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

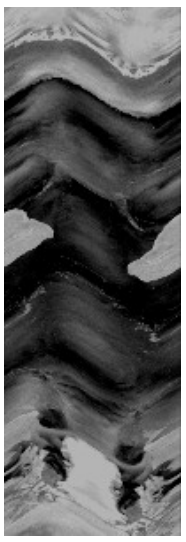
## Table of Contents



| | | | | | |
|---|---|---|---|---|---|
| **Satellite Id** | ScatSat-1 | **Start Orbit** | 16627 | **Total Scans** | 1017 |
| **Sensor Name** | Scatterometer | **End Orbit** | 16628 | **No of Inner FootPrints** | 281 |
| **Processor Version** | v1.1.3 | **Rev. Number** | 16627_16628 | **No Of Outer FootPrints** | 282 |
| **Half Orbit Direction** | SN | **Data Production Date** | 17-11-2019 | **No. Of Inner Slices** | 9 |
| **Equator Crossing Date** | 16-11-2019 | **Equator Crossing Time** | 22:57:56.000 | **No Of Outer Slices** | 15 |

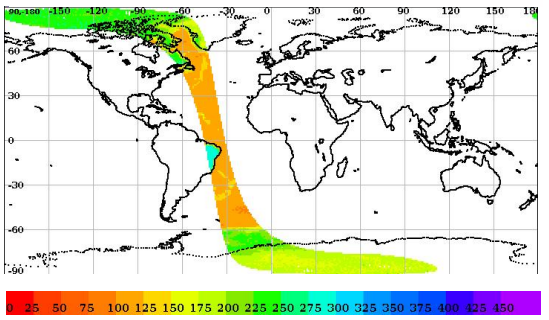
## Image Snapshot for Inner & Outer Beam

**Inner (HH)** **Outer (VV)**

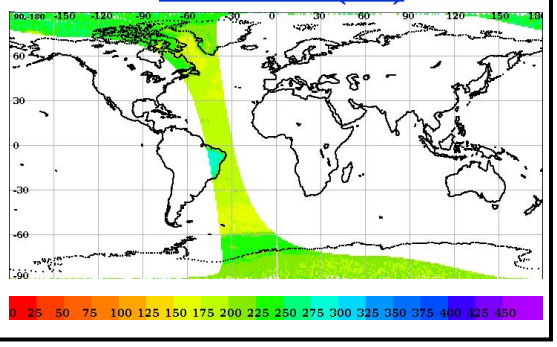


## Brightness Temprature(k) Footprint trace

**Inner Beam (HH)**

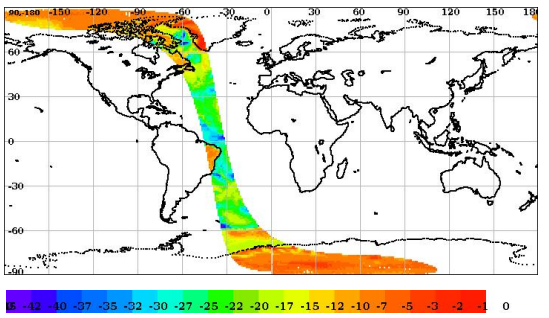


**Outer Beam (VV)**

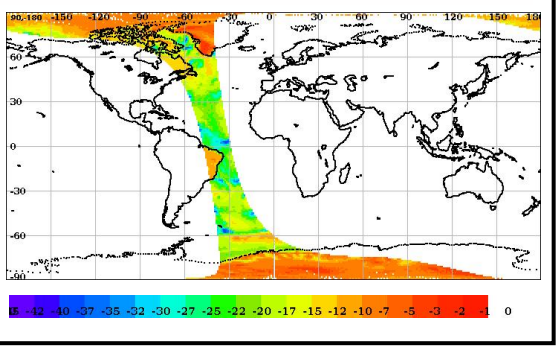


## Sigma0(dB) Footprint trace

**Inner Beam (HH)**



**Outer Beam (VV)**



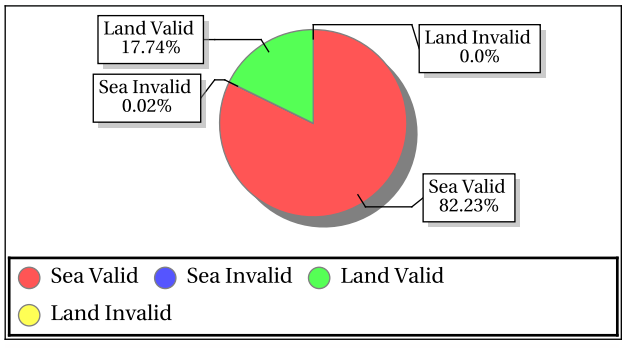
## Invalid and Poor Sigma-0 Quality Flag Statistics for Inner/Outer Slices*

| Sigma-0 Flags | Inner Beam | Outer Beam |
|---|---|---|
| **Invalid Sigma0(%)** | 0.02 | 0.03 |
| **Data Not Available From Payload (%)** | 100.0 | 100.0 |
| **Slice not within sample array limits (%)** | 0.00 | 0.00 |
| **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 (-96bB) (%)** | 0.0 | 0.0 |
| **Sigma0>upper bound (0 dB) (%)** | 0.00 | 0.00 |
| **SNR <-65 dB (%)** | 0.019949 | 0.057698 |

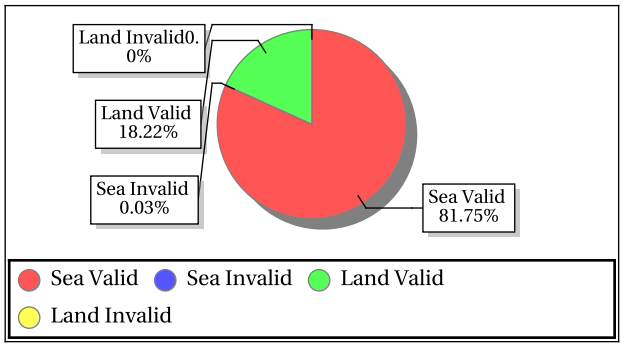
*DP Format Document

## 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 | Outer | ASC | Aft | -5.88 | -4.30 | -5.07 | 0.45 | 175.17 | 236.10 | 216.26 | 12.83 |
| GreenLand_2 | 77.50 | -41.50 | Outer | ASC | Fore | -5.73 | -4.13 | -5.06 | 0.45 | 195.59 | 231.14 | 212.52 | 10.75 |
| GreenLand_3 | 71.55 | -42.45 | Outer | ASC | Aft | -11.74 | -9.43 | -10.72 | 0.50 | 193.87 | 258.25 | 226.46 | 15.71 |
| GreenLand_3 | 71.55 | -42.45 | Outer | ASC | Fore | -11.47 | -9.34 | -10.31 | 0.44 | 186.05 | 244.48 | 218.10 | 12.66 |
| GreenLand_1 | 74.69 | -42.50 | Outer | ASC | Aft | -10.41 | -7.70 | -9.16 | 0.66 | 198.64 | 249.04 | 222.73 | 12.23 |
| GreenLand_1 | 74.69 | -42.50 | Outer | ASC | Fore | -10.54 | -7.90 | -9.20 | 0.79 | 199.30 | 261.55 | 225.40 | 16.05 |

# 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. (%) |
| Kp | 0.12 | 263.14 | 0.24 | 1.226 | 0.12 | 214.03 | 0.21 | 0.953 | 0.12 | 0.13 | 0.12 | 0.000 | 0.12 | 0.13 | 0.12 | 0.000 |
| Kpa | 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 |
| Kpb | 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 |
| Kpc | 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 |
| SNR | -34.34 | 23.39 | 6.14 | 0.072 | -33.44 | 24.49 | 8.05 | 0.757 | 6.90 | 29.70 | 20.39 | 27.250 | 8.29 | 30.10 | 20.97 | 32.539 |

## 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. (%) |
| Kp | 0.09 | 232.89 | 0.23 | 1.349 | 0.09 | 190.68 | 0.18 | 0.994 | 0.09 | 0.12 | 0.09 | 0.000 | 0.09 | 0.11 | 0.09 | 0.000 |
| Kpa | 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 |
| Kpb | 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 |
| Kpc | 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 |
| SNR | -34.97 | 16.59 | 3.39 | 0.000 | -34.11 | 17.49 | 4.72 | 0.000 | 2.28 | 22.95 | 14.68 | 0.084 | 3.57 | 23.04 | 14.73 | 0.693 |

| 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)

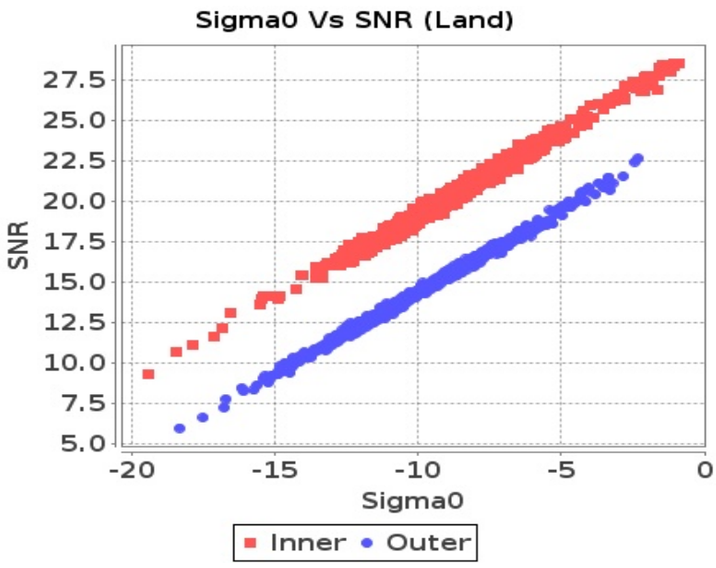
| | Inner Beam (HH) | | | | Outer Beam (VV) | | | |
|---|---|---|---|---|---|---|---|---|
| | Min | Max | Mean | Bad Occ. (%) | Min | Max | Mean | Bad Occ. (%) |
| Incidence Angle (deg) | 48.78 | 49.41 | 49.06 | 0.000 | 57.59 | 58.25 | 57.96 | 0.000 |
| Azimuth Diff. (deg) | 0.0027 | 214.84 | 1.27 | 2.654 | 0.0000 | 299.85 | 1.27 | 3.878 |
| Range(Km) | 1040.75 | 1077.74 | 1055.42 | 0.000 | 1219.55 | 1266.44 | 1241.08 | 0.000 |
| X Factor(dbm) | -91.79 | -90.10 | -90.58 | 0.000 | -93.23 | -92.15 | -92.33 | 0.000 |
| Across Distance (Km) | 15.56 | 16.06 | 15.77 | 0.000 | 8.78 | 37.51 | 20.95 | 7.000 |
| Along Distance (Km) | 18.73 | 20.68 | 19.72 | 0.000 | 8.04 | 36.16 | 19.64 | 2.000 |

| Parameter Specifications | | |
|---|---|---|
| Parameter | Min | Max |
| Inci.(Inner) | 47.10 | 49.90 |
| Inci.(Outer) | 57.30 | 58.90 |
| Azimuth Diff. | 0.60 | 2.00 |
| Range(Inner) | 1025.00 | 1095.70 |
| Range(Outer) | 1210.00 | 1280.00 |
| X-Factor | -100.00 | -80.00 |
| Ac.Dist(Inner) | 15.00 | 20.00 |
| Ac.Dist(Outer) | 15.00 | 22.00 |
| Al.Dist(Inner) | 15.00 | 30.00 |
| Al.Dist(Outer) | 10.00 | 30.00 |

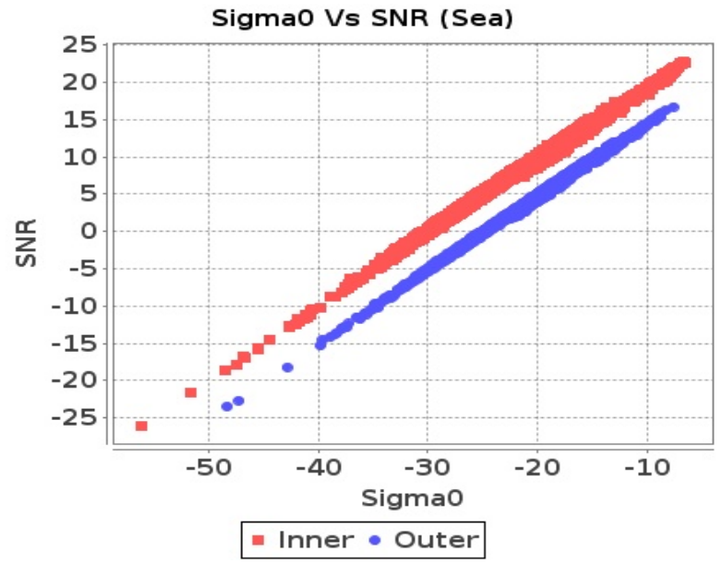
Normal
Deviations
Alarming
High Errors

# Sigma0 Behaviour (Sigma0 Vs SNR)

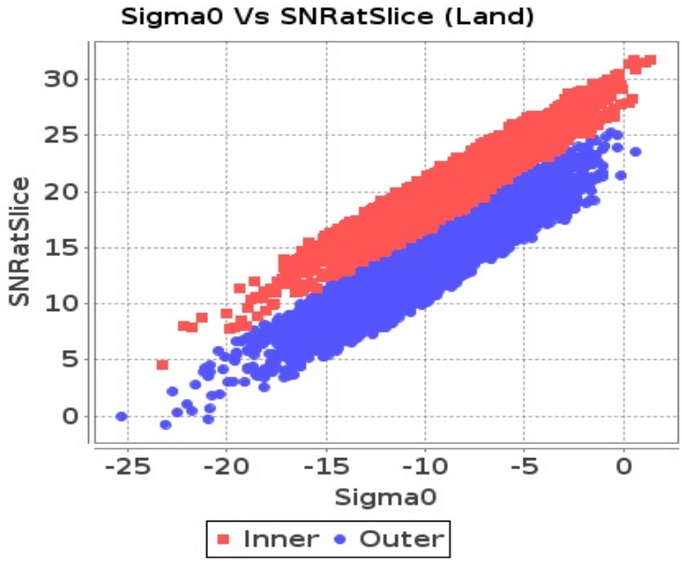
**Footprint-Land**



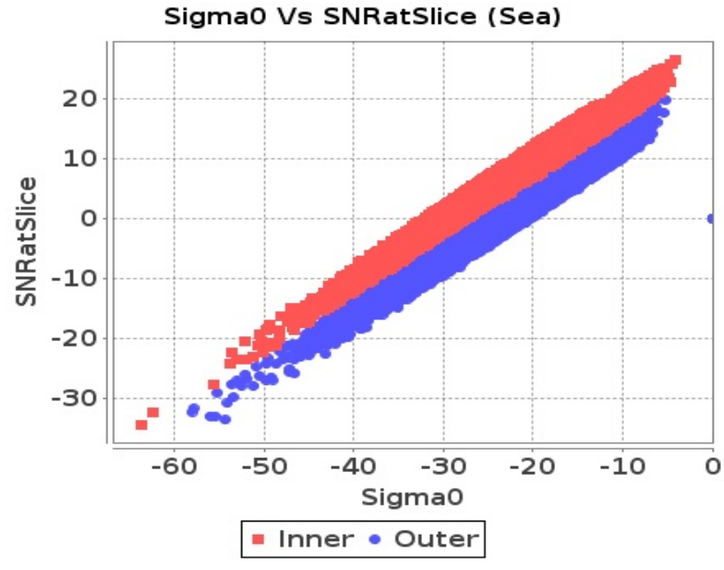

**Footprint-Sea**




**Slice-Land**

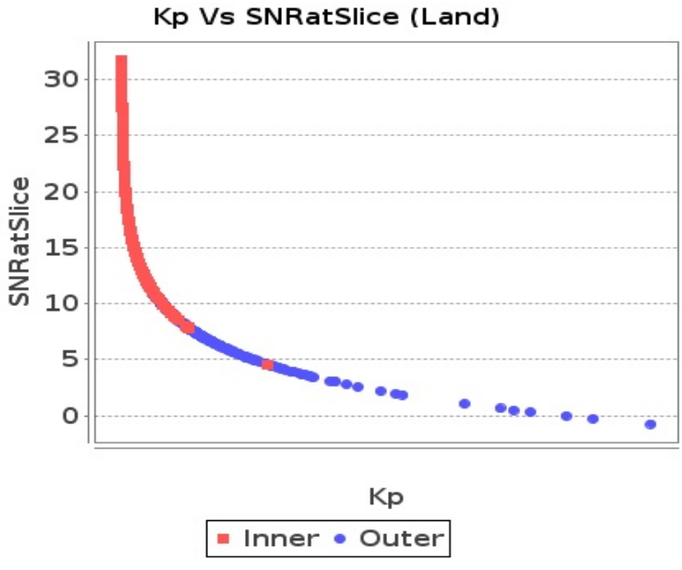



**Slice-Sea**

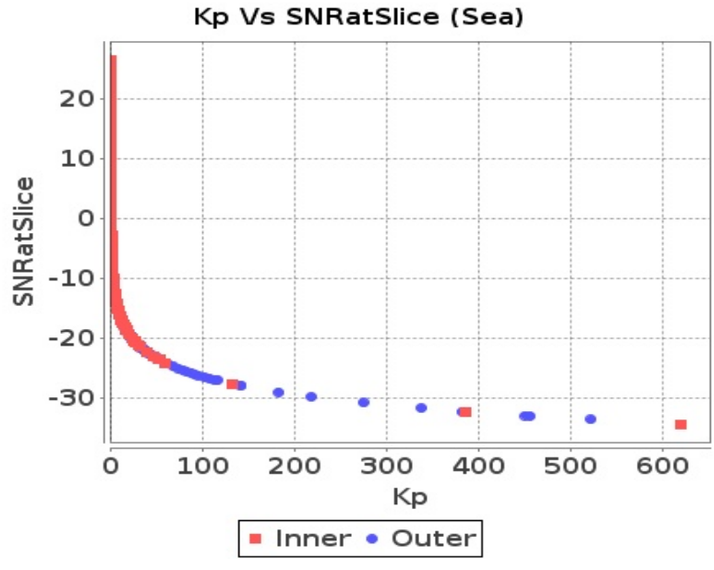



# Sigma0 Behaviour (Kp Vs SNR)

**Slice**

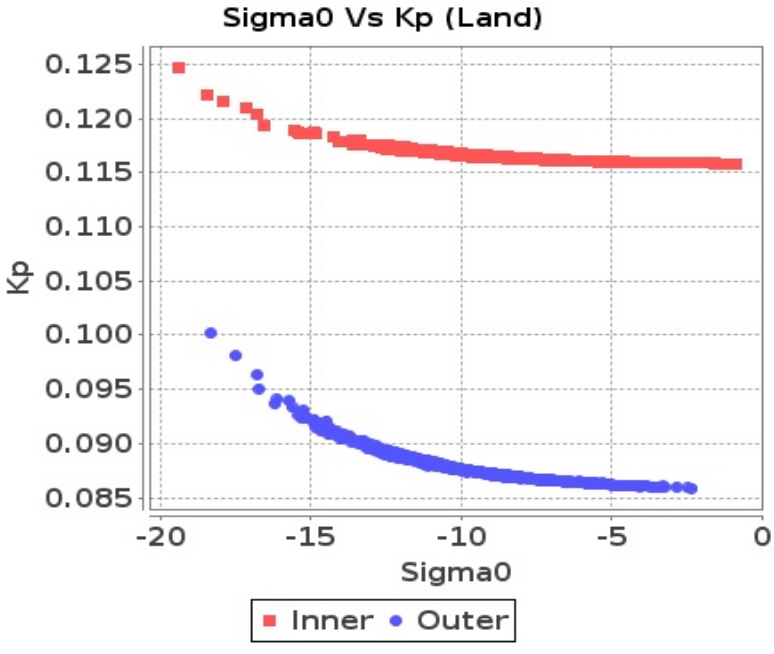



**Slice**

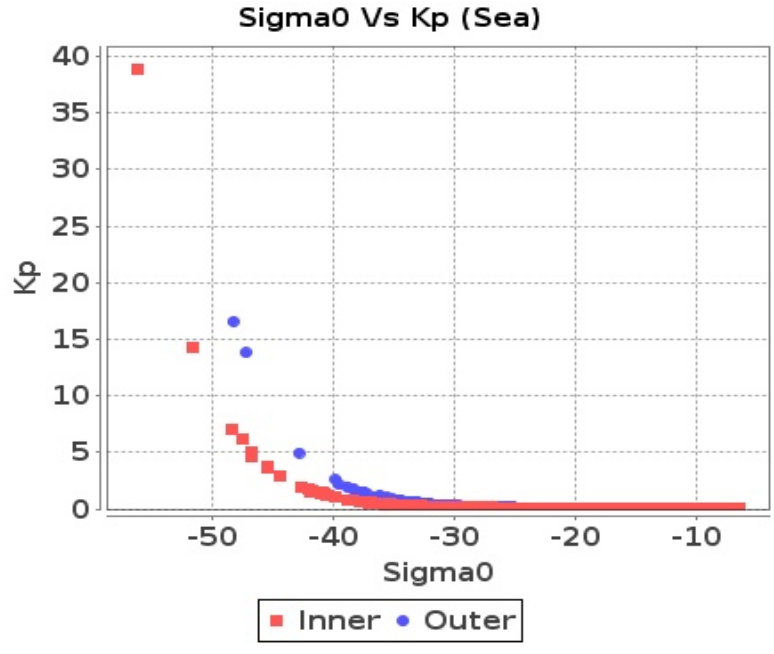


# Sigma0 Behaviour(Sigma0 Vs Kp)

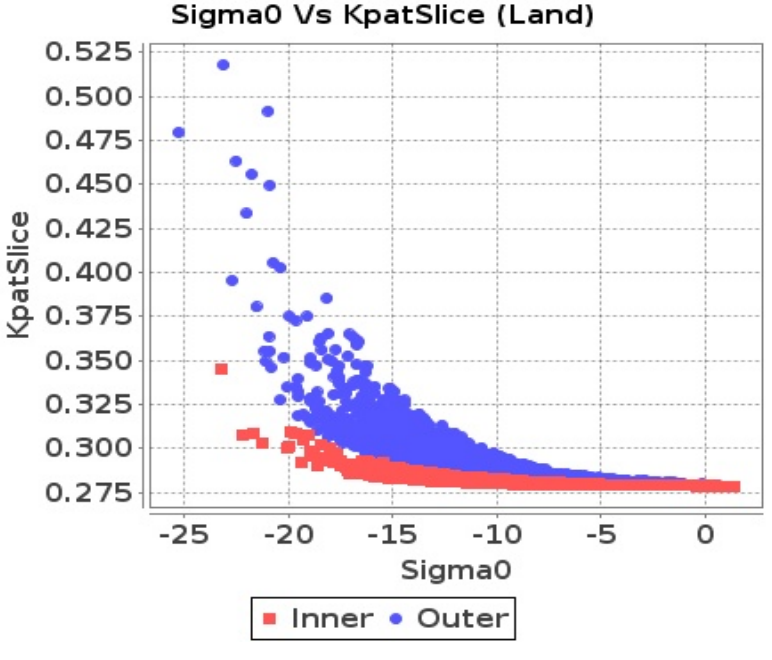
## Footprint-Land



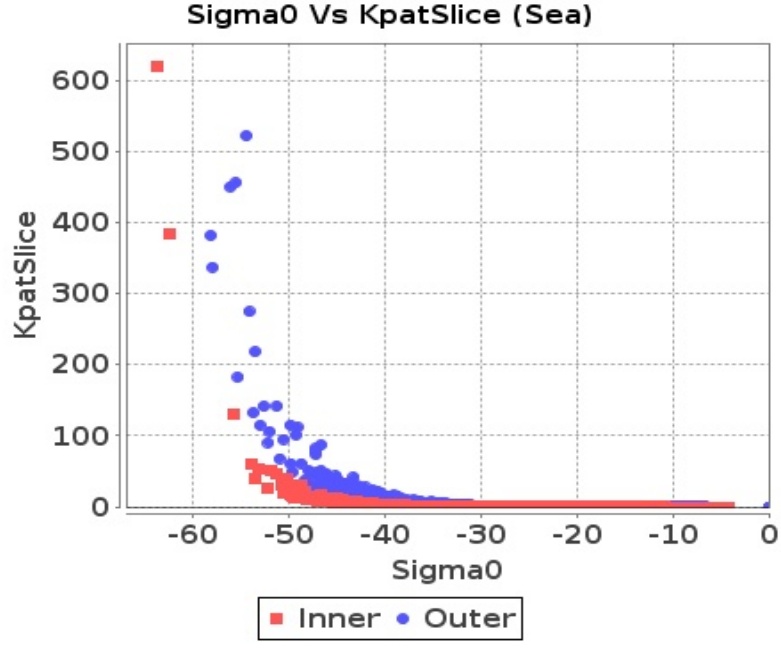

## Footprint-Sea




## Slice-Land




## Slice-Sea

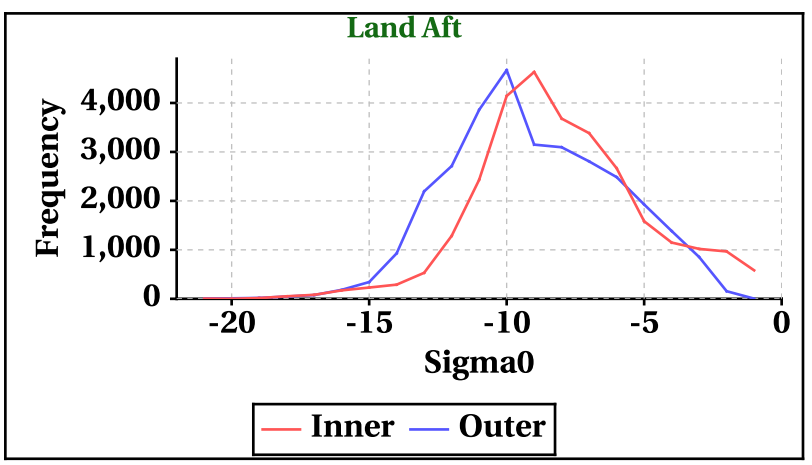


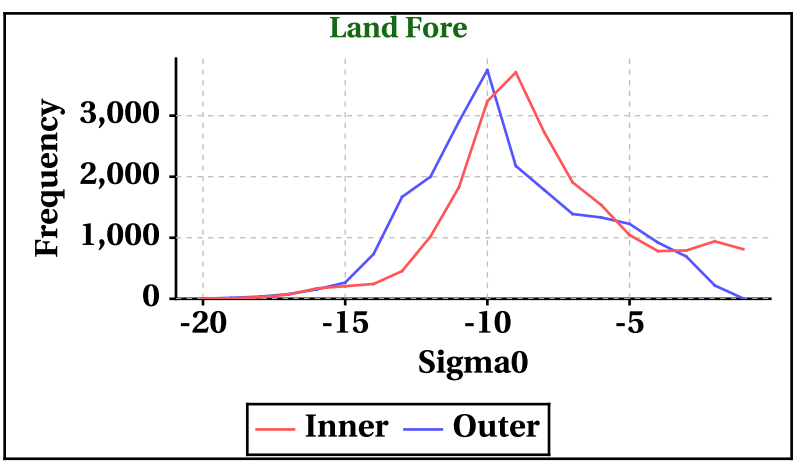
# Dynamic Range (Data Histograms)

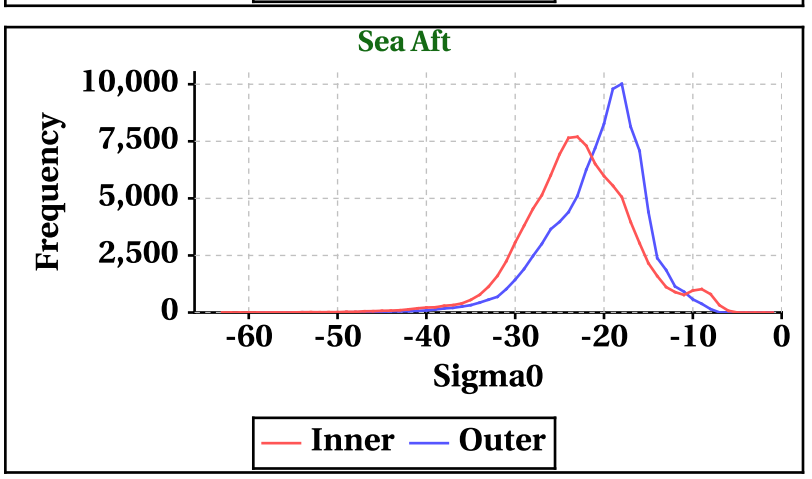
## Sigma0(db)

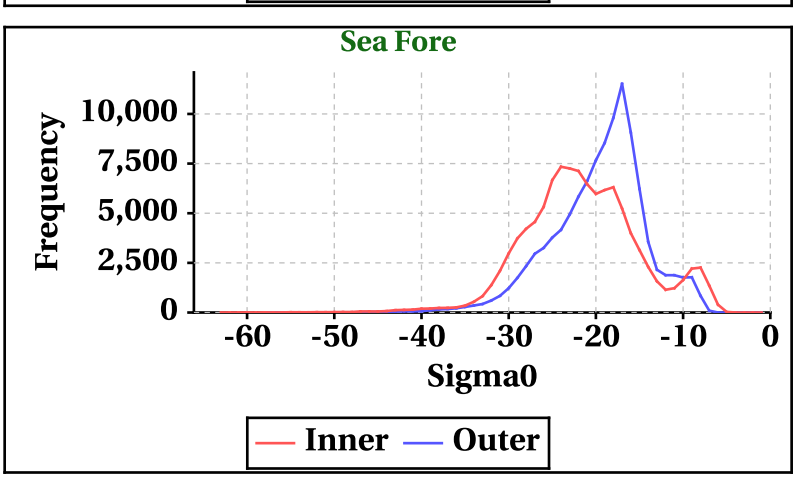
| Inner Beam (HH) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | -21 | -20 | -63 | -63 |
| Max | 0 | 0 | 0 | 0 |

| Outer Beam (VV) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | -21 | -20 | -59 | -58 |
| Max | 0 | 0 | 0 | 0 |



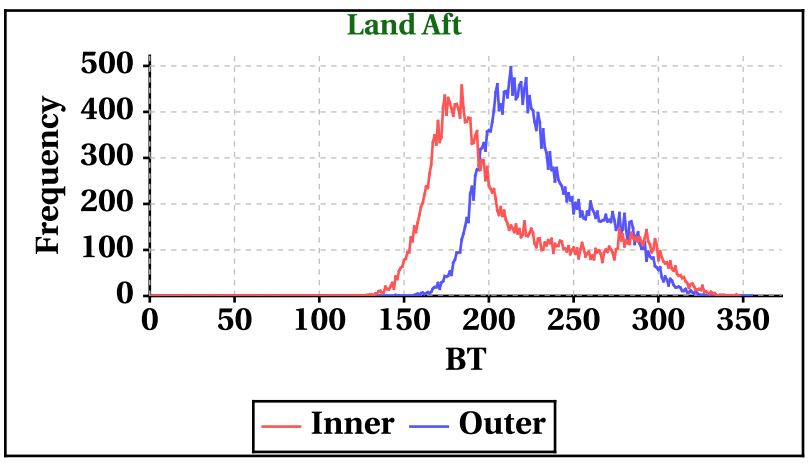



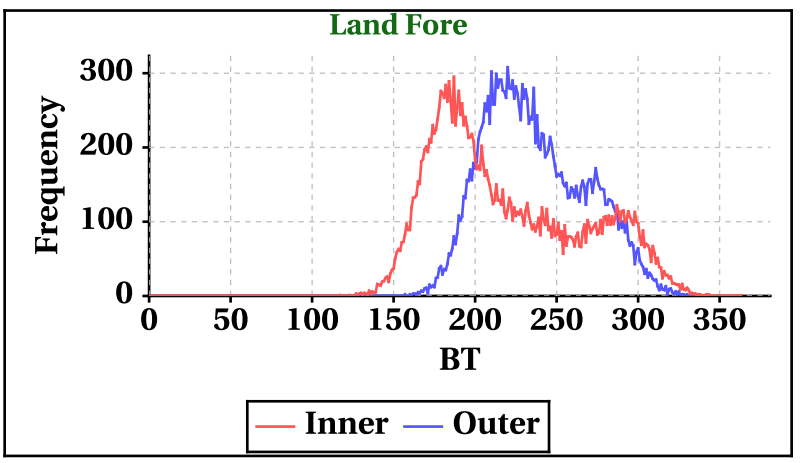



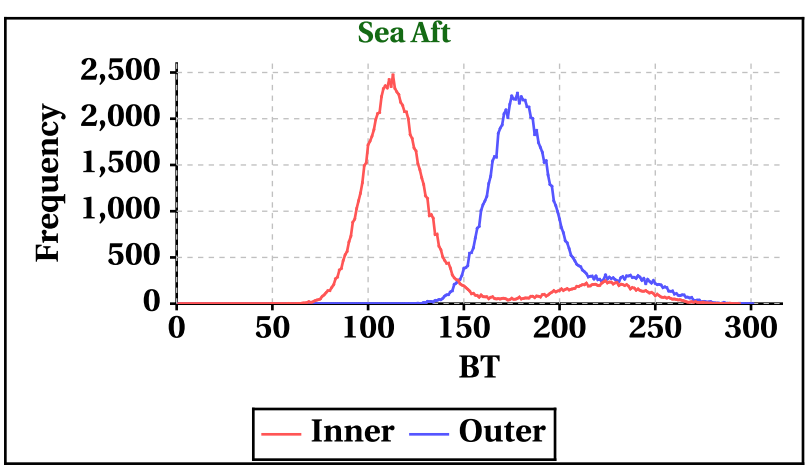

## Brightness Temperature(K)

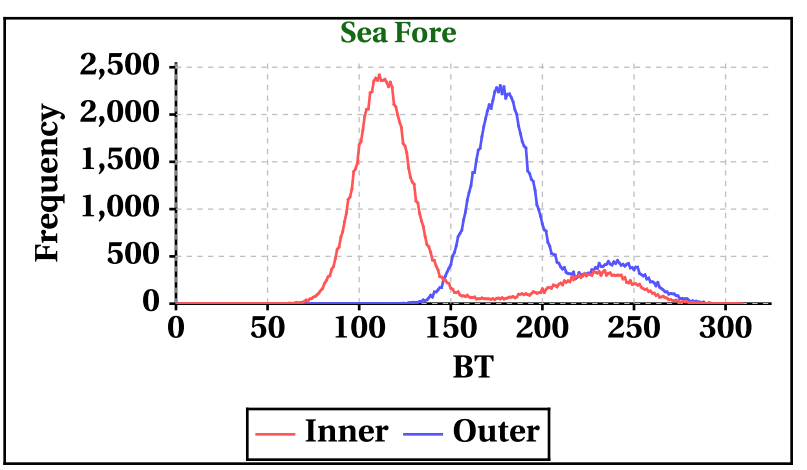
| Inner Beam(HH) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | 0 | 0 | 0 | 0 |
| Max | 348 | 363 | 294 | 309 |

| Outer Beam(VV) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | 0 | 0 | 0 | 0 |
| Max | 355 | 344 | 301 | 308 |



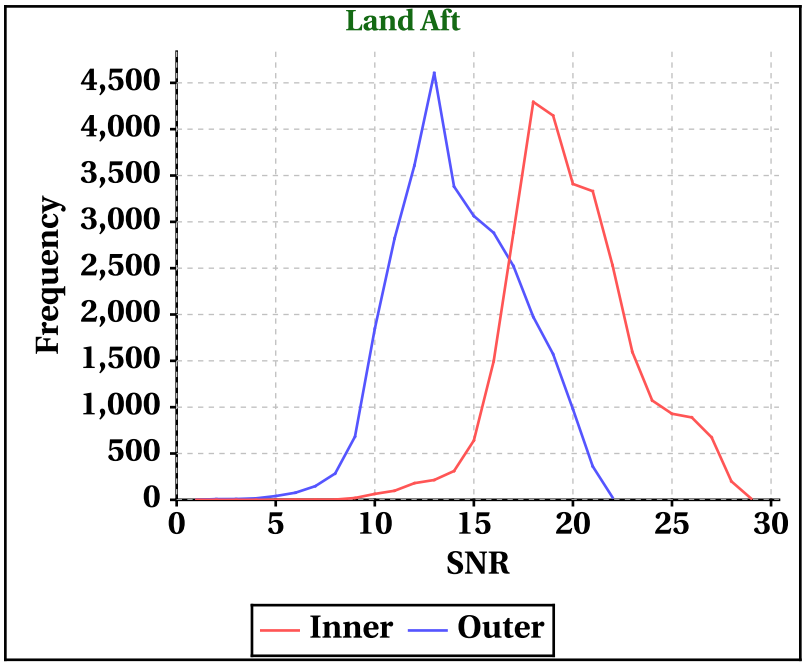



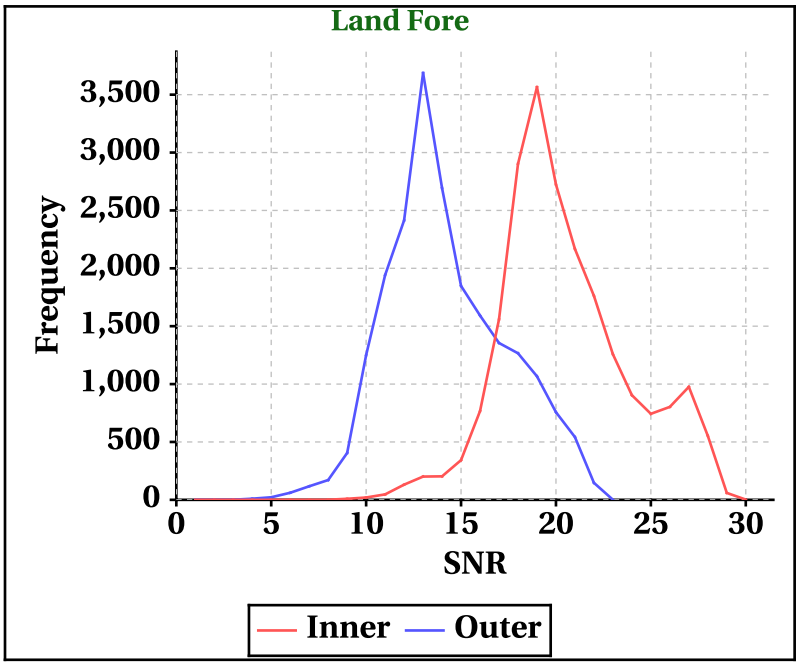
# Dynamic Range (Data Histograms)

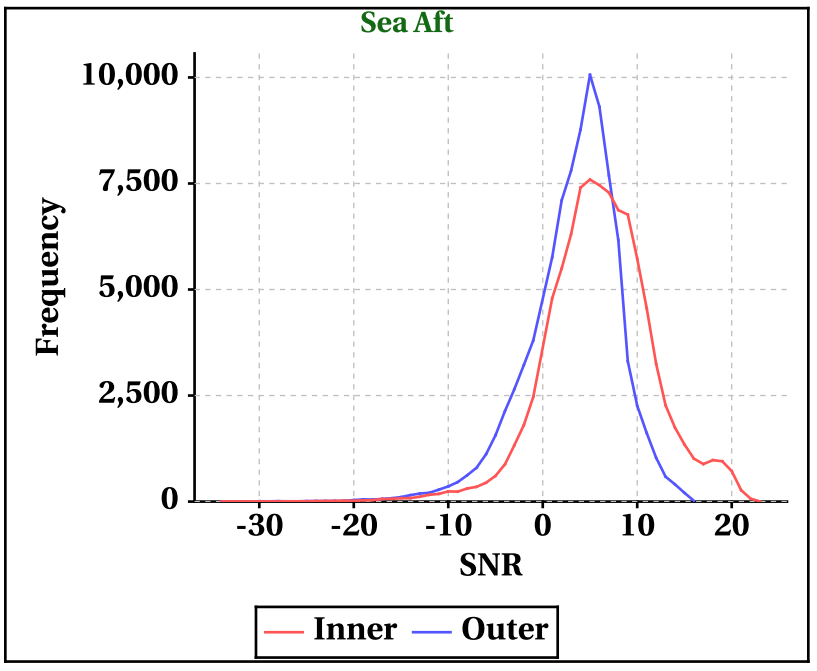
## SNR(dBm)

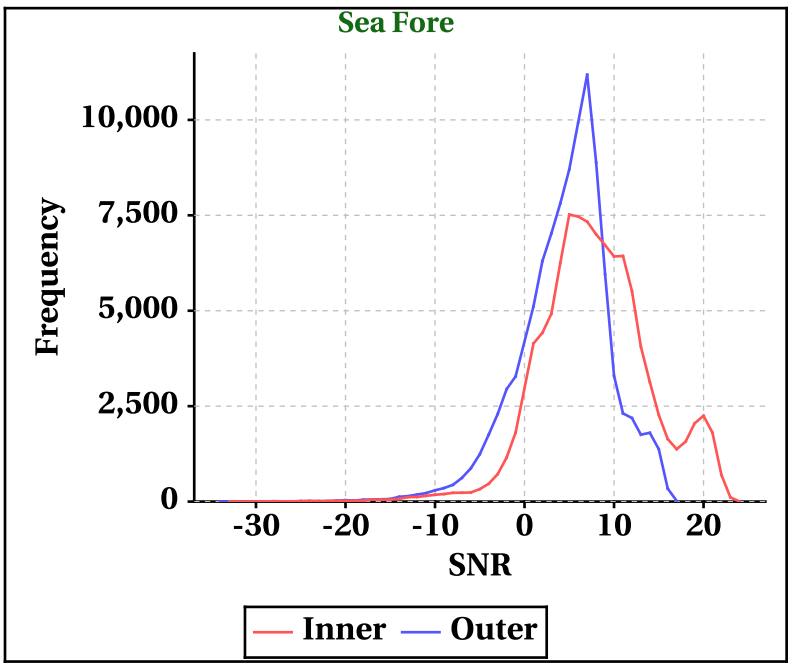
| Inner Beam (HH) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | 0 | 0 | -34 | -33 |
| Max | 29 | 30 | 23 | 24 |

| Outer Beam (VV) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | 0 | 0 | -34 | -34 |
| Max | 22 | 23 | 16 | 17 |



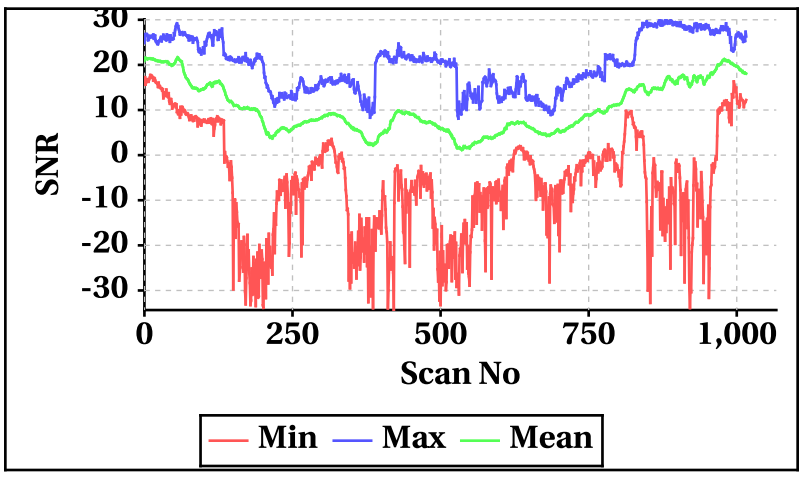



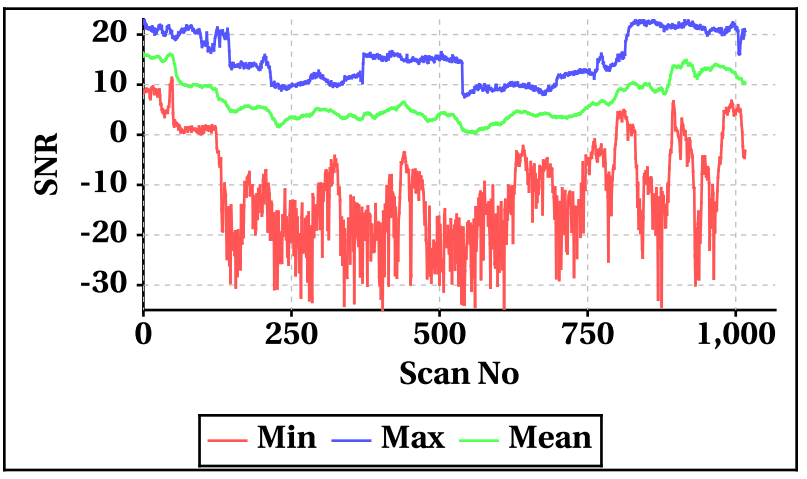



## Orbit-wise behaviour of SNR

Inner Beam (HH)

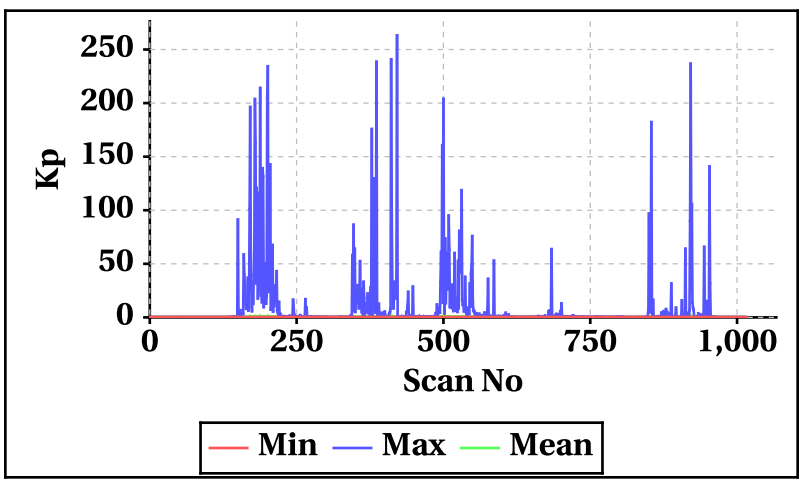



Outer Beam(VV)

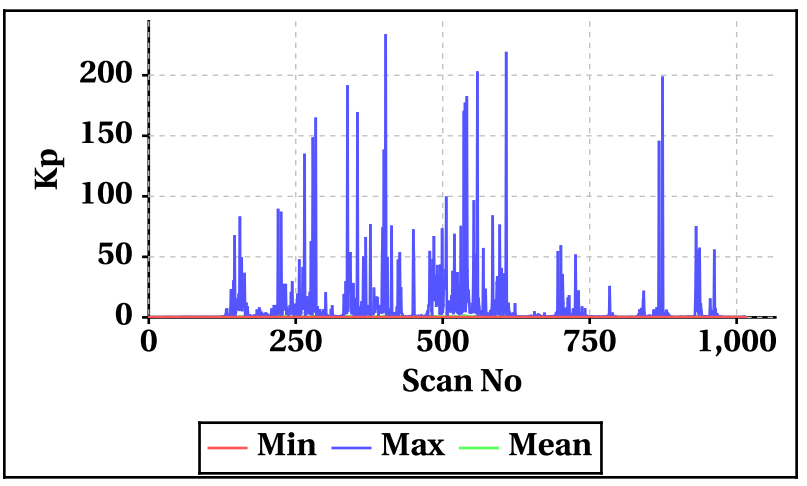



## Orbit-wise behaviour of Kp,Kpa,Kpb,Kpc

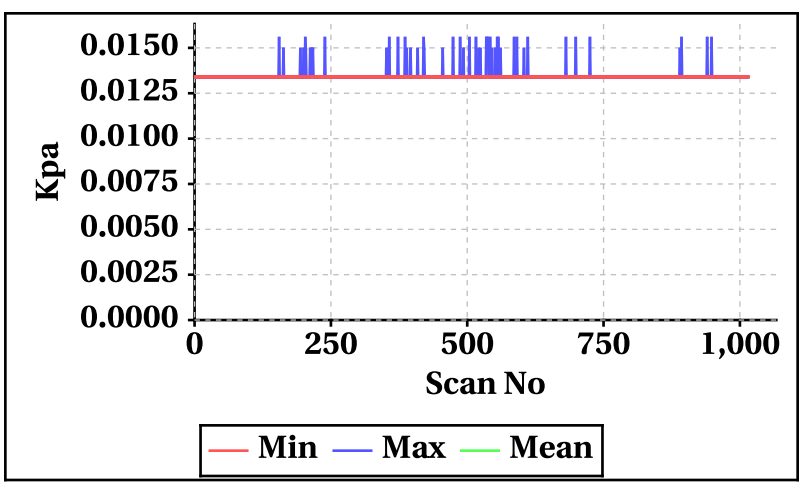
Inner Beam(HH)



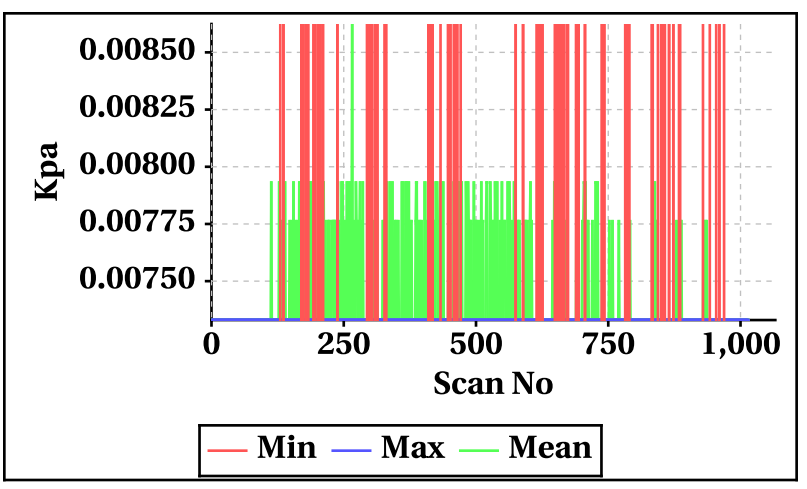

Outer Beam(VV)



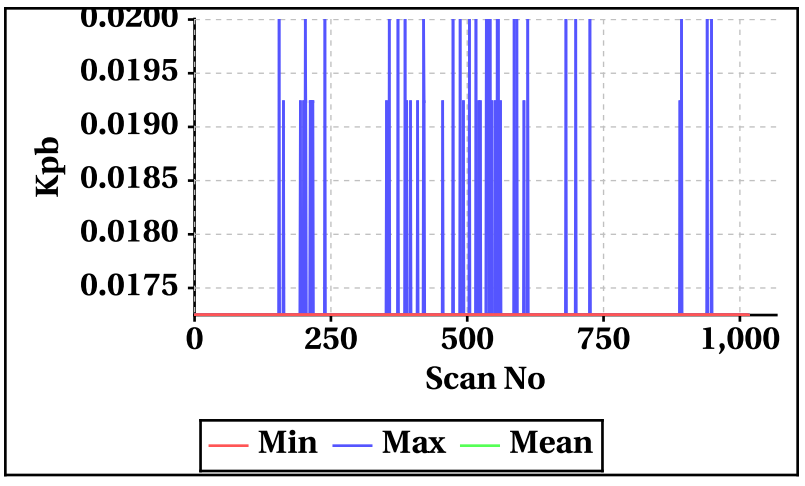

Inner Beam(HH)



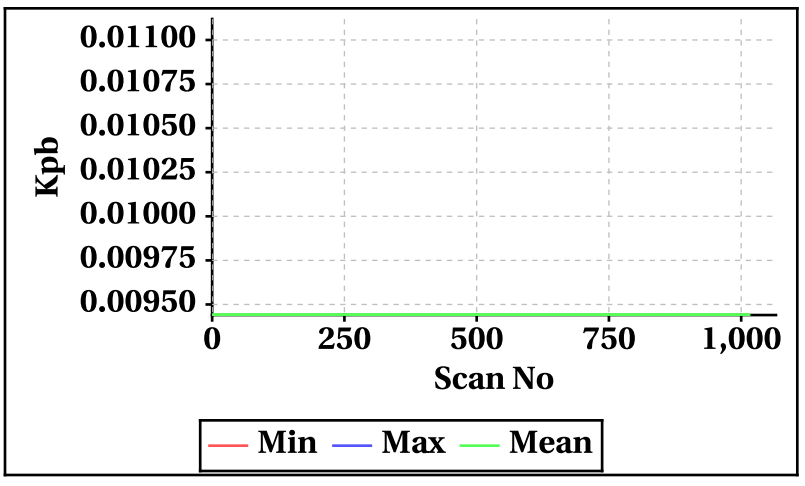

Outer Beam(VV)



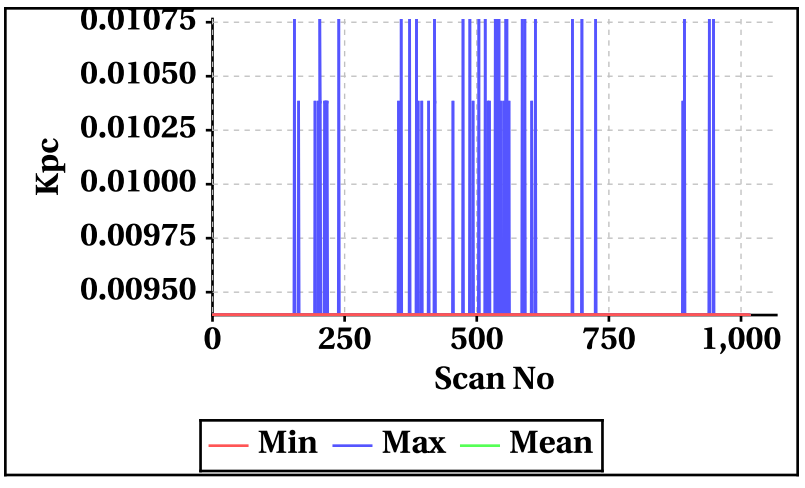

Inner Beam(HH)



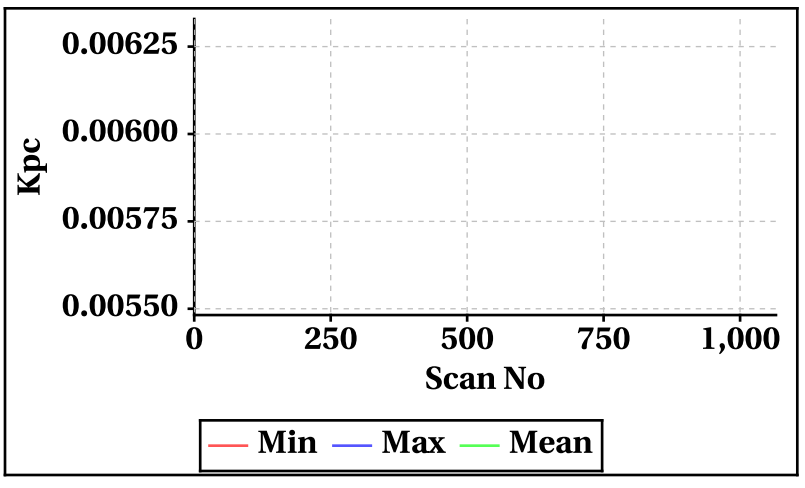

Outer Beam(VV)




Inner Beam(HH)

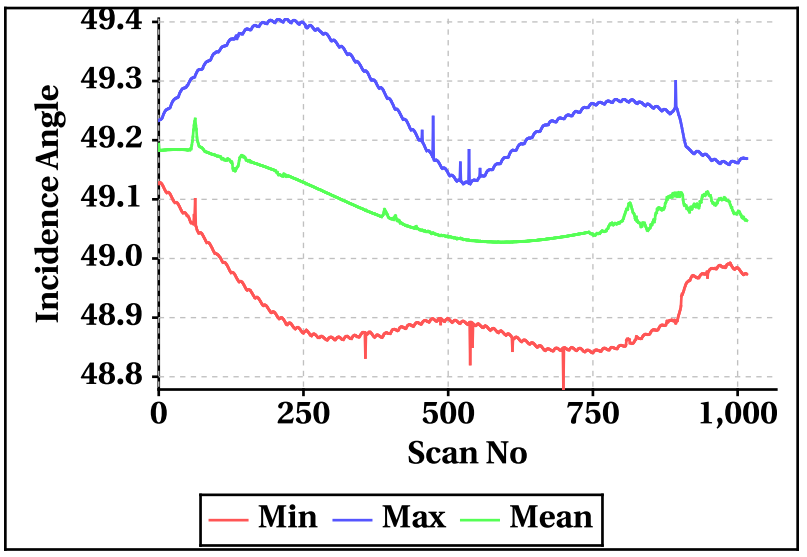



Outer Beam(VV)

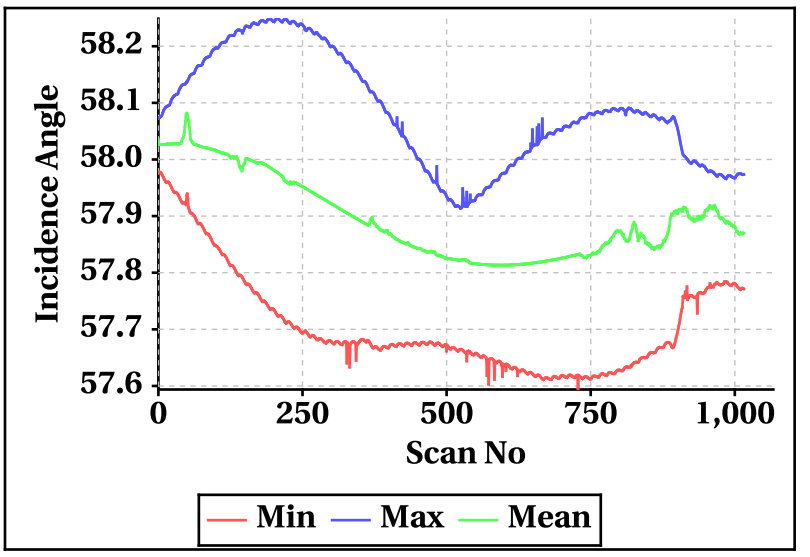


## Orbit-wise behaviour of Incidence,Azimuth,Range,X-Factor

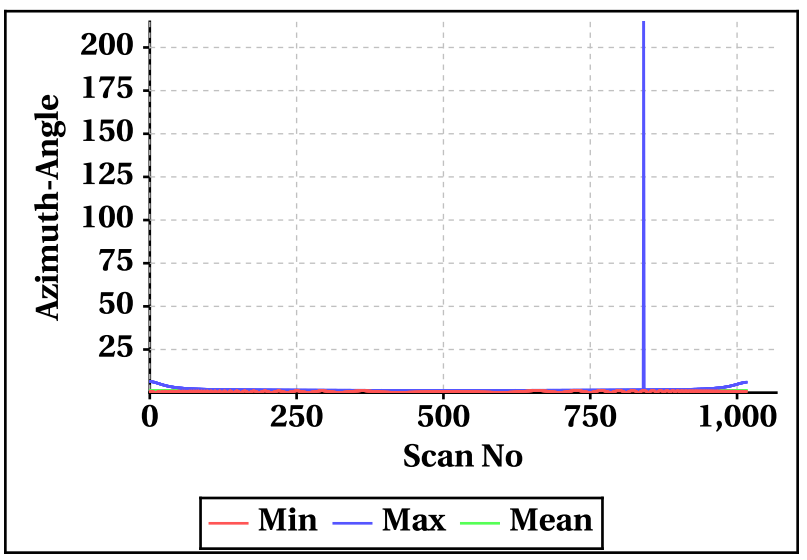
### Inner Beam (HH)



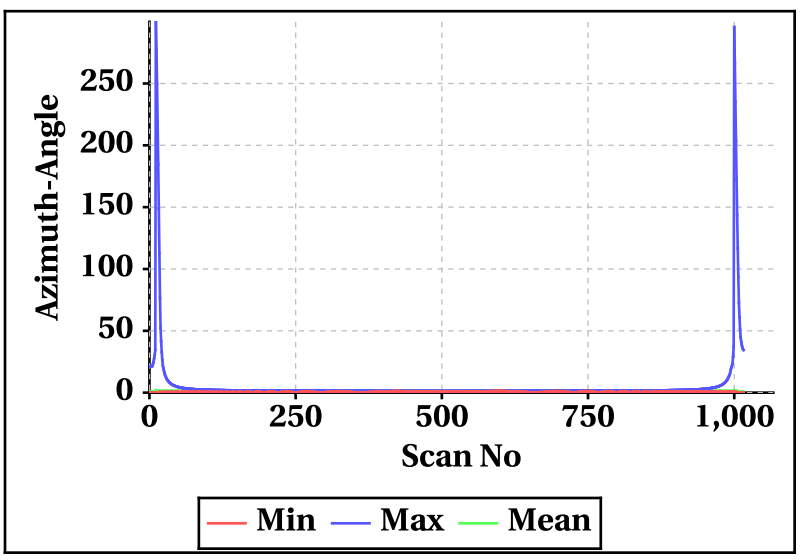

### Outer Beam(VV)



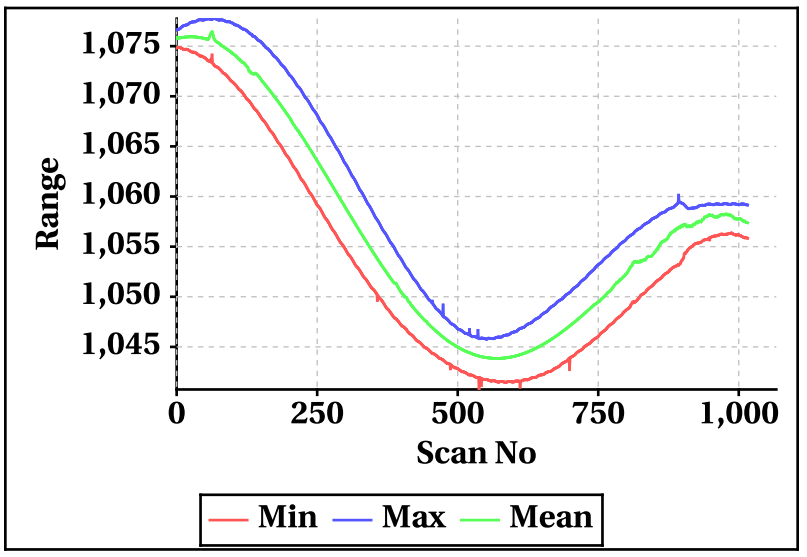

### Inner Beam (HH)



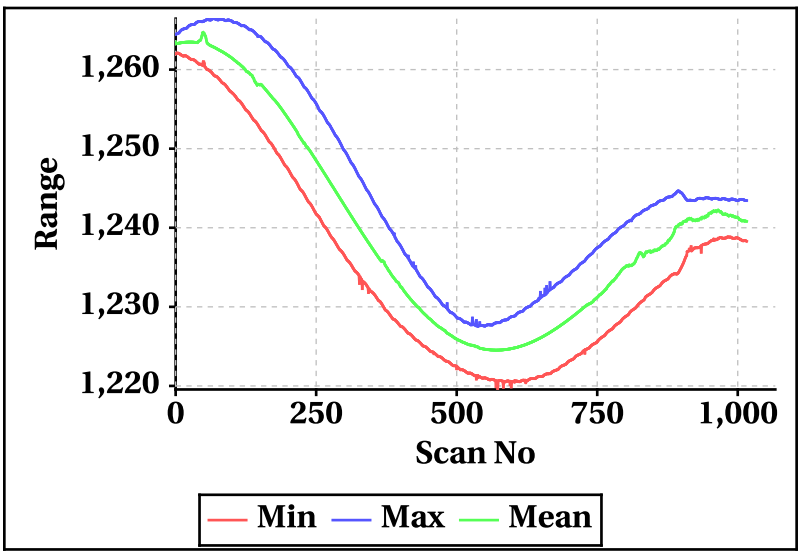

### Outer Beam(VV)



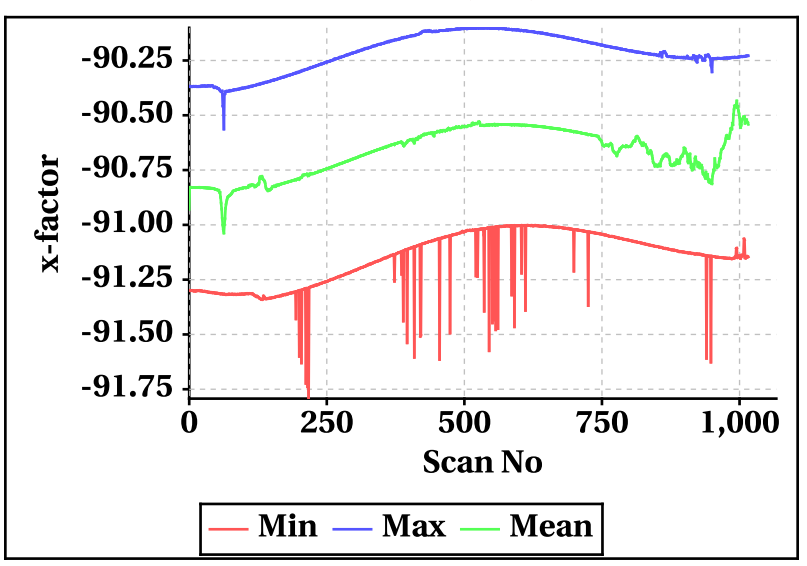

### Inner Beam (HH)



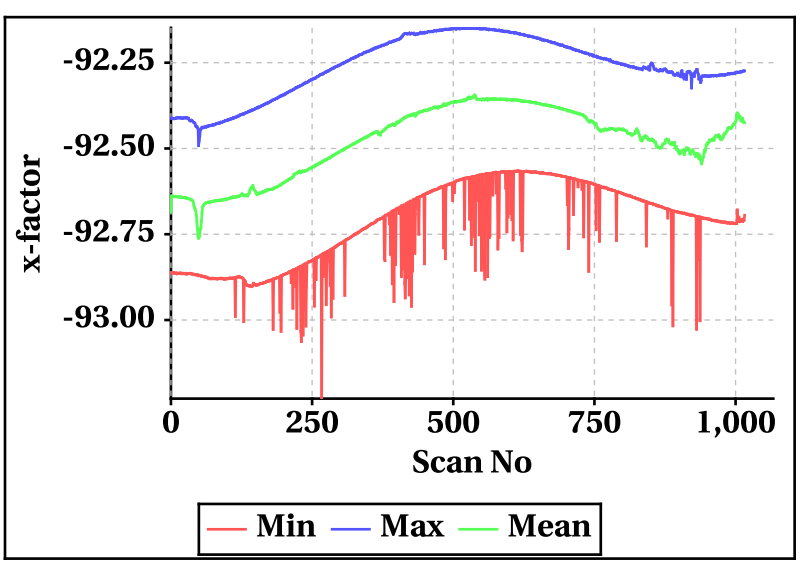

### Outer Beam(VV)




### Inner Beam (HH)




### Outer Beam(VV)



# Doppler Frequency Variation

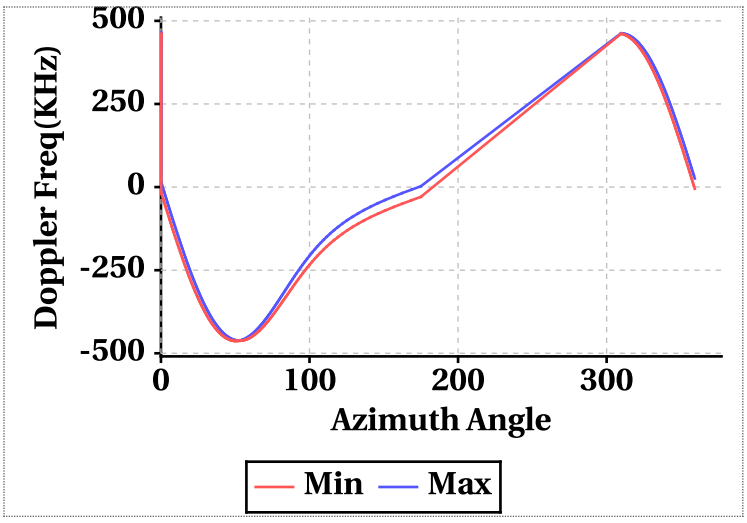
### Doppler Frequency(KHz) variation statistics Over the half Orbit

| | Inner Beam (HH) | Outer Beam (VV) |
|---|---|---|
| Min | -462.96 | -518.84 |
| Max | 463.28 | 519.12 |

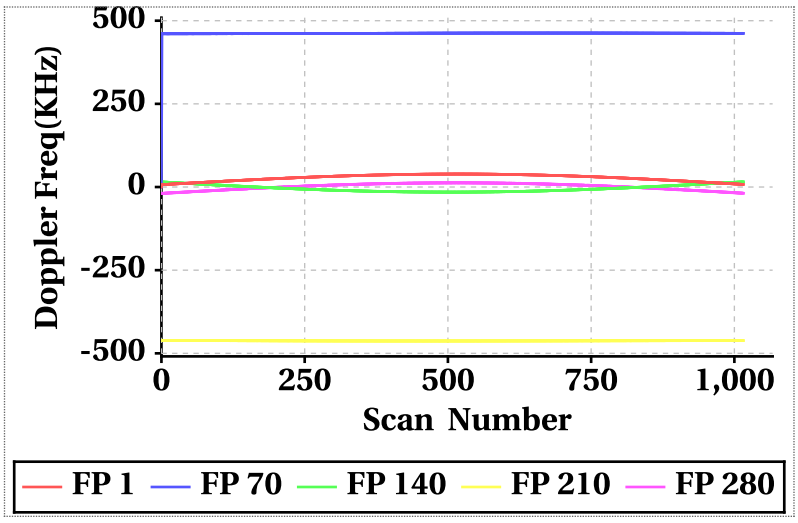
### Doppler Frequency(KHz) variation

| | Inner Beam (HH) | | | Outer Beam (VV) | | |
|---|---|---|---|---|---|---|
| Doppler_FP | Min | Max | Mean | Min | Max | Mean |
| Doppler_1 | 0.00 | 39.02 | 27.51 | -18.80 | 38.06 | 25.19 |
| Doppler_70 | 0.00 | 462.86 | 461.63 | -18.80 | 518.86 | 517.46 |
| Doppler_140 | -15.40 | 15.62 | -4.17 | -23.14 | 11.66 | -10.53 |
| Doppler_210 | -462.88 | -461.40 | -462.33 | -518.62 | -517.22 | -518.12 |
| Doppler_280 | -19.30 | 12.72 | 1.11 | -15.64 | 20.10 | 7.12 |

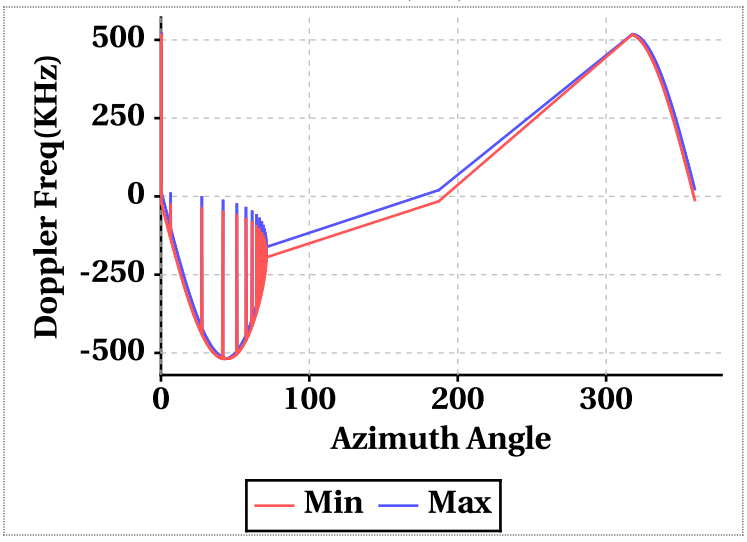
### Footprint wise Doopler frequency variation Inner Beam (HH)



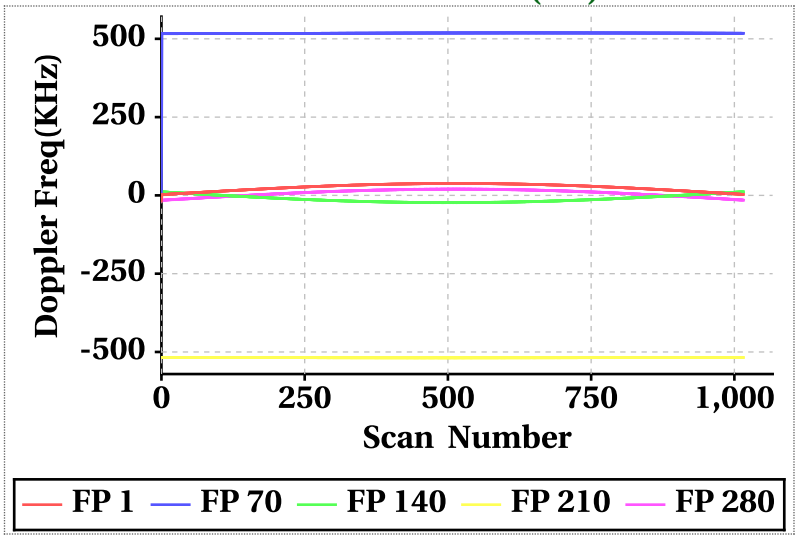

### Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Inner Beam (HH)




### Footprint wise Doopler frequency variation Outer Beam (VV)

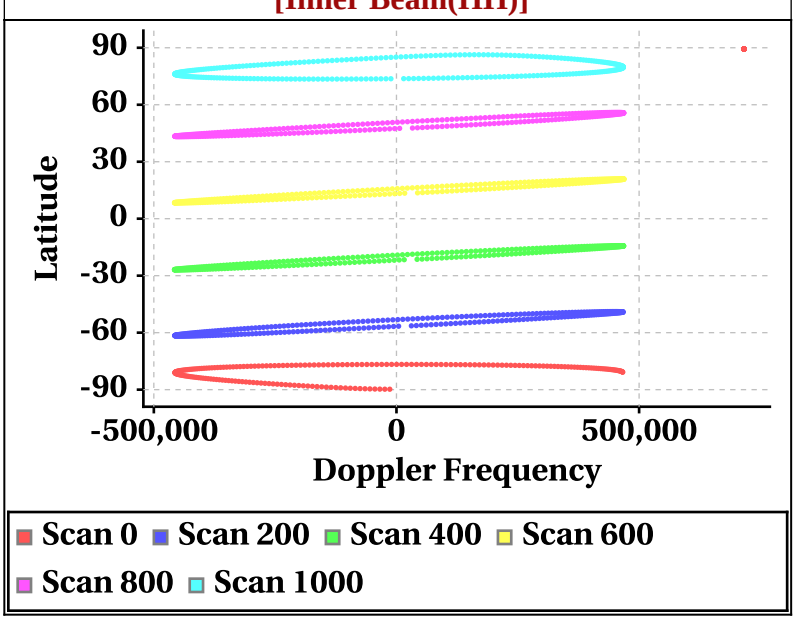



### Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Outer Beam (VV)

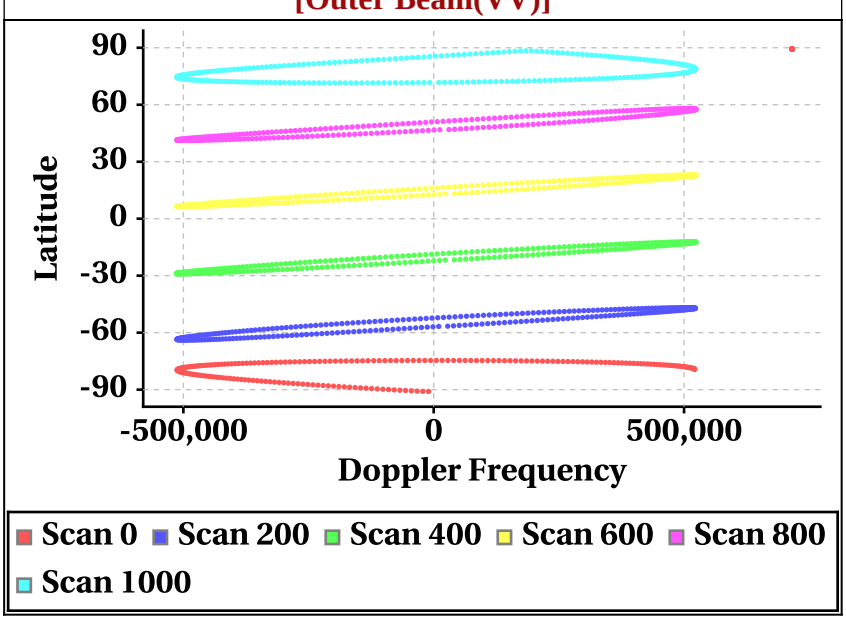



## Latitude Vs Doppler Frequency

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



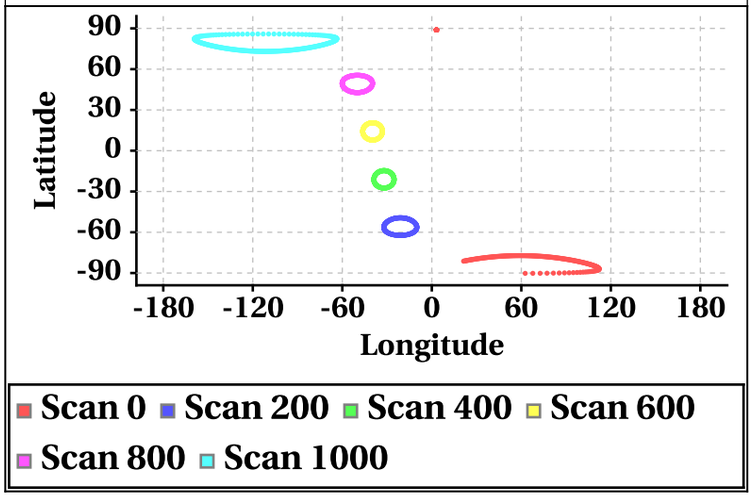

### Doppler Frequency at Scan Interval of 200 [Outer Beam(VV)]



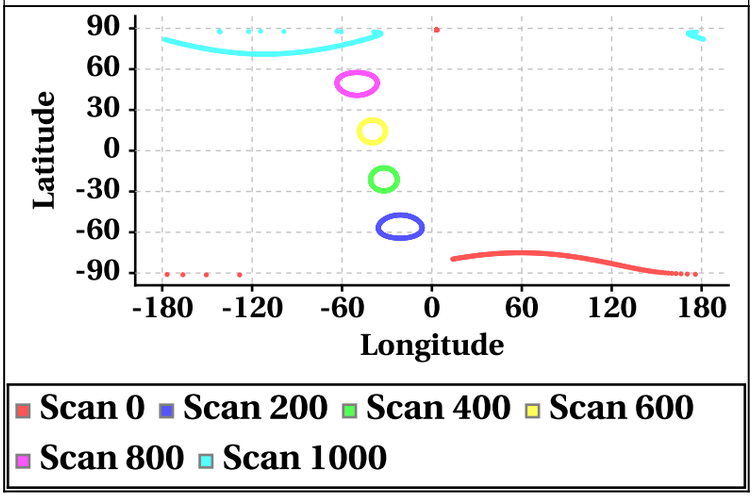
# Parameter as a function of Latitude

## Latitude Vs Longitude

### Scan Trace [Inner Beam(HH)]

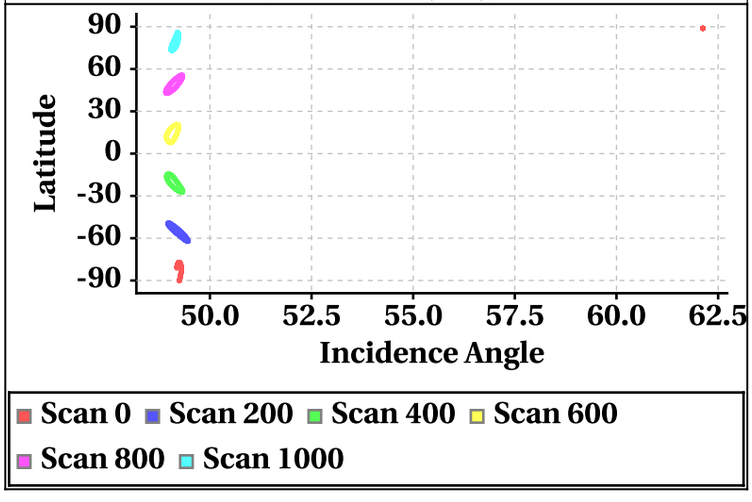



### Scan Trace [Outer Beam (VV)]

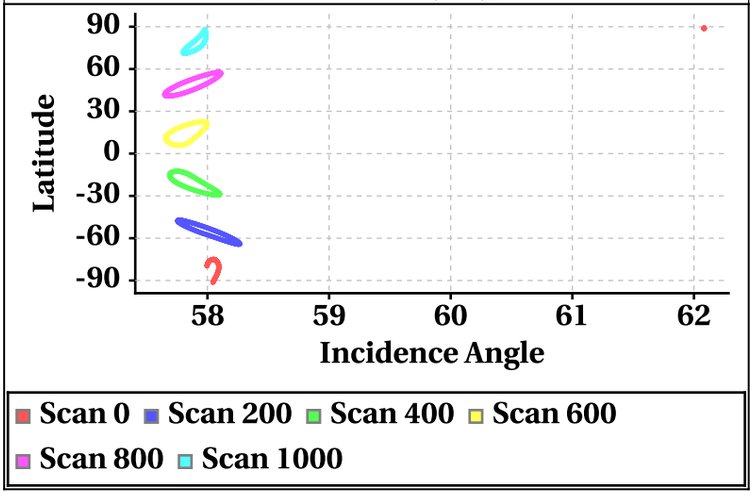



## Latitude Vs Incidence Angle

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

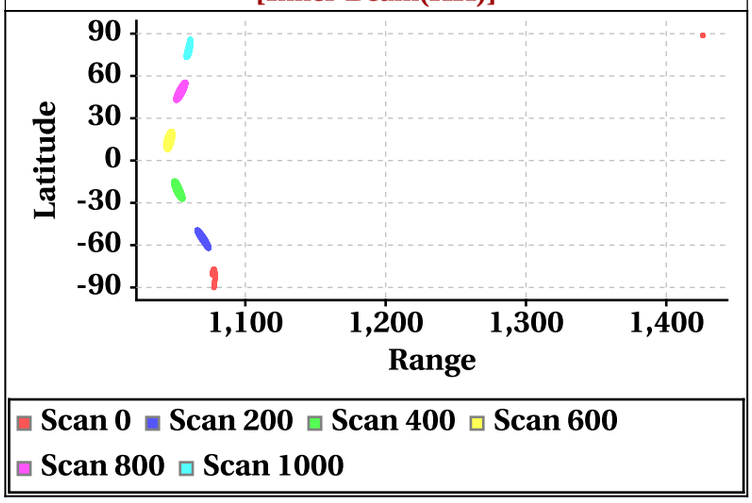



### Incidence Angle at Scan Interval of 200 [Outer Beam (VV)]

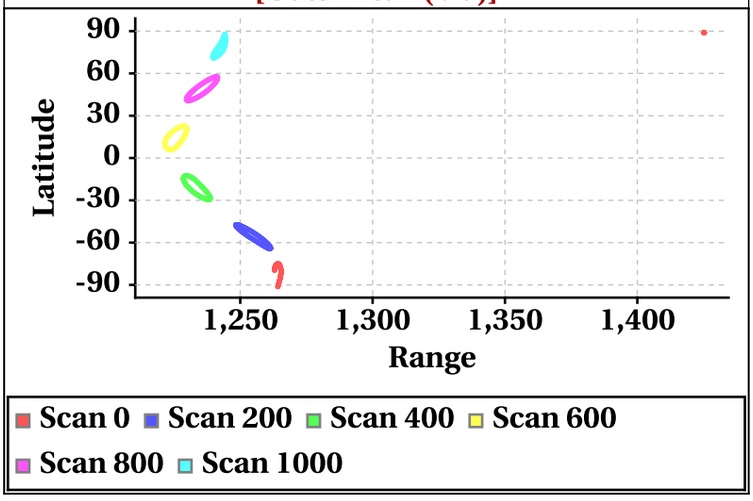



## Latitude Vs Range

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



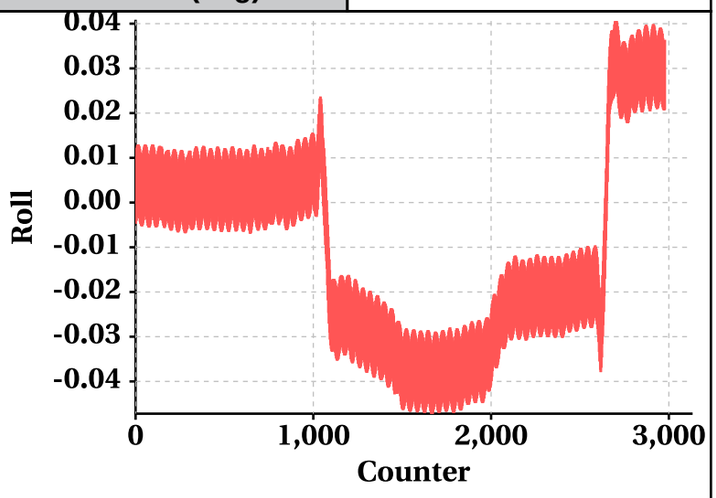

### Range at Scan Interval of 200 [Outer Beam(VV)]



# Variation in Orbit and Attitude Parameters

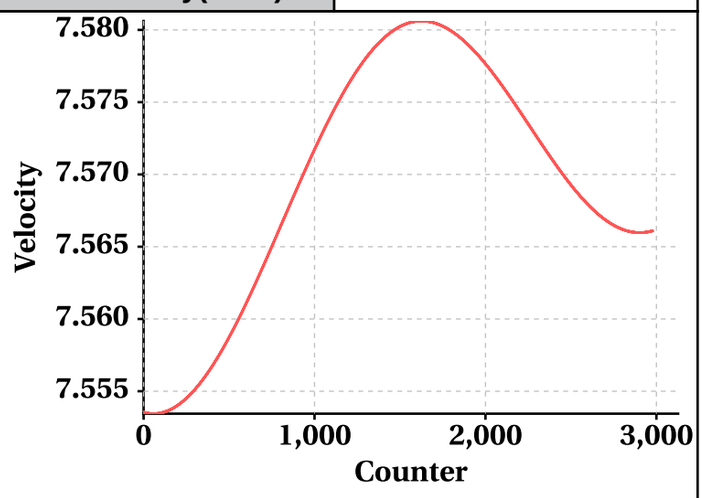
## Roll

| Min Roll(deg) | -0.047218 |
|---|---|
| Max Roll(deg) | 0.040601 |



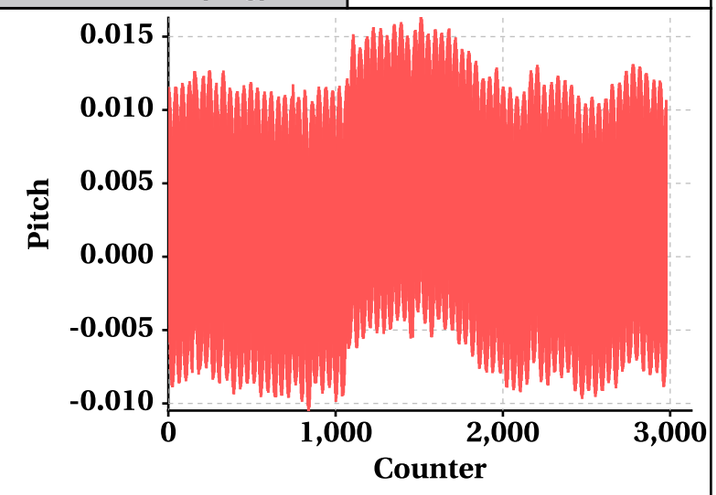

## Velocity

| Min Velocity(km/s) | 7.553446 |
|---|---|
| Max Velocity(km/s) | 7.580618 |



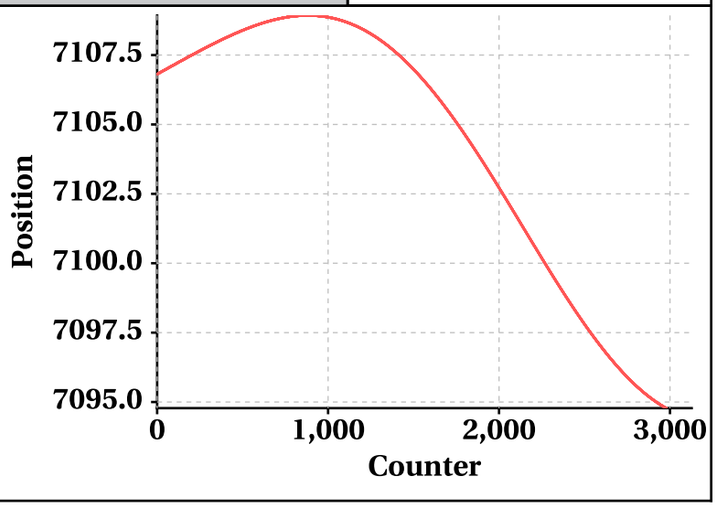

## Pitch

| Min Pitch(deg) | -0.010488 |
|---|---|
| Max Pitch(deg) | 0.016277 |



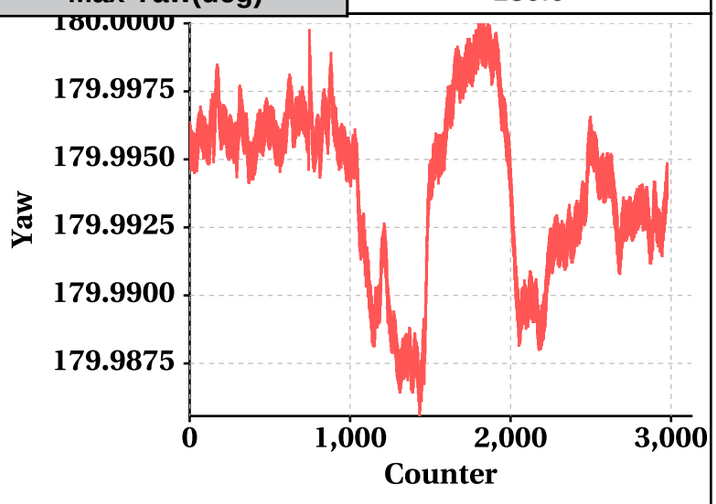

## Position

| Min Position(km) | 7094.778809 |
|---|---|
| Max Position(km) | 7108.927246 |




## Yaw

| Min Yaw(deg) | 179.985565 |
|---|---|
| Max Yaw(deg) | 180.0 |




## TimeDifference

| Min TimeDifference | 1.0 |
|---|---|
| Max TimeDifference | 1.0 |