

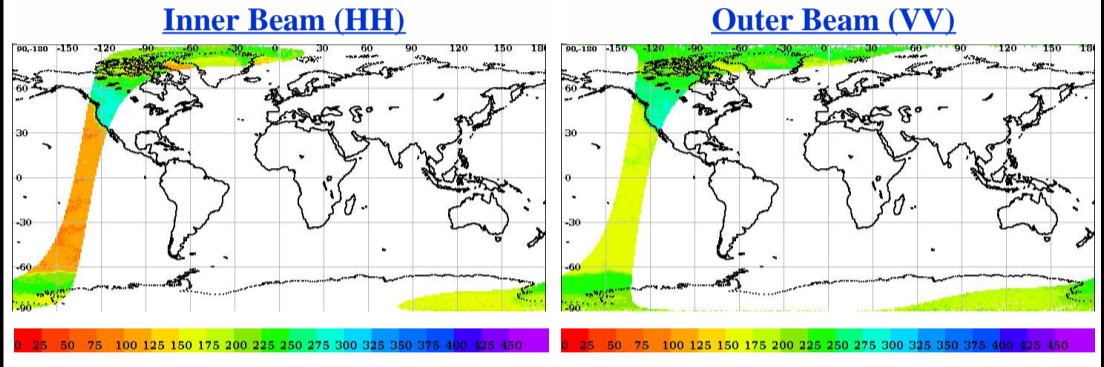
# SCATSAT-1 Scatterometer Level-1B Data Quality Evaluation Report

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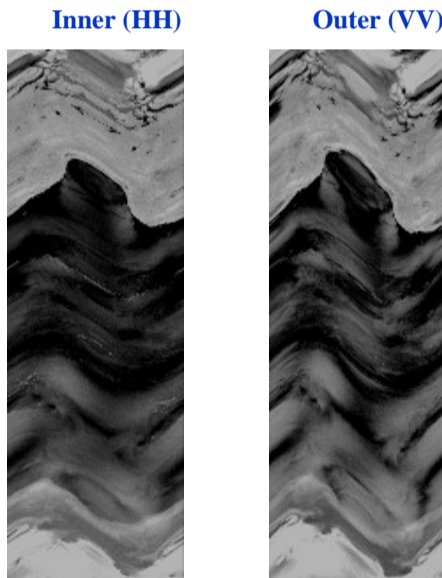
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|                              |               |                              |              |                               |      |
|------------------------------|---------------|------------------------------|--------------|-------------------------------|------|
| <b>Satellite Id</b>          | ScatSat-1     | <b>Start Orbit</b>           | 15406        | <b>Total Scans</b>            | 1016 |
| <b>Sensor Name</b>           | Scatterometer | <b>End Orbit</b>             | 15407        | <b>No of Inner FootPrints</b> | 281  |
| <b>Processor Version</b>     | v1.1.3        | <b>Rev. Number</b>           | 15406_15407  | <b>No Of Outer FootPrints</b> | 282  |
| <b>Half Orbit Direction</b>  | NS            | <b>Data Production Date</b>  | 26-08-2019   | <b>No. Of Inner Slices</b>    | 9    |
| <b>Equator Crossing Date</b> | 24-08-2019    | <b>Equator Crossing Time</b> | 17:14:06.000 | <b>No Of Outer Slices</b>     | 15   |

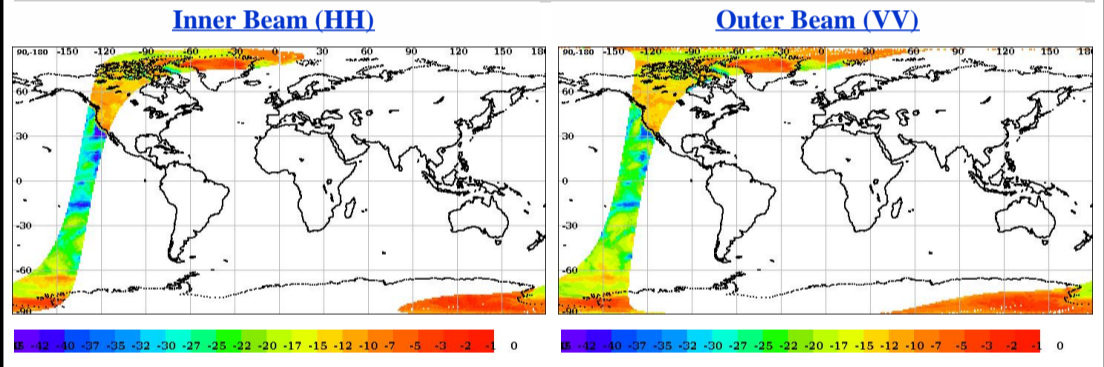
## Brightness Temperature(k) Footprint trace



## Image Snapshot for Inner & Outer Beam



## Sigma0(dB) Footprint trace



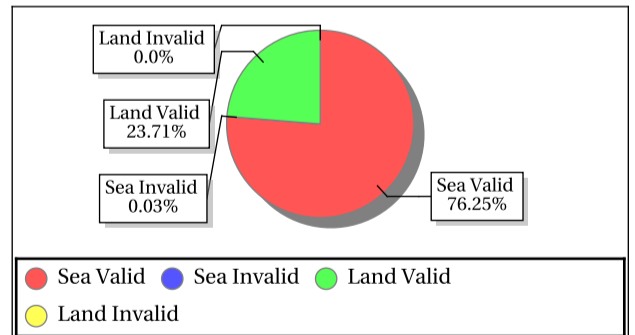
## Invalid and Poor Sigma-0 Quality Flag Statistics for Inner/Outer Slices\*

| Sigma-0 Flags                            | Inner Beam | Outer Beam |
|--|------------|------------|
| Invalid Sigma0(%)                        | 0.03       | 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 (-96dB) (%)         | 0.0        | 0.0        |
| Sigma0 > upper bound (0 dB) (%)          | 0.00       | 0.00       |
| SNR < -65 dB (%)                         | 0.035381   | 0.088623   |

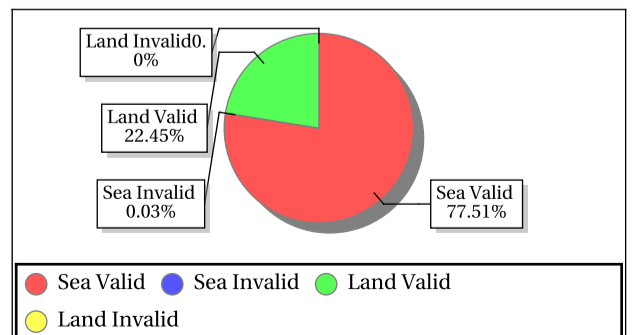
\*DP Format Document

## 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     | -6.30      | -4.83      | -5.69       | 0.48       | 168.09 | 185.59 | 176.98  | 6.39   |
| ANT_1       | -75.00     | 121.00     | Outer | DSC  | Fore    | -9.22      | -7.17      | -8.19       | 0.57       | 167.30 | 209.76 | 190.16  | 10.53  |
| GreenLand_2 | 77.50      | -41.50     | Outer | DSC  | Aft     | -5.72      | -5.16      | -5.45       | 0.24       | 208.32 | 250.63 | 226.50  | 17.93  |
| GreenLand_1 | 74.69      | -42.50     | Outer | DSC  | Aft     | -10.08     | -8.33      | -9.19       | 0.66       | 217.71 | 265.83 | 234.82  | 13.25  |



## 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    | 260.33 | 0.34 | 3.004        | 0.12     | 256.94 | 0.33 | 2.905        | 0.12     | 9.66  | 0.12  | 0.026        | 0.12      | 7.03  | 0.12  | 0.022        |
| <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    | 0.02   | 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>      | -34.29  | 29.50  | 4.78 | 0.089        | -34.23   | 28.54  | 4.95 | 0.025        | -19.95   | 28.89 | 18.32 | 17.310       | -18.55    | 31.58 | 19.58 | 25.167       |

| 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    | 232.27 | 0.28 | 2.435        | 0.09     | 208.05 | 0.29 | 2.447        | 0.09     | 1.34  | 0.09  | 0.007        | 0.09      | 8.02  | 0.09  | 0.014        |
| <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>      | -34.96  | 17.62  | 2.75 | 0.000        | -34.48   | 19.48  | 2.85 | 0.000        | -12.37   | 22.31 | 12.53 | 0.003        | -20.31    | 24.22 | 13.64 | 0.366        |

| 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)

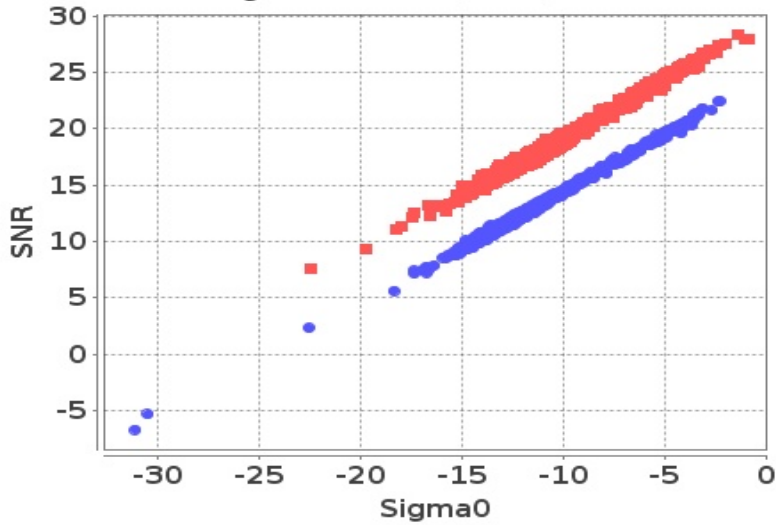
|                              | Inner Beam (HH) |         |         |              | Outer Beam (VV) |         |         |              | Parameter Specifications   |  |         |
|------------------------------|-----------------|---------|---------|--------------|-----------------|---------|---------|--------------|--|--|---------|
|                              | Min             | Max     | Mean    | Bad Occ. (%) | Min             | Max     | Mean    | Bad Occ. (%) | Parameter  | Min  | Max     |
| <b>Incidence Angle (deg)</b> | 48.62           | 49.33   | 48.99   | 0.000        | 57.36           | 58.19   | 57.87   | 0.000        | Inci.(Inner)   | 47.10  | 49.90   |
| <b>Azimuth Diff. (deg)</b>   | 0.0029          | 264.32  | 1.28    | 2.663        | 0.0000          | 298.96  | 1.27    | 3.770        | Inci.(Outer)   | 57.30  | 58.90   |
| <b>Range(Km)</b>             | 1029.26         | 1085.99 | 1051.82 | 0.000        | 1205.86         | 1276.22 | 1235.03 | 5.972        | Azimuth Diff.  | 0.60   | 2.00    |
| <b>X Factor(dbm)</b>         | -91.58          | -89.98  | -90.59  | 0.000        | -93.24          | -92.02  | -92.19  | 0.000        | Range(Inner)   | 1025.00  | 1095.70 |
| <b>Across Distance (Km)</b>  | 15.97           | 16.50   | 16.12   | 0.000        | 21.14           | 22.84   | 21.23   | 2.000        | Range(Outer)   | 1210.00  | 1280.00 |
| <b>Along Distance (Km)</b>   | 18.79           | 1188.65 | 22.01   | 3.000        | 18.45           | 1569.21 | 22.67   | 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   |
|                              |                 |         |         |              |                 |         |         |              | <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

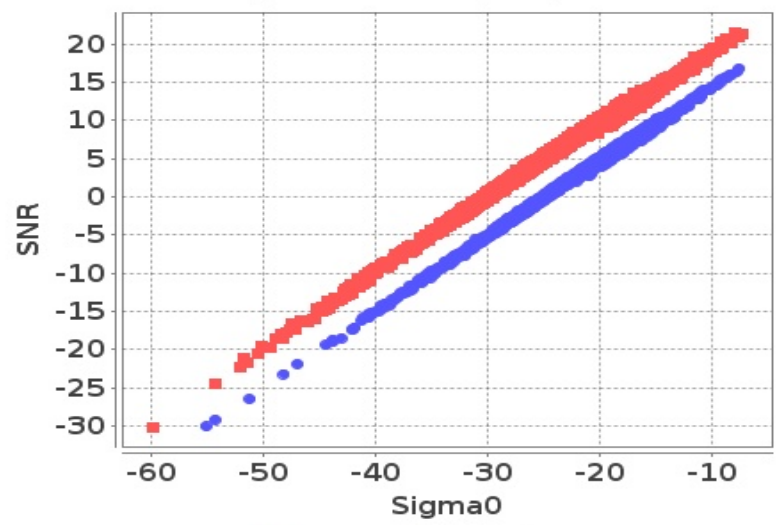
Sigma0 Vs SNR (Land)



■ Inner ● Outer

Footprint-Sea

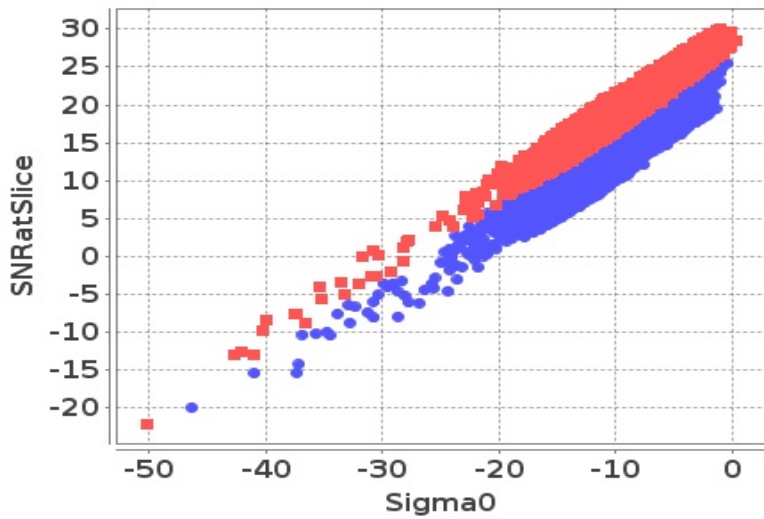
Sigma0 Vs SNR (Sea)



■ Inner ● Outer

Slice-Land

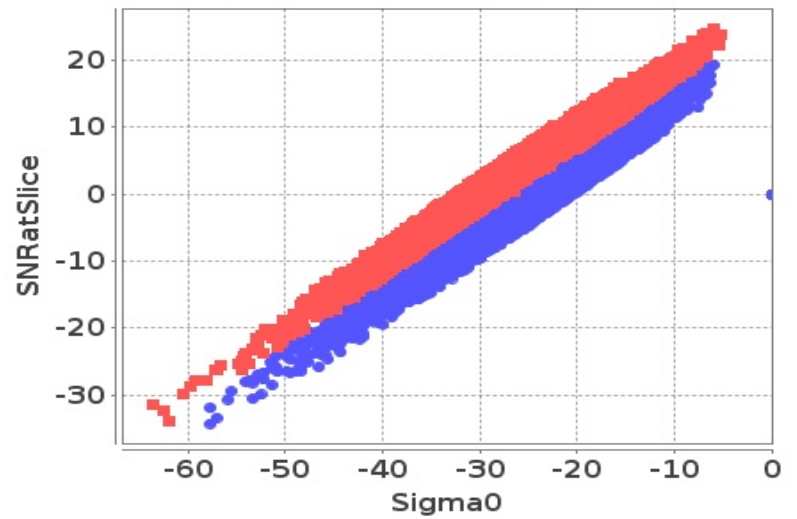
Sigma0 Vs SNRatSlice (Land)



■ Inner ● Outer

Slice-Sea

Sigma0 Vs SNRatSlice (Sea)

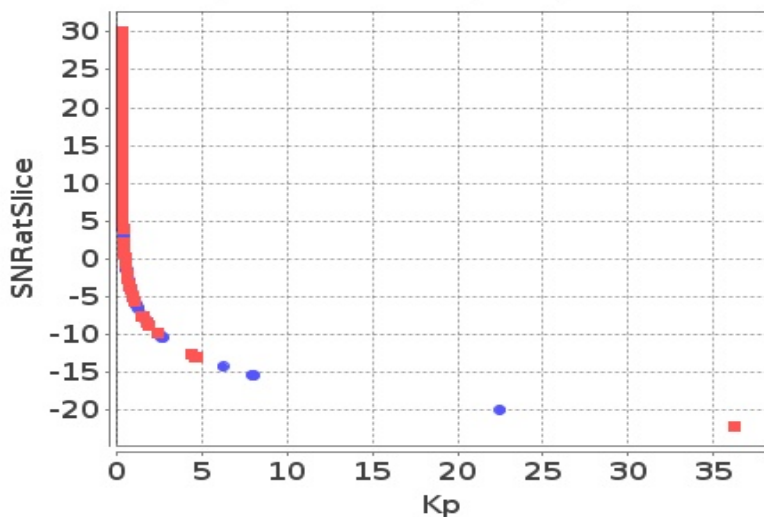


■ Inner ● Outer

## Sigma0 Behaviour (Kp Vs SNR)

Slice

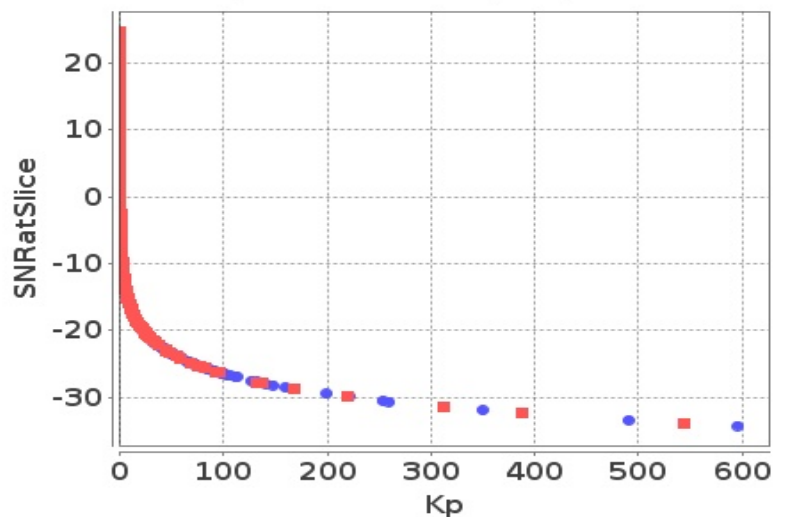
Kp Vs SNRatSlice (Land)



■ Inner ● Outer

Slice

Kp Vs SNRatSlice (Sea)



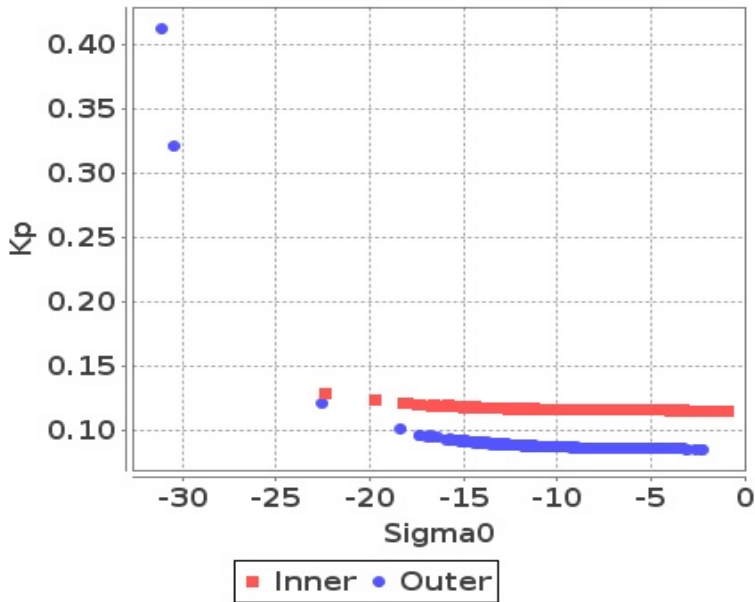
■ Inner ● Outer



# Sigma0 Behaviour(Sigma0 Vs Kp)

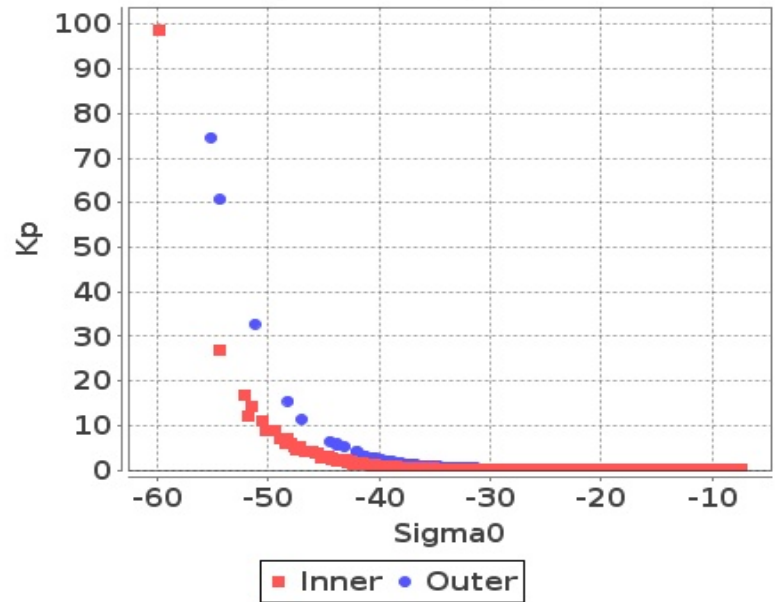
## Footprint-Land

### Sigma0 Vs Kp (Land)



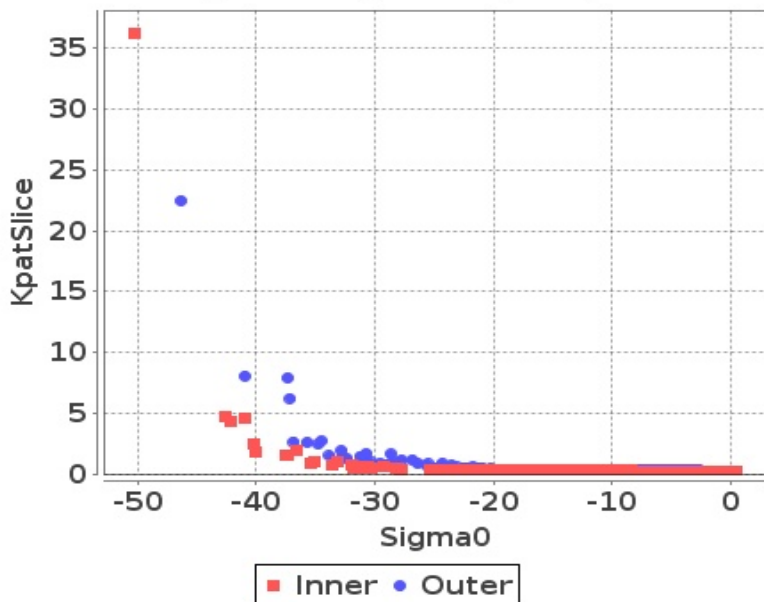
## Footprint-Sea

### Sigma0 Vs Kp (Sea)



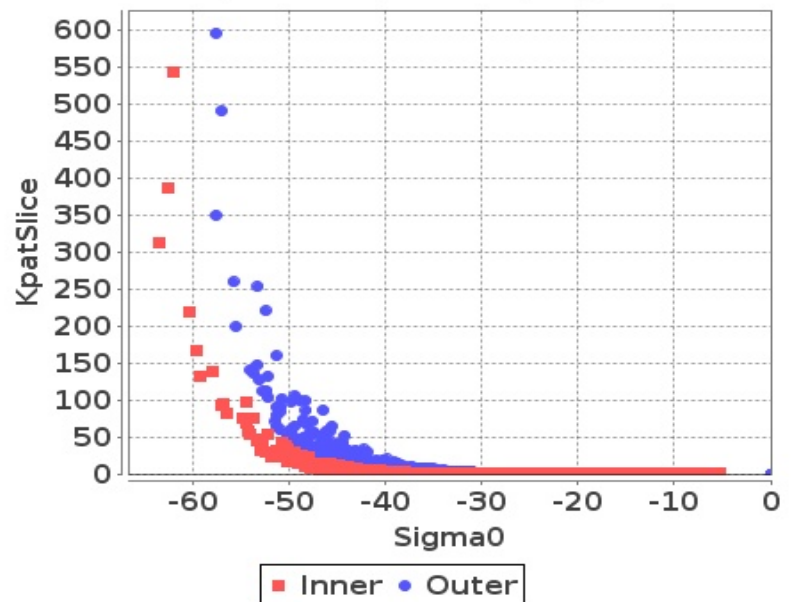
## Slice-Land

### Sigma0 Vs KpatSlice (Land)



## Slice-Sea

### Sigma0 Vs KpatSlice (Sea)



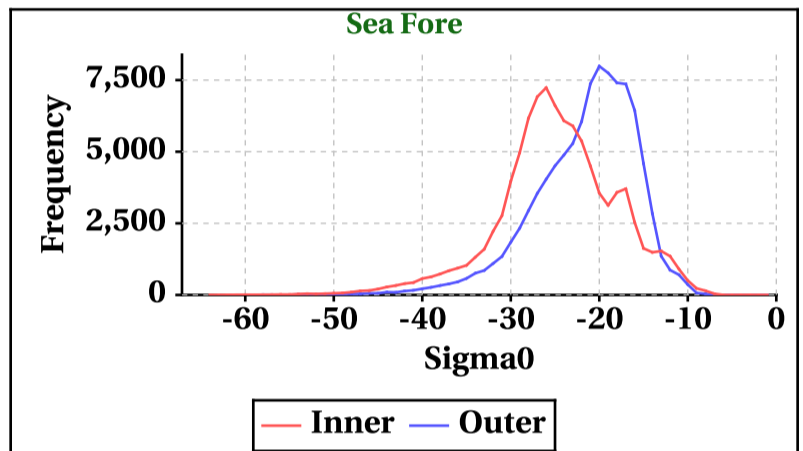
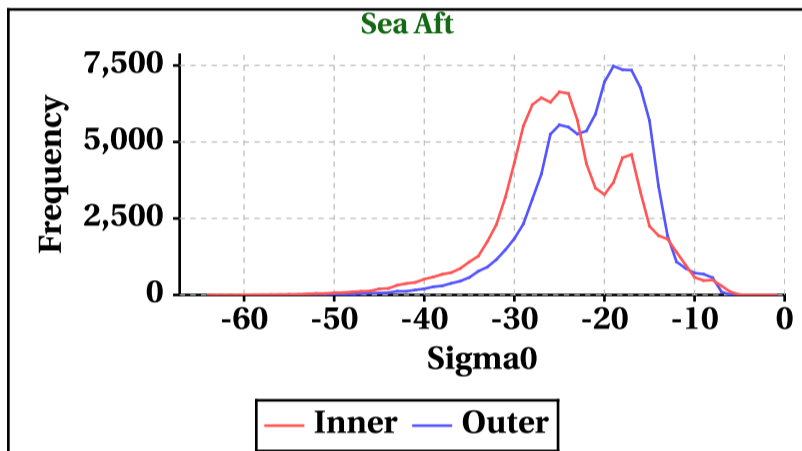
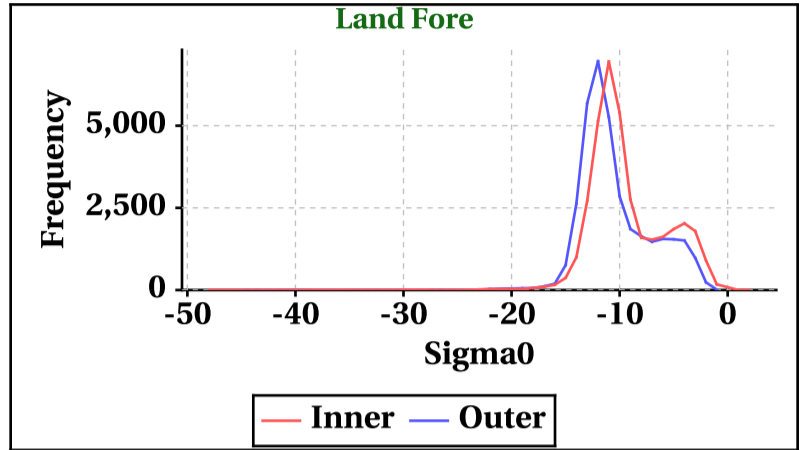
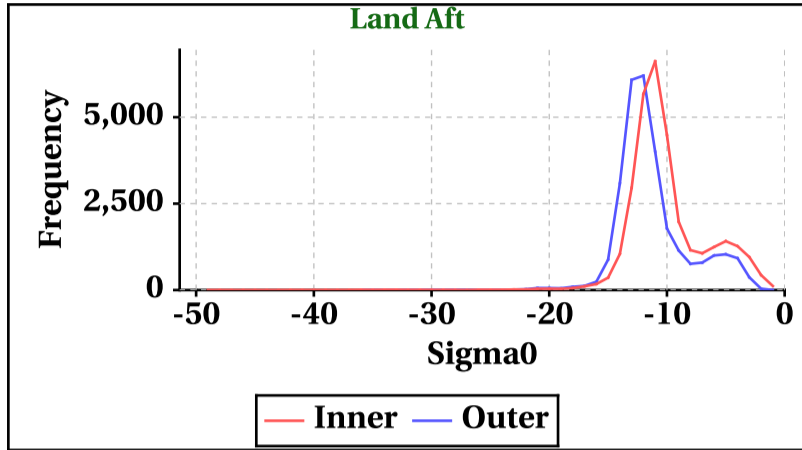


# Dynamic Range (Data Histograms)

## Sigma0(db)

| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -49      | -48       | -64     | -64      |
| Max             | 0        | 2         | 0       | 0        |

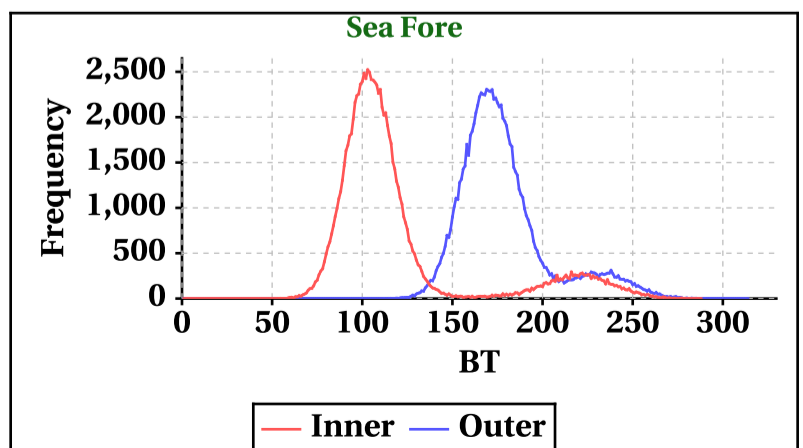
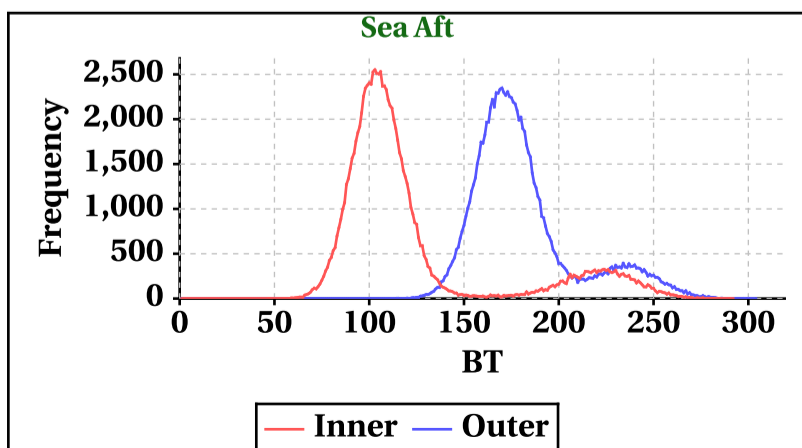
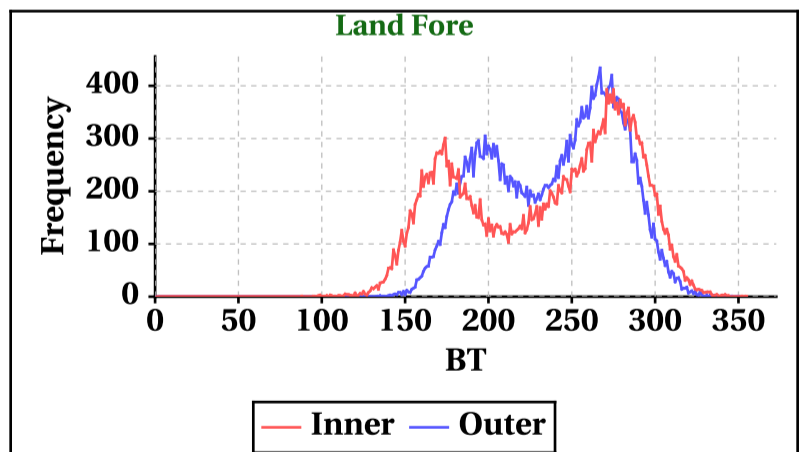
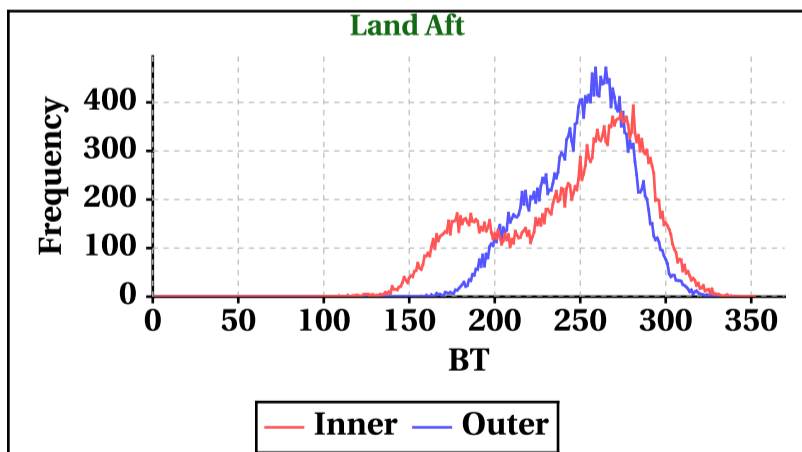
| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -36      | -45       | -59     | -59      |
| Max             | 0        | 0         | 0       | 0        |



## Brightness Temperature(K)

| Inner Beam(HH) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 352      | 355       | 292     | 288      |

| Outer Beam(VV) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 342      | 350       | 304     | 314      |

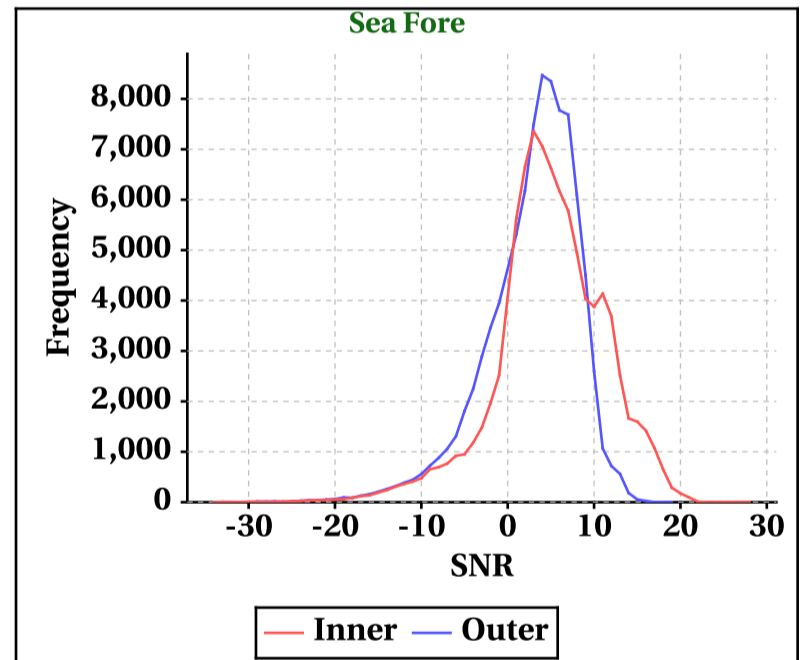
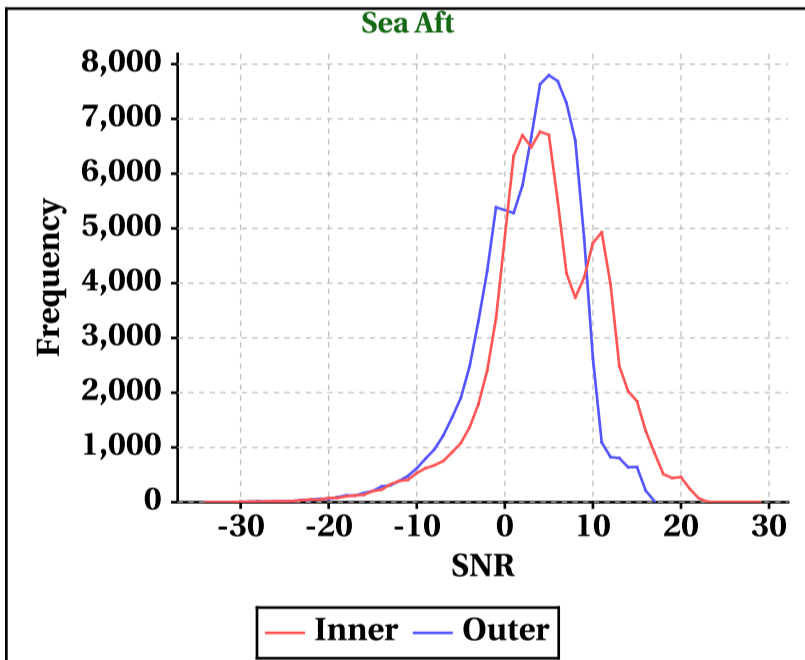
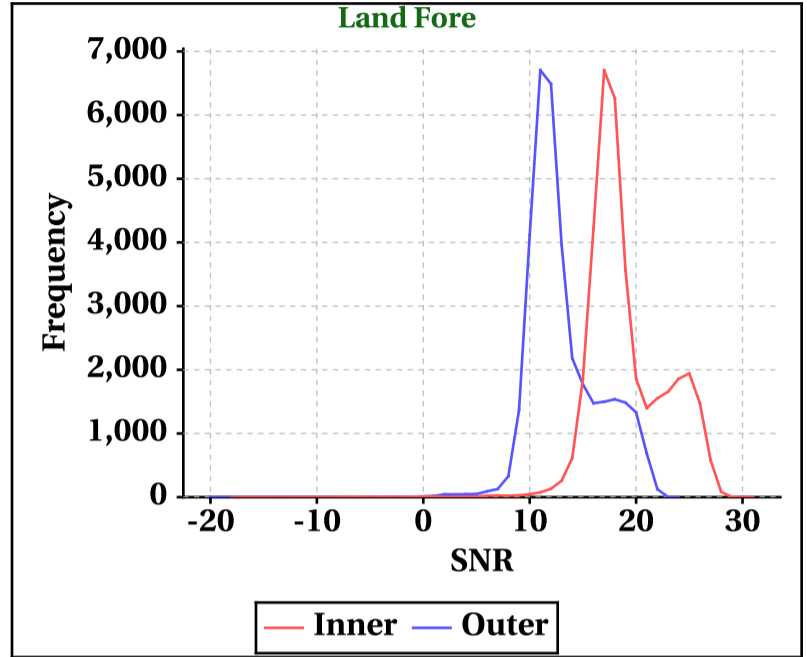
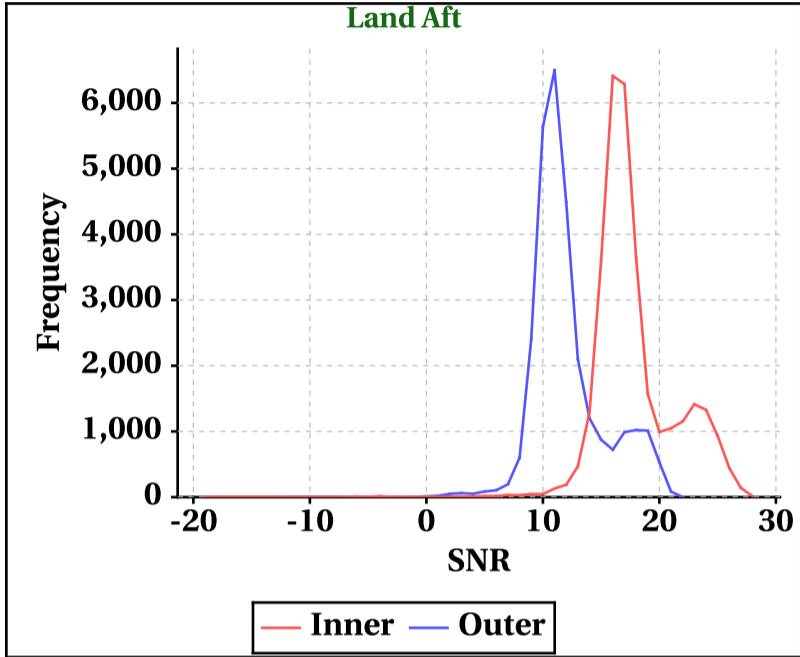


# Dynamic Range (Data Histograms)

## SNR(dBm)

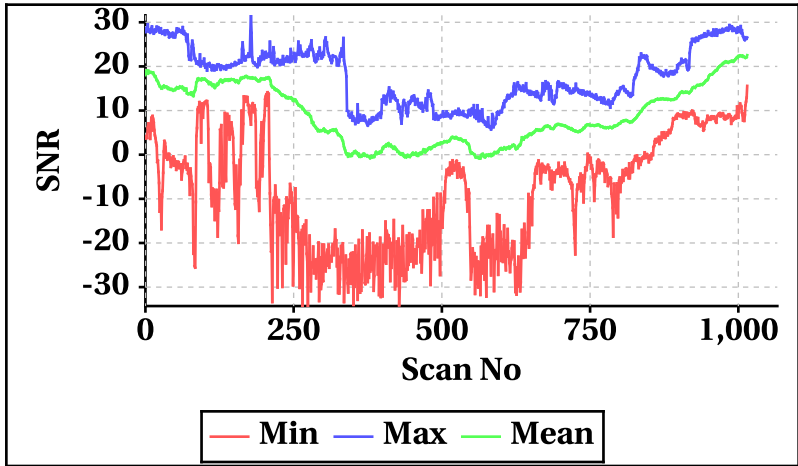
| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -19      | -18       | -34     | -34      |
| Max             | 28       | 31        | 29      | 28       |

| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -12      | -20       | -34     | -34      |
| Max             | 22       | 24        | 17      | 19       |

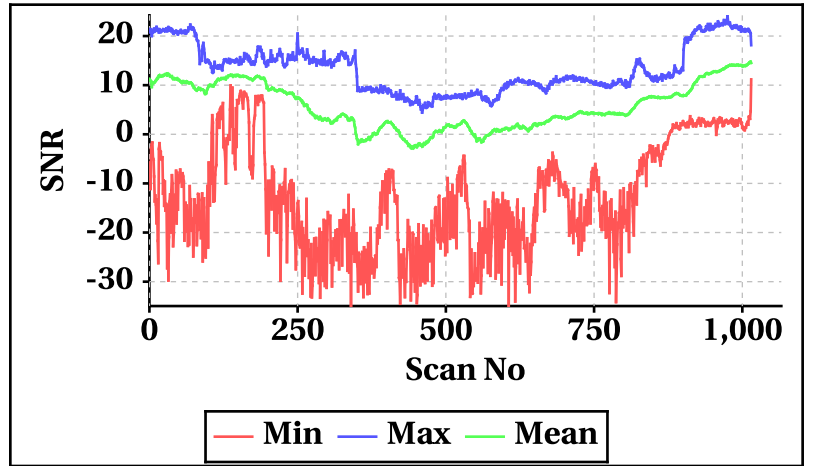


## Orbit-wise behaviour of SNR

**Inner Beam (HH)**

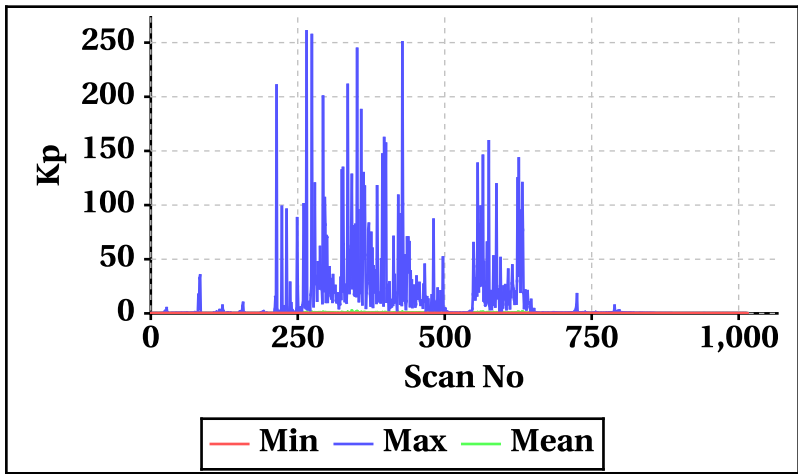


**Outer Beam(VV)**

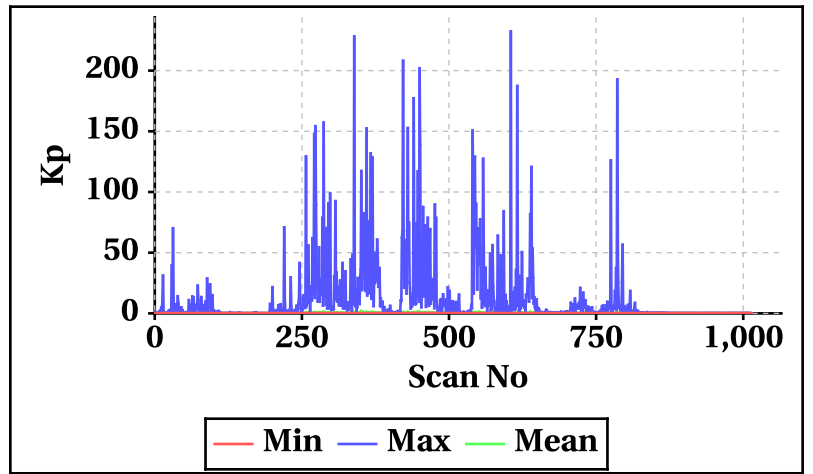


## Orbit-wise behaviour of Kp,Kpa,Kpb,Kpc

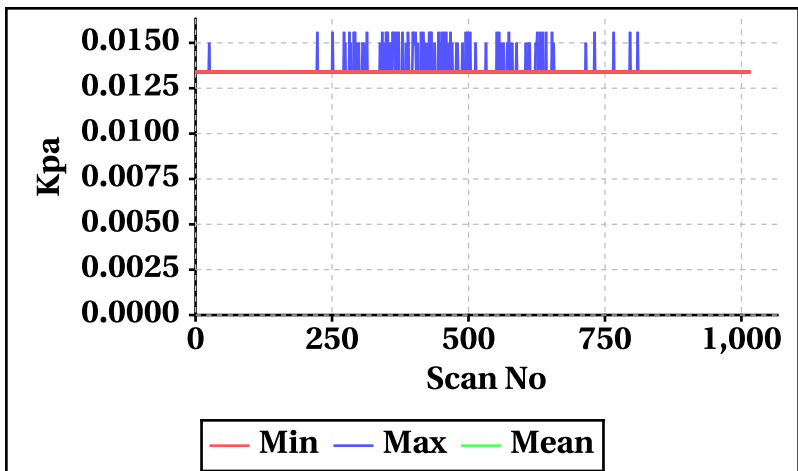
**Inner Beam(HH)**



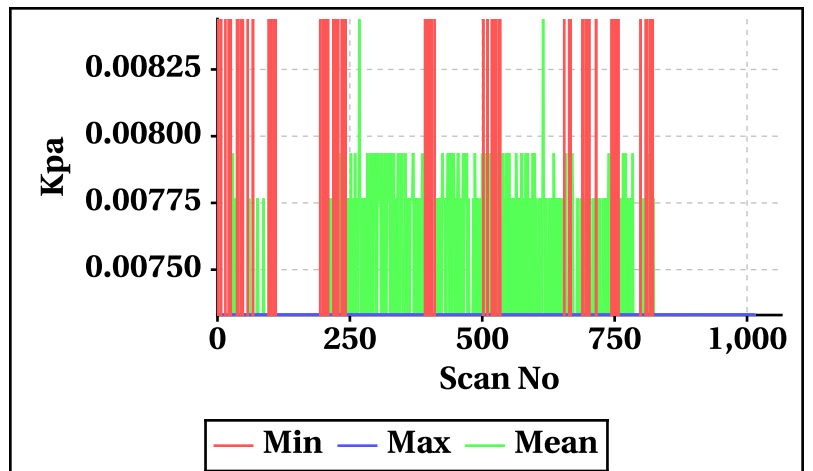
**Outer Beam(VV)**



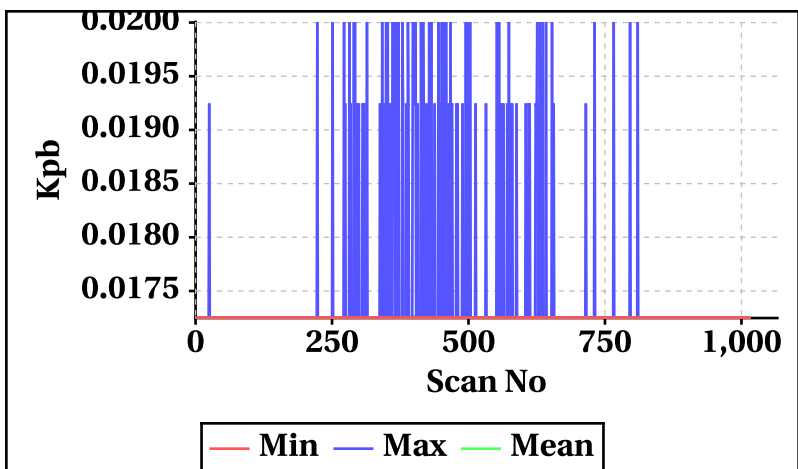
**Inner Beam(HH)**



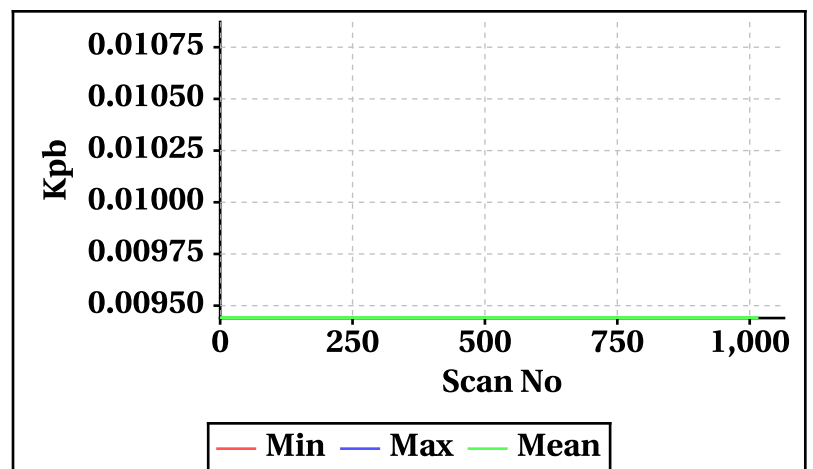
**Outer Beam(VV)**



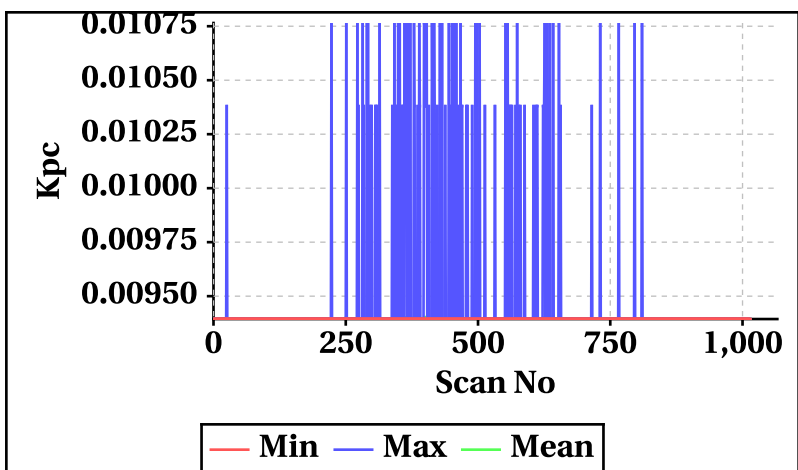
**Inner Beam(HH)**



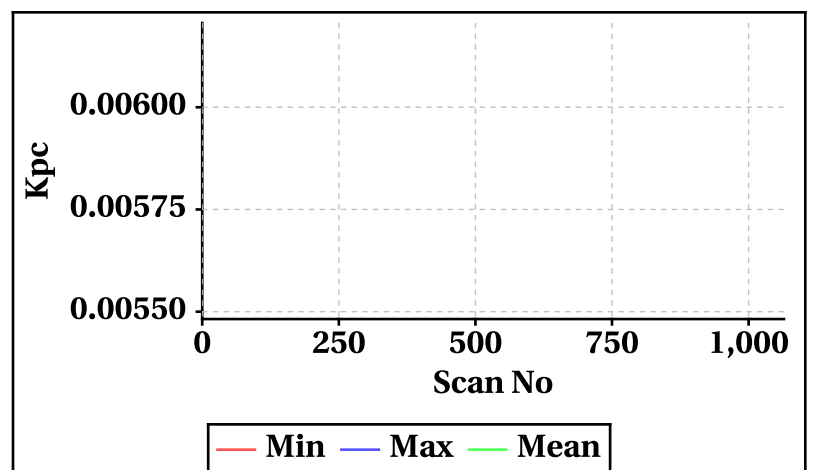
**Outer Beam(VV)**



**Inner Beam(HH)**



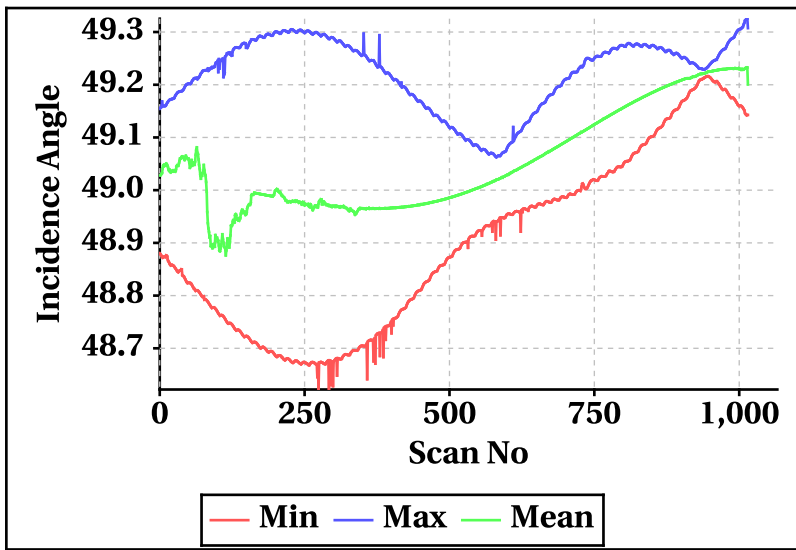
**Outer Beam(VV)**



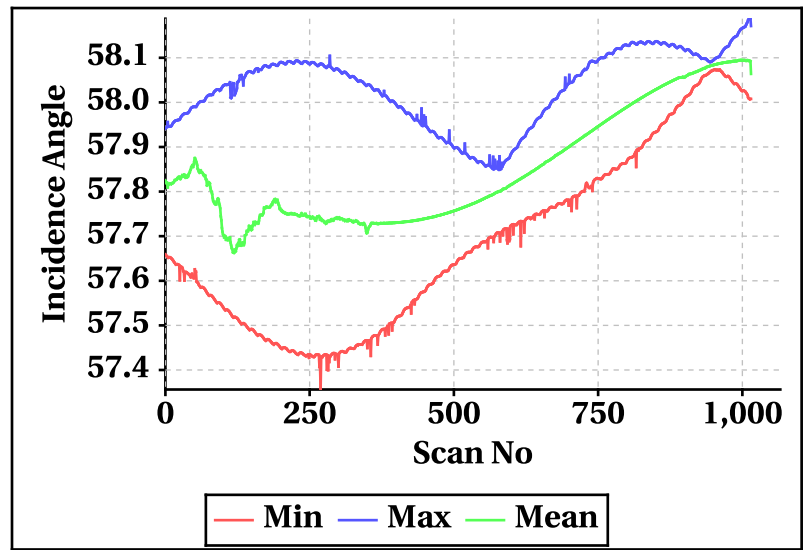


Orbit-wise behaviour of Incidence, Azimuth, Range, X-Factor

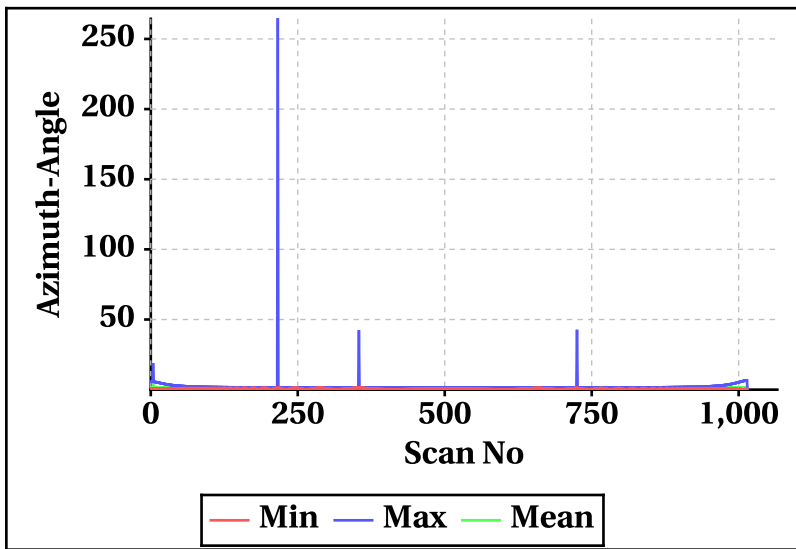
Inner Beam (HH)



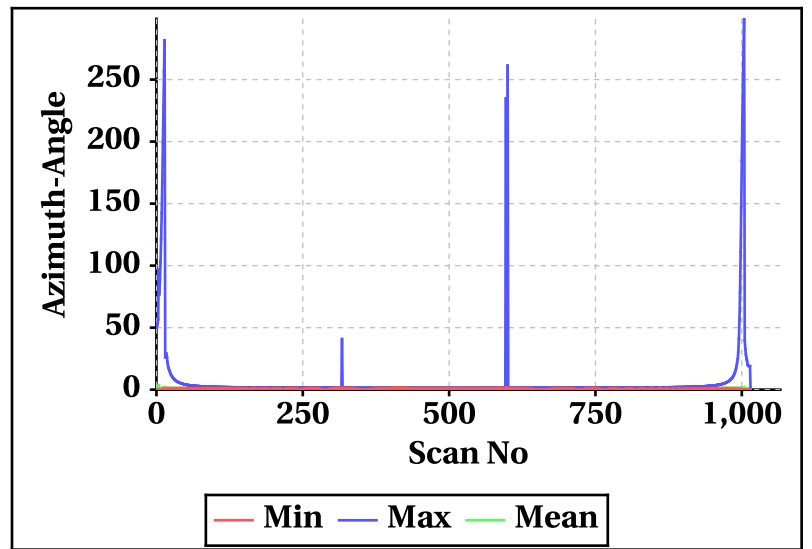
Outer Beam(VV)



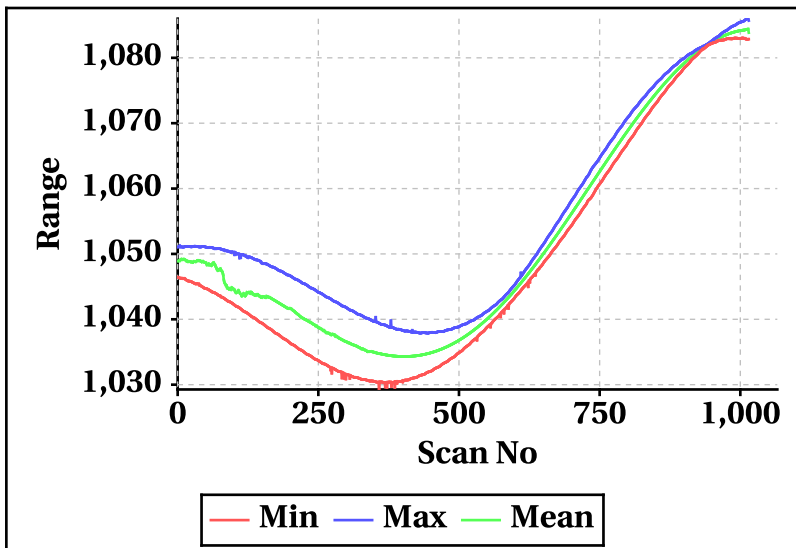
Inner Beam (HH)



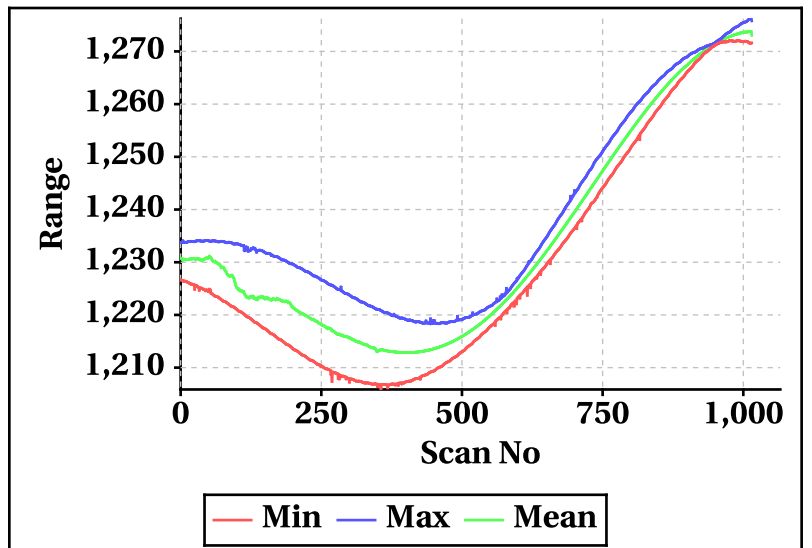
Outer Beam(VV)



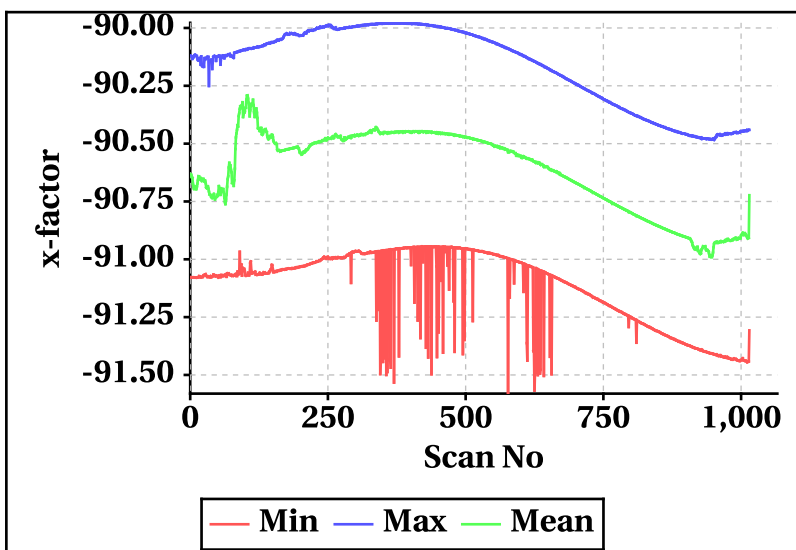
Inner Beam (HH)



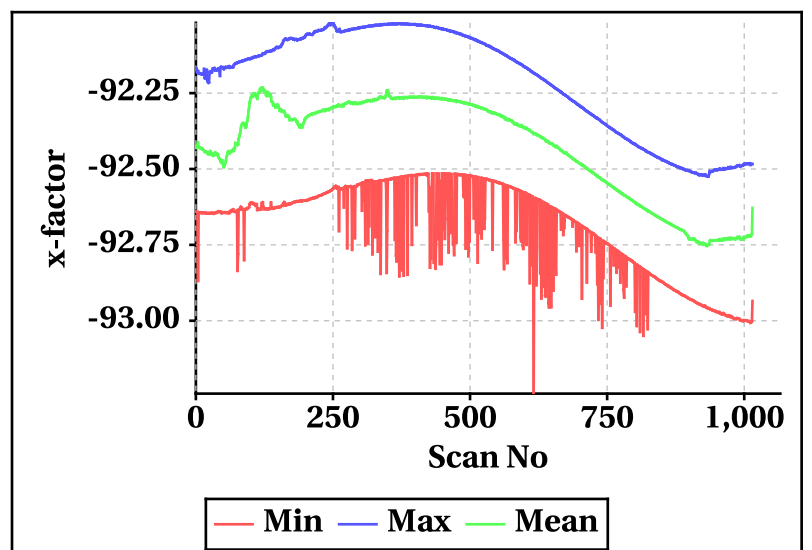
Outer Beam(VV)



Inner Beam (HH)



Outer Beam(VV)

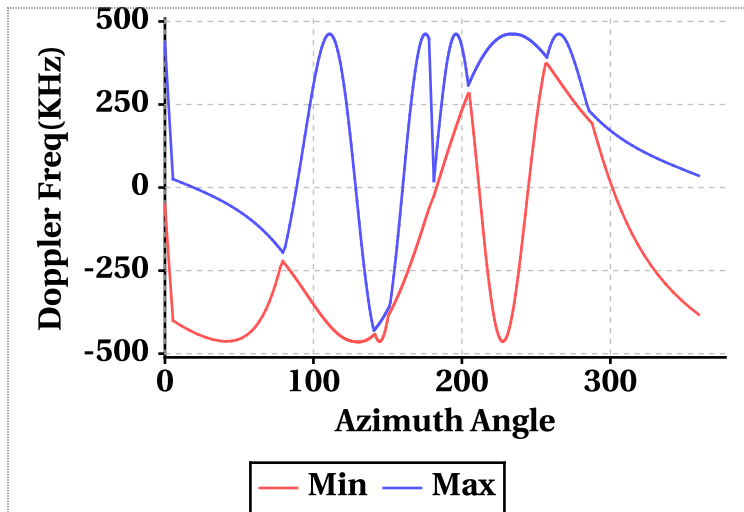


# Doppler Frequency Variation

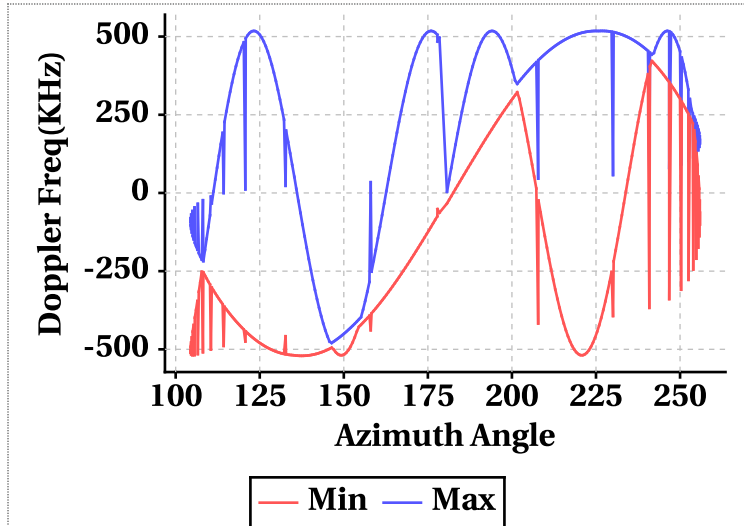
Doppler Frequency(KHz) variation statistics Over the half Orbit

|     | Inner Beam (HH) | Outer Beam (VV) |
|-----|-----------------|-----------------|
| Min | -464.90         | -520.66         |
| Max | 462.04          | 518.10          |

Footprint wise Doppler frequency variation Inner Beam (HH)



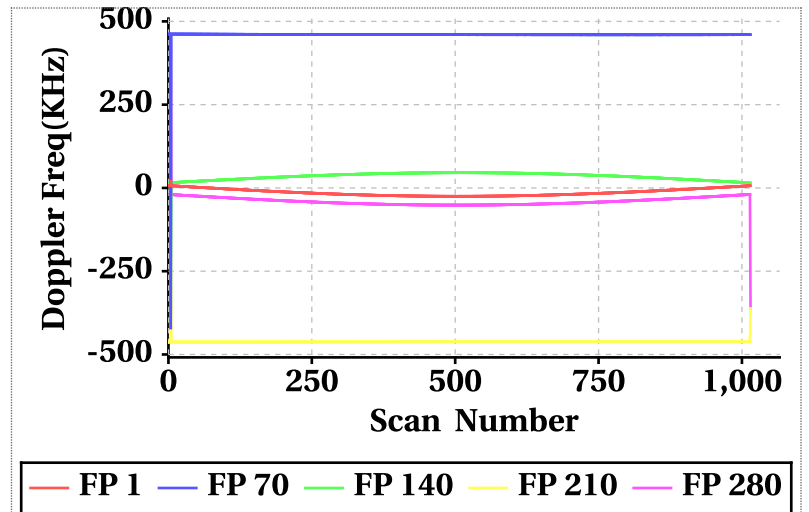
Footprint wise Doppler frequency variation Outer Beam (VV)



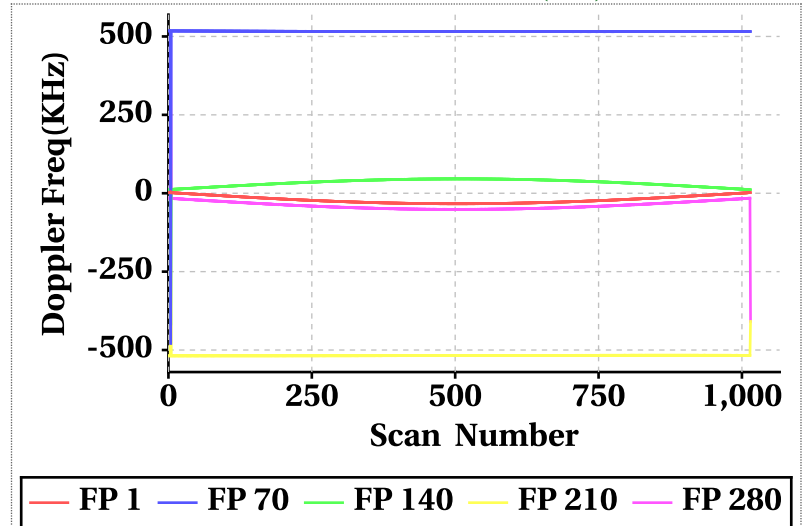
Doppler Frequency(KHz) variation

| Doppler_FP  | Inner Beam (HH) |        |         | Outer Beam (VV) |        |         |
|-------------|-----------------|--------|---------|-----------------|--------|---------|
|             | Min             | Max    | Mean    | Min             | Max    | Mean    |
| Doppler_1   | -25.16          | 20.16  | -13.44  | -33.50          | 3.66   | -20.46  |
| Doppler_70  | -420.24         | 461.96 | 459.56  | -478.54         | 517.70 | 514.91  |
| Doppler_140 | -361.96         | 45.86  | 34.30   | -417.28         | 45.88  | 32.85   |
| Doppler_210 | -462.50         | 96.28  | -461.00 | -518.46         | 89.12  | -516.92 |
| Doppler_280 | -361.72         | 437.64 | -39.73  | -408.84         | 484.08 | -38.44  |

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

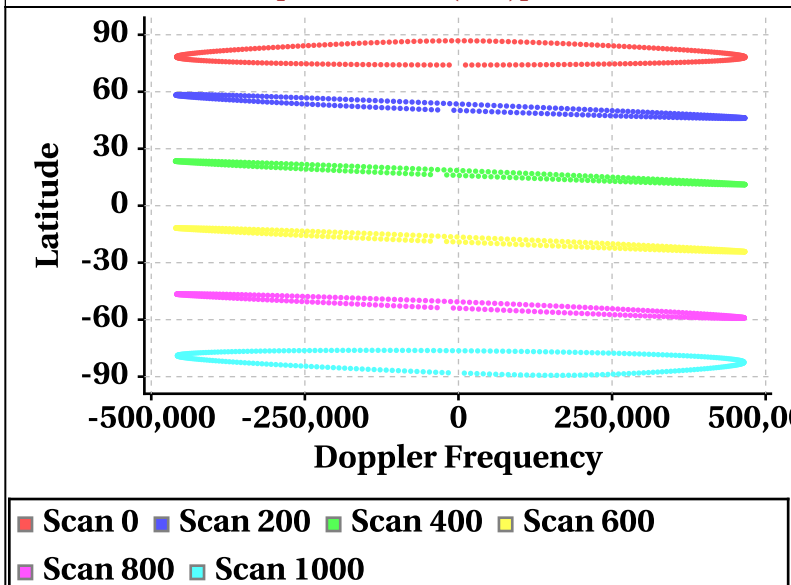


Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Outer Beam (VV)

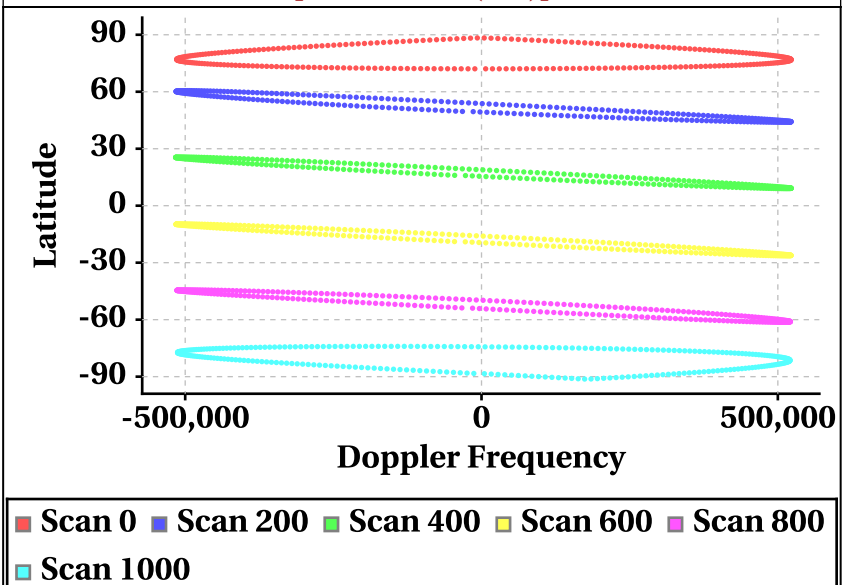


# Latitude Vs Doppler Frequency

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



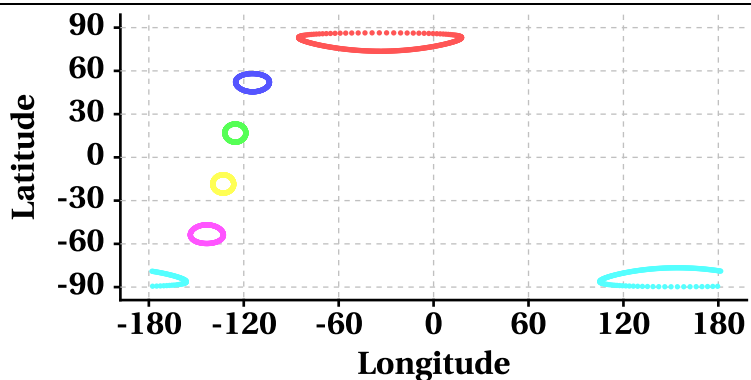
Doppler Frequency at Scan Interval of 200 [Outer Beam(VV)]



# Parameter as a function of Latitude

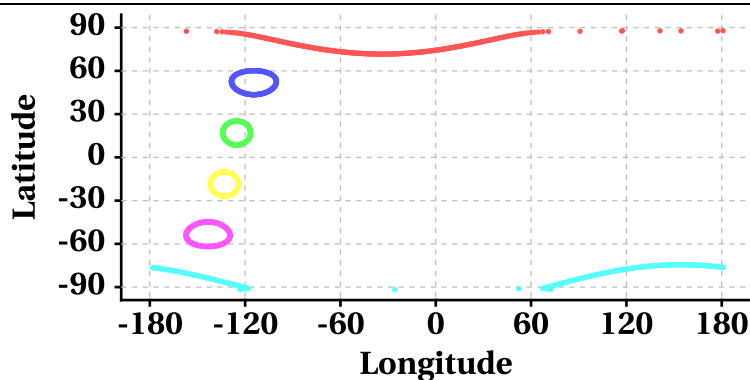
## Latitude Vs Longitude

Scan Trace [Inner Beam(HH)]



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

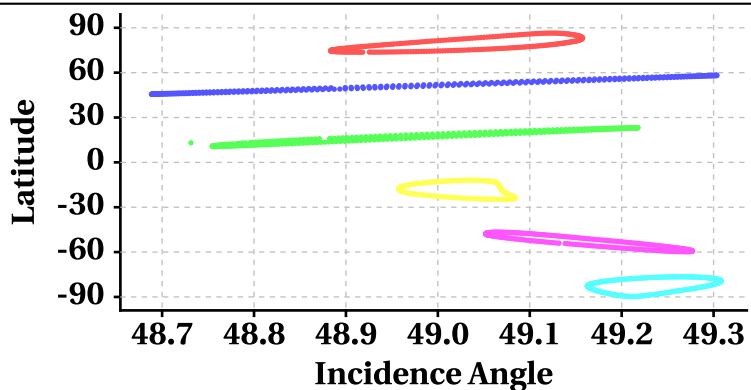
Scan Trace [Outer Beam (VV)]



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

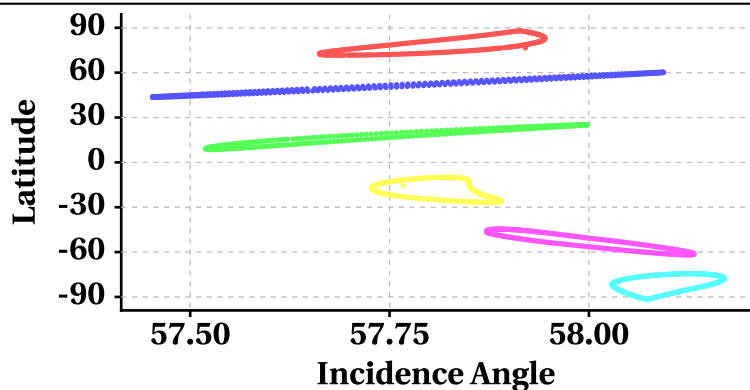
## Latitude Vs Incidence Angle

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



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

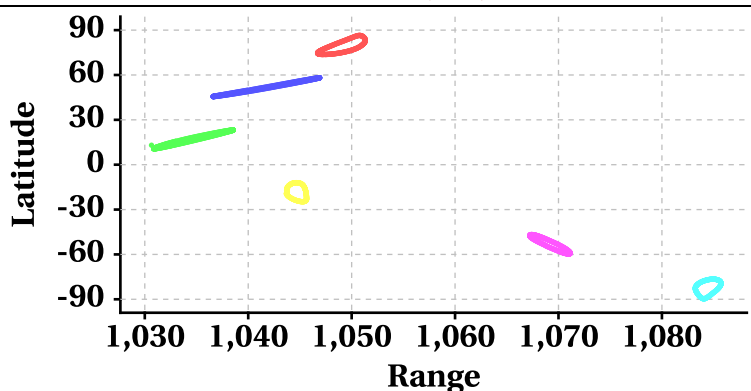
Incidence Angle at Scan Interval of 200 [Outer Beam (VV)]



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

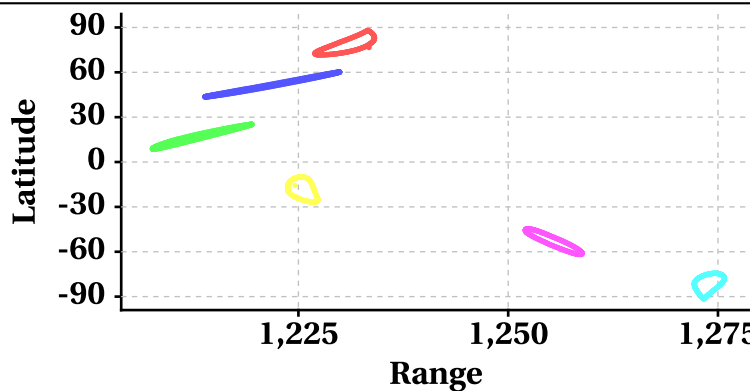
## Latitude Vs Range

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

