

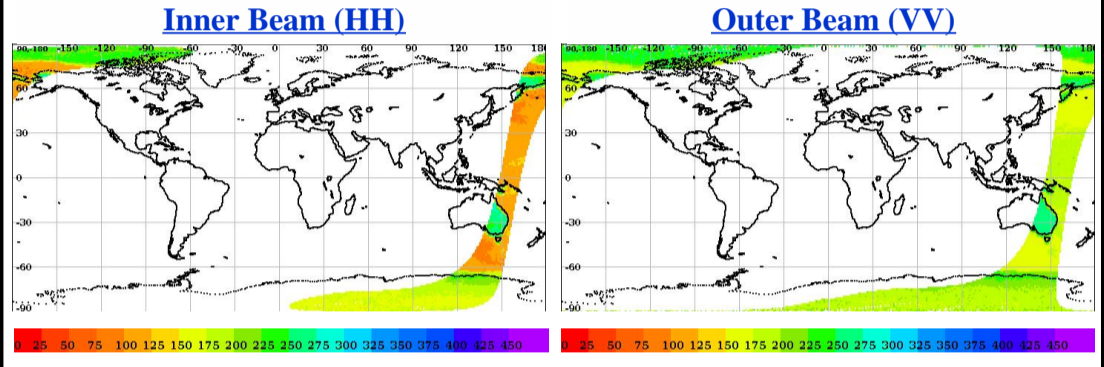
# SCATSAT-1 Scatterometer Level-1B Data Quality Evaluation Report

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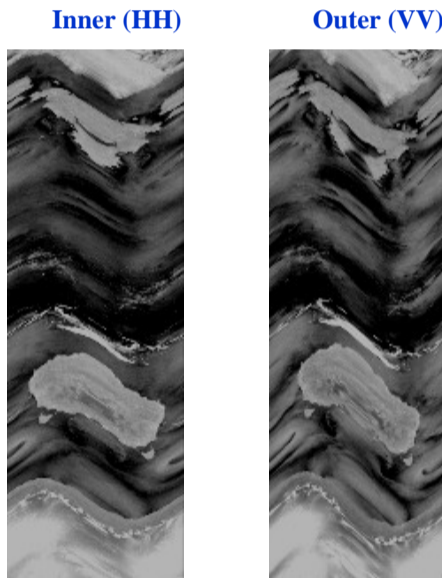
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|                              |               |                              |              |                               |      |
|------------------------------|---------------|------------------------------|--------------|-------------------------------|------|
| <b>Satellite Id</b>          | ScatSat-1     | <b>Start Orbit</b>           | 15815        | <b>Total Scans</b>            | 1016 |
| <b>Sensor Name</b>           | Scatterometer | <b>End Orbit</b>             | 15816        | <b>No of Inner FootPrints</b> | 281  |
| <b>Processor Version</b>     | v1.1.3        | <b>Rev. Number</b>           | 15815_15816  | <b>No Of Outer FootPrints</b> | 282  |
| <b>Half Orbit Direction</b>  | NS            | <b>Data Production Date</b>  | 22-09-2019   | <b>No. Of Inner Slices</b>    | 9    |
| <b>Equator Crossing Date</b> | 21-09-2019    | <b>Equator Crossing Time</b> | 22:10:22.000 | <b>No Of Outer Slices</b>     | 15   |

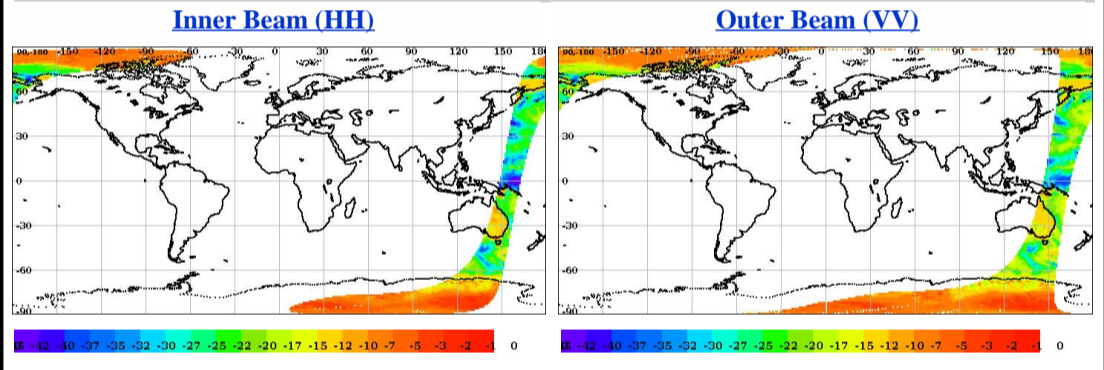
## Brightness Temperature(k) Footprint trace



## Image Snapshot for Inner & Outer Beam



## Sigma0(dB) Footprint trace



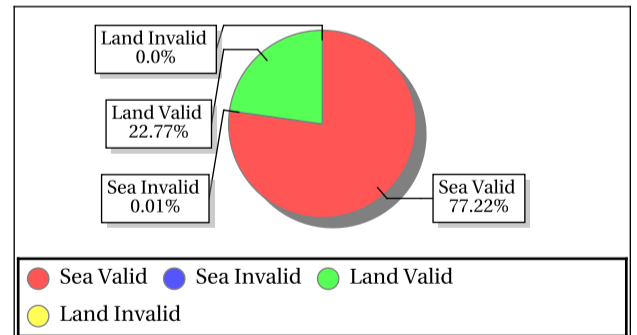
## Invalid and Poor Sigma-0 Quality Flag Statistics for Inner/Outer Slices\*

| Sigma-0 Flags                            | Inner Beam | Outer Beam |
|--|------------|------------|
| Invalid Sigma0(%)                        | 0.01       | 0.01       |
| 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(%)                           | 22.23      | 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 (%)                         | 0.056029   | 0.113172   |

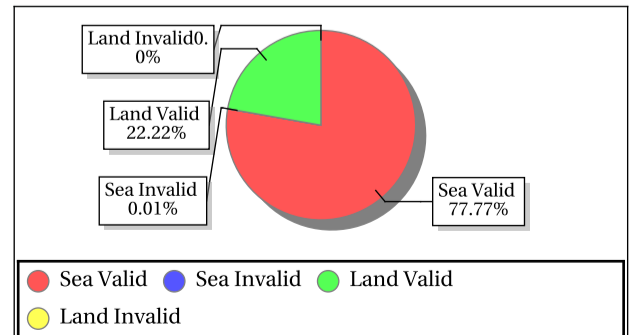
\*DP Format Document

## 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 |
|-----------|------------|------------|-------|------|---------|------------|------------|-------------|------------|--------|--------|---------|--------|
| ANT_1     | -75.00     | 121.00     | Inner | DSC  | Aft     | -7.52      | -4.48      | -6.23       | 1.14       | 175.74 | 217.65 | 199.06  | 13.79  |
| ANT_1     | -75.00     | 121.00     | Inner | DSC  | Fore    | -8.34      | -5.40      | -6.87       | 0.98       | 157.23 | 195.03 | 181.79  | 11.61  |
| ANT_1     | -75.00     | 121.00     | Outer | DSC  | Aft     | -8.89      | -6.70      | -7.56       | 0.75       | 178.71 | 216.45 | 197.47  | 12.96  |
| ANT_1     | -75.00     | 121.00     | Outer | DSC  | Fore    | -9.22      | -6.99      | -7.94       | 0.74       | 177.11 | 207.28 | 193.59  | 10.20  |



## 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    | 295.33 | 0.42 | 4.122        | 0.12     | 290.66 | 0.40 | 3.988        | 0.12     | 0.14  | 0.12  | 0.000        | 0.12      | 0.13  | 0.12  | 0.000        |
| <b>Kpa</b>      | 0.01    | 0.02   | 0.01 | 0.000        | 0.01     | 0.02   | 0.01 | 0.000        | 0.01     | 0.01  | 0.01  | 0.000        | 0.01      | 0.01  | 0.01  | 0.000        |
| <b>Kpb</b>      | 0.02    | 0.02   | 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>      | -34.84  | 27.21  | 4.72 | 0.940        | -34.77   | 24.83  | 4.29 | 0.176        | 5.90     | 32.46 | 17.86 | 17.209       | 7.03      | 31.96 | 19.06 | 26.780       |

| 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    | 212.60 | 0.38 | 4.146        | 0.09     | 230.43 | 0.38 | 3.996        | 0.09     | 0.24  | 0.09  | 0.000        | 0.09      | 0.13  | 0.09  | 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>      | 0.01    | 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>      | -34.58  | 18.46  | 2.38 | 0.000        | -34.93   | 20.86  | 1.99 | 0.000        | -3.46    | 22.76 | 12.12 | 0.214        | 1.21      | 23.32 | 13.23 | 0.469        |

| 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)

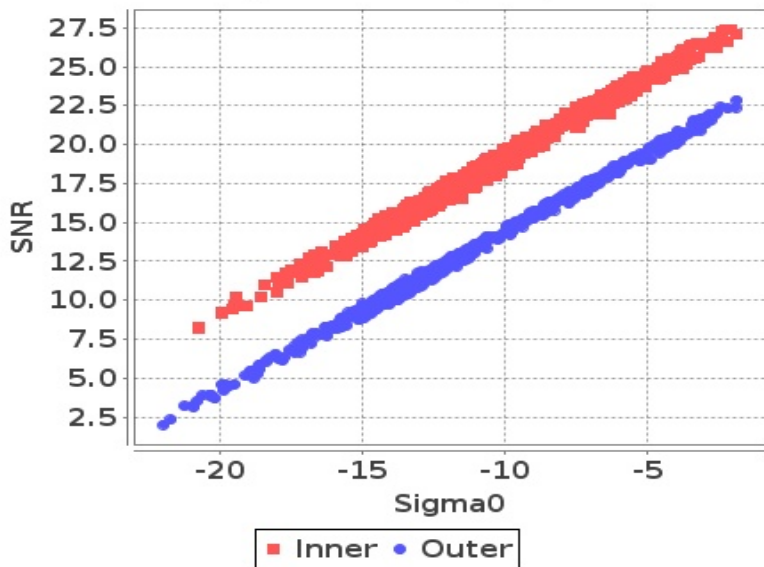
|                              | Inner Beam (HH) |         |         |              | Outer Beam (VV) |         |         |              | Parameter Specifications   |  |         |
|------------------------------|-----------------|---------|---------|--------------|-----------------|---------|---------|--------------|--|--|---------|
|                              | Min             | Max     | Mean    | Bad Occ. (%) | Min             | Max     | Mean    | Bad Occ. (%) | Parameter  | Min  | Max     |
| <b>Incidence Angle (deg)</b> | 48.69           | 49.38   | 49.01   | 0.000        | 57.47           | 58.19   | 57.89   | 0.000        | Inci.(Inner)   | 47.10  | 49.90   |
| <b>Azimuth Diff. (deg)</b>   | 0.0027          | 210.13  | 1.28    | 2.630        | 0.0000          | 298.17  | 1.28    | 3.784        | Inci.(Outer)   | 57.30  | 58.90   |
| <b>Range(Km)</b>             | 1037.72         | 1084.07 | 1056.66 | 0.000        | 1214.89         | 1273.94 | 1241.37 | 0.000        | Azimuth Diff.  | 0.60   | 2.00    |
| <b>X Factor(dbm)</b>         | -91.78          | -90.05  | -90.63  | 0.000        | -93.19          | -92.09  | -92.25  | 0.000        | Range(Inner)   | 1025.00  | 1095.70 |
| <b>Across Distance (Km)</b>  | 15.91           | 16.53   | 16.13   | 0.000        | 21.04           | 22.92   | 21.24   | 3.000        | Range(Outer)   | 1210.00  | 1280.00 |
| <b>Along Distance (Km)</b>   | 18.80           | 1369.28 | 22.36   | 2.000        | 18.50           | 1804.84 | 23.13   | 2.000        | X-Factor   | -100.00  | -80.00  |
|                              |                 |         |         |              |                 |         |         |              | Ac.Distance(Inner)   | 15.00  | 20.00   |
|                              |                 |         |         |              |                 |         |         |              | Ac.Distance(Outer)   | 15.00  | 22.00   |
|                              |                 |         |         |              |                 |         |         |              | Al.Distance(Inner)   | 15.00  | 30.00   |
|                              |                 |         |         |              |                 |         |         |              | Al.Distance(Outer)   | 10.00  | 30.00   |
|                              |                 |         |         |              |                 |         |         |              | <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)

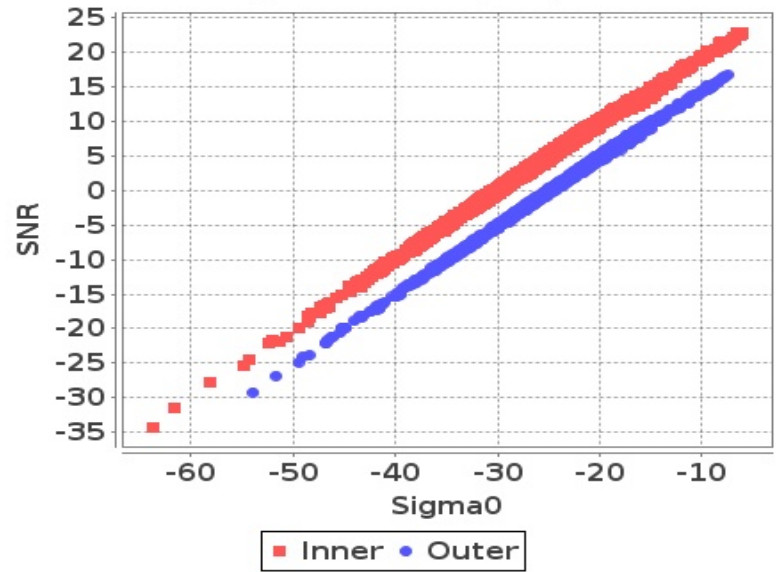
Footprint-Land

Sigma0 Vs SNR (Land)



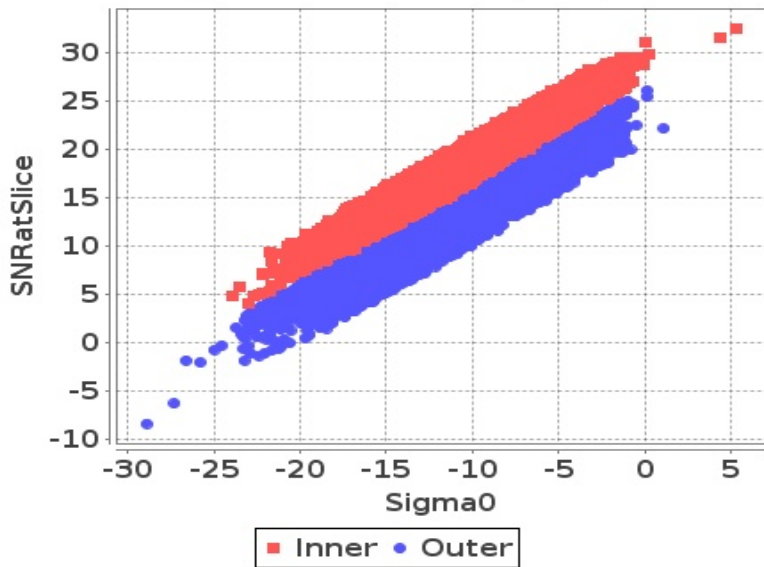
Footprint-Sea

Sigma0 Vs SNR (Sea)



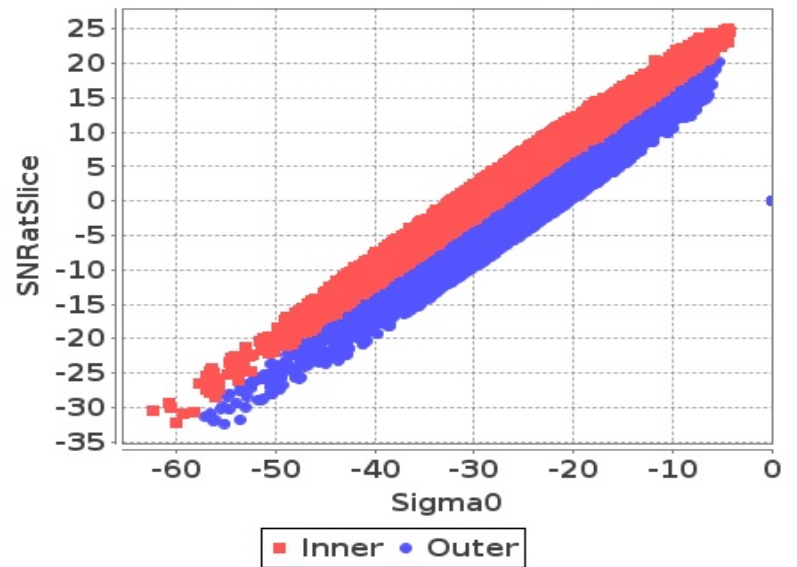
Slice-Land

Sigma0 Vs SNRatSlice (Land)



Slice-Sea

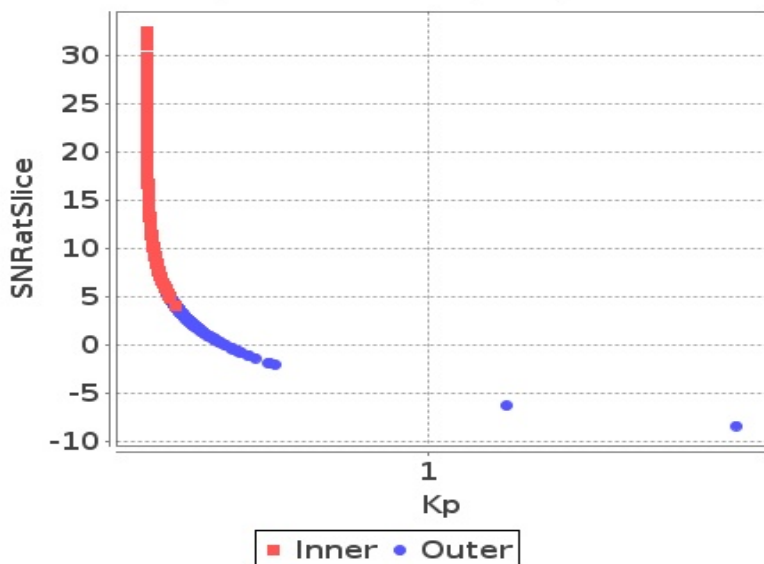
Sigma0 Vs SNRatSlice (Sea)



## Sigma0 Behaviour (Kp Vs SNR)

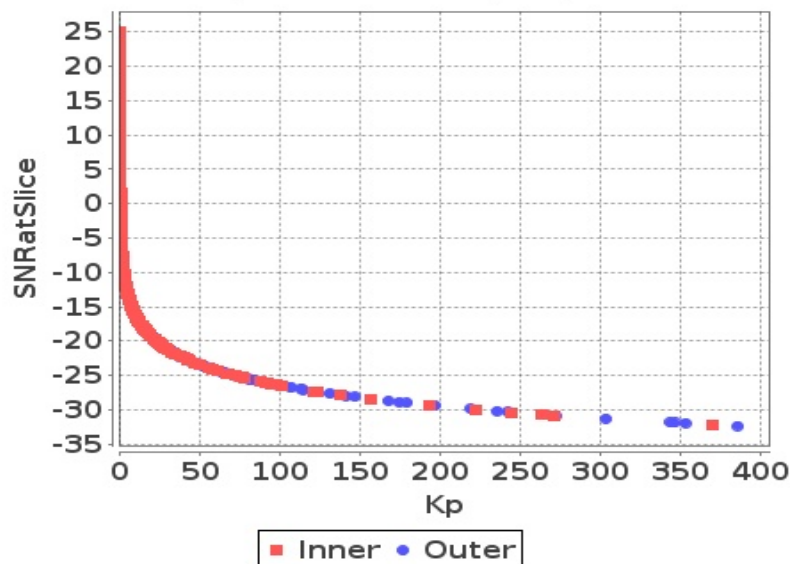
Slice

Kp Vs SNRatSlice (Land)



Slice

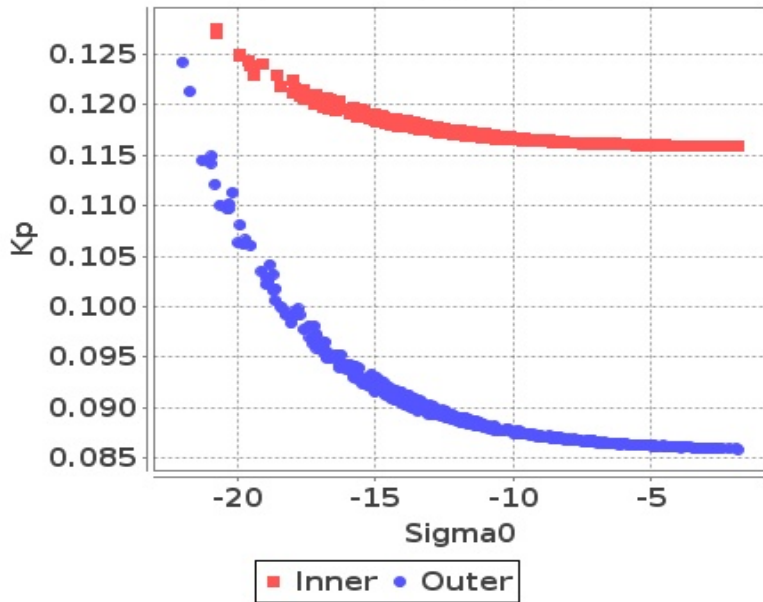
Kp Vs SNRatSlice (Sea)



# Sigma0 Behaviour(Sigma0 Vs Kp)

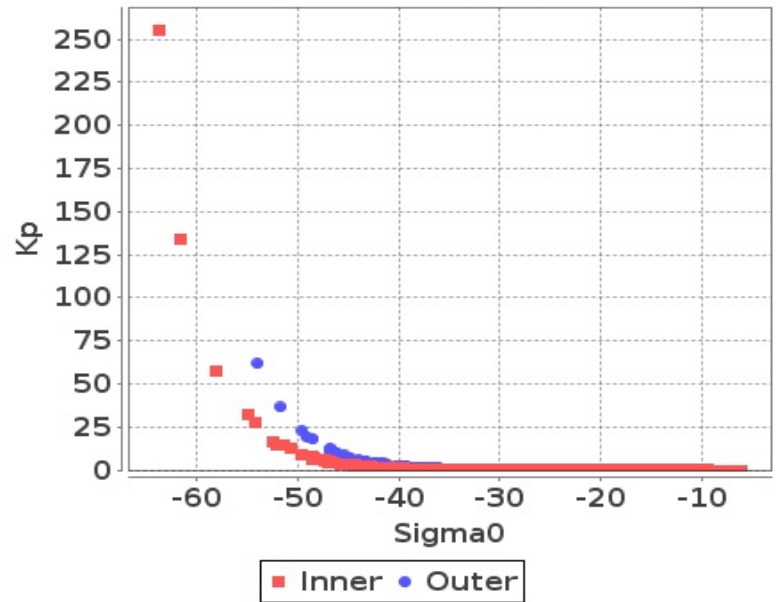
## Footprint-Land

### Sigma0 Vs Kp (Land)



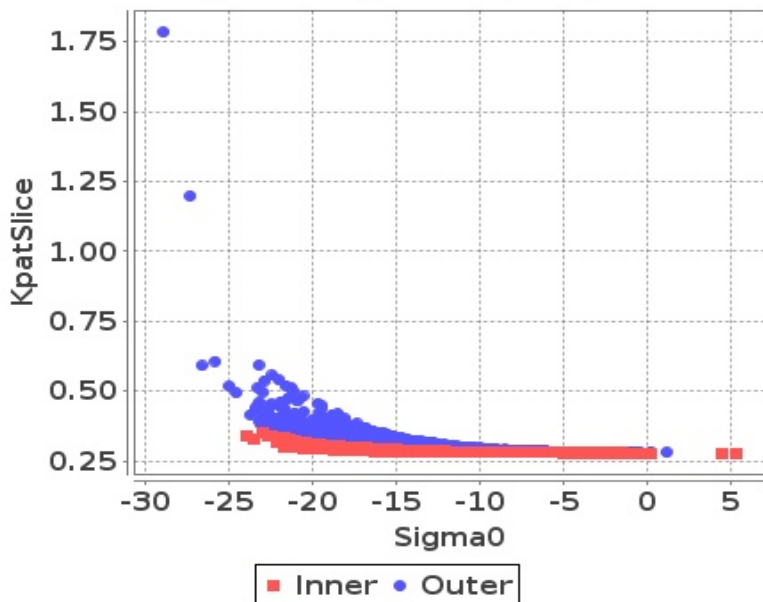
## Footprint-Sea

### Sigma0 Vs Kp (Sea)



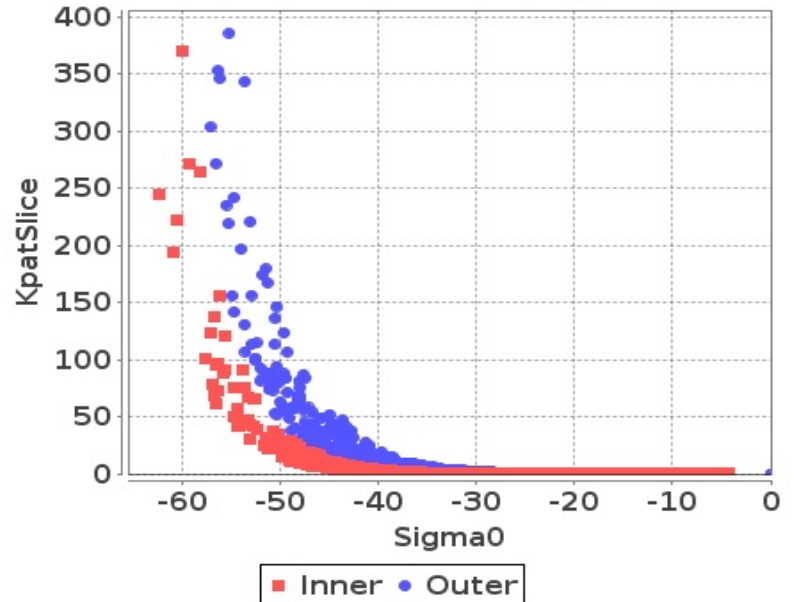
## Slice-Land

### Sigma0 Vs KpatSlice (Land)



## Slice-Sea

### Sigma0 Vs KpatSlice (Sea)

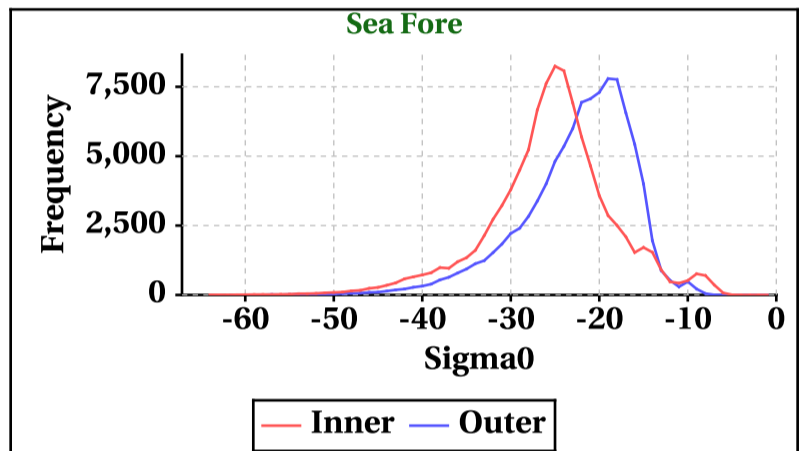
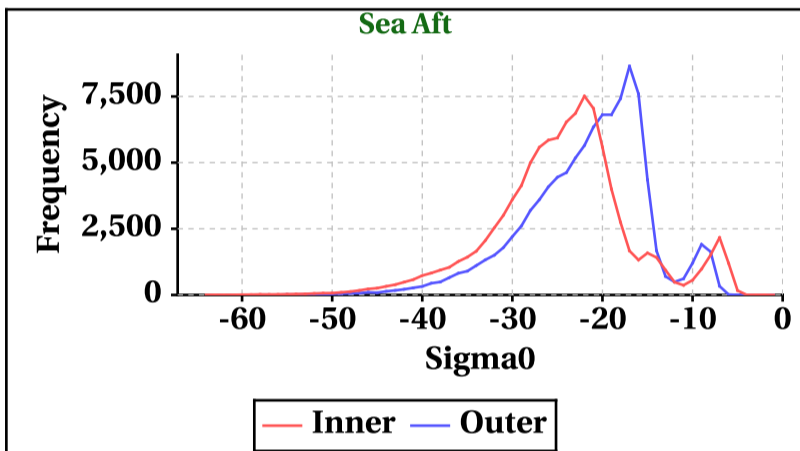
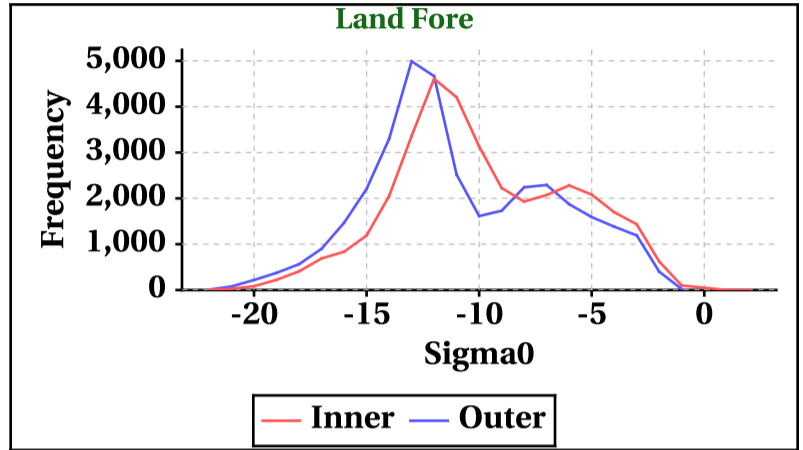
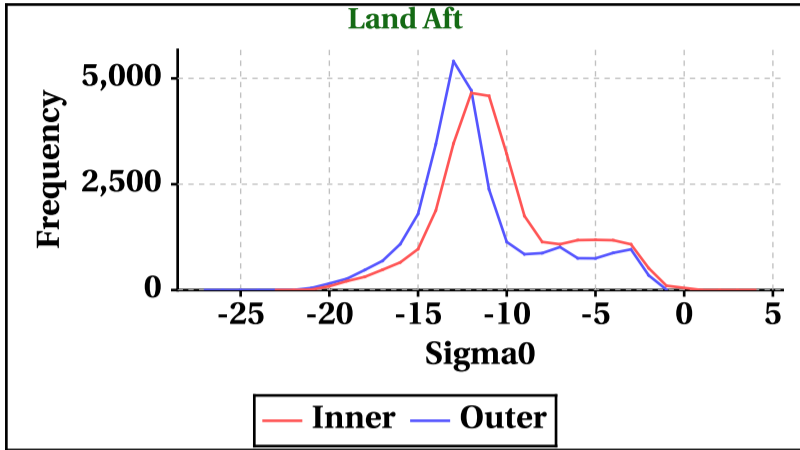


# Dynamic Range (Data Histograms)

## Sigma0(db)

| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -23      | -22       | -64     | -64      |
| Max             | 4        | 2         | 0       | 0        |

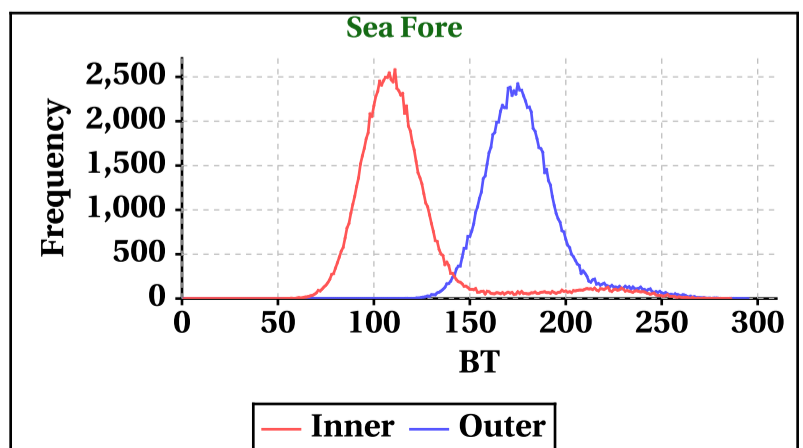
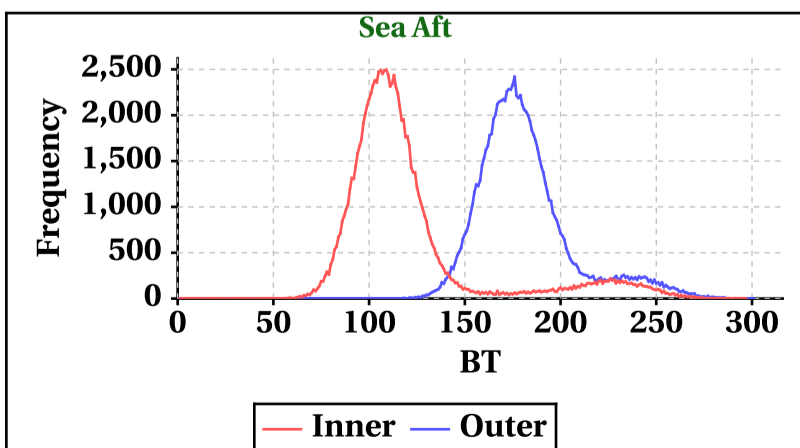
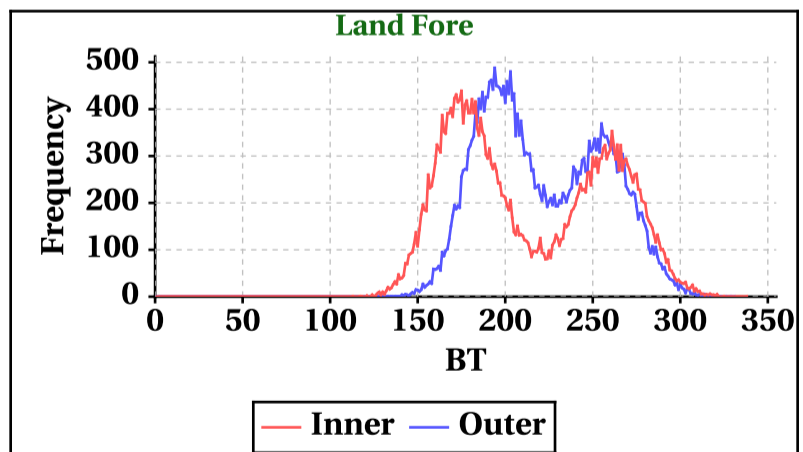
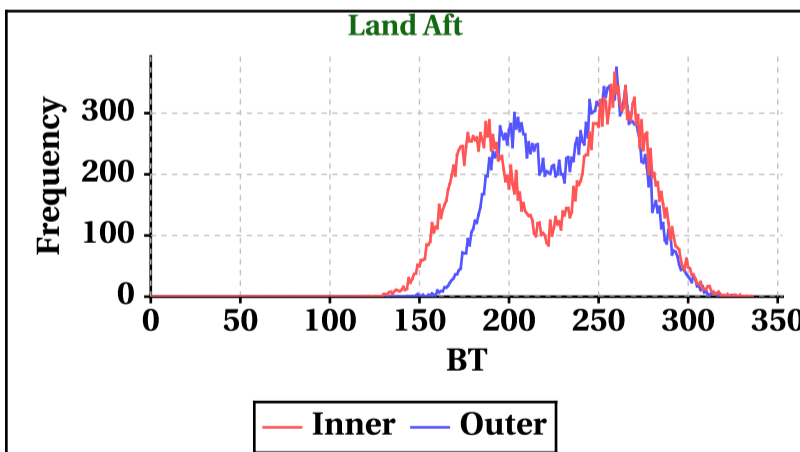
| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -27      | -22       | -59     | -59      |
| Max             | 0        | 0         | 0       | 0        |



## Brightness Temperature(K)

| Inner Beam(HH) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 336      | 338       | 297     | 286      |

| Outer Beam(VV) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 333      | 331       | 301     | 295      |

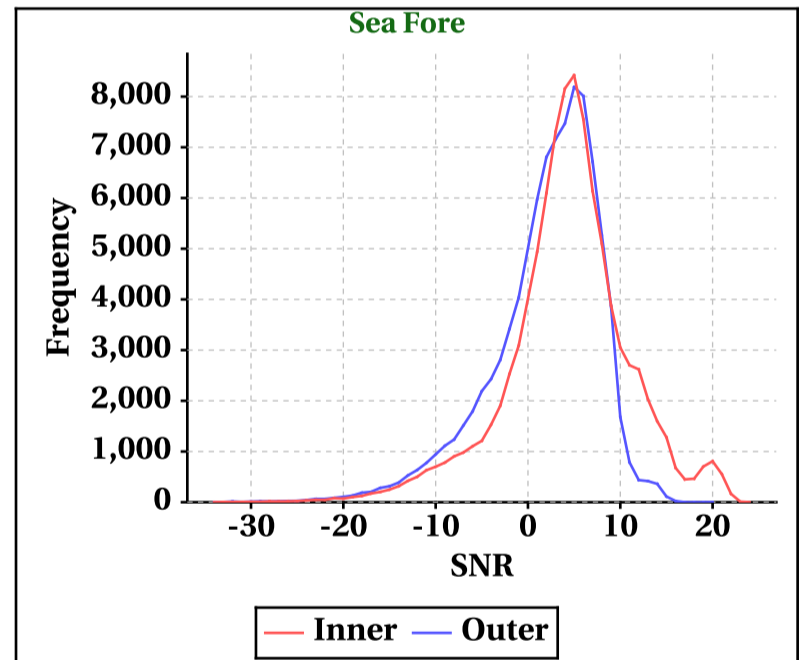
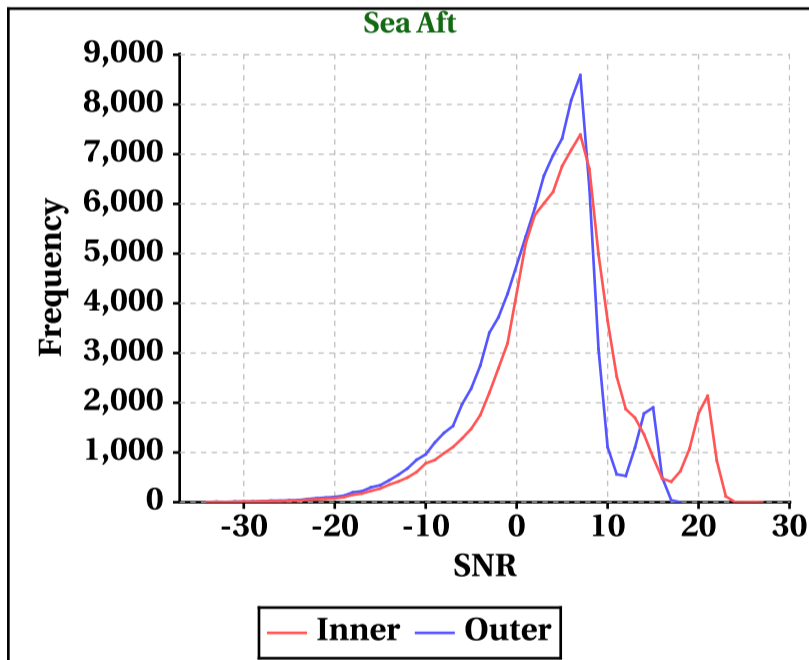
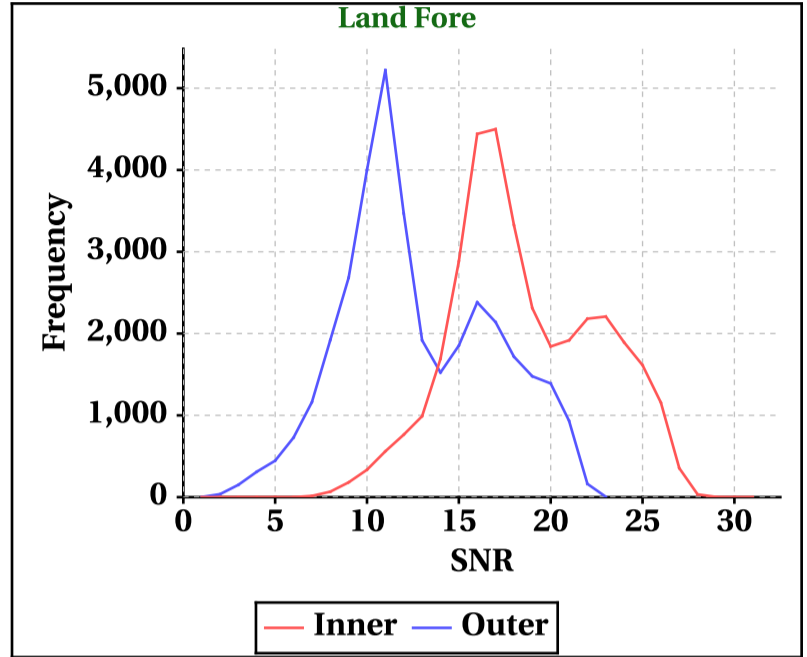
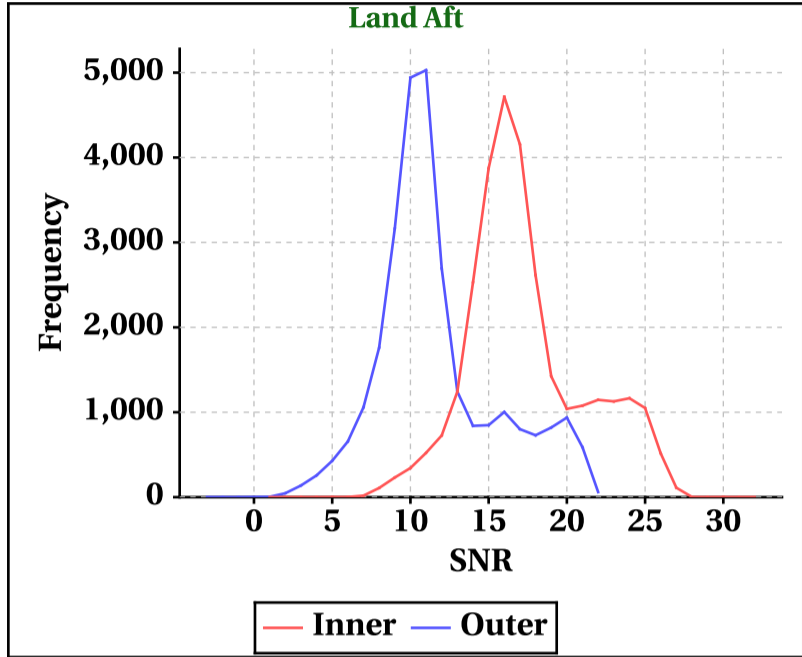


# Dynamic Range (Data Histograms)

## SNR(dBm)

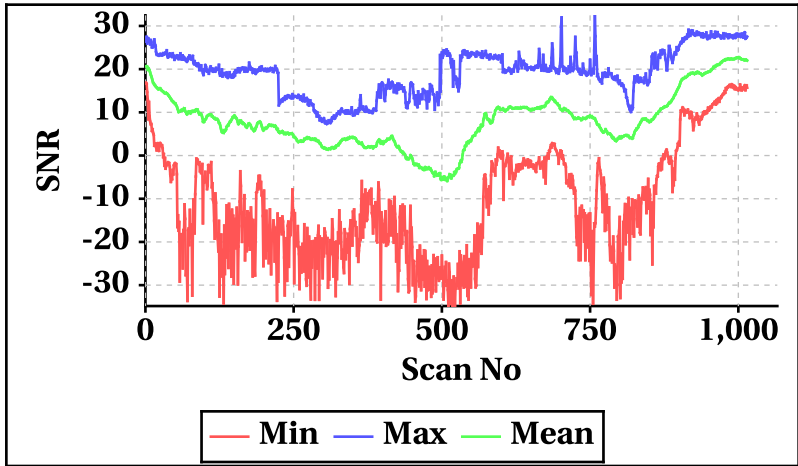
| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | 0        | 0         | -34     | -34      |
| Max             | 32       | 31        | 27      | 24       |

| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -3       | 0         | -34     | -34      |
| Max             | 22       | 23        | 18      | 20       |

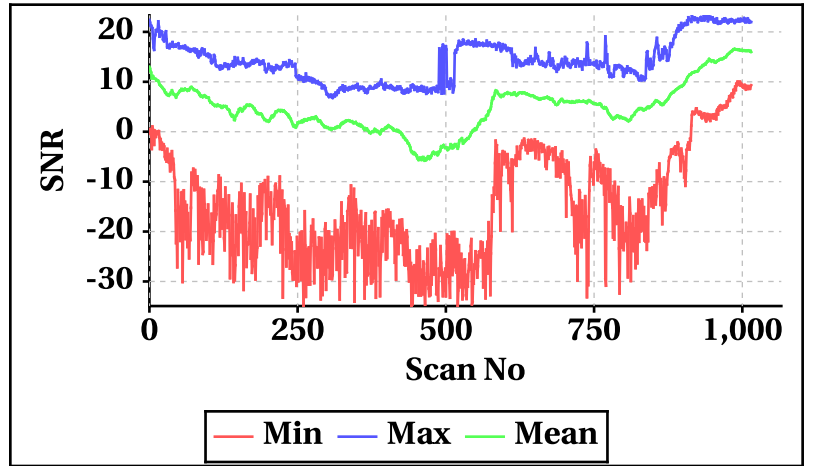


## Orbit-wise behaviour of SNR

**Inner Beam (HH)**

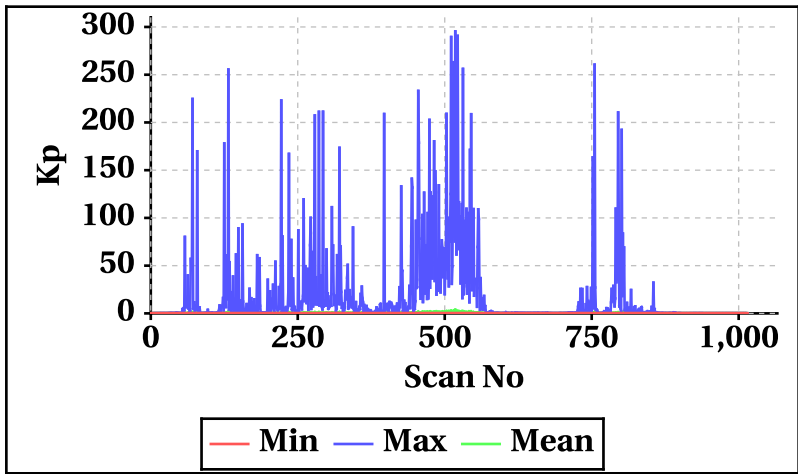


**Outer Beam(VV)**

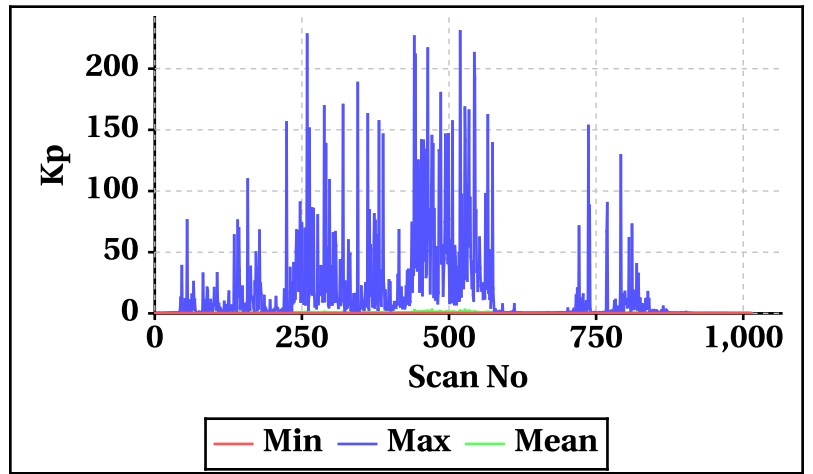


## Orbit-wise behaviour of Kp,Kpa,Kpb,Kpc

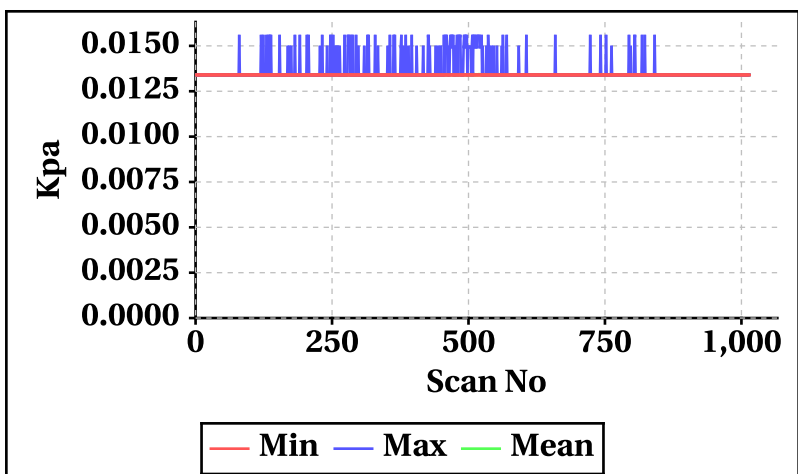
**Inner Beam(HH)**



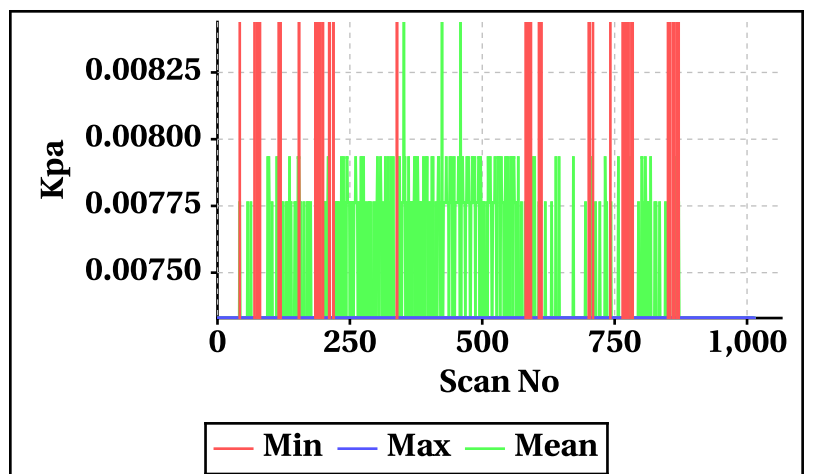
**Outer Beam(VV)**



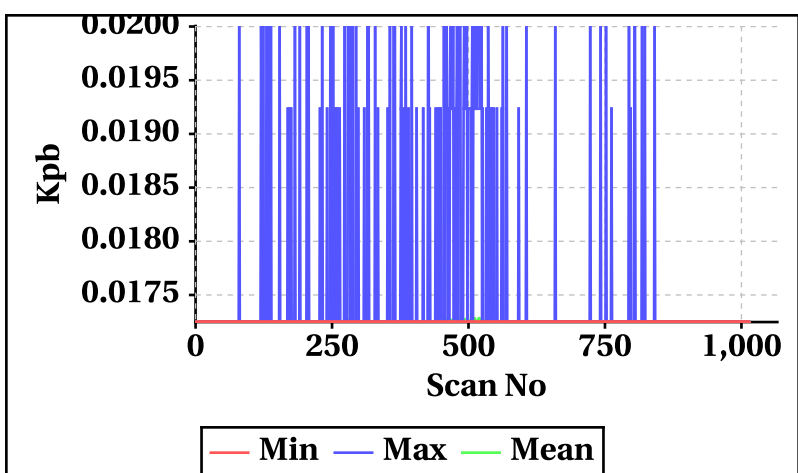
**Inner Beam(HH)**



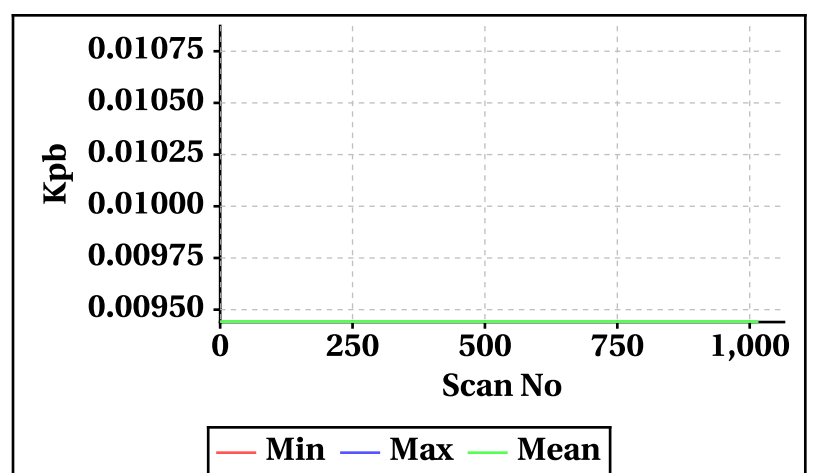
**Outer Beam(VV)**



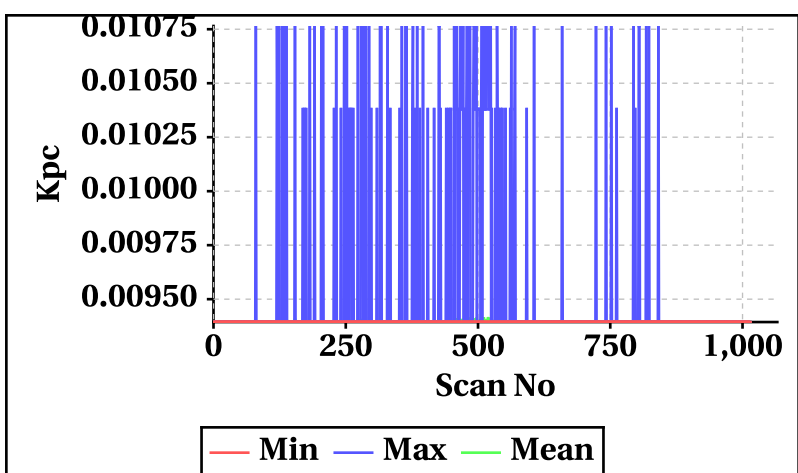
**Inner Beam(HH)**



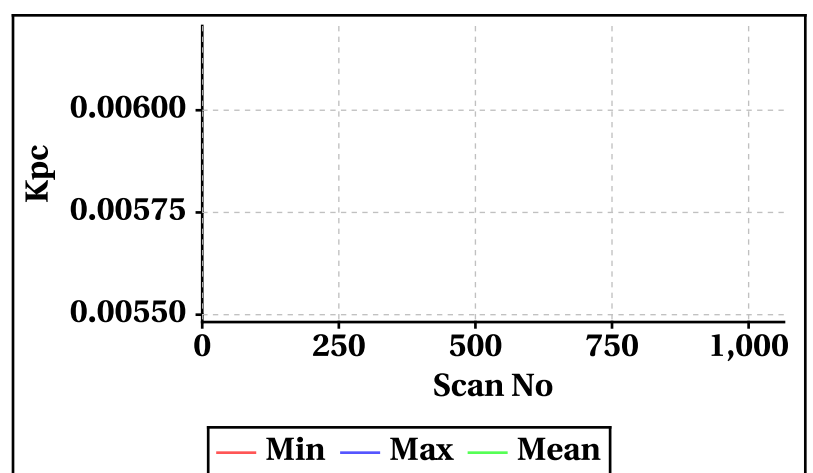
**Outer Beam(VV)**



**Inner Beam(HH)**



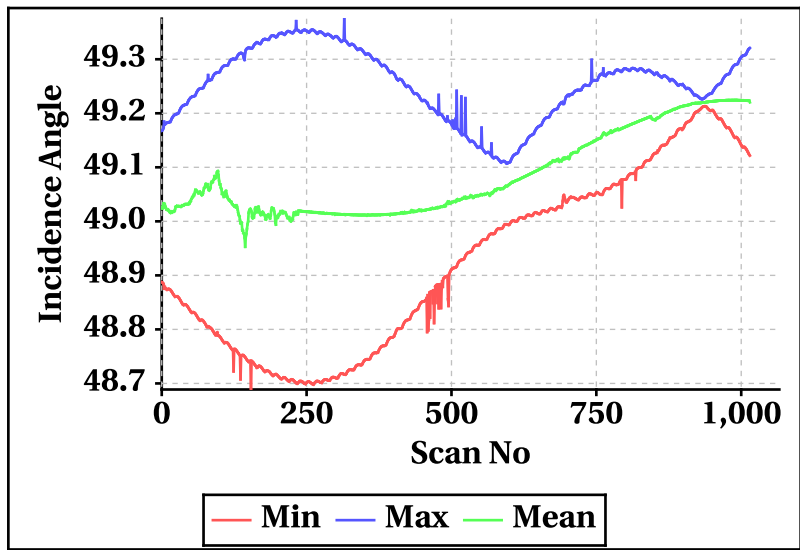
**Outer Beam(VV)**



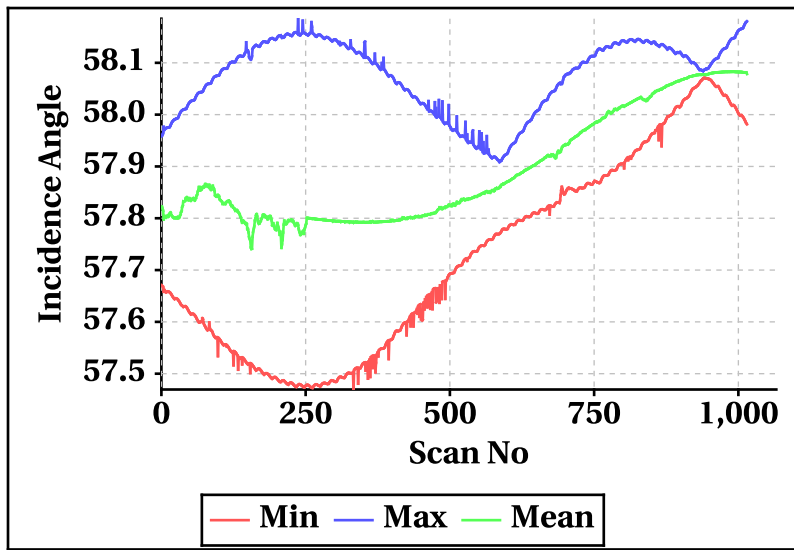


Orbit-wise behaviour of Incidence, Azimuth, Range, X-Factor

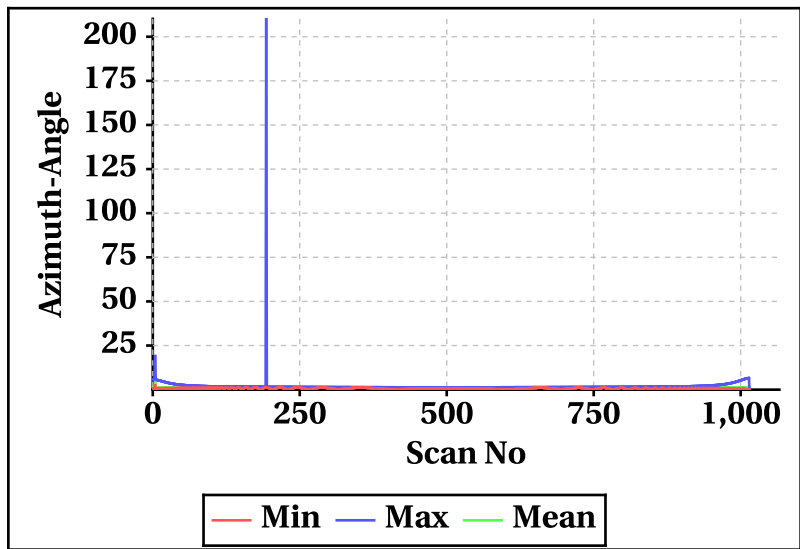
Inner Beam (HH)



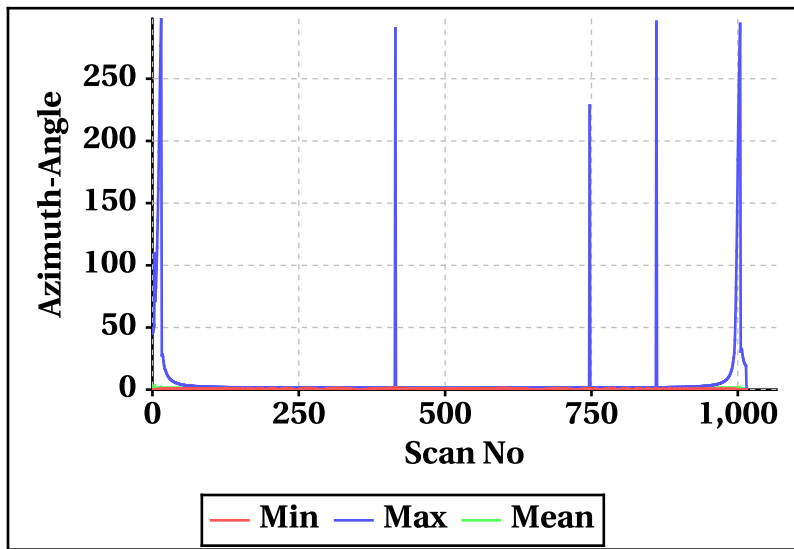
Outer Beam(VV)



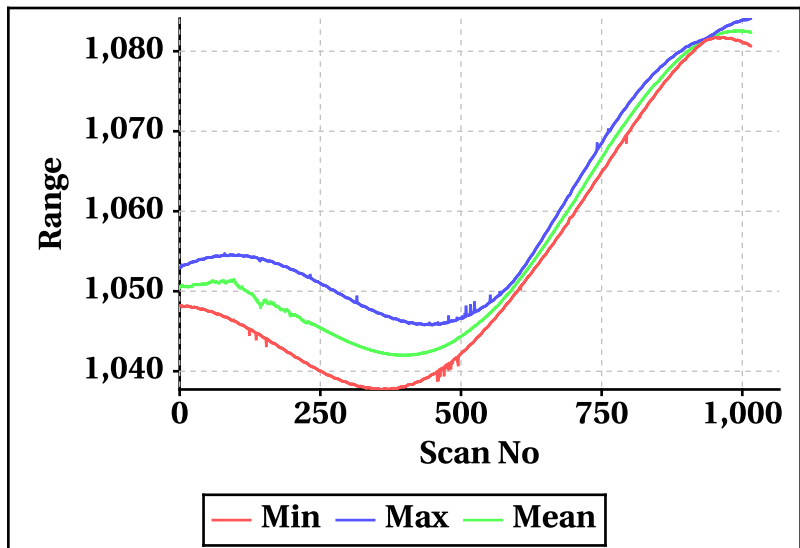
Inner Beam (HH)



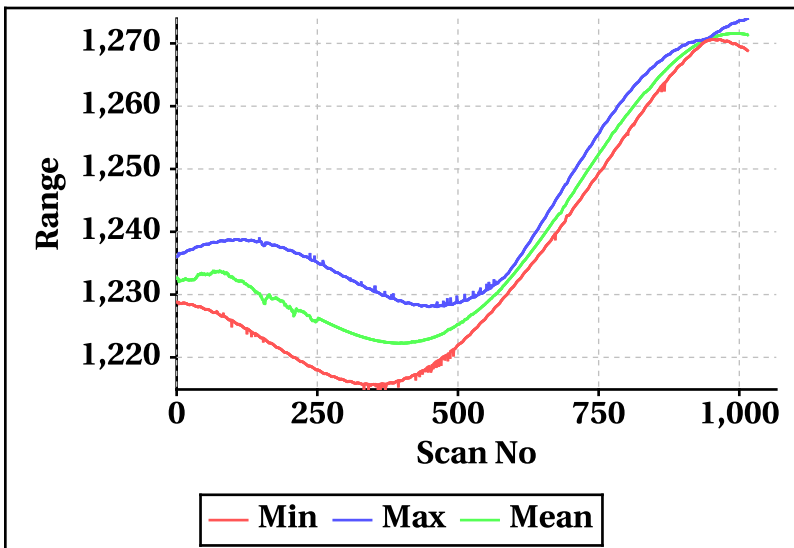
Outer Beam(VV)



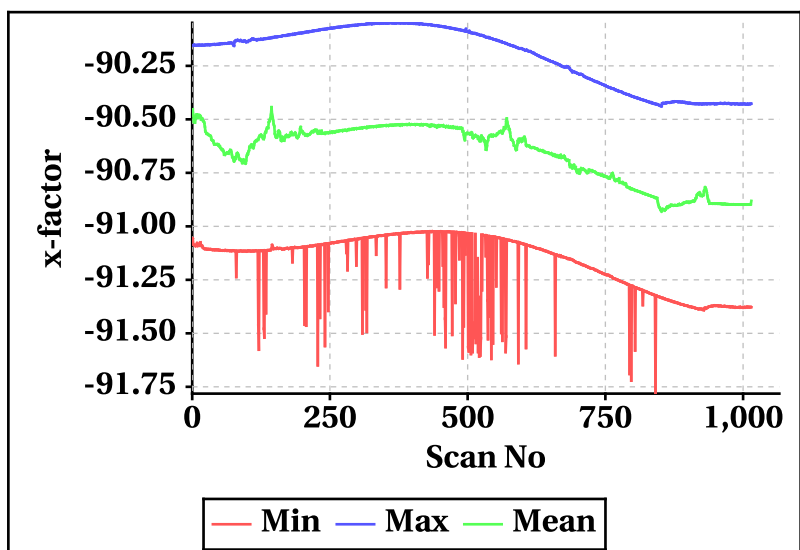
Inner Beam (HH)



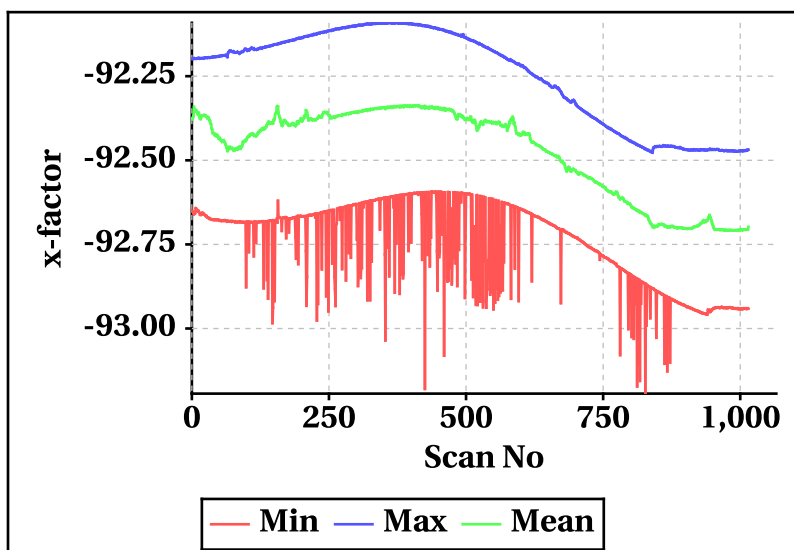
Outer Beam(VV)



Inner Beam (HH)



Outer Beam(VV)

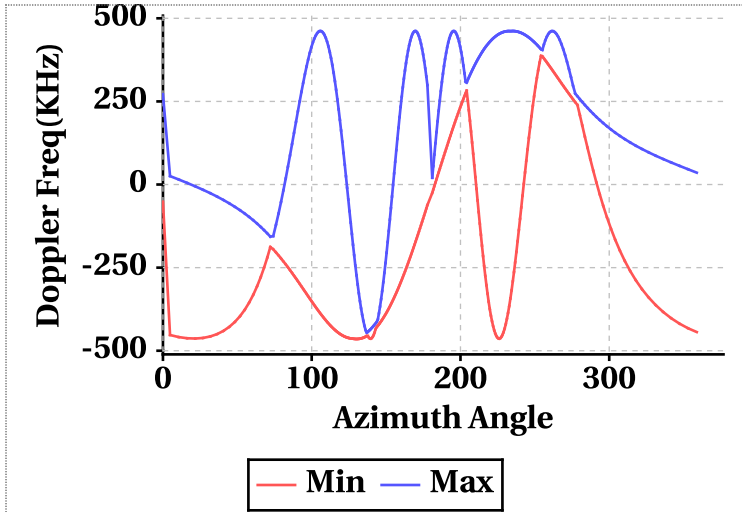


# Doppler Frequency Variation

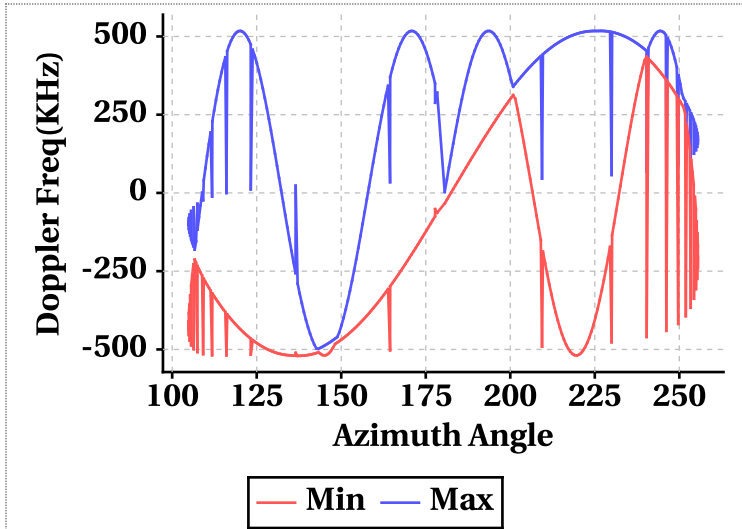
**Doppler Frequency(KHz) variation statistics Over the half Orbit**

|            | Inner Beam (HH) | Outer Beam (VV) |
|------------|-----------------|-----------------|
| <b>Min</b> | -464.68         | -520.38         |
| <b>Max</b> | 461.66          | 517.70          |

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



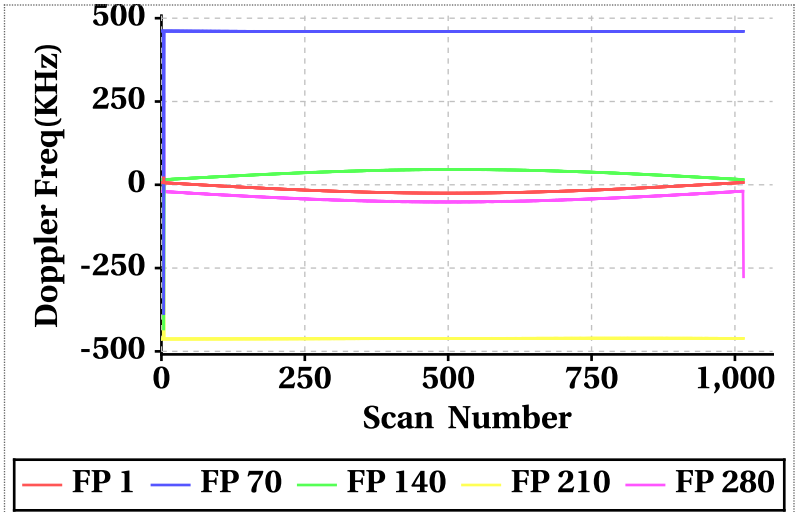
**Footprint wise Doppler frequency variation Outer Beam (VV)**



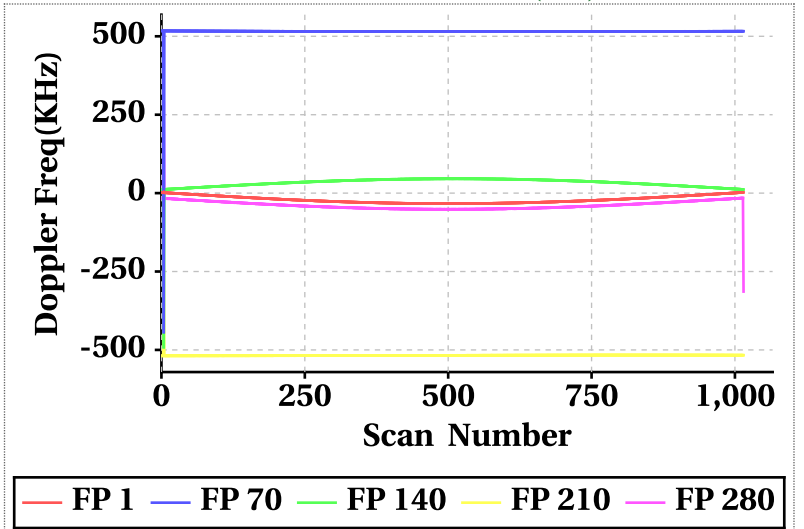
**Doppler Frequency(KHz) variation**

| Doppler_FP  | Inner Beam (HH) |         |         | Outer Beam (VV) |         |         |
|-------------|-----------------|---------|---------|-----------------|---------|---------|
|             | Min             | Max     | Mean    | Min             | Max     | Mean    |
| Doppler_1   | -25.14          | 20.28   | -13.48  | -33.50          | 3.34    | -20.50  |
| Doppler_70  | -386.20         | 461.42  | 459.38  | -443.14         | 517.20  | 514.71  |
| Doppler_140 | -432.44         | 45.92   | 34.24   | -491.20         | 45.94   | 32.79   |
| Doppler_210 | -462.84         | -114.58 | -461.12 | -518.74         | -147.30 | -517.05 |
| Doppler_280 | -276.18         | 271.46  | -39.85  | -313.92         | 288.22  | -38.58  |

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

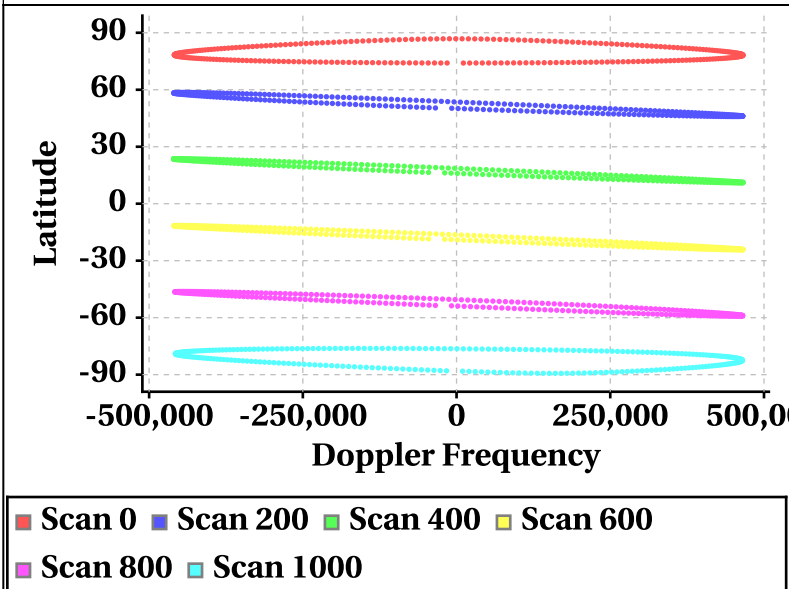


**Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Outer Beam (VV)**

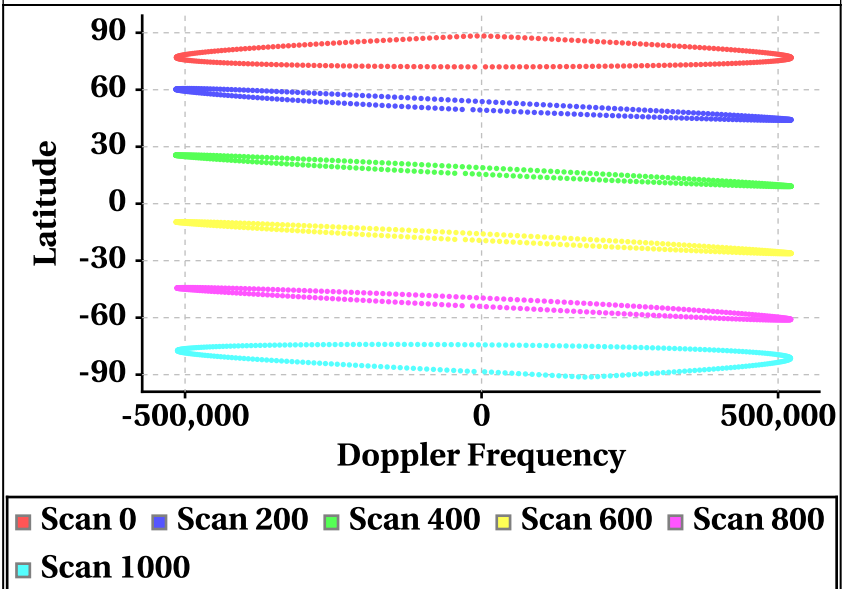


# Latitude Vs Doppler Frequency

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



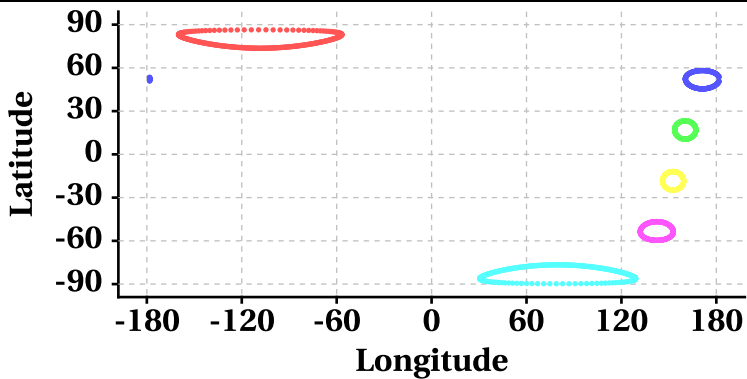
**Doppler Frequency at Scan Interval of 200 [Outer Beam(VV)]**



# Parameter as a function of Latitude

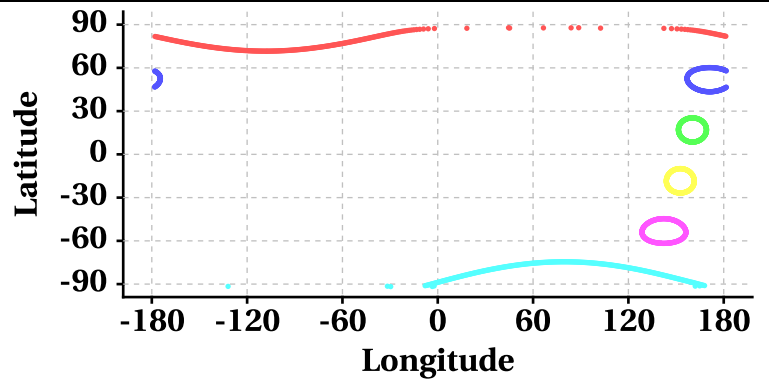
## Latitude Vs Longitude

Scan Trace [Inner Beam(HH)]



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

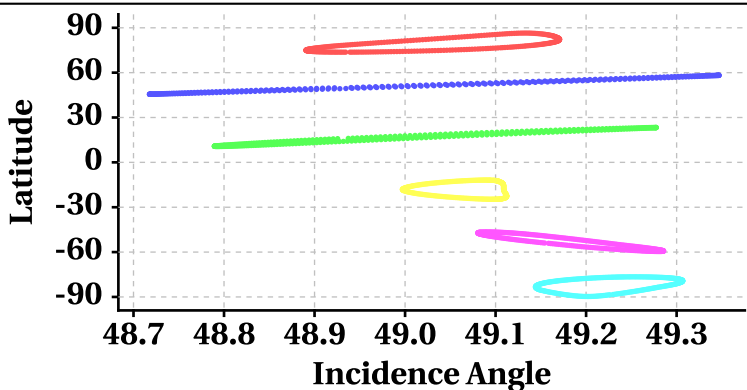
Scan Trace [Outer Beam (VV)]



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

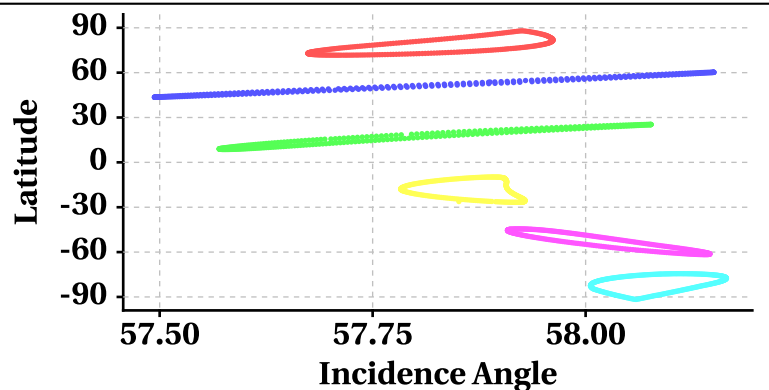
## Latitude Vs Incidence Angle

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



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

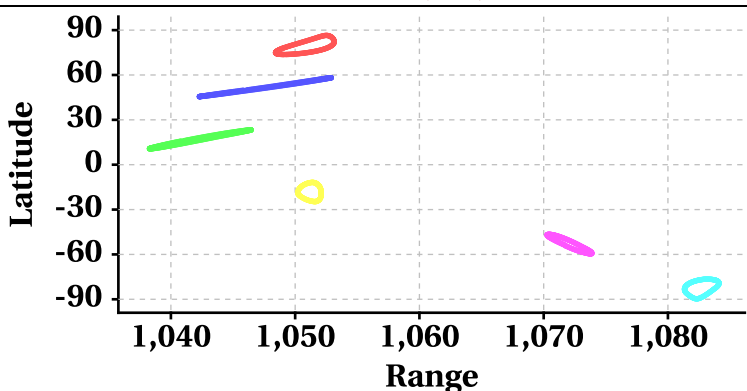
Incidence Angle at Scan Interval of 200 [Outer Beam (VV)]



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

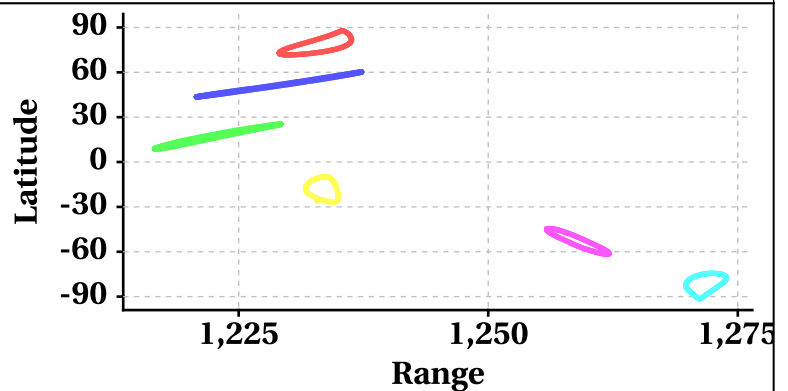
## Latitude Vs Range

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

