

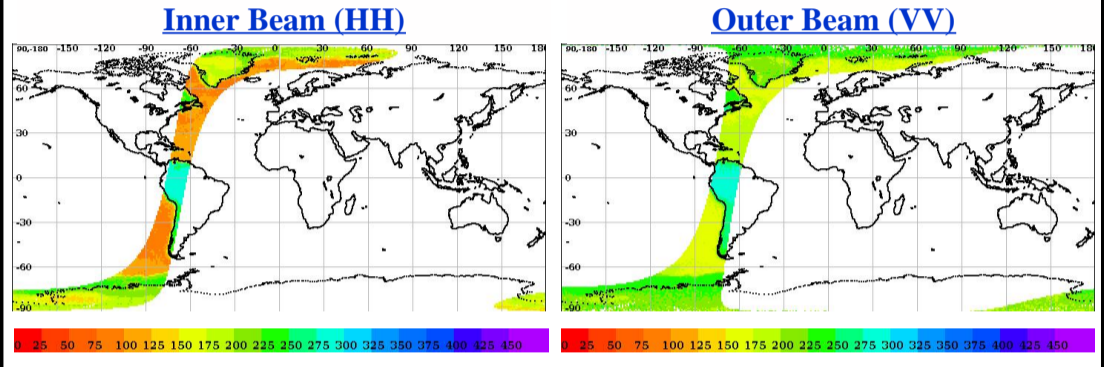
# SCATSAT-1 Scatterometer Level-1B Data Quality Evaluation Report

## Table of Contents

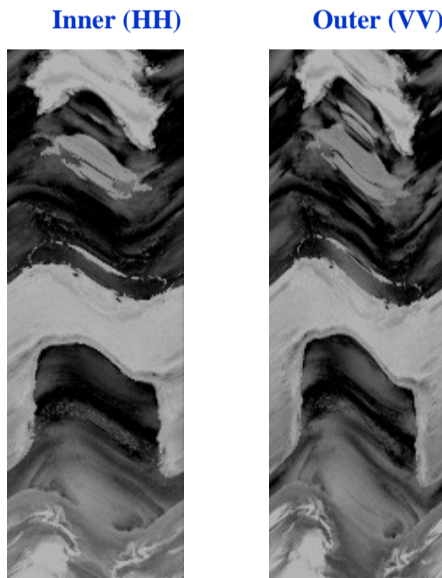
- Half-Orbit Coverage using BT & Sigma-0
- Invariant Site Sigma-0 Statistics (if Available)
- Half-Orbit Data Statistics
- Half Orbit wise - Dynamic Parameter (Sigma-0, Kp, SNR) Behaviour
- Dynamic Range (Data Histogram)
- Half Orbit Wise Behaviour - Static Parameters
- Doppler Variation (Across/Along 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>           | 4949         | <b>Total Scans</b>            | 1016 |
| <b>Sensor Name</b>           | Scatterometer | <b>End Orbit</b>             | 4950         | <b>No of Inner FootPrints</b> | 281  |
| <b>Processor Version</b>     | v1.1.2        | <b>Rev. Number</b>           | 04949_04950  | <b>No Of Outer FootPrints</b> | 282  |
| <b>Half Orbit Direction</b>  | NS            | <b>Data Production Date</b>  | 02-09-2017   | <b>No. Of Inner Slices</b>    | 9    |
| <b>Equator Crossing Date</b> | 02-09-2017    | <b>Equator Crossing Time</b> | 13:19:42.000 | <b>No Of Outer Slices</b>     | 14   |

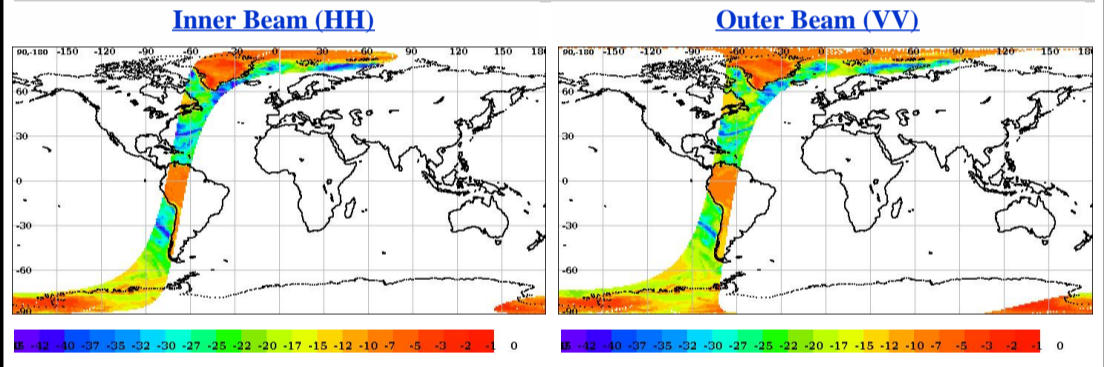
## Brightness Temperature(k) Footprint trace



## Image Snapshot for Inner & Outer Beam



## Sigma0(dB) Footprint trace



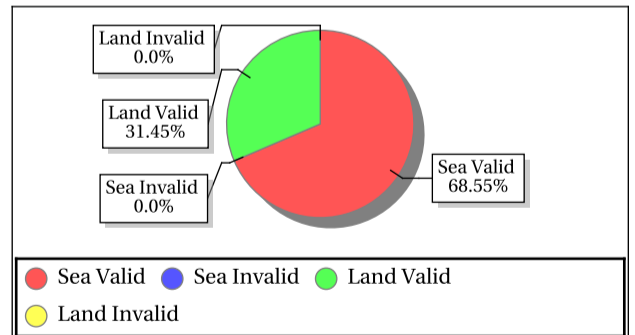
## Invalid and Poor Sigma-0 Quality Flag Statistics for Inner/Outer Slices\*

| Sigma-0 Flags                                   | Inner Beam | Outer Beam |
|---|------------|------------|
| <b>Invalid Sigma0(%)</b>                        | 0.00       | 0.00       |
| <b>Data Not Available From Payload (%)</b>      | 0.0        | 0.0        |
| <b>Slice not within sample array limits (%)</b> | 0.00       | 0.00       |
| <b>C(S+N) - C(N) &lt; 0.1 (%)</b>               | 0.00       | 0.00       |
| <b>Poor Sigma0(%)</b>                           | 0.01       | 0.01       |
| <b>Noise samples for blending Saturated</b>     | 0.0        | 0.0        |
| <b>Count samp. for interpol. saturated (%)</b>  | 0.00       | 0.00       |
| <b>Sigma0 &lt; lower bound (-96dB) (%)</b>      | 0.0        | 0.0        |
| <b>Sigma0 &gt; upper bound (0 dB) (%)</b>       | 0.00       | 0.00       |
| <b>SNR &lt; -65 dB (%)</b>                      | 100.0      | 100.0      |

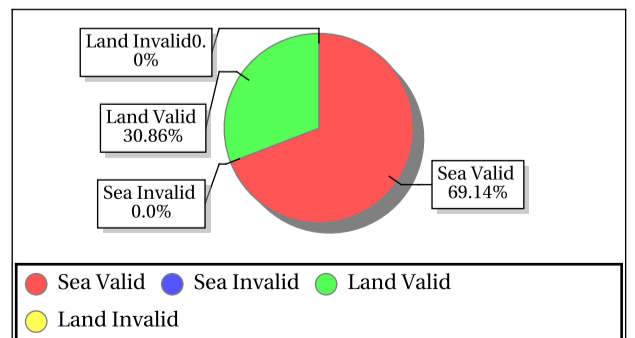
\*DP Format Document

## 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 | DSC  | Aft     | -5.12      | -4.47      | -4.89       | 0.26       | 153.09 | 178.67 | 162.95  | 9.57   |
| GreenLand_2 | 77.50      | -41.50     | Inner | DSC  | Fore    | -5.75      | -4.11      | -5.00       | 0.68       | 154.94 | 190.90 | 173.50  | 12.76  |
| GreenLand_3 | 71.55      | -42.45     | Inner | DSC  | Aft     | -10.90     | -9.25      | -10.08      | 0.54       | 166.33 | 216.41 | 194.51  | 15.35  |
| GreenLand_3 | 71.55      | -42.45     | Inner | DSC  | Fore    | -11.31     | -10.10     | -10.63      | 0.45       | 150.10 | 213.90 | 190.93  | 18.54  |
| GreenLand_1 | 74.69      | -42.50     | Inner | DSC  | Aft     | -9.32      | -7.82      | -8.41       | 0.46       | 156.59 | 182.64 | 171.57  | 8.79   |
| GreenLand_1 | 74.69      | -42.50     | Inner | DSC  | Fore    | -9.65      | -7.66      | -8.41       | 0.62       | 156.75 | 186.24 | 172.54  | 11.08  |
| Amazon_1    | 0.00       | -67.00     | Inner | DSC  | Aft     | -8.41      | -6.45      | -7.40       | 0.49       | 246.73 | 336.47 | 289.59  | 16.14  |
| Amazon_1    | 0.00       | -67.00     | Inner | DSC  | Fore    | -9.20      | -6.32      | -7.56       | 0.69       | 237.49 | 334.37 | 286.18  | 17.80  |
| GreenLand_2 | 77.50      | -41.50     | Outer | DSC  | Aft     | -5.35      | -4.76      | -4.95       | 0.23       | 188.66 | 222.80 | 204.11  | 11.37  |
| GreenLand_2 | 77.50      | -41.50     | Outer | DSC  | Fore    | -5.55      | -4.60      | -5.21       | 0.43       | 183.84 | 202.58 | 195.66  | 8.40   |
| GreenLand_3 | 71.55      | -42.45     | Outer | DSC  | Aft     | -11.58     | -9.72      | -10.88      | 0.65       | 195.30 | 250.51 | 227.40  | 17.37  |
| GreenLand_3 | 71.55      | -42.45     | Outer | DSC  | Fore    | -12.74     | -10.39     | -11.72      | 0.61       | 183.01 | 233.87 | 214.33  | 16.36  |
| GreenLand_1 | 74.69      | -42.50     | Outer | DSC  | Aft     | -9.59      | -7.64      | -8.78       | 0.57       | 199.12 | 231.74 | 218.62  | 11.51  |
| GreenLand_1 | 74.69      | -42.50     | Outer | DSC  | Fore    | -10.05     | -8.37      | -9.29       | 0.51       | 195.97 | 238.72 | 223.53  | 13.42  |
| Amazon_2    | -3.00      | -61.00     | Outer | DSC  | Aft     | -11.01     | -8.18      | -9.38       | 0.54       | 237.04 | 324.88 | 276.91  | 16.64  |
| Amazon_2    | -3.00      | -61.00     | Outer | DSC  | Fore    | -10.99     | -7.98      | -9.38       | 0.56       | 234.62 | 327.37 | 276.23  | 18.09  |
| Amazon_1    | 0.00       | -67.00     | Outer | DSC  | Aft     | -9.24      | -7.49      | -8.28       | 0.46       | 251.86 | 309.82 | 281.21  | 14.43  |
| Amazon_1    | 0.00       | -67.00     | Outer | DSC  | Fore    | -9.55      | -7.50      | -8.30       | 0.44       | 241.60 | 317.34 | 283.16  | 18.81  |



## 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>       | 0.10    | 213.22 | 0.39 | 4.026        | 0.10     | 259.71 | 0.32 | 3.087        | 0.10     | 0.20  | 0.10  | 0.000        | 0.10      | 0.24  | 0.10  | 0.000        |
| <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     | 0.02   | 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>      | -34.02  | 24.11  | 4.07 | 0.951        | -34.88   | 25.13  | 5.25 | 0.655        | -1.17    | 28.18 | 19.14 | 12.130       | -2.51     | 30.49 | 20.74 | 38.233       |

| 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>       | 0.08    | 195.71 | 0.32 | 3.260        | 0.08     | 184.74 | 0.28 | 2.509        | 0.08     | 0.13  | 0.09  | 0.000        | 0.08      | 0.13  | 0.08  | 0.000        |
| <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>      | 0.00    | 0.01   | 0.00 | 0.000        | 0.00     | 0.01   | 0.00 | 0.000        | 0.00     | 0.00  | 0.00  | 0.000        | 0.00      | 0.00  | 0.00  | 0.000        |
| <b>SNR</b>      | -34.53  | 18.19  | 2.49 | 0.000        | -34.28   | 18.88  | 3.07 | 0.000        | 0.66     | 22.63 | 13.92 | 0.034        | 0.63      | 24.77 | 14.95 | 1.910        |

| 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> | 48.77           | 49.32   | 49.03   | 0.000        | 57.59           | 58.23   | 57.95   | 0.000        | Inci.(Inner)             | 47.10   | 49.90   |
| <b>Azimuth Diff. (deg)</b>   | 0.0026          | 262.26  | 1.09    | 0.170        | 0.0026          | 1.96    | 1.08    | 0.179        | Inci.(Outer)             | 57.30   | 58.90   |
| <b>Range(Km)</b>             | 1033.43         | 1074.66 | 1049.82 | 0.000        | 1212.34         | 1263.57 | 1232.94 | 0.000        | Azimuth Diff.            | 0.60    | 2.00    |
| <b>X Factor(dbm)</b>         | -92.04          | -89.16  | -90.43  | 0.000        | -93.67          | -91.56  | -92.45  | 0.000        | Range(Inner)             | 1025.00 | 1095.70 |
| <b>Across Distance (Km)</b>  | 15.59           | 16.23   | 15.82   | 0.000        | 20.48           | 45.96   | 21.14   | 7.000        | Range(Outer)             | 1210.00 | 1280.00 |
| <b>Along Distance (Km)</b>   | 18.83           | 39.48   | 19.75   | 1.000        | 18.66           | 42.67   | 19.70   | 3.000        | 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   |
|                              |                 |         |         |              |                 |         |         |              |                          |         |         |

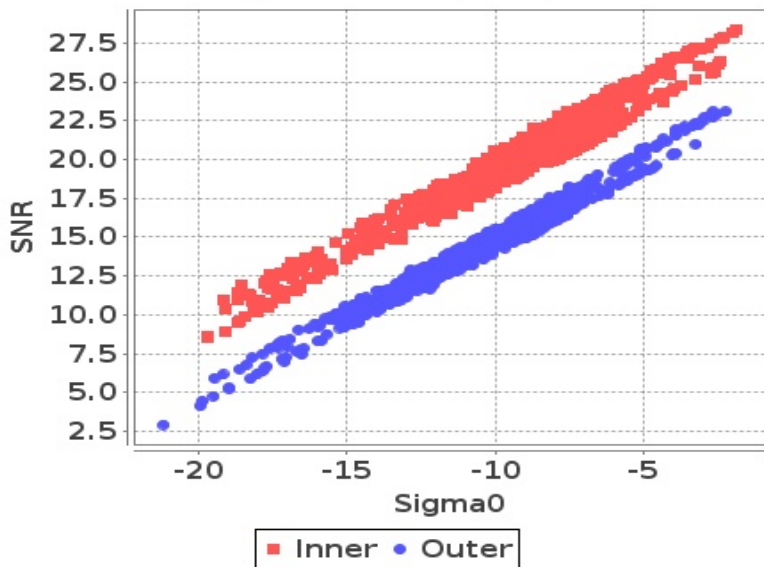
- Normal
- Deviations
- Alarming
- High Errors



## Sigma0 Behaviour (Sigma0 Vs SNR)

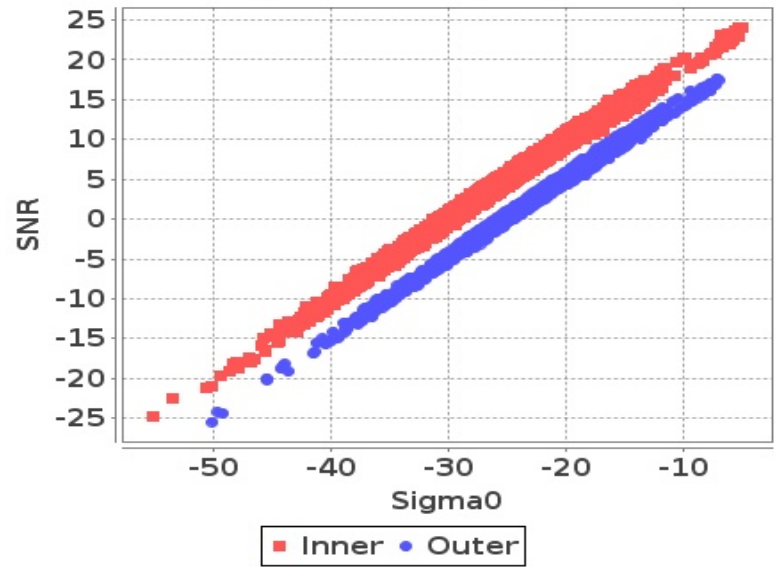
Footprint-Land

Sigma0 Vs SNR (Land)



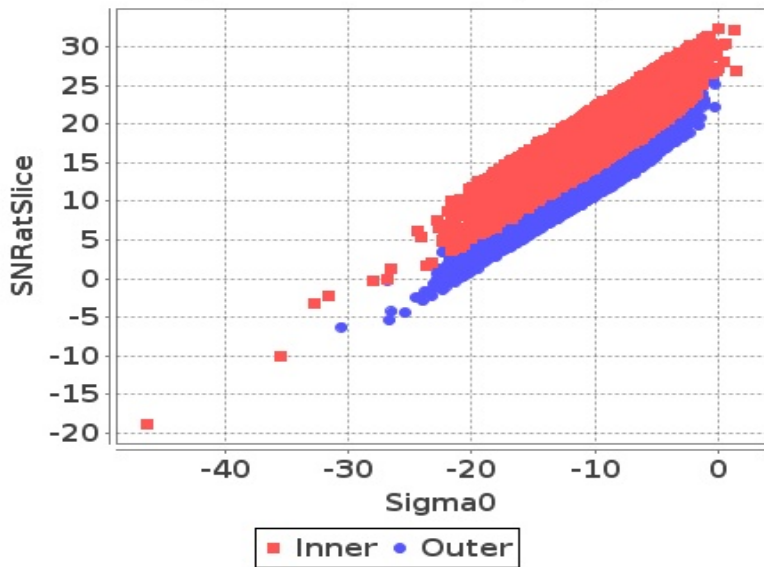
Footprint-Sea

Sigma0 Vs SNR (Sea)



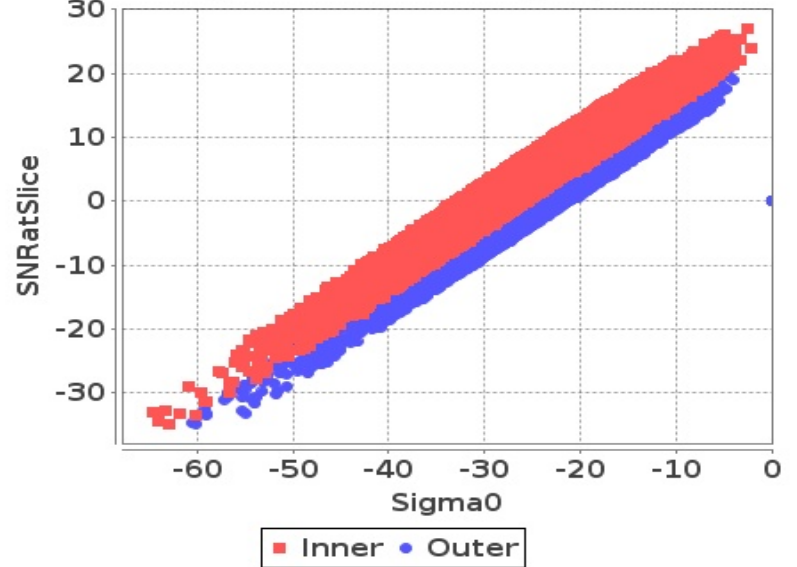
Slice-Land

Sigma0 Vs SNRatSlice (Land)



Slice-Sea

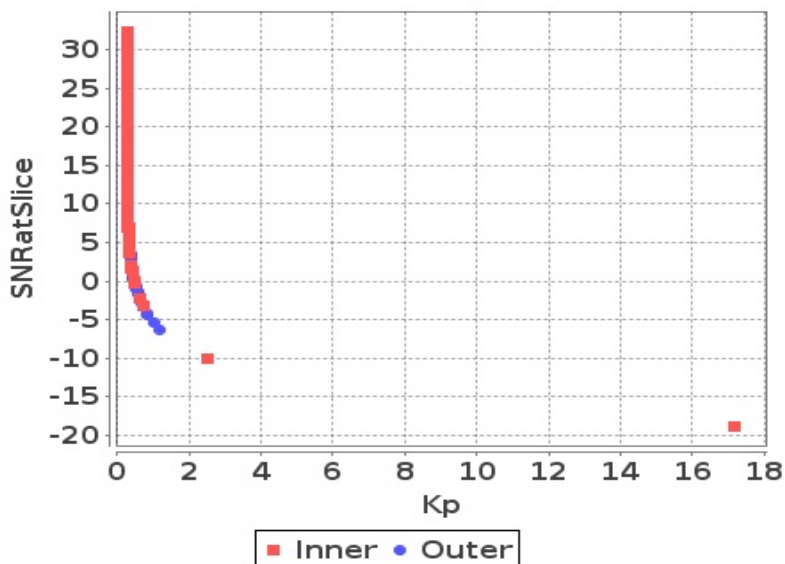
Sigma0 Vs SNRatSlice (Sea)



## Sigma0 Behaviour (Kp Vs SNR)

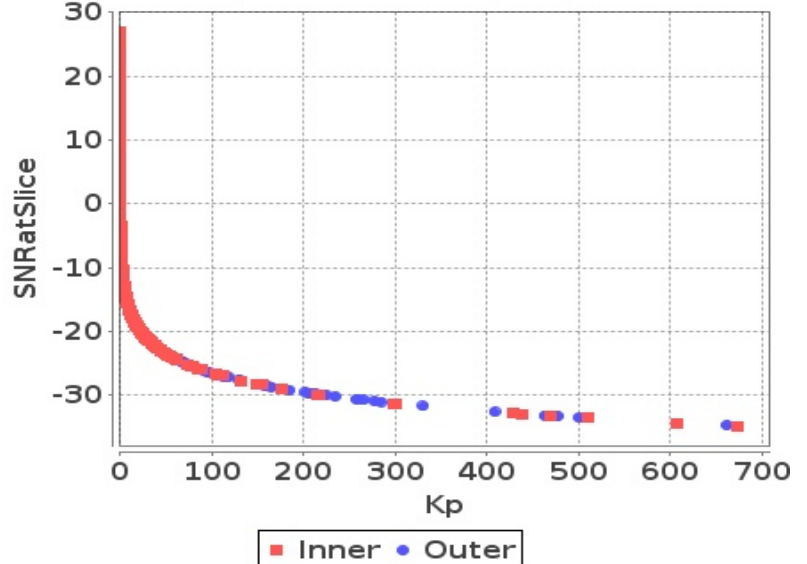
Slice

Kp Vs SNRatSlice (Land)



Slice

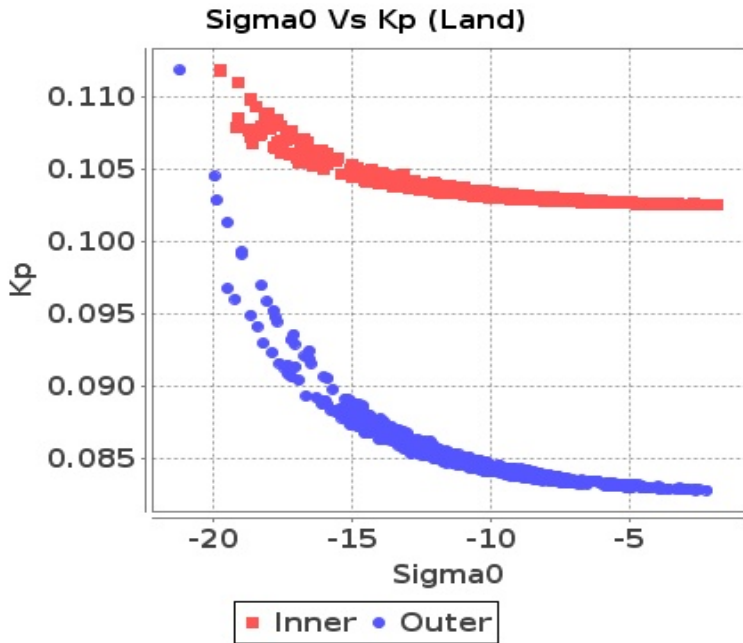
Kp Vs SNRatSlice (Sea)



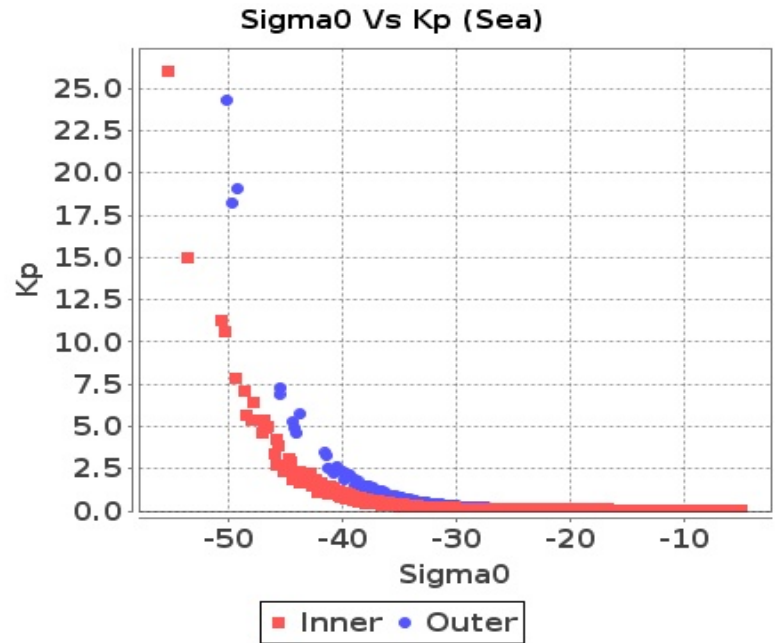


# Sigma0 Behaviour(Sigma0 Vs Kp)

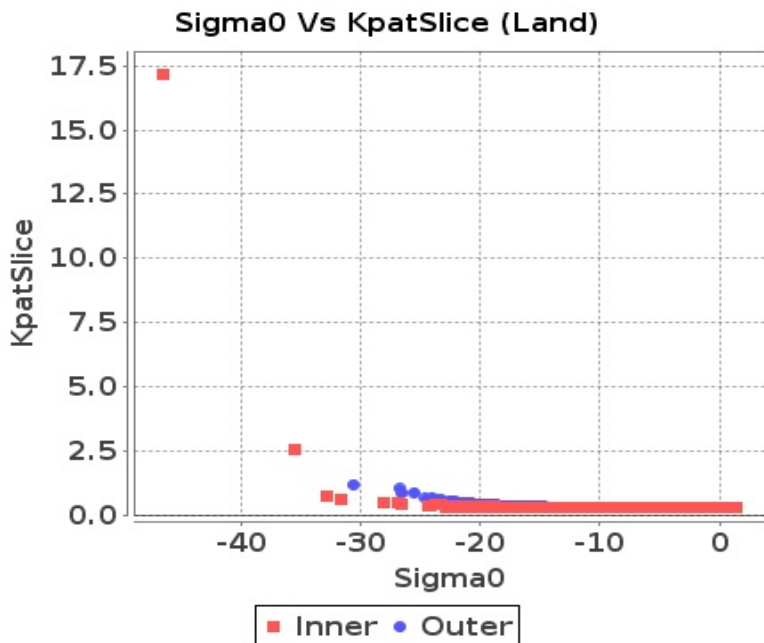
## Footprint-Land



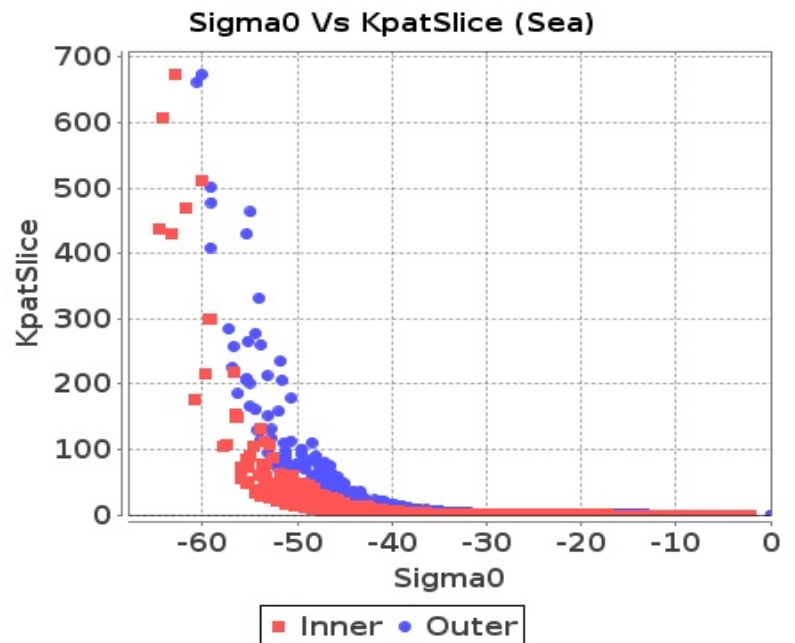
## Footprint-Sea



## Slice-Land



## Slice-Sea

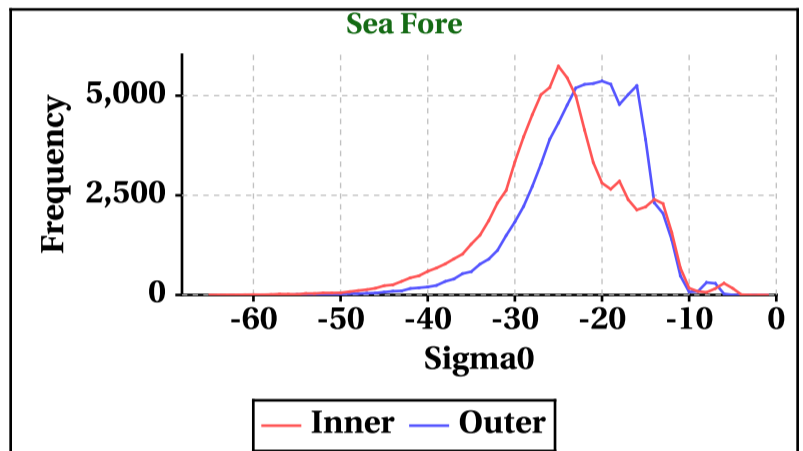
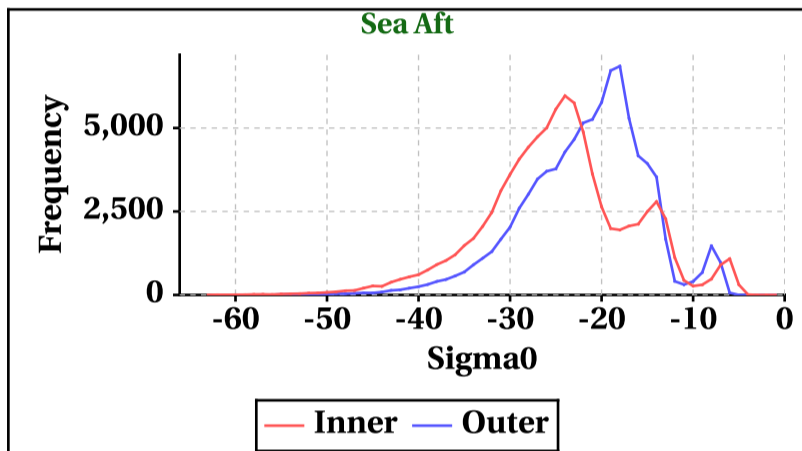
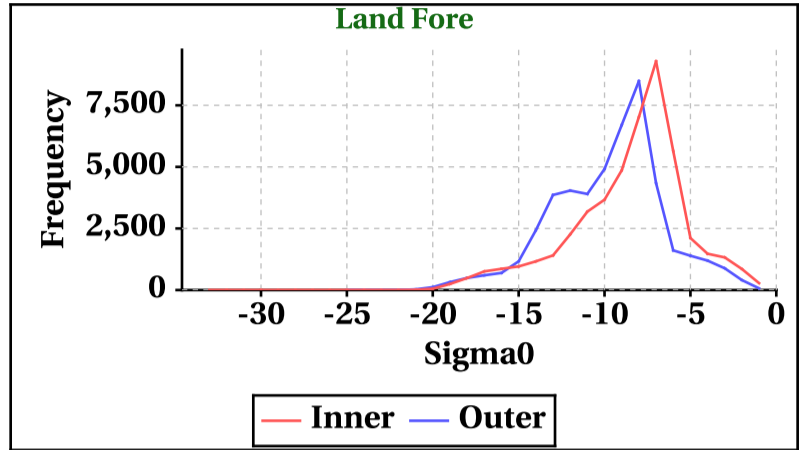
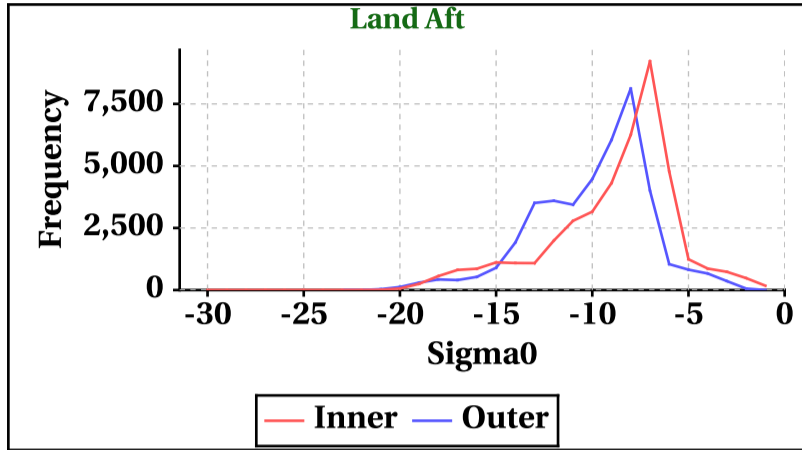


# Dynamic Range (Data Histograms)

## Sigma0(db)

| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -30      | -33       | -63     | -65      |
| Max             | 0        | 0         | 0       | 0        |

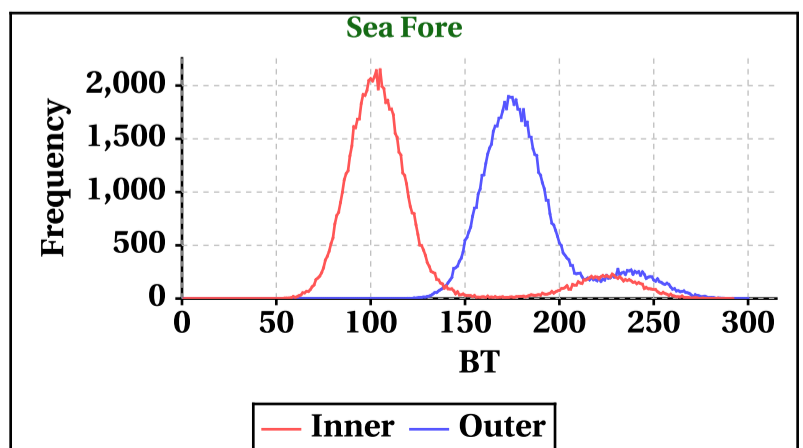
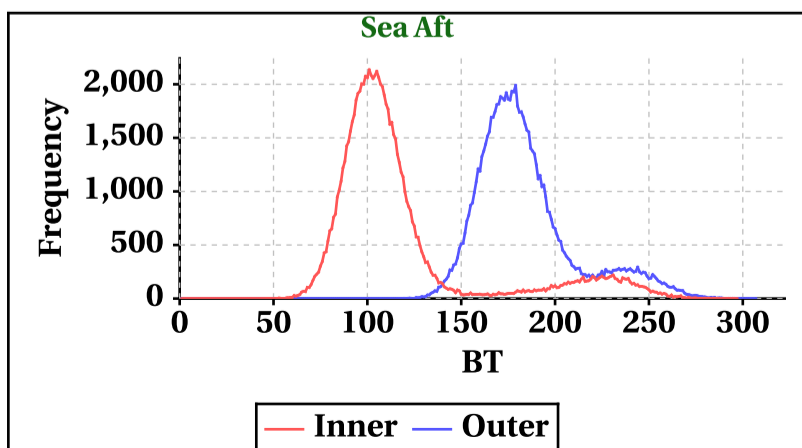
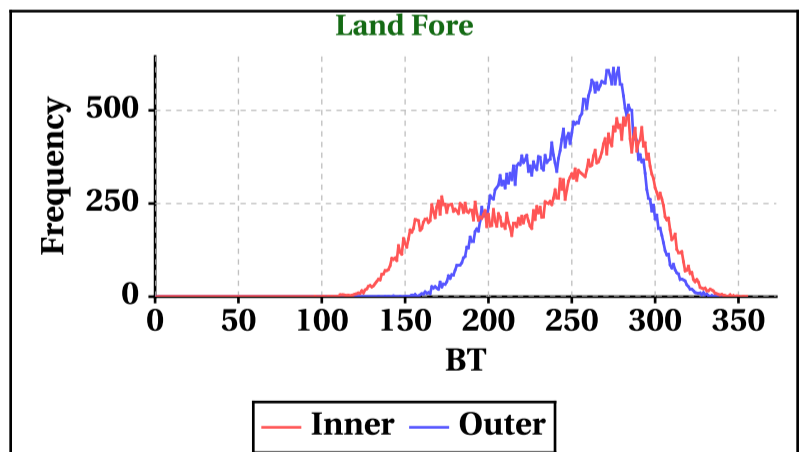
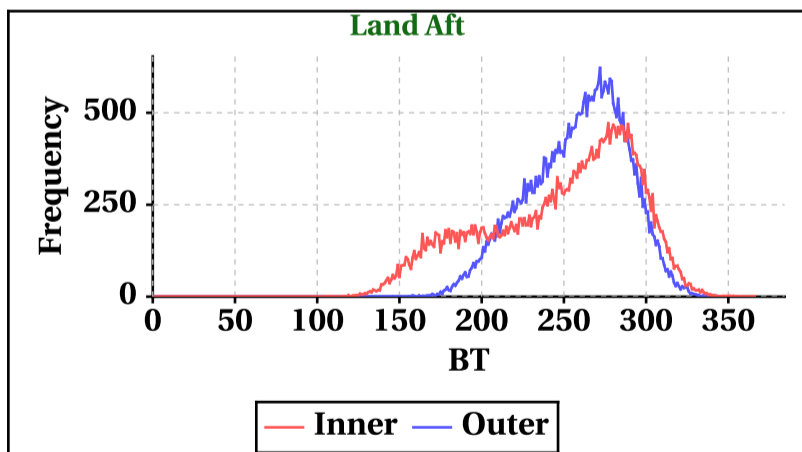
| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -23      | -25       | -59     | -60      |
| Max             | 0        | 0         | 0       | 0        |



## Brightness Temperature(K)

| Inner Beam(HH) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 366      | 355       | 297     | 292      |

| Outer Beam(VV) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 354      | 348       | 307     | 300      |

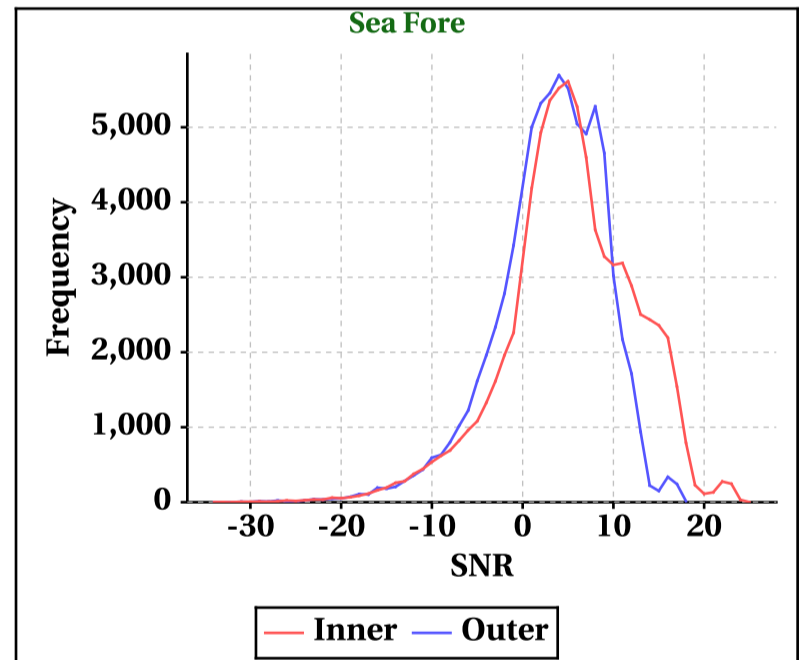
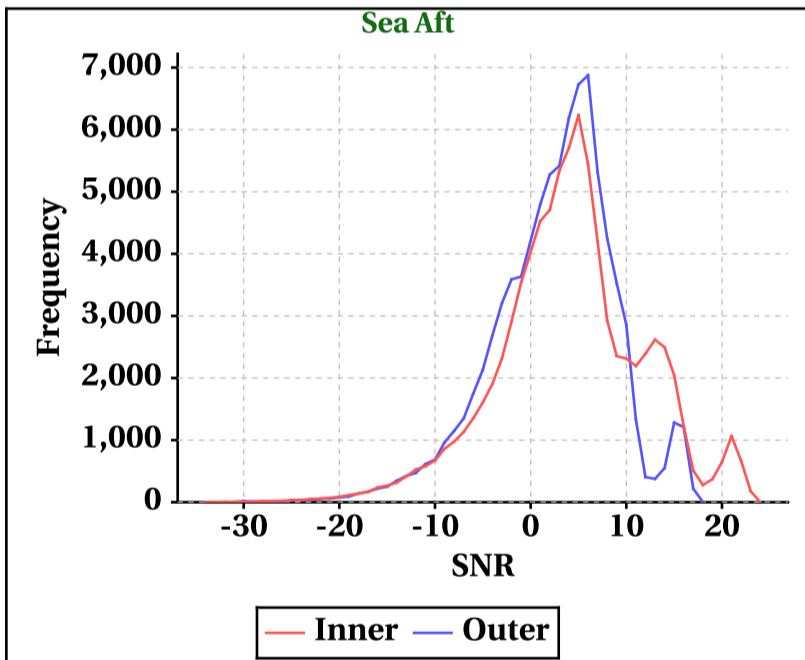
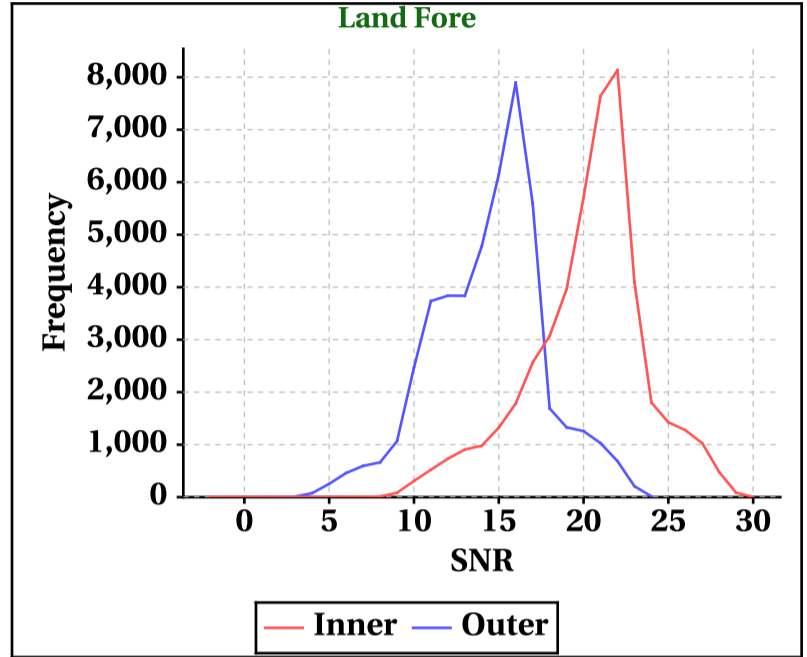
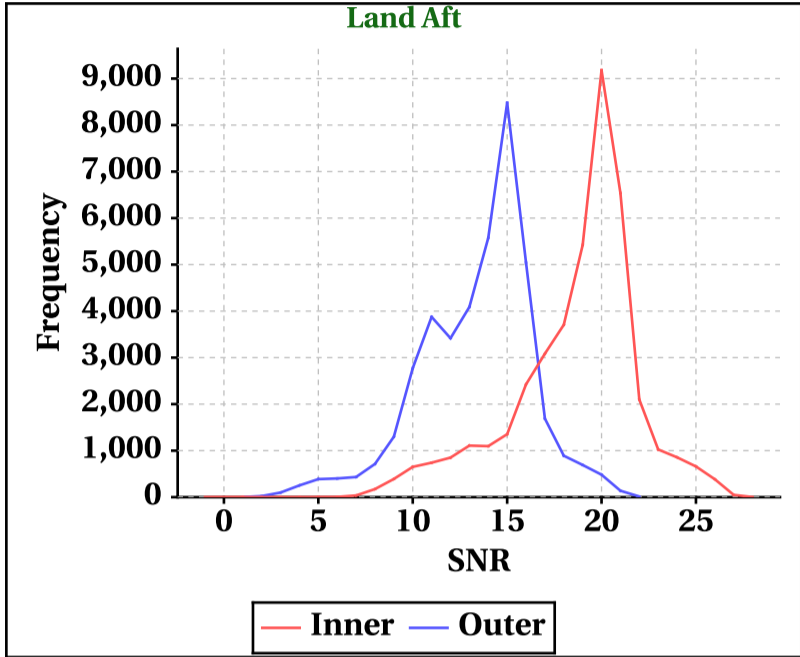


# Dynamic Range (Data Histograms)

## SNR(dBm)

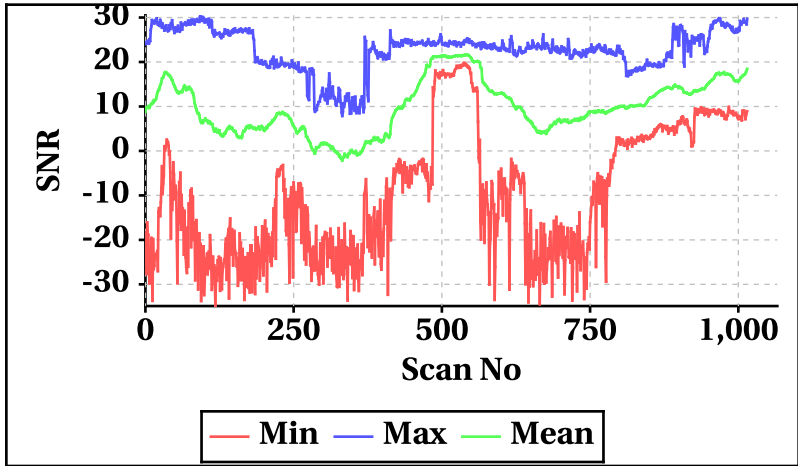
| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -1       | -2        | -34     | -34      |
| Max             | 28       | 30        | 24      | 25       |

| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | 0        | 0         | -34     | -34      |
| Max             | 22       | 24        | 18      | 18       |

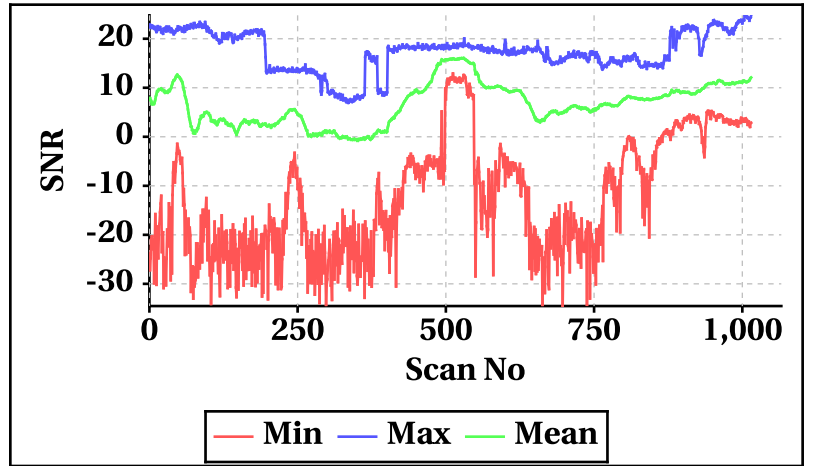


## Orbit-wise behaviour of SNR

Inner Beam (HH)

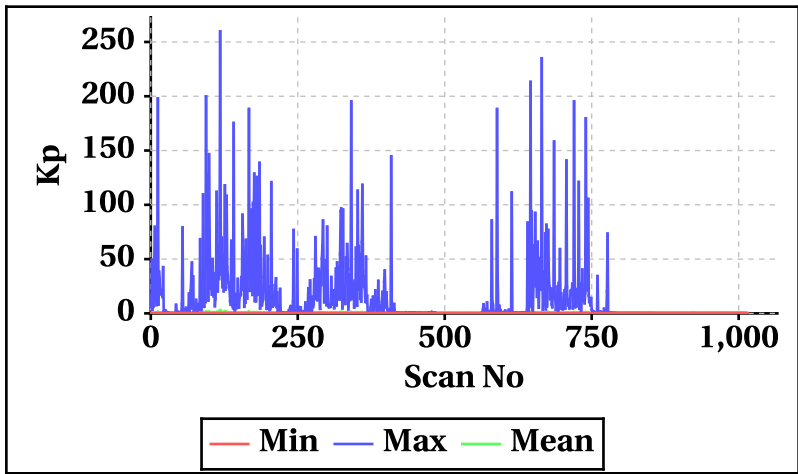


Outer Beam(VV)

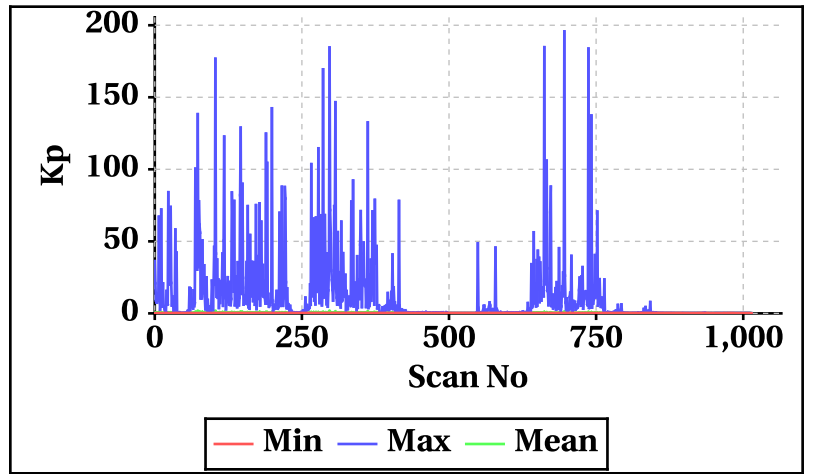


## Orbit-wise behaviour of Kp,Kpa,Kpb,Kpc

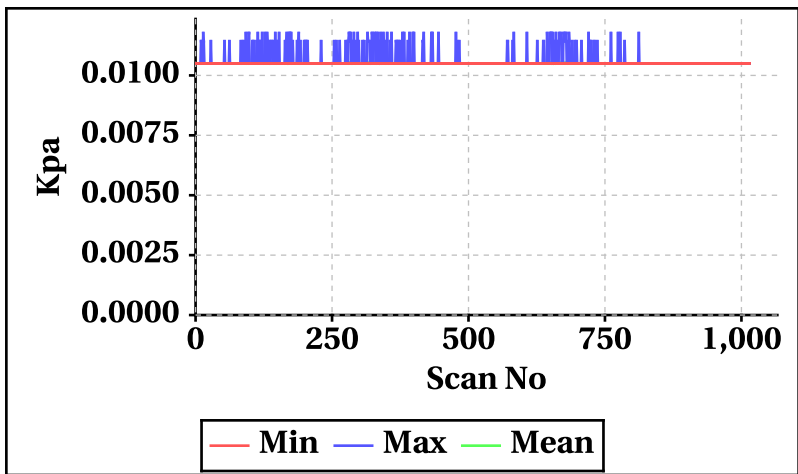
Inner Beam(HH)



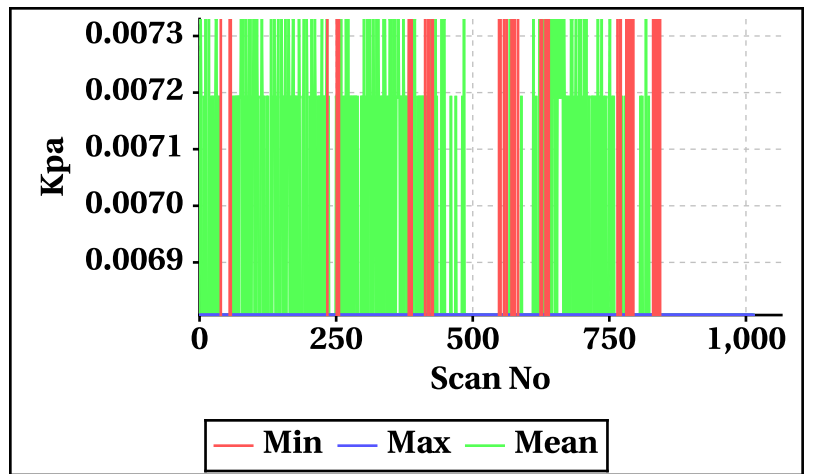
Outer Beam(VV)



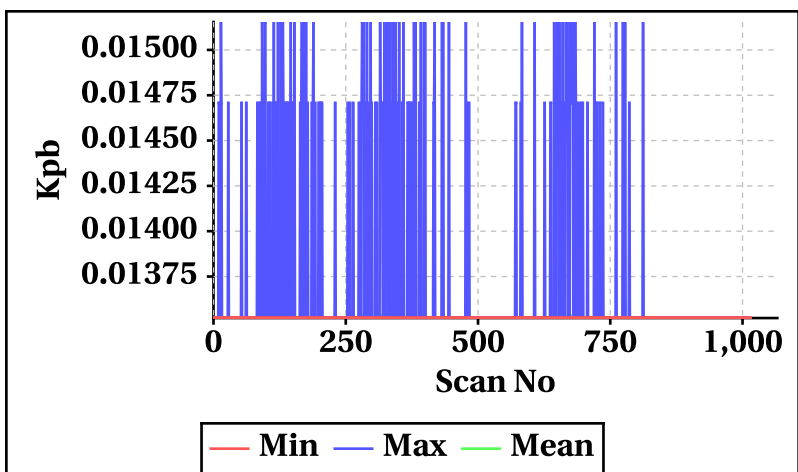
Inner Beam(HH)



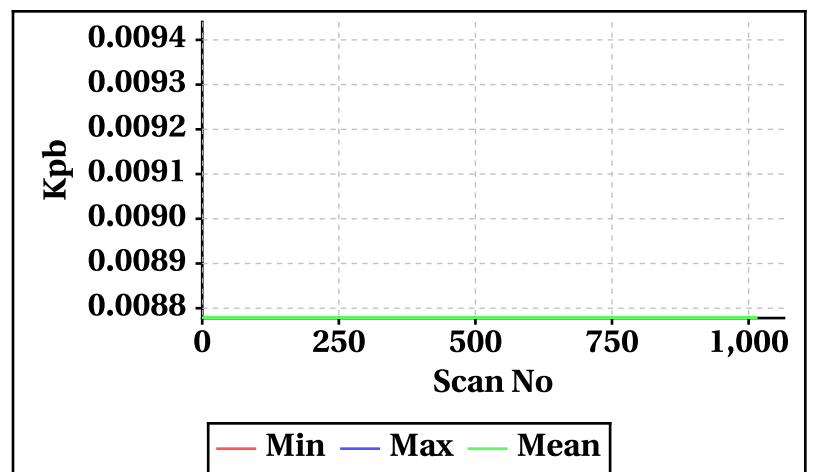
Outer Beam(VV)



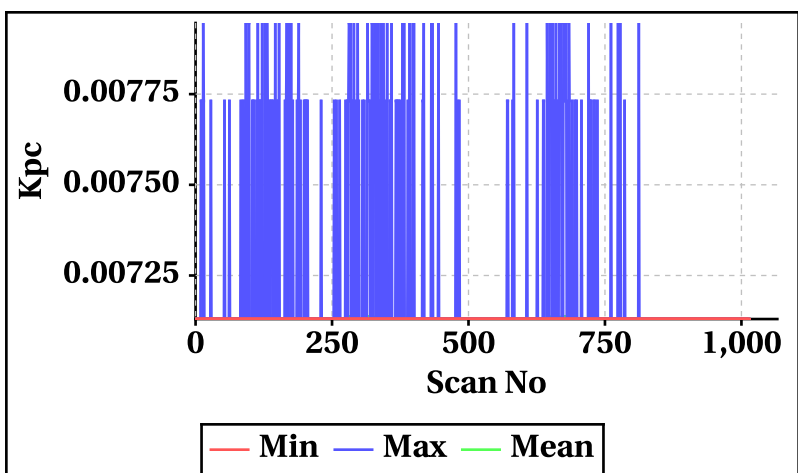
Inner Beam(HH)



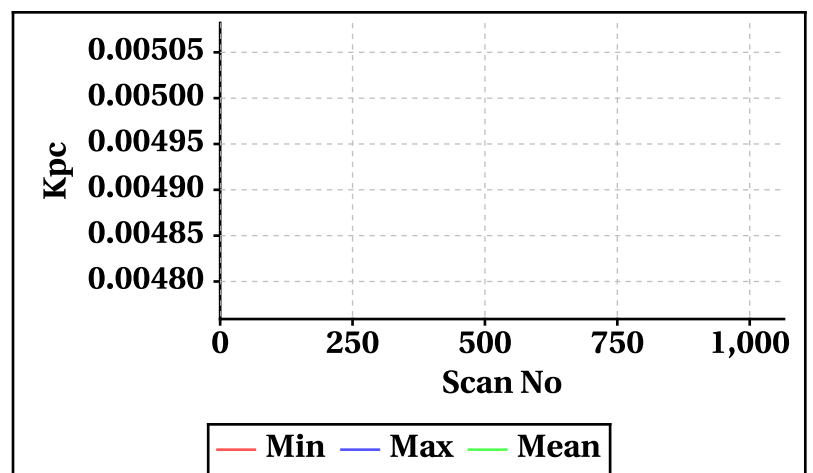
Outer Beam(VV)



Inner Beam(HH)



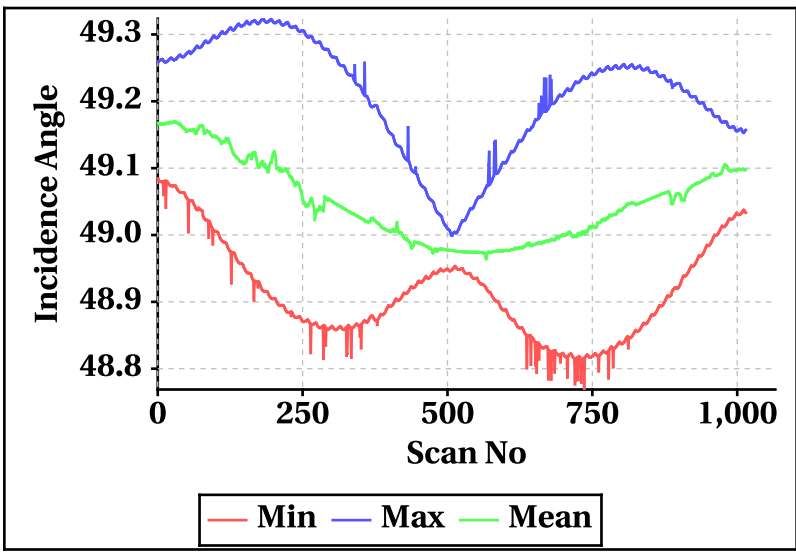
Outer Beam(VV)



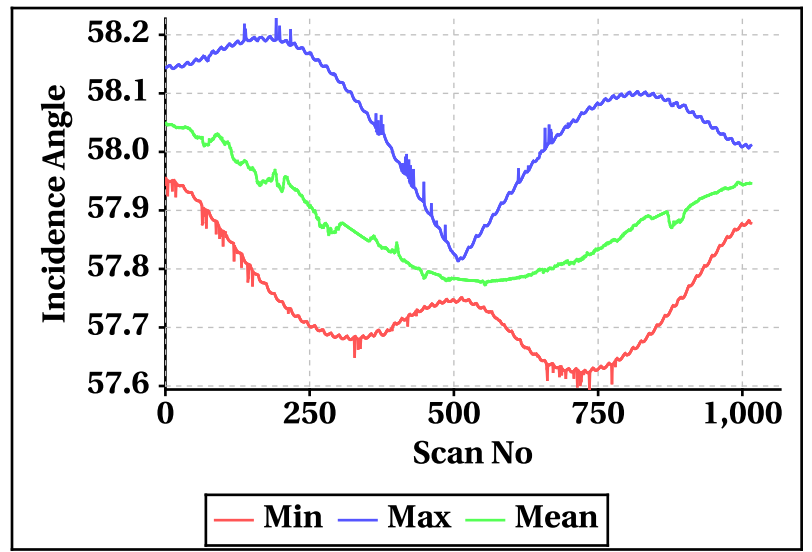


Orbt-wise behaviour of Incidence, Azimuth, Range, X-Factor

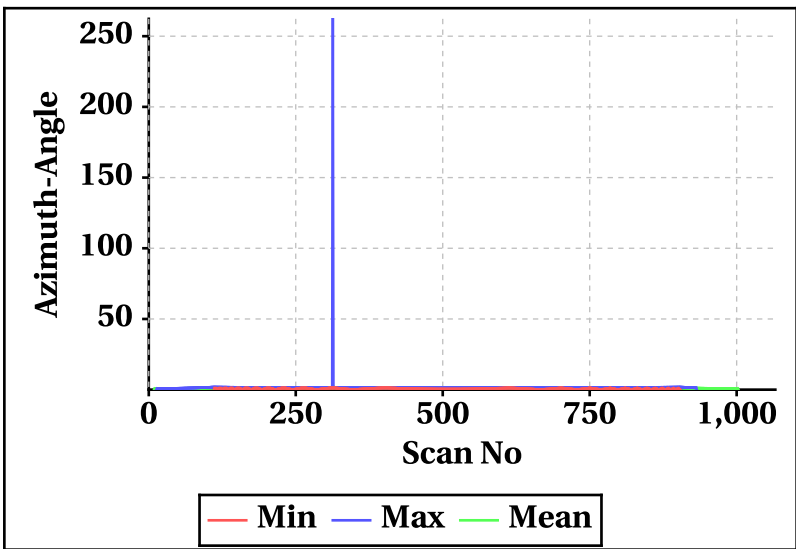
Inner Beam (HH)



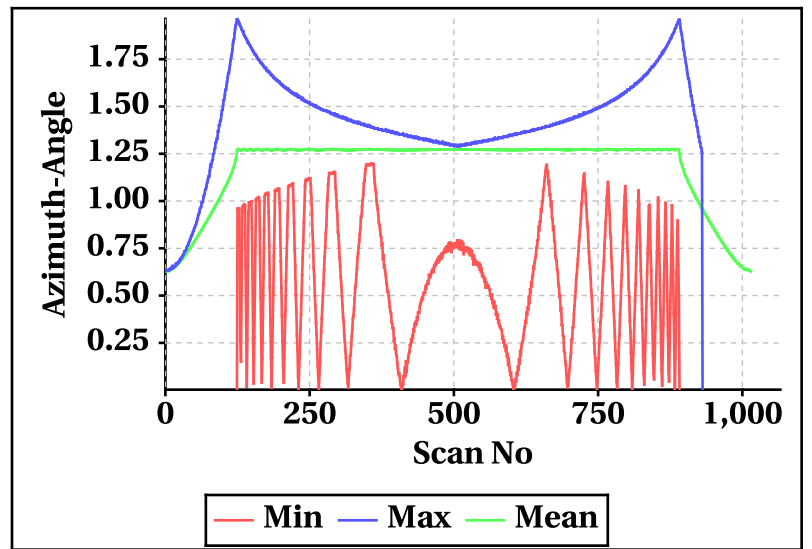
Outer Beam(VV)



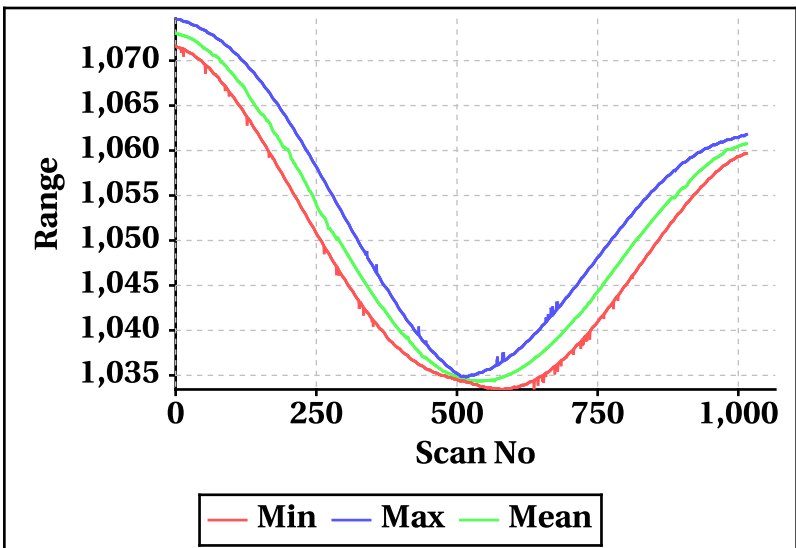
Inner Beam (HH)



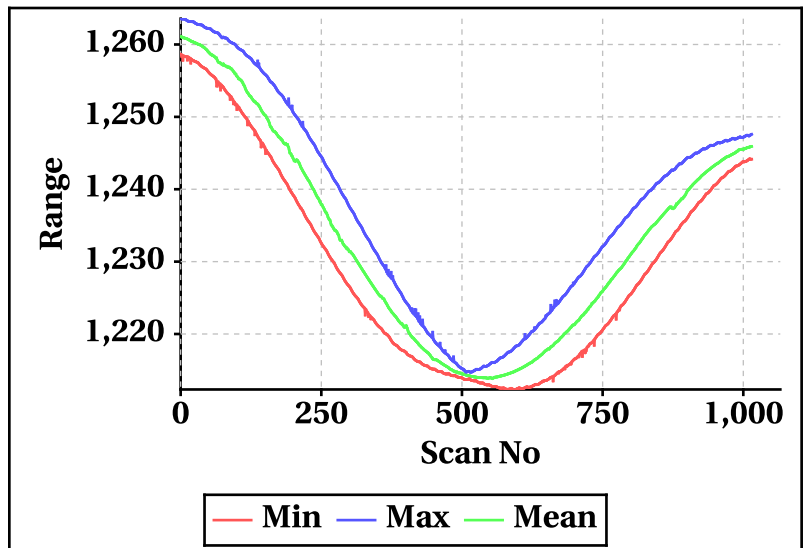
Outer Beam(VV)



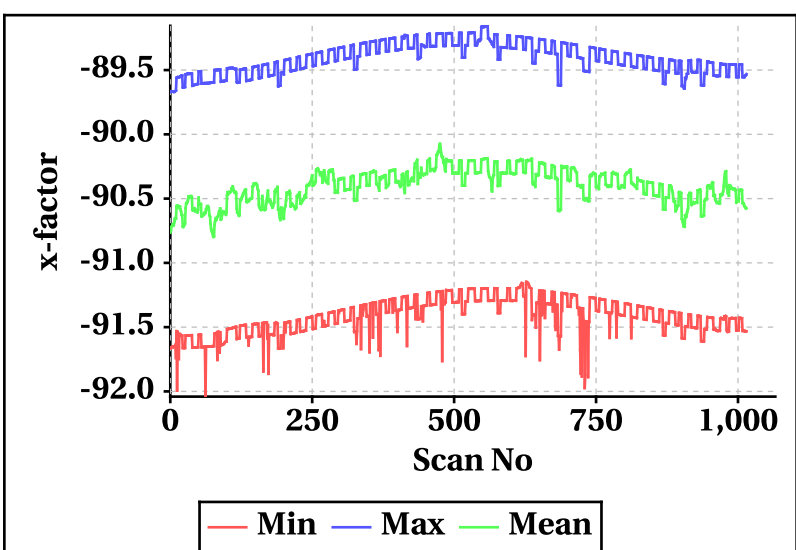
Inner Beam (HH)



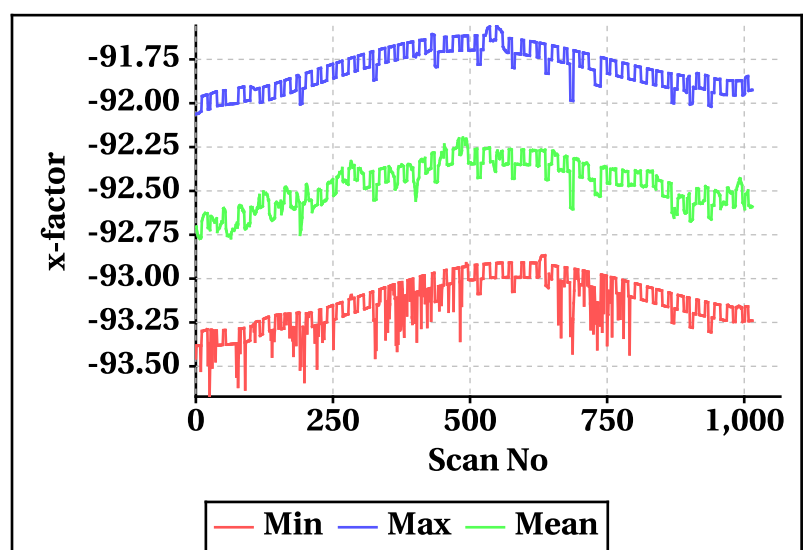
Outer Beam(VV)



Inner Beam (HH)



Outer Beam(VV)

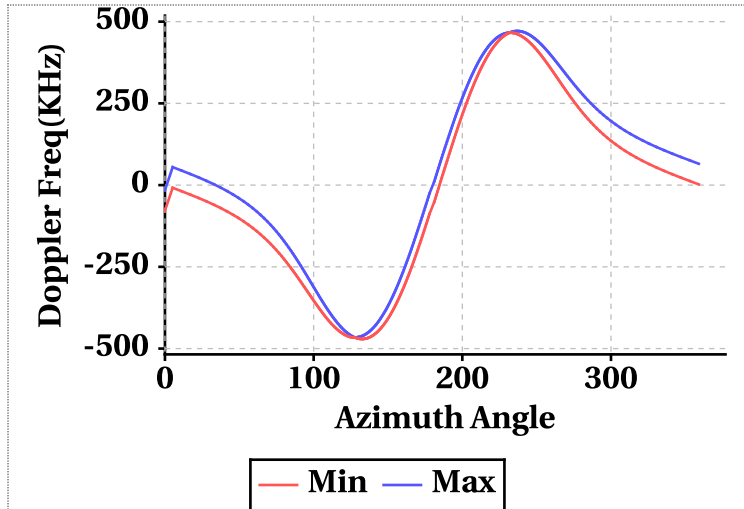


# Doppler Frequency Variation

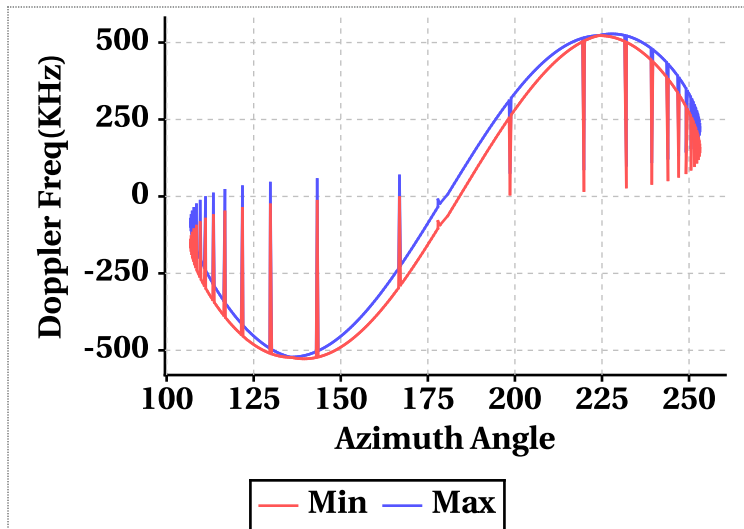
**Doppler Frequency(KHz) variation statistics Over the half Orbit**

|            | Inner Beam (HH) | Outer Beam (VV) |
|------------|-----------------|-----------------|
| <b>Min</b> | -470.68         | -527.54         |
| <b>Max</b> | 471.20          | 528.04          |

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



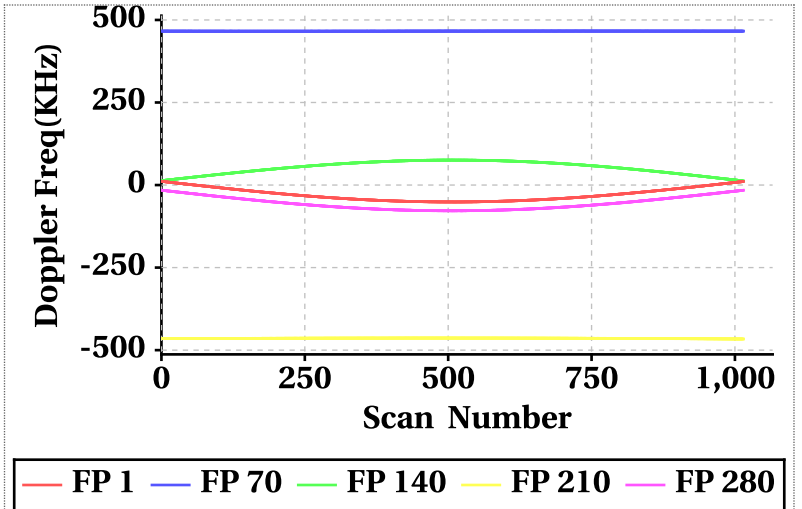
**Footprint wise Doppler frequency variation Outer Beam (VV)**



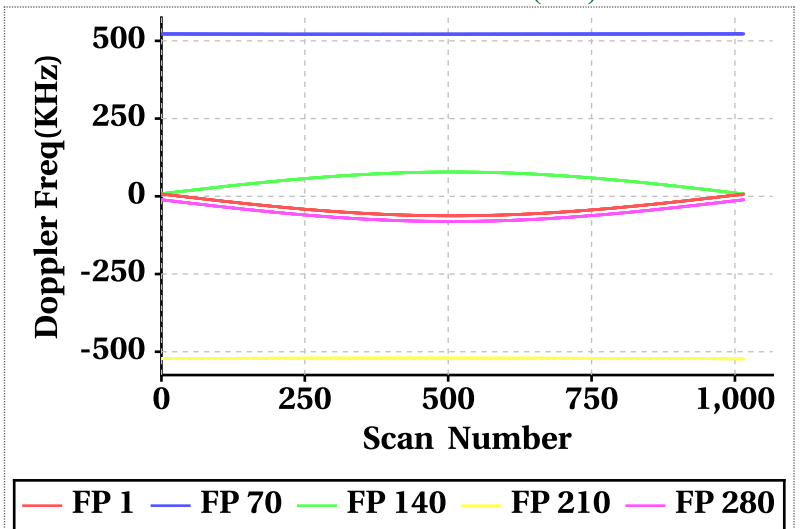
**Doppler Frequency(KHz) variation**

| Doppler_FP  | Inner Beam (HH) |         |         | Outer Beam (VV) |         |         |
|-------------|-----------------|---------|---------|-----------------|---------|---------|
|             | Min             | Max     | Mean    | Min             | Max     | Mean    |
| Doppler_1   | -51.24          | 11.38   | -28.58  | -62.64          | 7.58    | -37.22  |
| Doppler_70  | 465.86          | 466.34  | 466.12  | 521.42          | 522.34  | 521.80  |
| Doppler_140 | 12.48           | 75.60   | 52.69   | 7.54            | 78.22   | 52.54   |
| Doppler_210 | -466.24         | -463.44 | -464.25 | -522.68         | -520.54 | -521.11 |
| Doppler_280 | -78.00          | -15.46  | -55.24  | -81.02          | -10.90  | -55.48  |

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

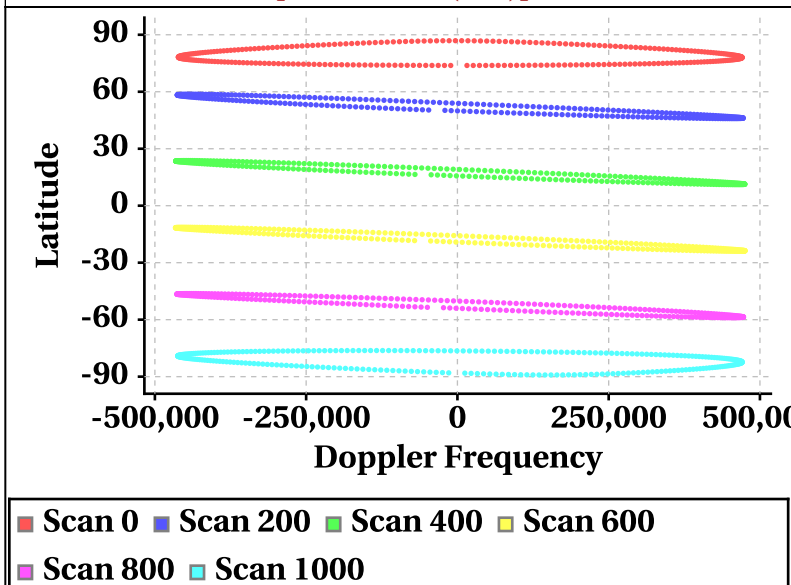


**Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Outer Beam (VV)**

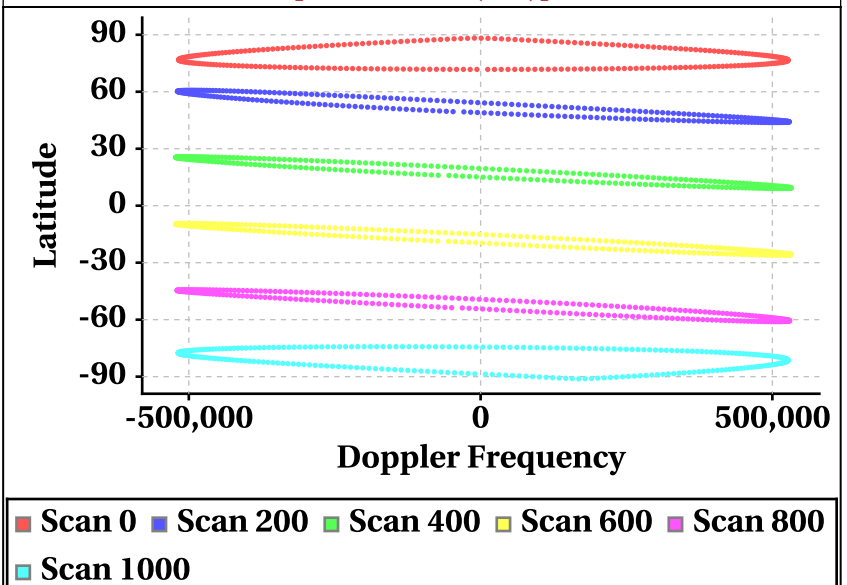


# Latitude Vs Doppler Frequency

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



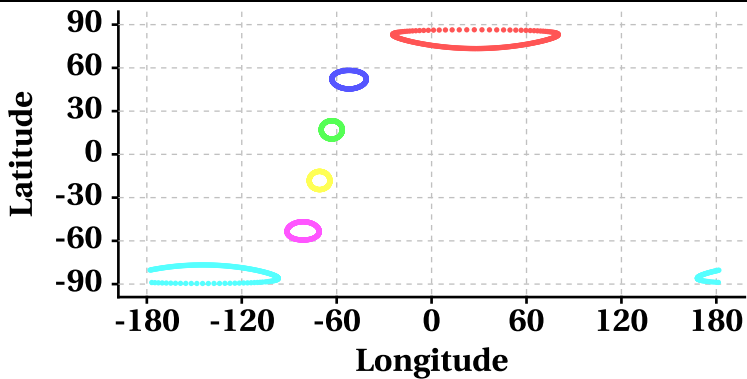
**Doppler Frequency at Scan Interval of 200 [Outer Beam(VV)]**



# Parameter as a function of Latitude

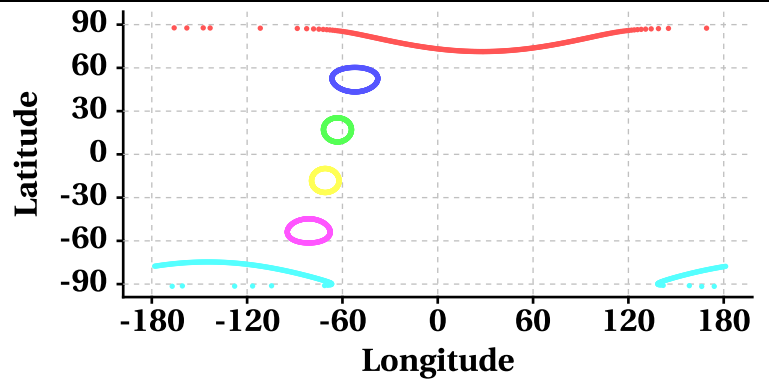
## Latitude Vs Longitude

Scan Trace [Inner Beam(HH)]



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

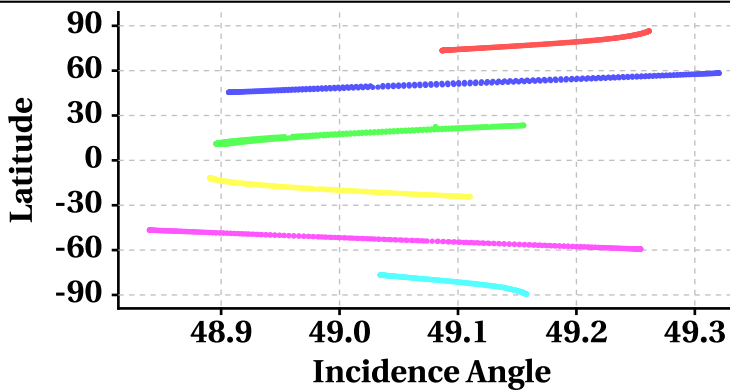
Scan Trace [Outer Beam (VV)]



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

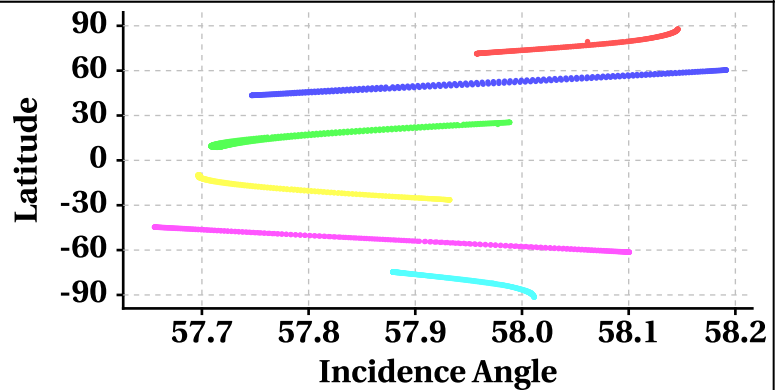
## Latitude Vs Incidence Angle

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



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

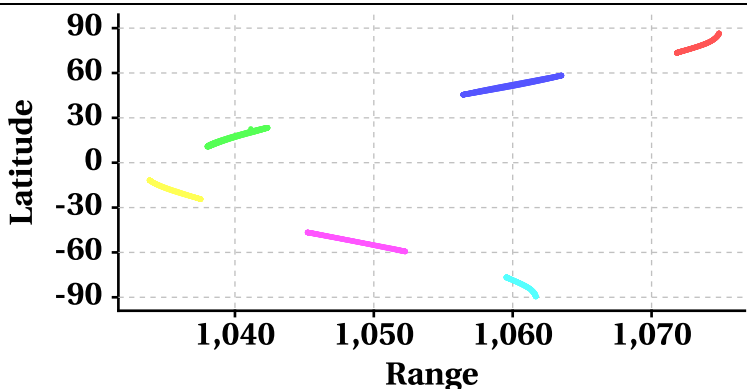
Incidence Angle at Scan Interval of 200 [Outer Beam (VV)]



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

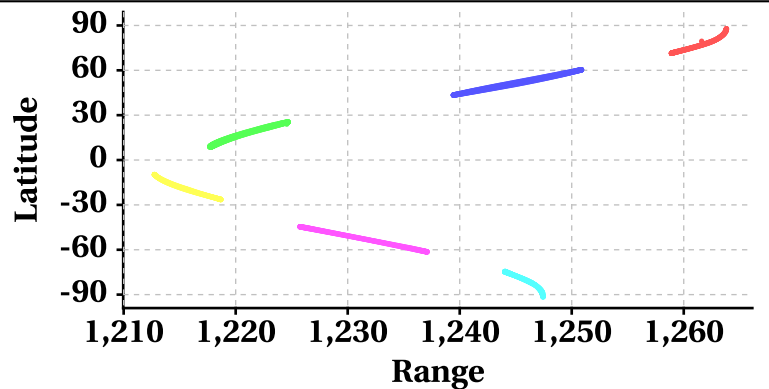
## Latitude Vs Range

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

