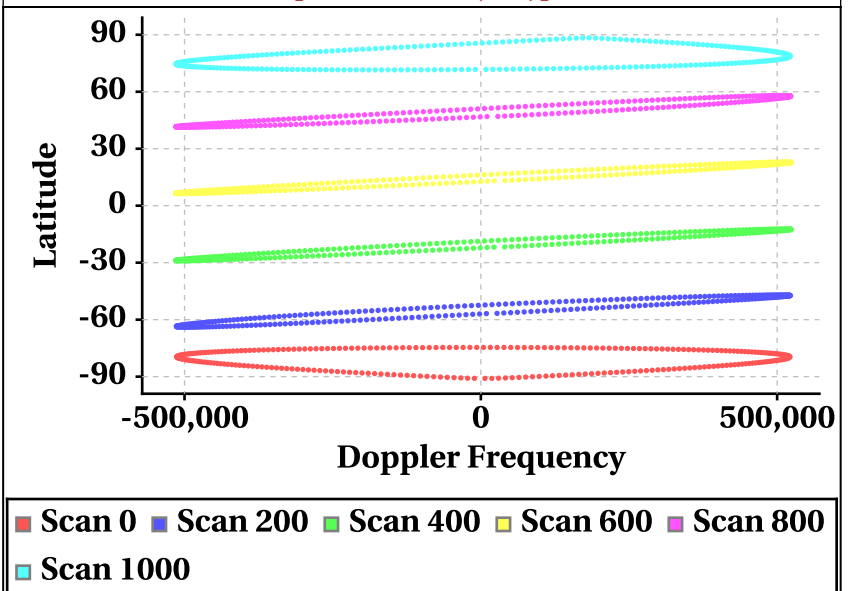


# Latitude Vs Doppler Frequency

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



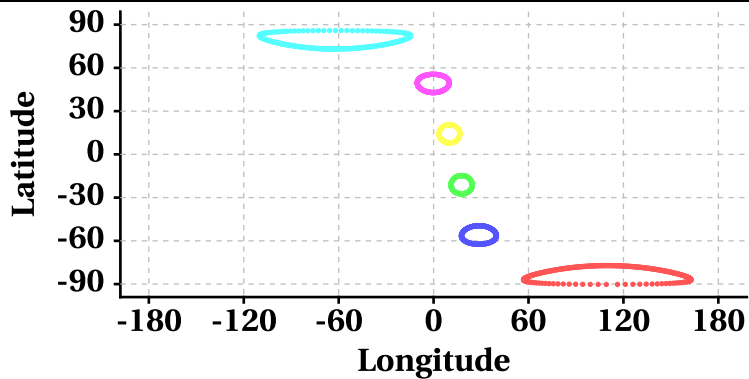
**Doppler Frequency at Scan Interval of 200 [Outer Beam(VV)]**



# Parameter as a function of Latitude

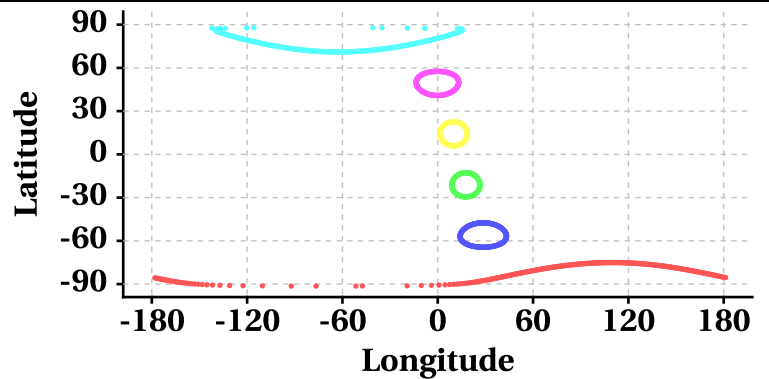
## Latitude Vs Longitude

Scan Trace [Inner Beam(HH)]



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

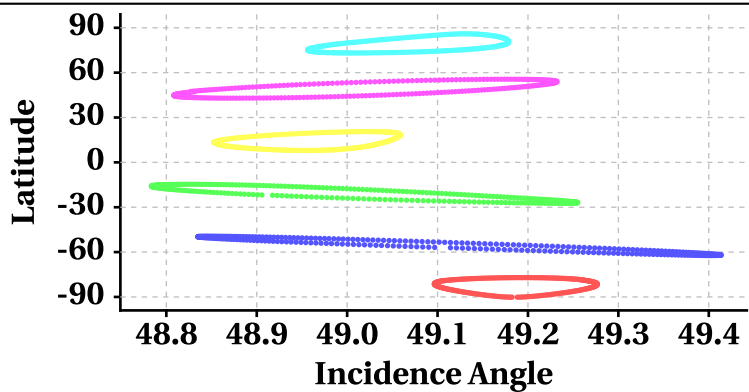
Scan Trace [Outer Beam (VV)]



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

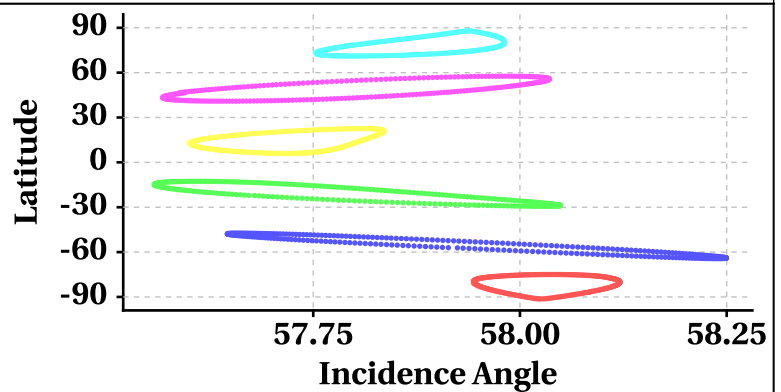
## Latitude Vs Incidence Angle

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



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

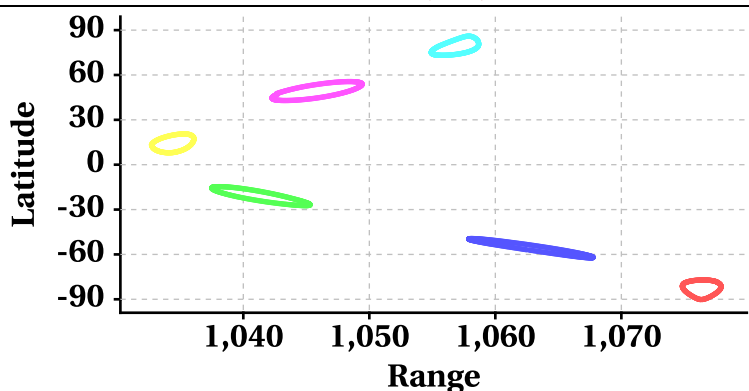
Incidence Angle at Scan Interval of 200 [Outer Beam (VV)]



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

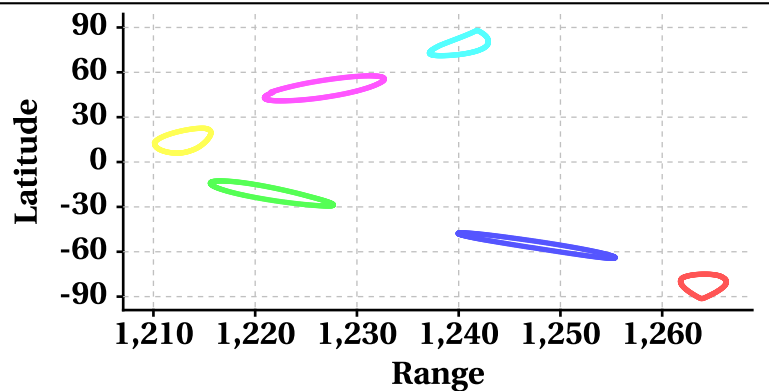
## Latitude Vs Range

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

