

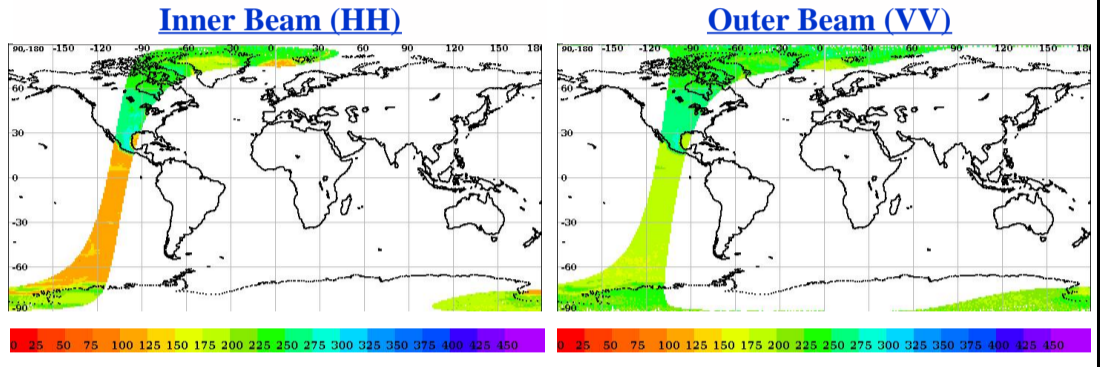
# SCATSAT-1 Scatterometer Level-1B Data Quality Evaluation Report

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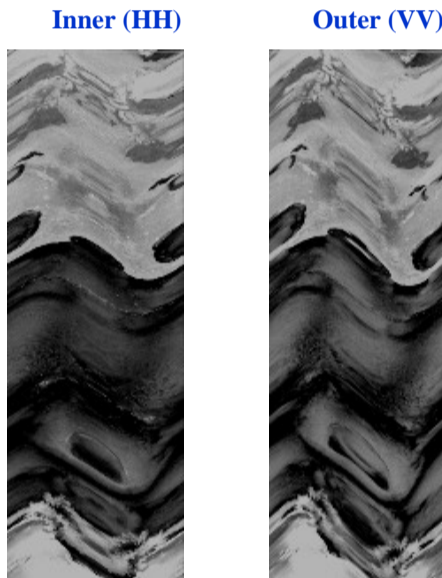
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|                              |               |                              |              |                               |      |
|------------------------------|---------------|------------------------------|--------------|-------------------------------|------|
| <b>Satellite Id</b>          | ScatSat-1     | <b>Start Orbit</b>           | 17464        | <b>Total Scans</b>            | 1017 |
| <b>Sensor Name</b>           | Scatterometer | <b>End Orbit</b>             | 17465        | <b>No of Inner FootPrints</b> | 281  |
| <b>Processor Version</b>     | v1.1.4        | <b>Rev. Number</b>           | 17464_17465  | <b>No Of Outer FootPrints</b> | 282  |
| <b>Half Orbit Direction</b>  | NS            | <b>Data Production Date</b>  | 13-01-2020   | <b>No. Of Inner Slices</b>    | 9    |
| <b>Equator Crossing Date</b> | 13-01-2020    | <b>Equator Crossing Time</b> | 15:27:47.000 | <b>No Of Outer Slices</b>     | 15   |

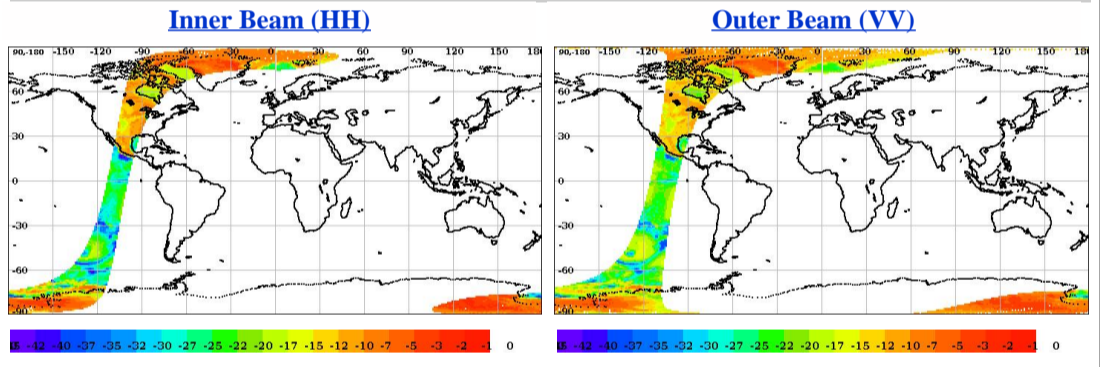
## Brightness Temperature(k) Footprint trace



## Image Snapshot for Inner & Outer Beam



## Sigma0(dB) Footprint trace



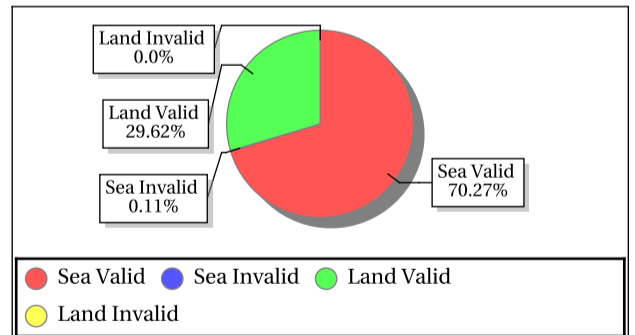
## Invalid and Poor Sigma-0 Quality Flag Statistics for Inner/Outer Slices\*

| Sigma-0 Flags                                   | Inner Beam | Outer Beam |
|---|------------|------------|
| <b>Invalid Sigma0(%)</b>                        | 0.11       | 0.11       |
| <b>Data Not Available From Payload (%)</b>      | 100.0      | 99.89328   |
| <b>Slice not within sample array limits (%)</b> | 0.00       | 0.11       |
| <b>C(S+N) - C(N) &lt; 0.1 (%)</b>               | 0.00       | 0.00       |
| <b>Poor Sigma0(%)</b>                           | 22.22      | 13.34      |
| <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>                      | 0.037438   | 0.084509   |

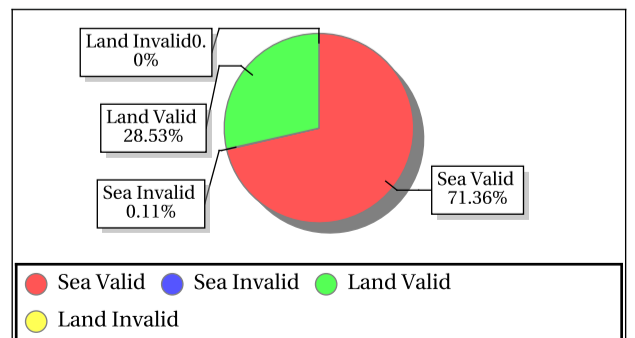
\*DP Format Document

## 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     | -5.79      | -5.10      | -5.46       | 0.29       | 161.28 | 194.21 | 177.67  | 12.68  |
| GreenLand_2 | 77.50      | -41.50     | Inner | DSC  | Fore    | -15.51     | -3.87      | -6.62       | 3.69       | 160.59 | 266.46 | 201.29  | 34.48  |
| GreenLand_1 | 74.69      | -42.50     | Inner | DSC  | Aft     | -10.72     | -8.55      | -9.44       | 0.62       | 176.95 | 214.20 | 193.91  | 9.17   |
| GreenLand_1 | 74.69      | -42.50     | Inner | DSC  | Fore    | -9.97      | -7.12      | -8.88       | 0.72       | 146.44 | 219.47 | 191.83  | 19.03  |
| GreenLand_2 | 77.50      | -41.50     | Outer | DSC  | Aft     | -5.90      | -5.06      | -5.38       | 0.37       | 212.28 | 239.49 | 227.97  | 11.49  |
| GreenLand_3 | 71.55      | -42.45     | Outer | DSC  | Aft     | -11.77     | -9.96      | -10.90      | 0.46       | 201.11 | 257.15 | 228.80  | 14.63  |
| GreenLand_3 | 71.55      | -42.45     | Outer | DSC  | Fore    | -11.83     | -9.91      | -10.90      | 0.44       | 211.24 | 251.70 | 230.31  | 11.27  |
| GreenLand_1 | 74.69      | -42.50     | Outer | DSC  | Aft     | -9.80      | -8.41      | -9.32       | 0.43       | 221.76 | 242.55 | 230.31  | 6.53   |
| GreenLand_1 | 74.69      | -42.50     | Outer | DSC  | Fore    | -20.07     | -8.01      | -10.53      | 3.63       | 222.83 | 276.58 | 245.70  | 17.61  |



## 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    | 277.60 | 0.31 | 2.449        | 0.12     | 258.30 | 0.32 | 2.750        | 0.12     | 45.49 | 0.12  | 0.018        | 0.12      | 0.68  | 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     | 0.02  | 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>      | -34.57  | 26.57  | 4.88 | 0.200        | -34.26   | 24.78  | 4.24 | 0.319        | -26.71   | 34.76 | 18.15 | 12.219       | -7.79     | 32.55 | 19.48 | 21.437       |

| 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    | 206.59 | 0.32 | 2.914        | 0.09     | 229.46 | 0.31 | 3.038        | 0.09     | 6.03  | 0.09  | 0.026        | 0.09      | 27.51 | 0.09  | 0.034        |
| <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>      | -34.45  | 21.61  | 2.66 | 0.000        | -34.91   | 18.62  | 2.08 | 0.000        | -19.06   | 22.52 | 11.93 | 0.016        | -25.69    | 23.17 | 12.97 | 0.173        |

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

- Normal
- Deviations
- Alarming
- High Errors

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

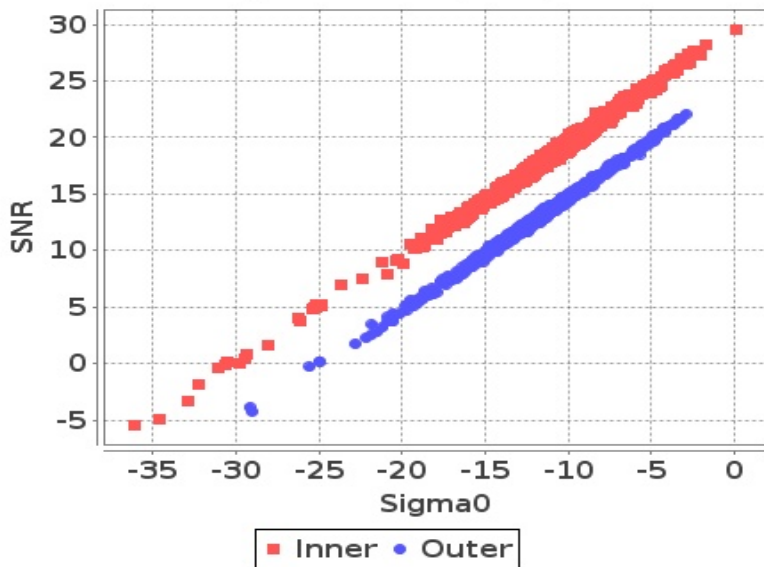
|                              | Inner Beam (HH) |         |         |              | Outer Beam (VV) |         |         |              | Parameter Specifications   |  |         |
|------------------------------|-----------------|---------|---------|--------------|-----------------|---------|---------|--------------|--|--|---------|
|                              | Min             | Max     | Mean    | Bad Occ. (%) | Min             | Max     | Mean    | Bad Occ. (%) | Parameter  | Min  | Max     |
| <b>Incidence Angle (deg)</b> | 48.75           | 49.41   | 49.00   | 0.000        | 57.52           | 58.23   | 57.90   | 0.000        | Inci.(Inner)   | 47.10  | 49.90   |
| <b>Azimuth Diff. (deg)</b>   | 0.0000          | 35.30   | 1.27    | 2.802        | 0.0000          | 291.26  | 1.27    | 3.946        | Inci.(Outer)   | 57.30  | 58.90   |
| <b>Range(Km)</b>             | 1037.26         | 1084.15 | 1056.97 | 0.000        | 1216.01         | 1273.42 | 1241.42 | 0.000        | Azimuth Diff.  | 0.60   | 2.00    |
| <b>X Factor(dbm)</b>         | -91.53          | -89.67  | -90.22  | 0.000        | -92.91          | -91.71  | -92.00  | 0.000        | Range(Inner)   | 1025.00  | 1095.70 |
| <b>Across Distance (Km)</b>  | 15.98           | 16.54   | 16.15   | 0.000        | 21.07           | 22.74   | 21.26   | 3.000        | Range(Outer)   | 1210.00  | 1280.00 |
| <b>Along Distance (Km)</b>   | 18.81           | 8440.12 | 36.31   | 3.000        | 18.56           | 8218.44 | 35.78   | 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)

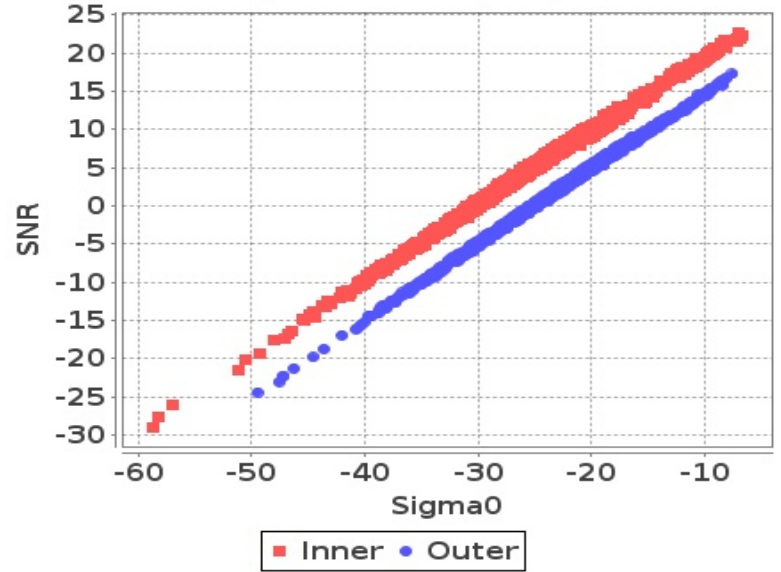
Footprint-Land

Sigma0 Vs SNR (Land)



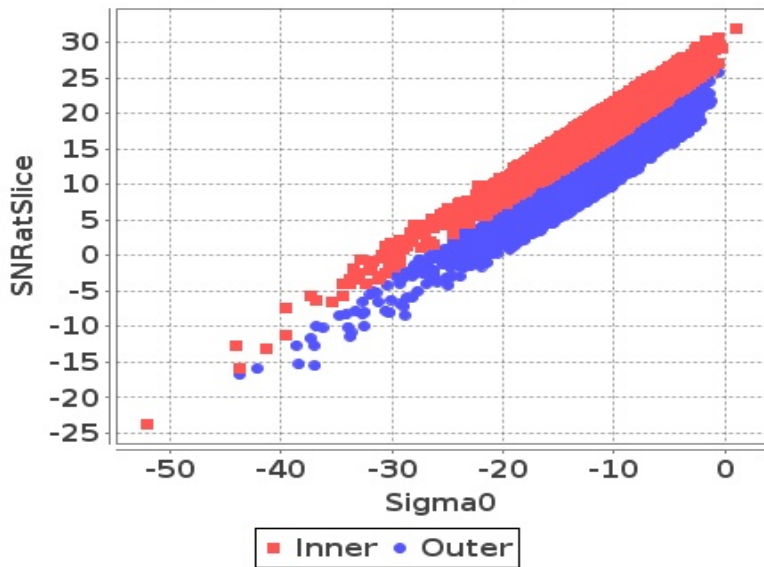
Footprint-Sea

Sigma0 Vs SNR (Sea)



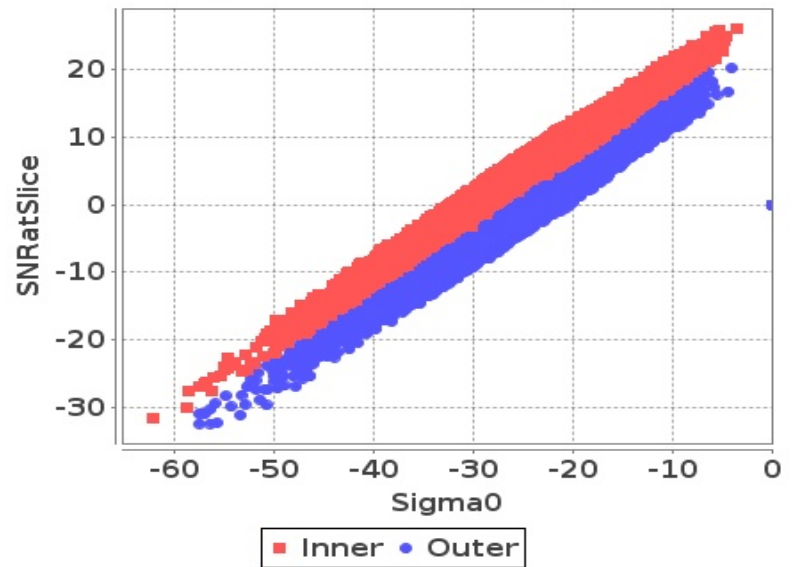
Slice-Land

Sigma0 Vs SNRatSlice (Land)



Slice-Sea

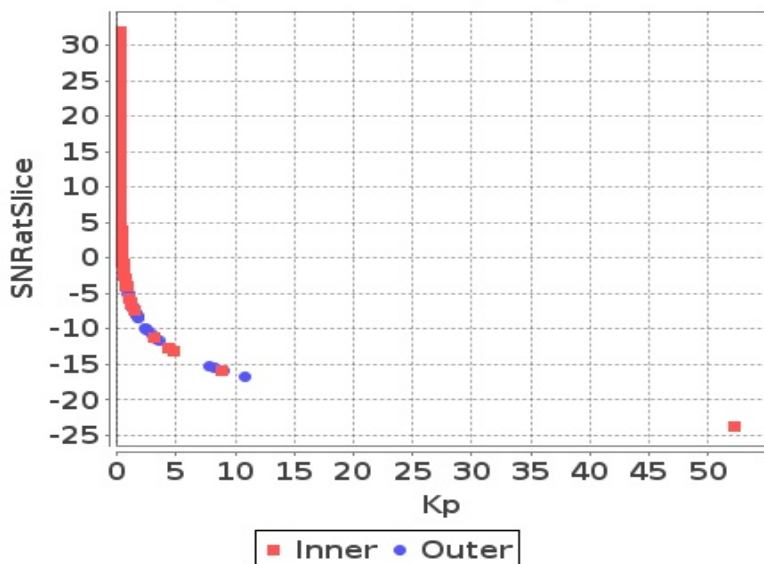
Sigma0 Vs SNRatSlice (Sea)



## Sigma0 Behaviour (Kp Vs SNR)

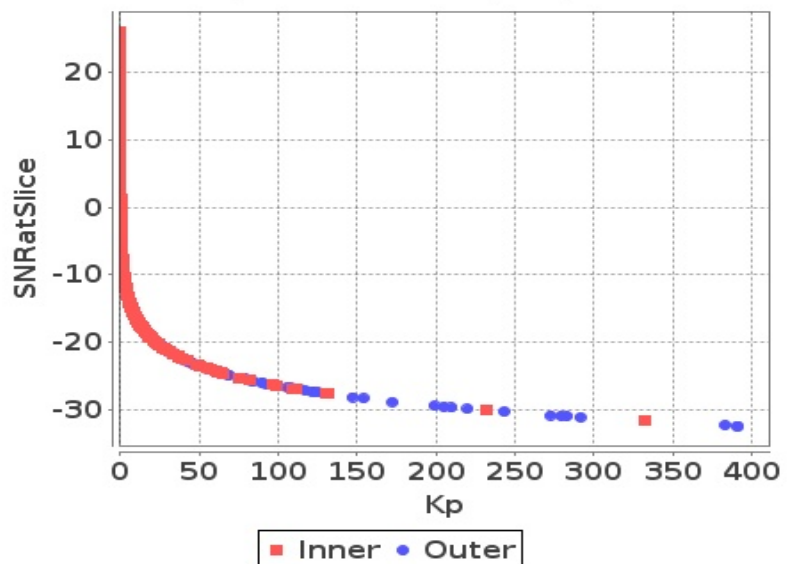
Slice

Kp Vs SNRatSlice (Land)



Slice

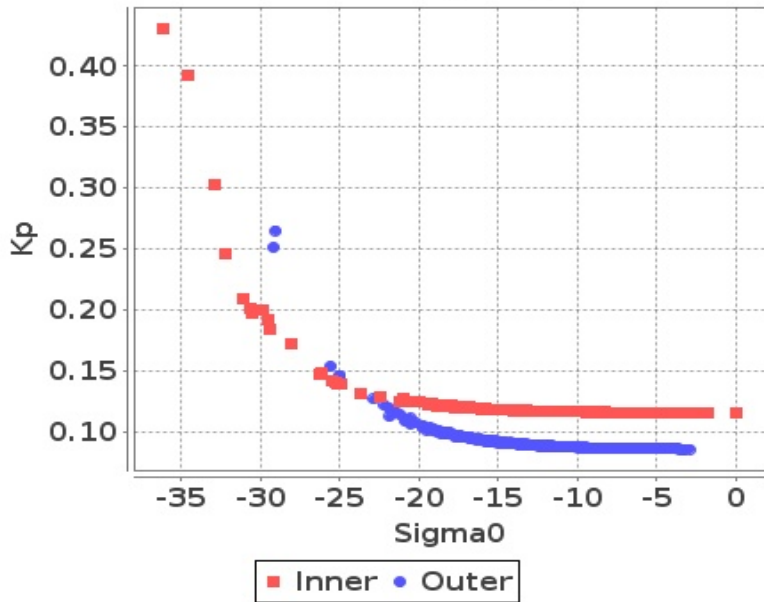
Kp Vs SNRatSlice (Sea)



# Sigma0 Behaviour(Sigma0 Vs Kp)

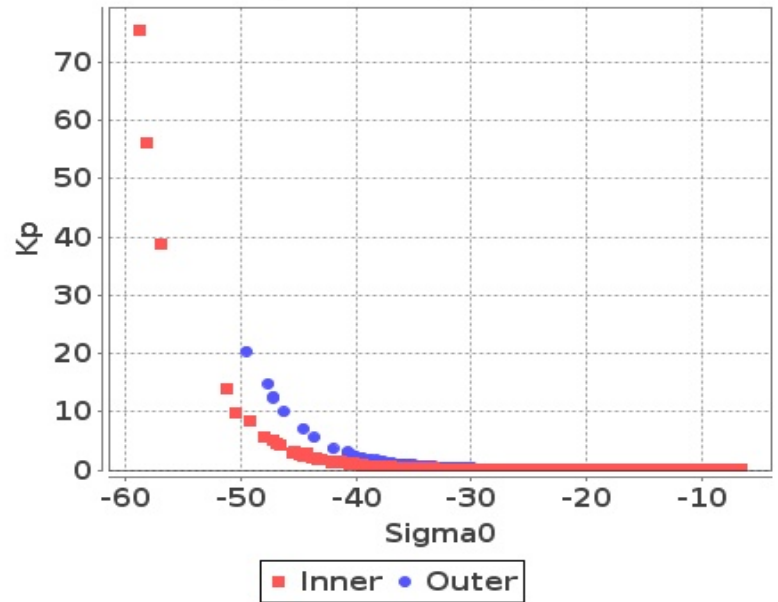
## Footprint-Land

### Sigma0 Vs Kp (Land)



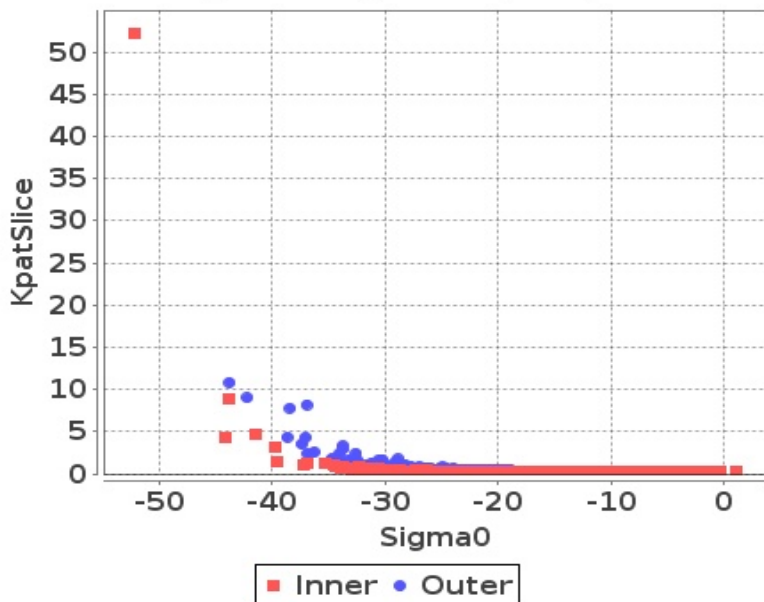
## Footprint-Sea

### Sigma0 Vs Kp (Sea)



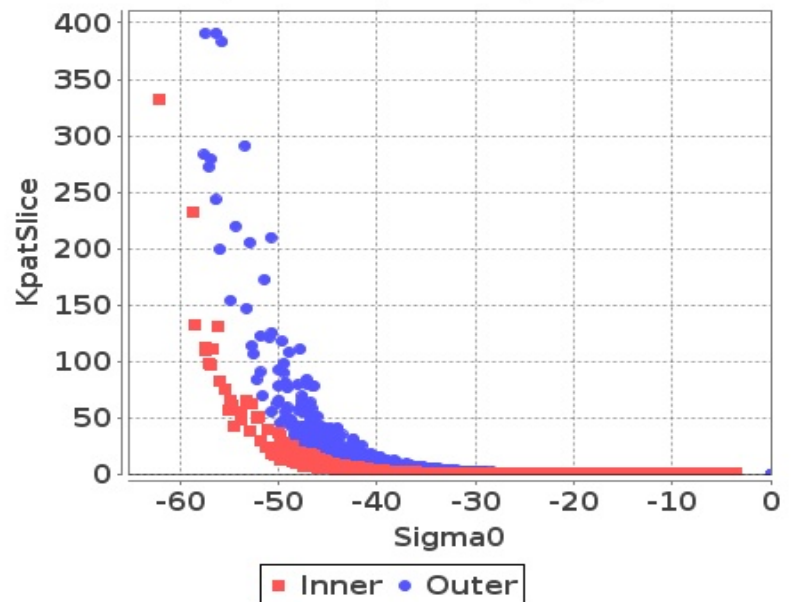
## Slice-Land

### Sigma0 Vs KpatSlice (Land)



## Slice-Sea

### Sigma0 Vs KpatSlice (Sea)

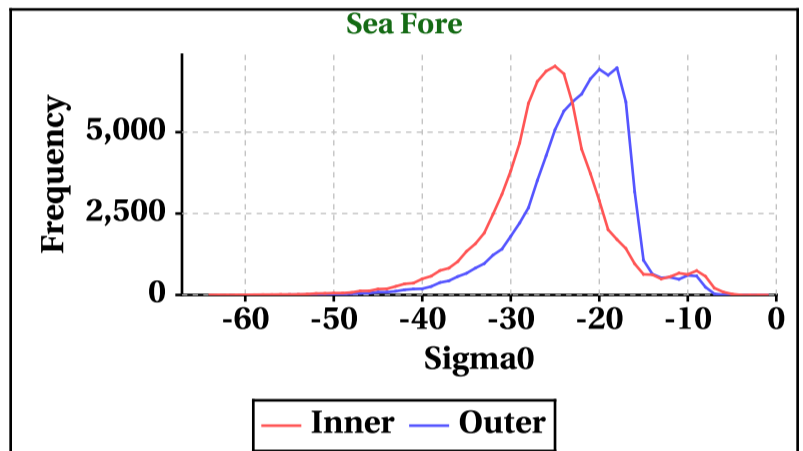
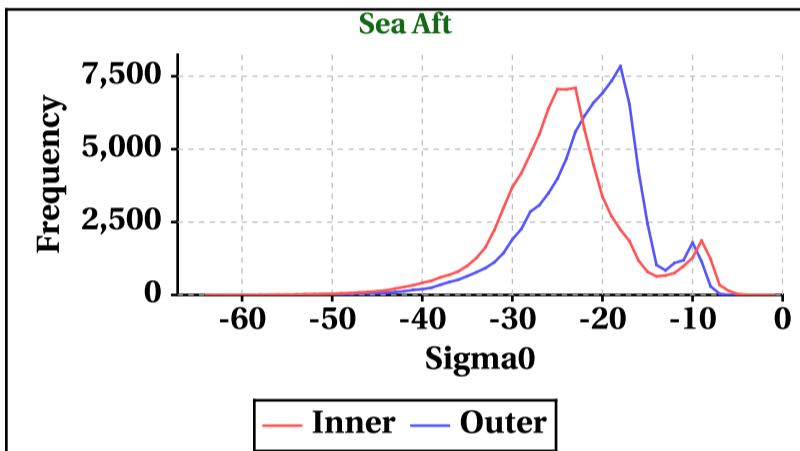
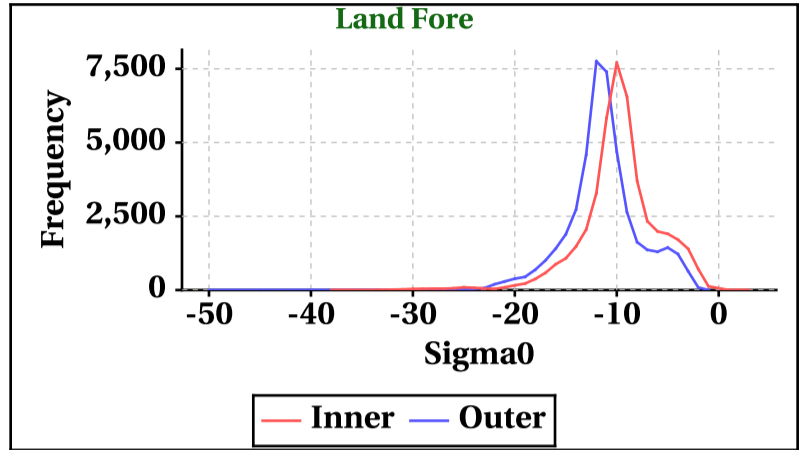
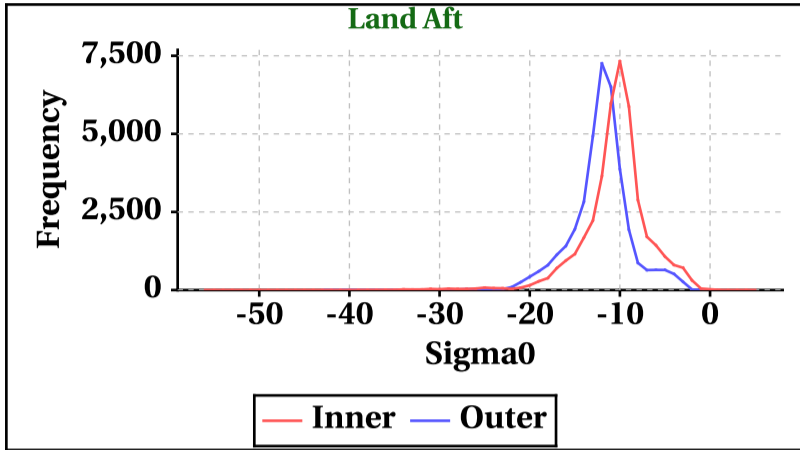


# Dynamic Range (Data Histograms)

## Sigma0(db)

| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -56      | -38       | -64     | -64      |
| Max             | 5        | 3         | 0       | 0        |

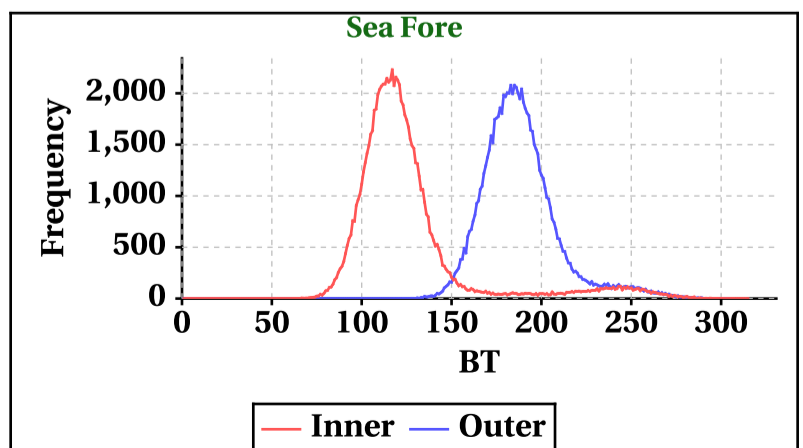
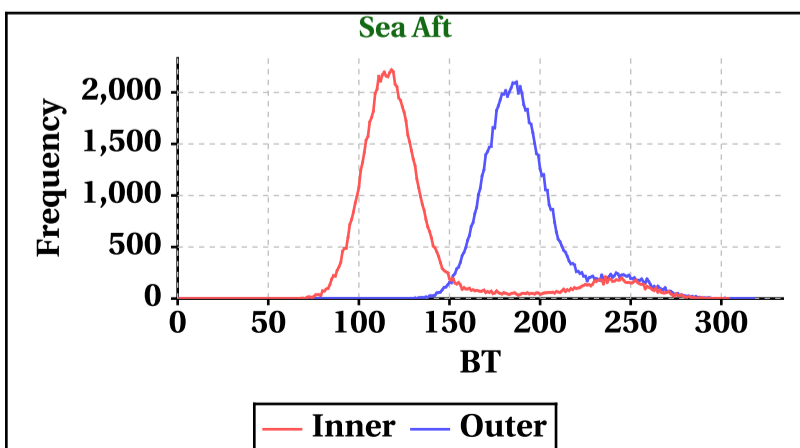
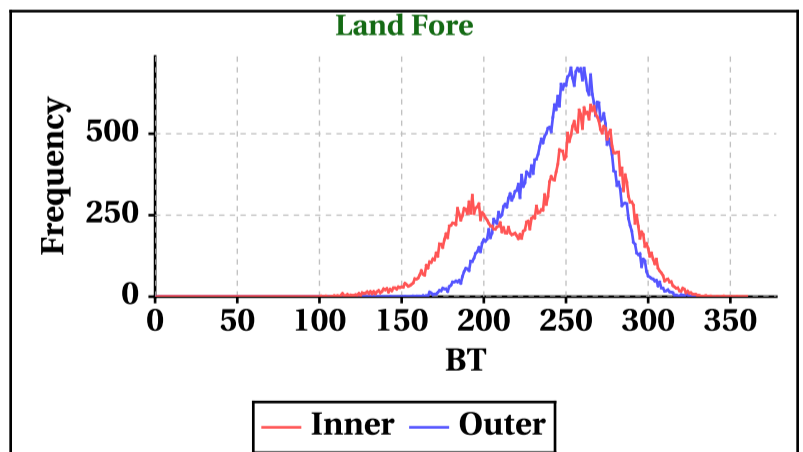
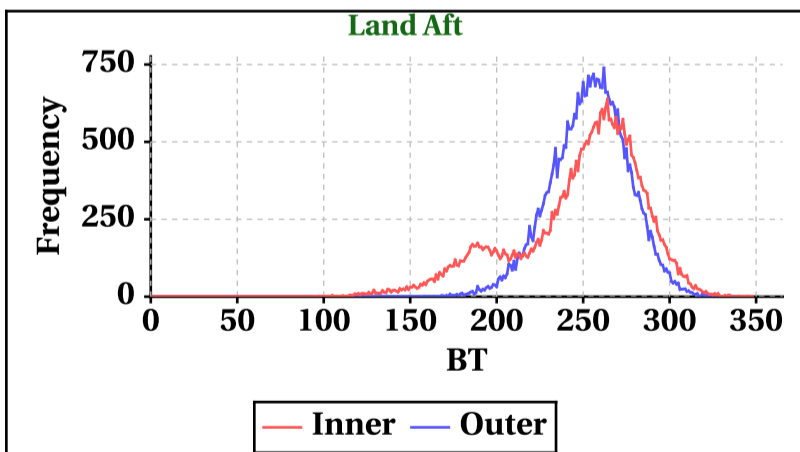
| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -43      | -50       | -59     | -60      |
| Max             | 0        | 0         | 0       | 0        |



## Brightness Temperature(K)

| Inner Beam(HH) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 348      | 360       | 304     | 315      |

| Outer Beam(VV) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 340      | 336       | 318     | 305      |

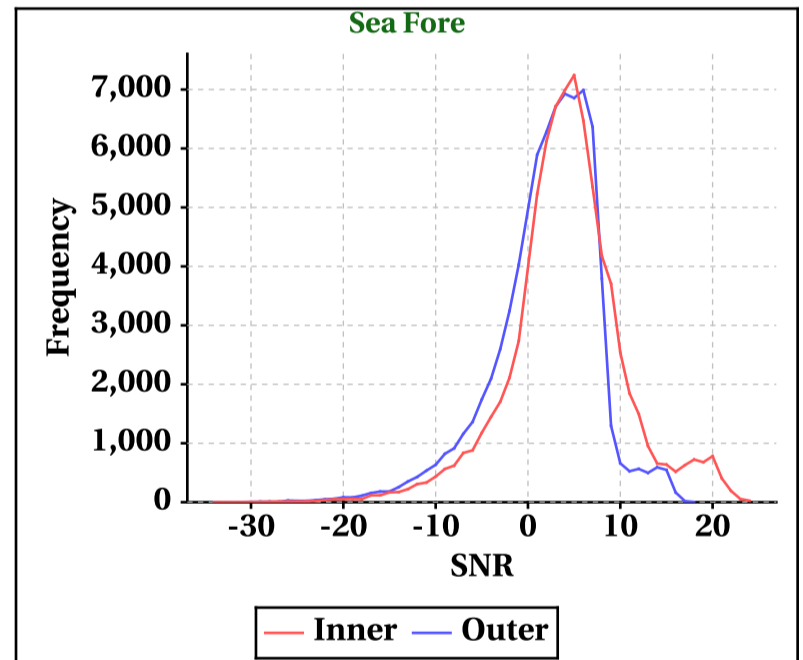
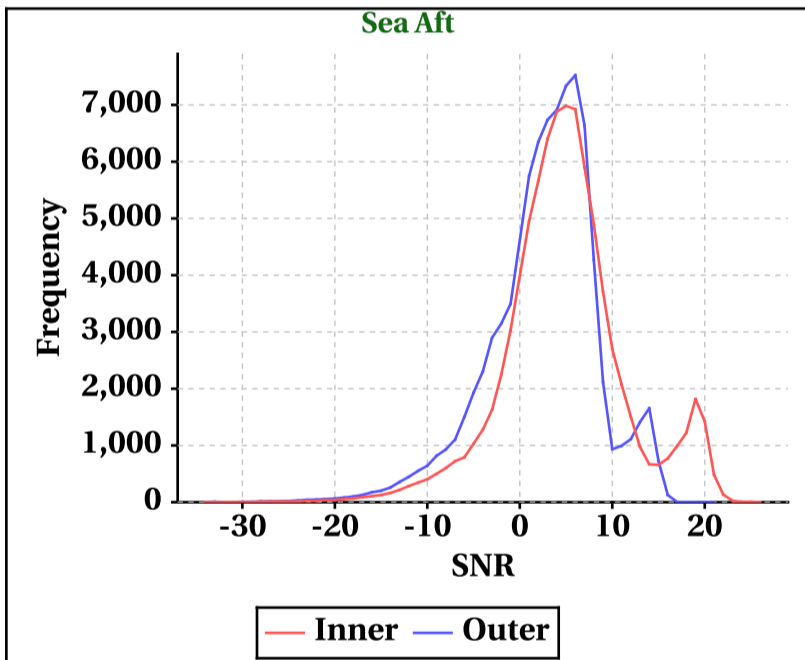
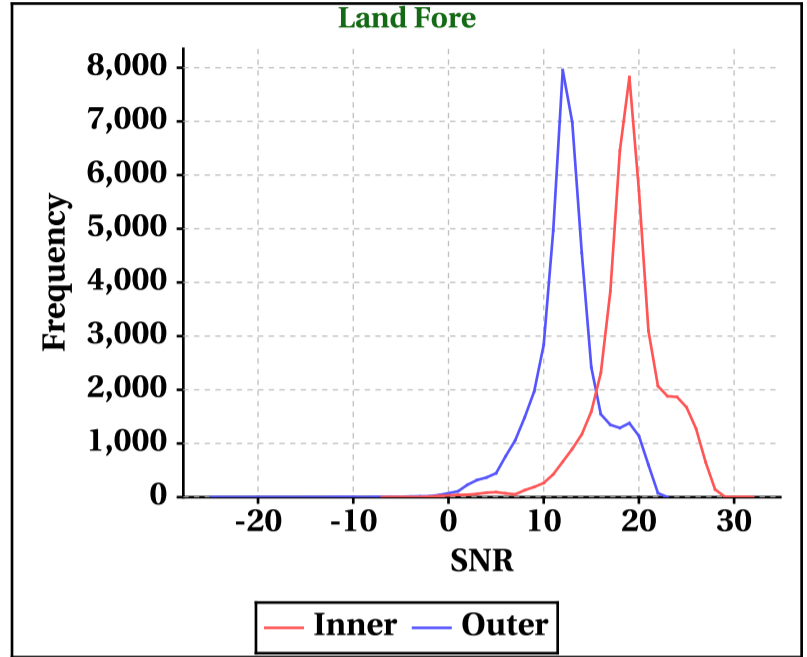
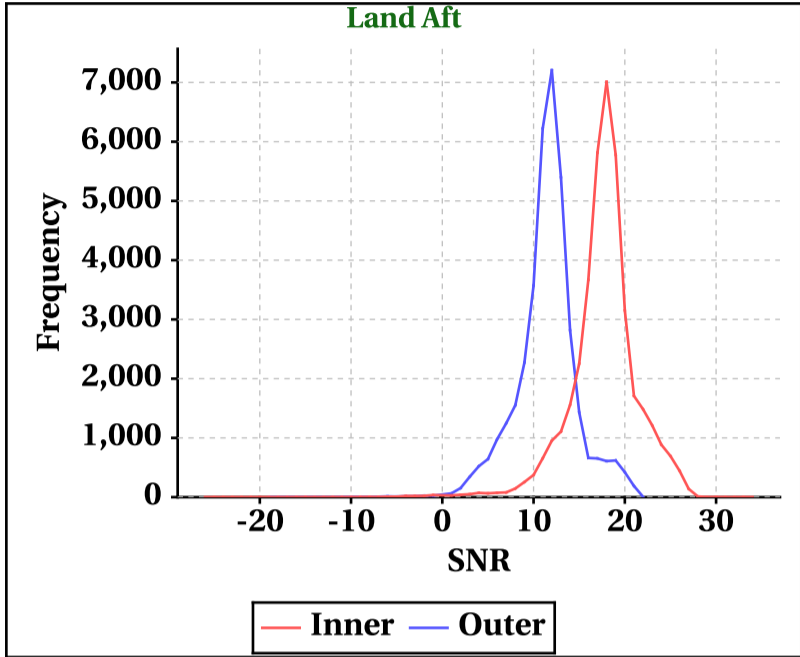


# Dynamic Range (Data Histograms)

## SNR(dBm)

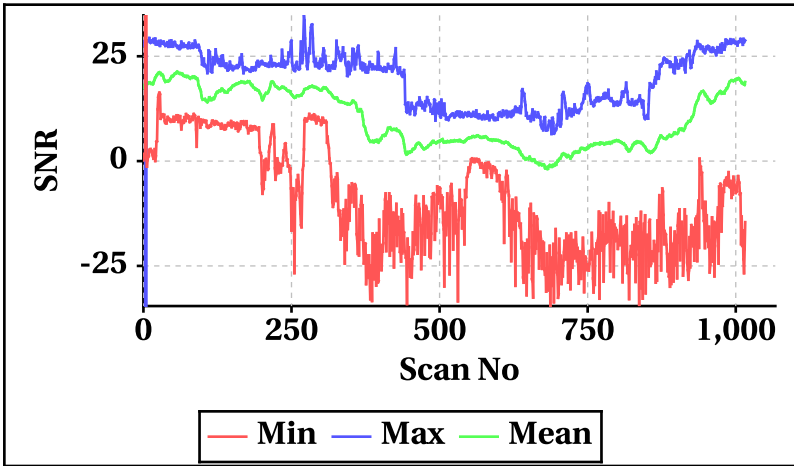
| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -26      | -7        | -34     | -34      |
| Max             | 34       | 32        | 26      | 24       |

| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -19      | -25       | -34     | -34      |
| Max             | 22       | 23        | 21      | 18       |

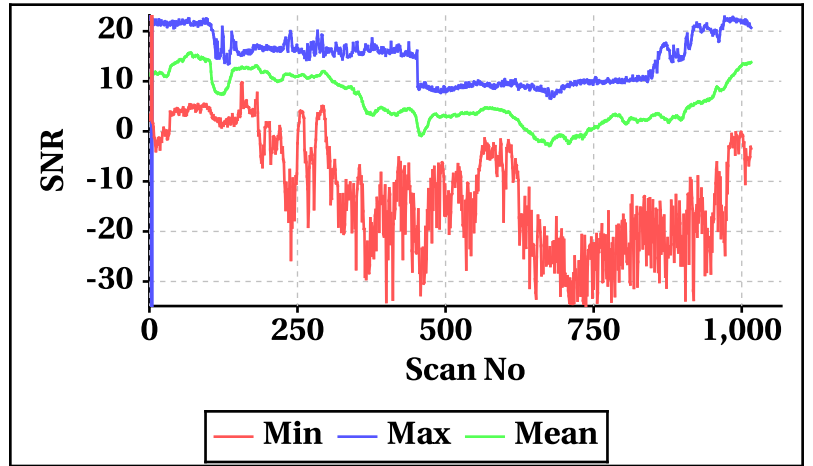


## Orbit-wise behaviour of SNR

Inner Beam (HH)

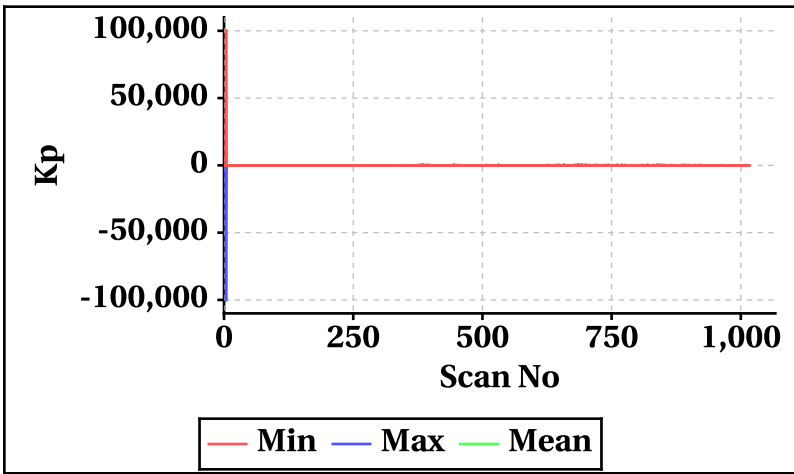


Outer Beam(VV)

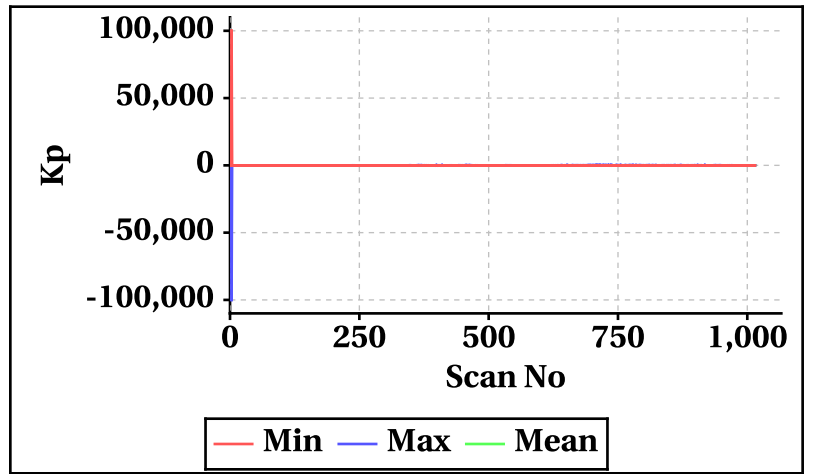


## Orbit-wise behaviour of Kp,Kpa,Kpb,Kpc

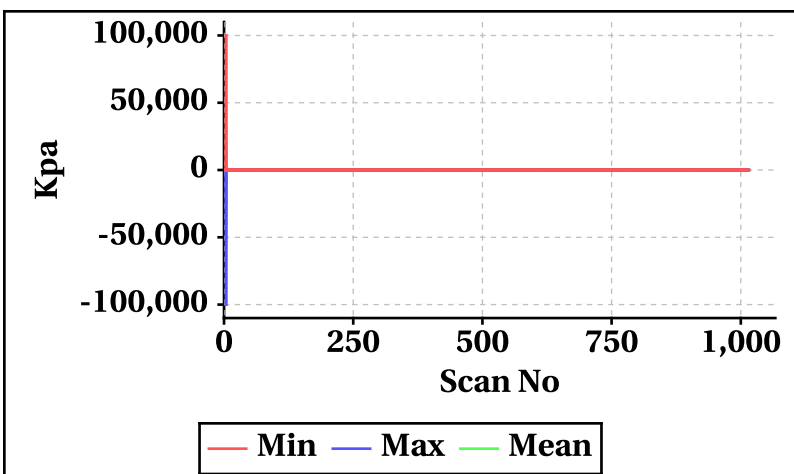
Inner Beam(HH)



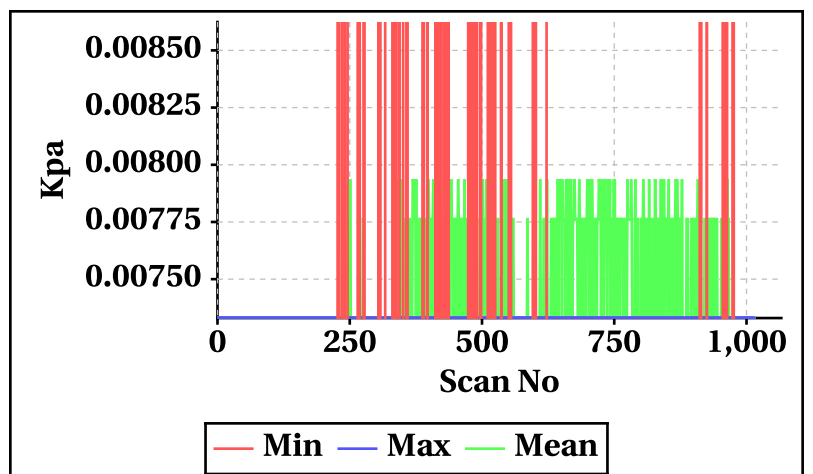
Outer Beam(VV)



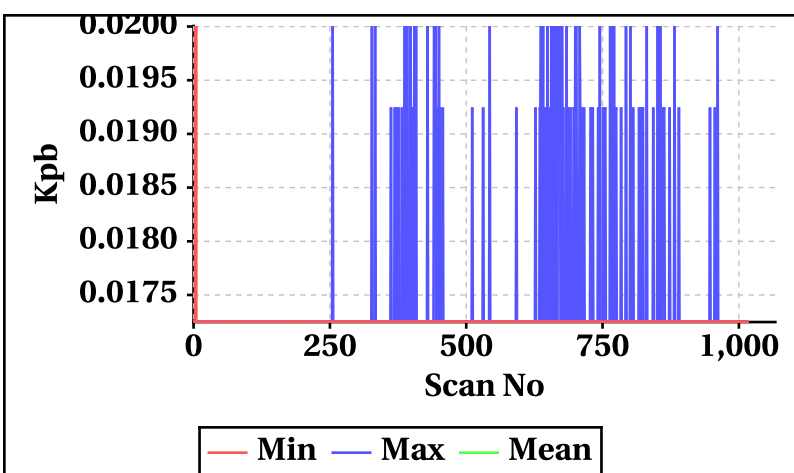
Inner Beam(HH)



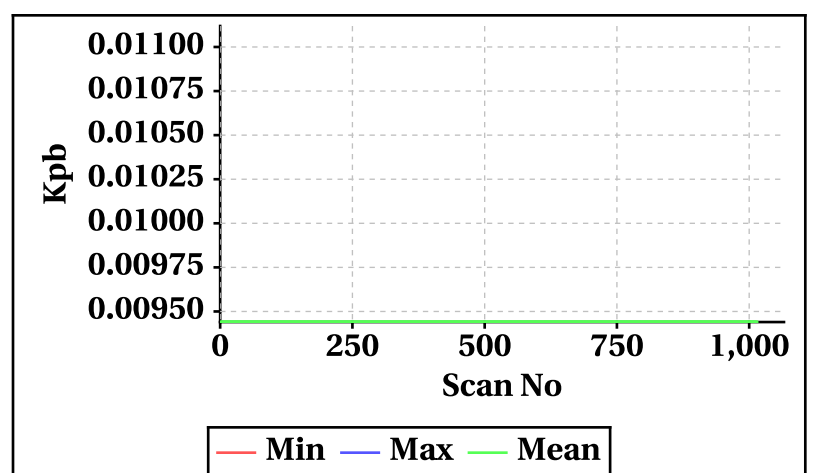
Outer Beam(VV)



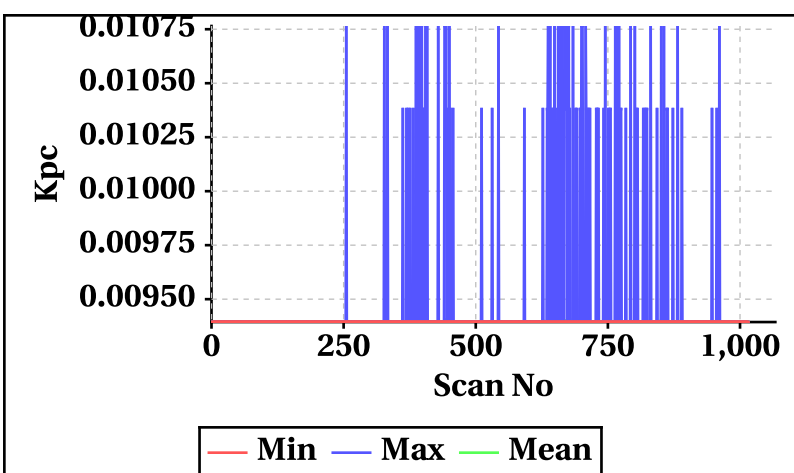
Inner Beam(HH)



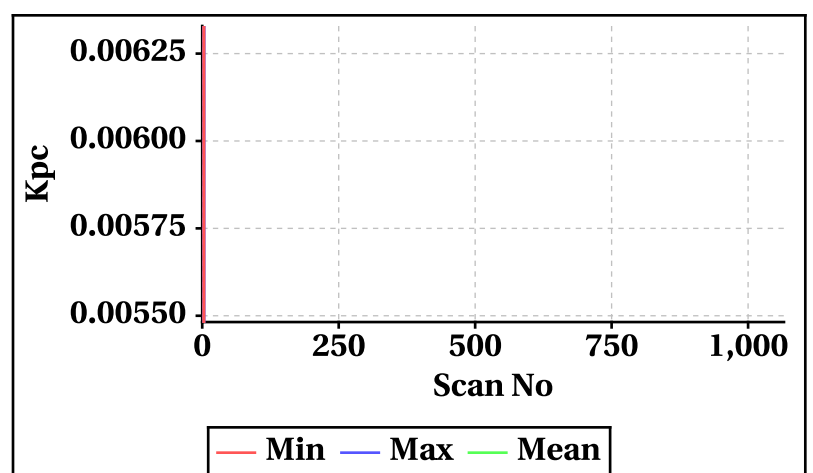
Outer Beam(VV)



Inner Beam(HH)



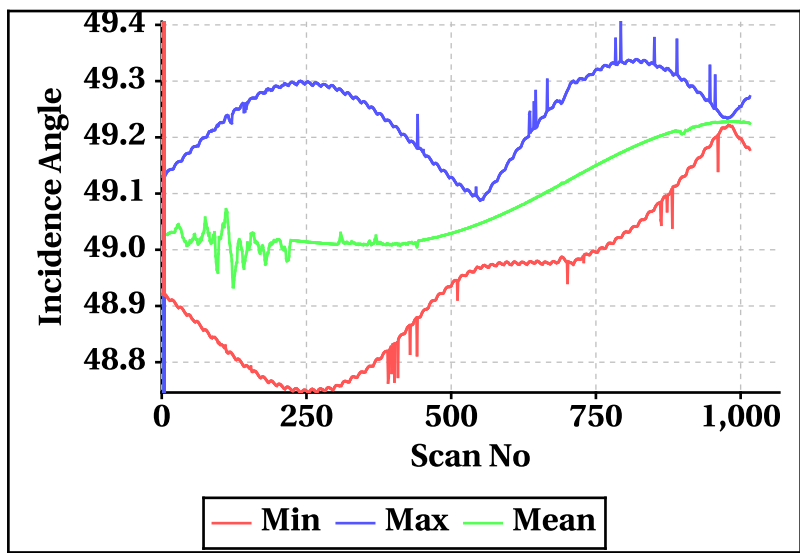
Outer Beam(VV)



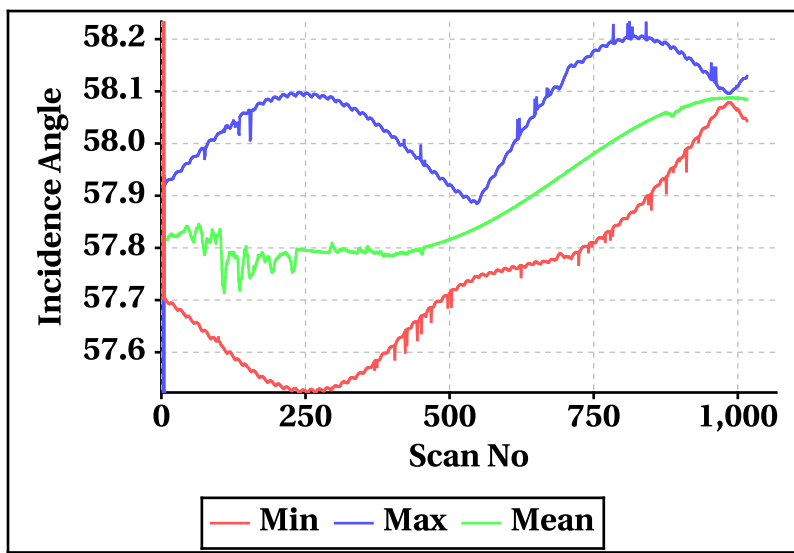


Orbit-wise behaviour of Incidence, Azimuth, Range, X-Factor

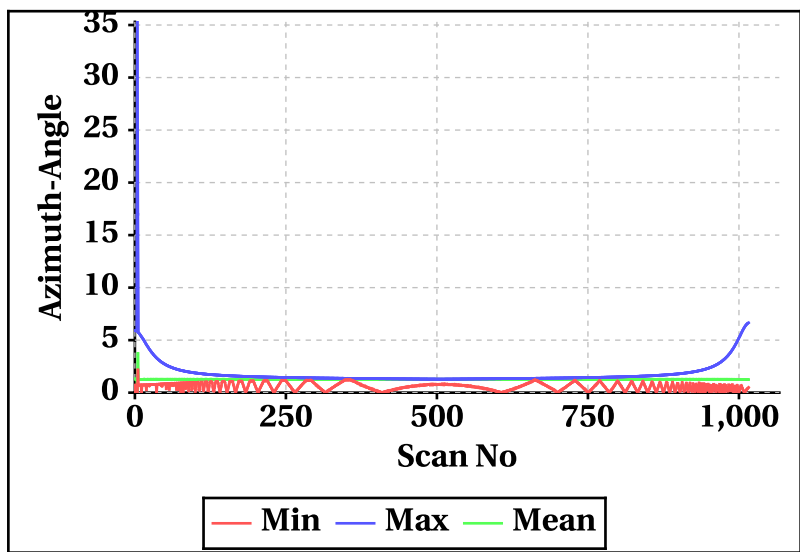
Inner Beam (HH)



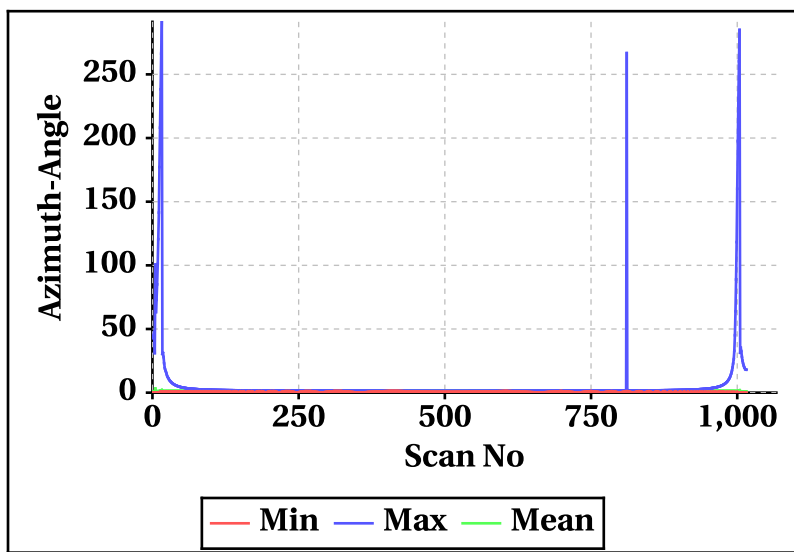
Outer Beam(VV)



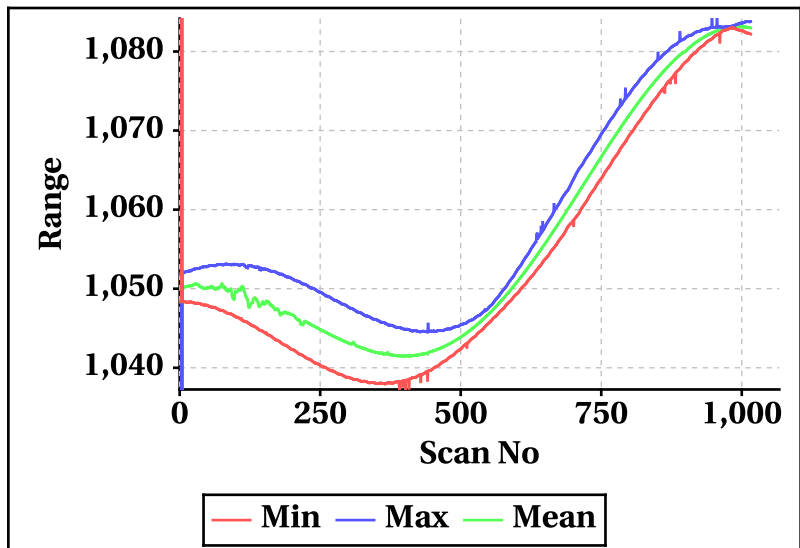
Inner Beam (HH)



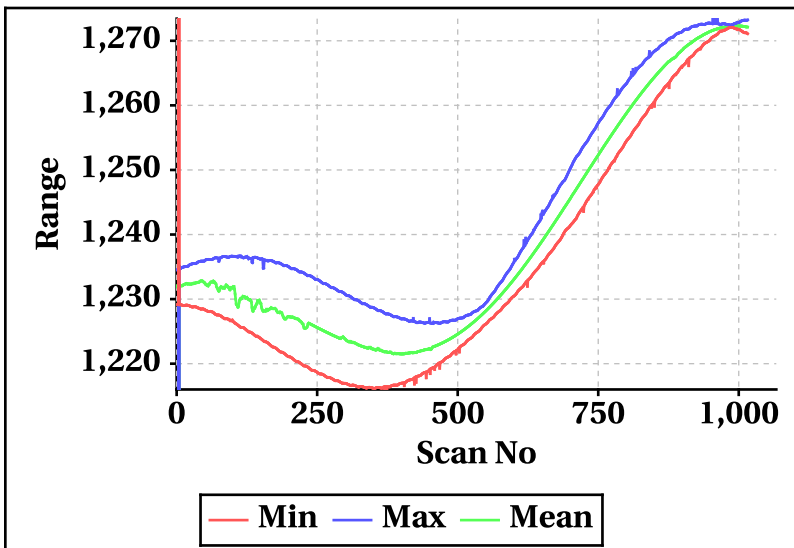
Outer Beam(VV)



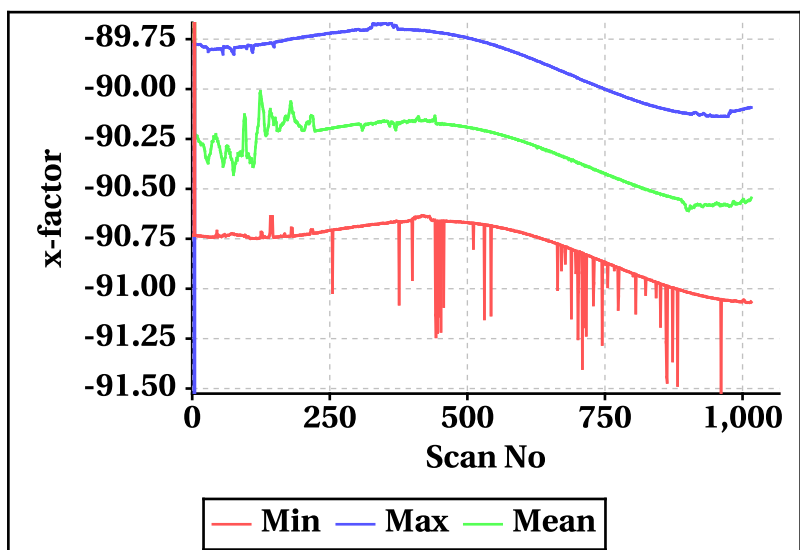
Inner Beam (HH)



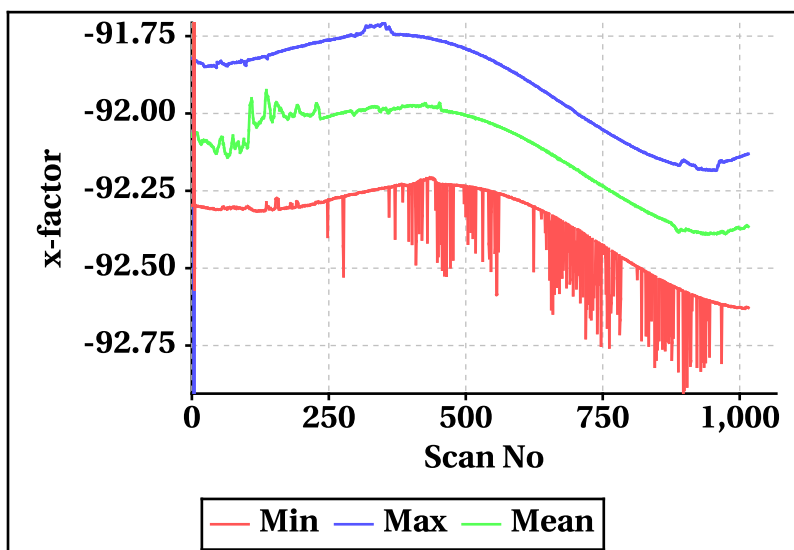
Outer Beam(VV)



Inner Beam (HH)



Outer Beam(VV)

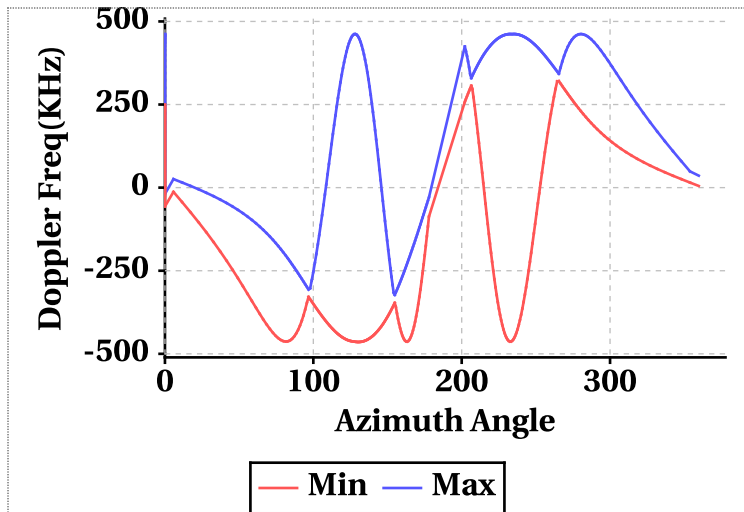


# Doppler Frequency Variation

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

|            | Inner Beam (HH) | Outer Beam (VV) |
|------------|-----------------|-----------------|
| <b>Min</b> | -464.34         | -520.08         |
| <b>Max</b> | 462.00          | 518.00          |

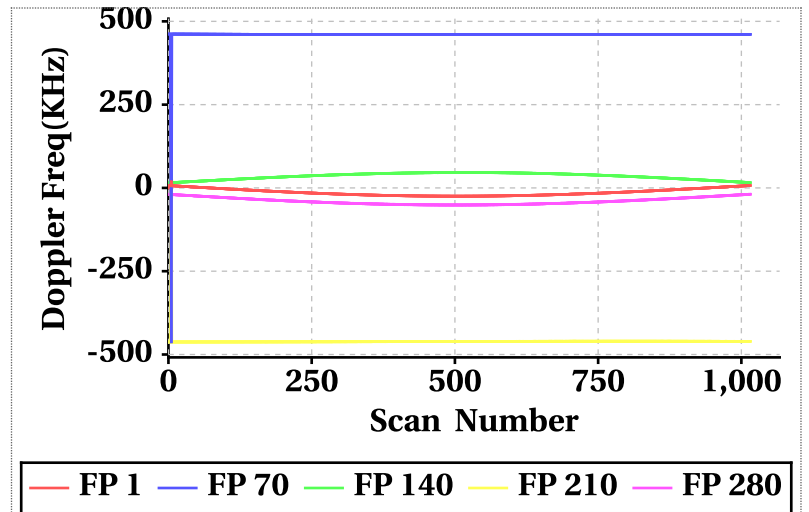
**Footprint wise Doppler frequency variation Inner Beam (HH)**



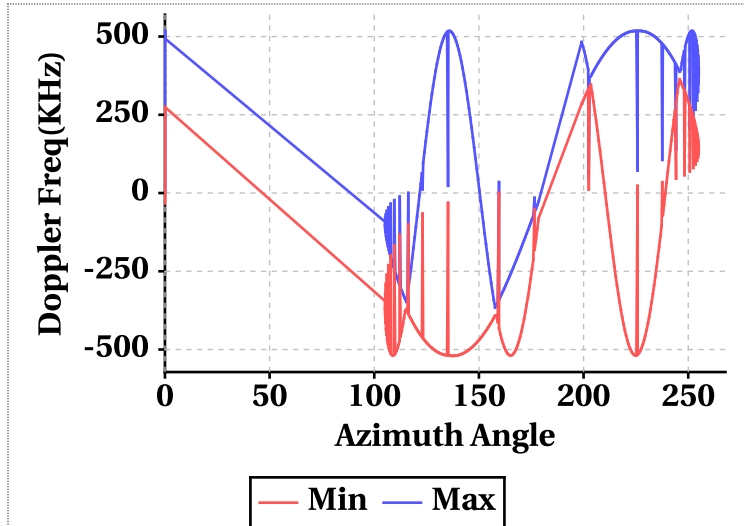
**Doppler Frequency(KHz) variation**

| Doppler_FP  | Inner Beam (HH) |        |         | Outer Beam (VV) |        |         |
|-------------|-----------------|--------|---------|-----------------|--------|---------|
|             | Min             | Max    | Mean    | Min             | Max    | Mean    |
| Doppler_1   | -24.82          | 18.30  | -13.12  | -33.22          | 3.46   | -20.19  |
| Doppler_70  | -462.10         | 461.84 | 459.20  | -516.30         | 517.58 | 514.44  |
| Doppler_140 | 1.66            | 48.90  | 35.03   | 2.08            | 46.24  | 33.59   |
| Doppler_210 | -462.46         | 456.94 | -459.75 | -518.42         | 514.50 | -515.57 |
| Doppler_280 | -56.58          | 1.54   | -39.54  | -51.48          | 1.96   | -38.27  |

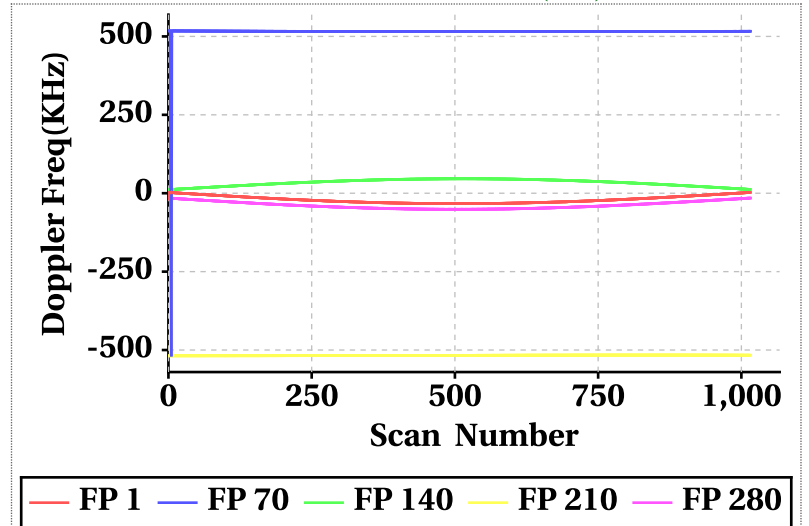
**Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Inner Beam (HH)**



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

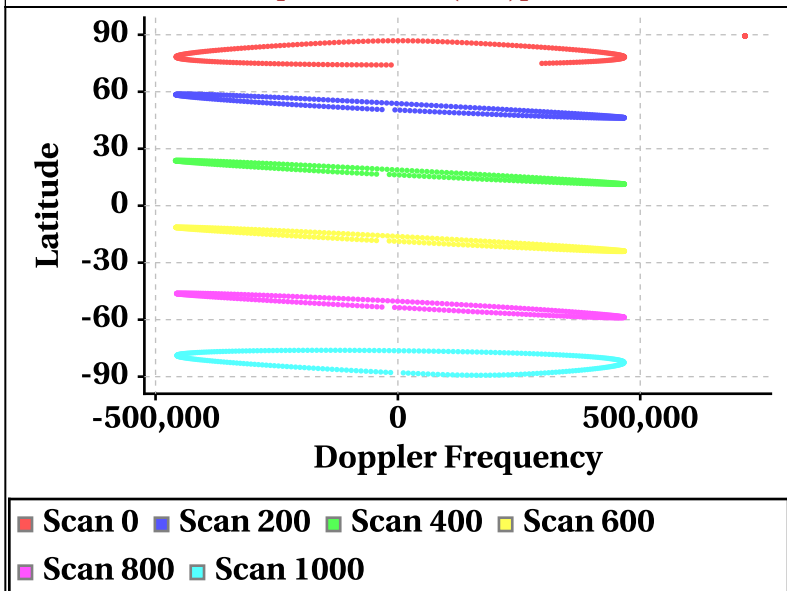


**Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Outer Beam (VV)**

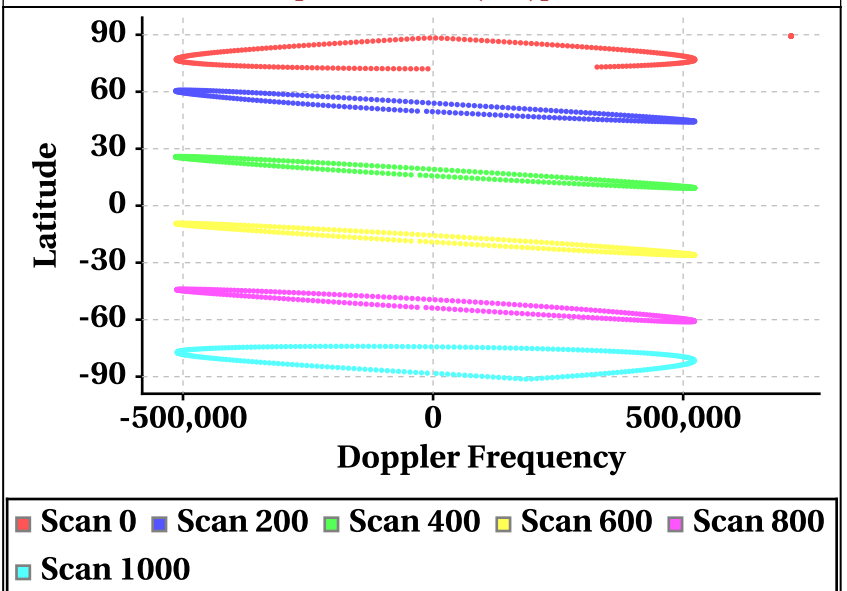


# Latitude Vs Doppler Frequency

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



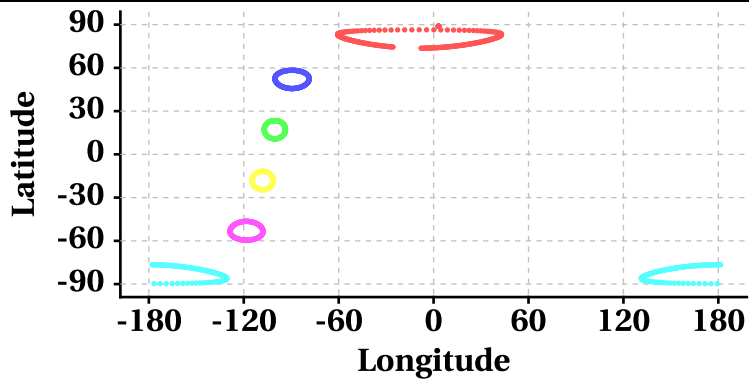
**Doppler Frequency at Scan Interval of 200 [Outer Beam(VV)]**



# Parameter as a function of Latitude

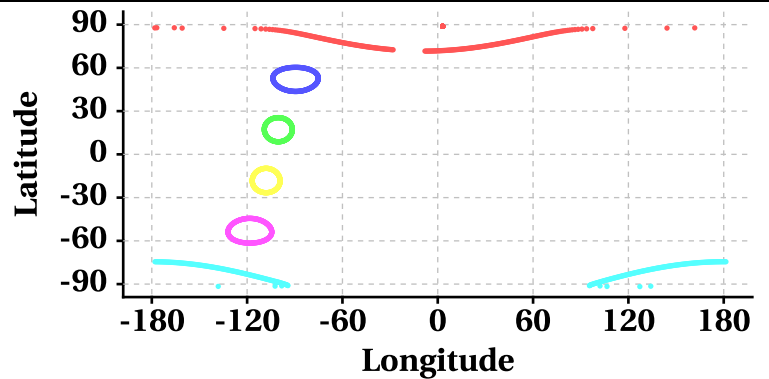
## Latitude Vs Longitude

Scan Trace [Inner Beam(HH)]



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

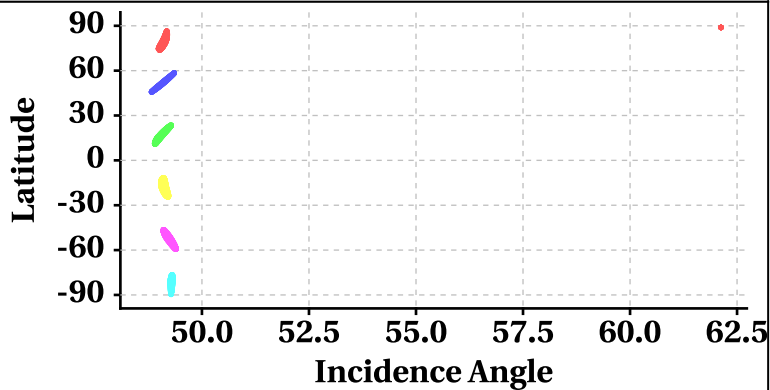
Scan Trace [Outer Beam (VV)]



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

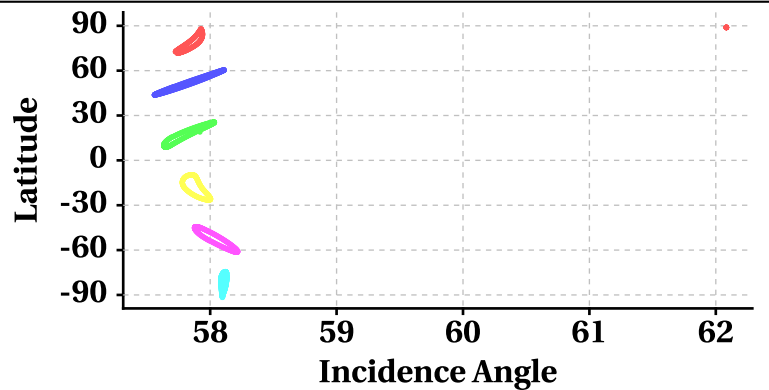
## Latitude Vs Incidence Angle

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



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

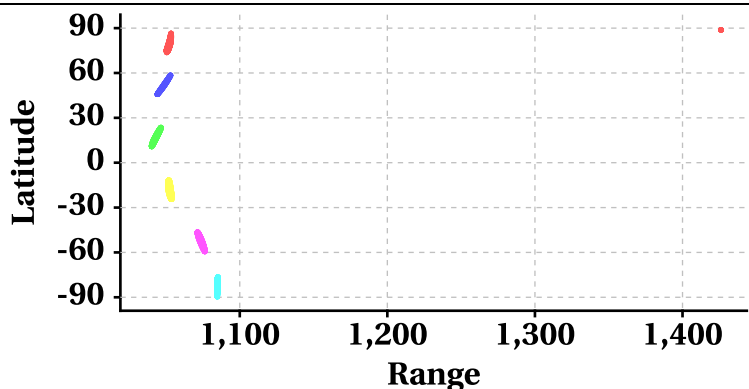
Incidence Angle at Scan Interval of 200 [Outer Beam (VV)]



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

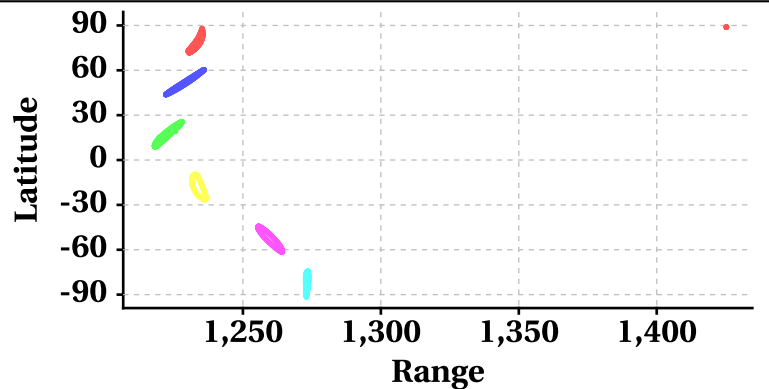
## Latitude Vs Range

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

