

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

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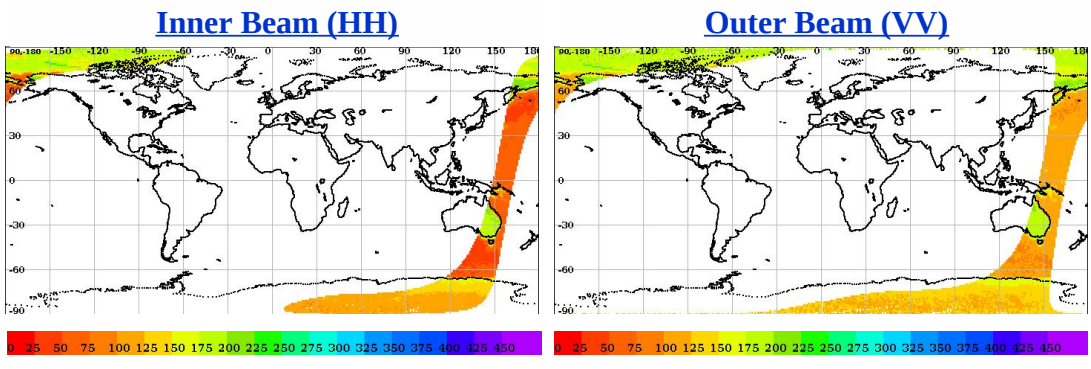
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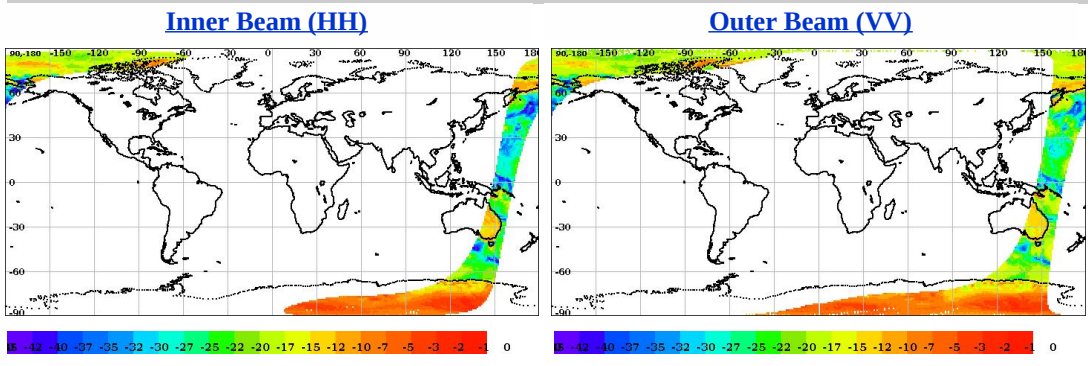
Half Orbit OAT Behaviour

|                       |               |                       |              |                        |      |
|-----------------------|---------------|-----------------------|--------------|------------------------|------|
| Satellite Id          | ScatSat-1     | Start Orbit           | 14452        | Total Scans            | 1017 |
| Sensor Name           | Scatterometer | End Orbit             | 14453        | No of Inner FootPrints | 281  |
| Processor Version     | v1.1.3        | Rev. Number           | 14452_14453  | No Of Outer FootPrints | 282  |
| Half Orbit Direction  | NS            | Data Production Date  | 20-06-2019   | No. Of Inner Slices    | 9    |
| Equator Crossing Date | 19-06-2019    | Equator Crossing Time | 22:13:01.000 | No Of Outer Slices     | 15   |

## Brightness Temperature(k) Footprint trace



## Sigma0(dB) Footprint trace



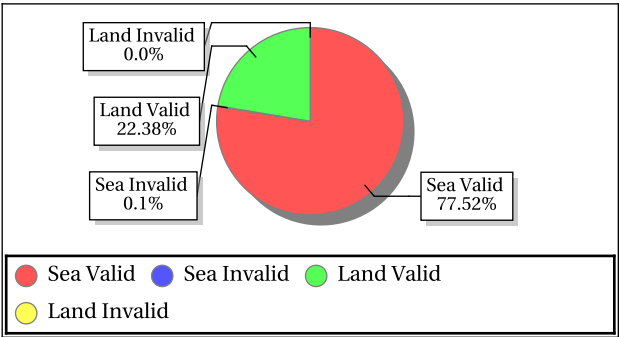
## Invalid and Poor Sigma-0 Quality Flag Statistics for Inner/Outer Slices\*

| Sigma-0 Flags                            | Inner Beam | Outer Beam |
|------------------------------------------|------------|------------|
| Invalid Sigma0(%)                        | 0.10       | 0.10       |
| 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      | 13.35      |
| Noise samples for blending Saturated     | 0.0        | 0.0        |
| Count samp. for interpol. saturated (%)  | 0.00       | 0.00       |
| Sigma0<lower bound (-96bB) (%)           | 0.0        | 0.0        |
| Sigma0>upper bound (0 dB) (%)            | 0.00       | 0.00       |
| SNR <-65 dB (%)                          | 0.059815   | 0.121926   |

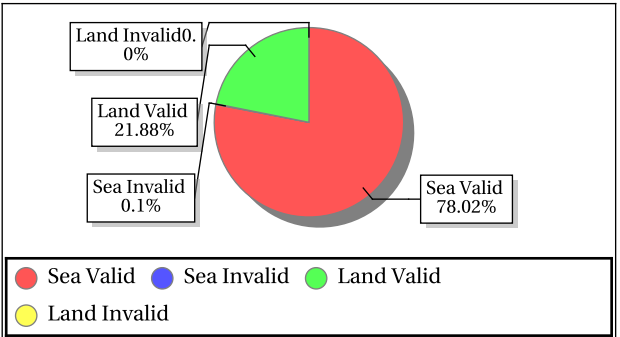
\*DP Format Document

## 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     | -7.44      | -5.30      | -6.16       | 0.63       | 105.08 | 137.52 | 125.47  | 11.82  |
| ANT_1     | -75.00     | 121.00     | Inner | DSC  | Fore    | -9.05      | -5.39      | -6.83       | 1.02       | 105.12 | 143.59 | 121.70  | 11.32  |
| ANT_1     | -75.00     | 121.00     | Outer | DSC  | Aft     | -9.02      | -6.58      | -7.79       | 0.76       | 100.95 | 151.10 | 134.89  | 17.64  |
| ANT_1     | -75.00     | 121.00     | Outer | DSC  | Fore    | -9.48      | -6.93      | -8.07       | 0.90       | 96.76  | 135.92 | 126.27  | 11.60  |



## Overall statistics for the Static Parameters (Footprint-wise)

|     | Inner Beam (HH) |        |      |              |          |        |      |              |          |       |       |              |           |       |       |              |
|-----|-----------------|--------|------|--------------|----------|--------|------|--------------|----------|-------|-------|--------------|-----------|-------|-------|--------------|
|     | Sea Aft         |        |      |              | Sea Fore |        |      |              | Land Aft |       |       |              | Land fore |       |       |              |
|     | Min             | Max    | Mean | Bad Occ. (%) | Min      | Max    | Mean | Bad Occ. (%) | Min      | Max   | Mean  | Bad Occ. (%) | Min       | Max   | Mean  | Bad Occ. (%) |
| Kp  | 0.12            | 277.73 | 0.47 | 4.768        | 0.12     | 255.89 | 0.39 | 3.923        | 0.12     | 0.13  | 0.12  | 0.000        | 0.12      | 0.13  | 0.12  | 0.000        |
| Kpa | 0.01            | 0.02   | 0.01 | 0.000        | 0.01     | 0.02   | 0.01 | 0.000        | 0.01     | 0.01  | 0.01  | 0.000        | 0.01      | 0.01  | 0.01  | 0.000        |
| Kpb | 0.02            | 0.02   | 0.02 | 0.000        | 0.02     | 0.02   | 0.02 | 0.000        | 0.02     | 0.02  | 0.02  | 0.000        | 0.02      | 0.02  | 0.02  | 0.000        |
| Kpc | 0.01            | 0.01   | 0.01 | 0.000        | 0.01     | 0.01   | 0.01 | 0.000        | 0.01     | 0.01  | 0.01  | 0.000        | 0.01      | 0.01  | 0.01  | 0.000        |
| SNR | -34.57          | 24.40  | 3.01 | 0.033        | -34.22   | 25.65  | 4.00 | 0.039        | 6.78     | 34.06 | 18.15 | 18.216       | 7.09      | 29.91 | 19.39 | 28.437       |

|     | 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. (%) |
| Kp  | 0.09            | 227.02 | 0.40 | 4.143        | 0.09     | 212.79 | 0.38 | 3.992        | 0.09     | 0.14  | 0.09  | 0.000        | 0.09      | 0.13  | 0.09  | 0.000        |
| Kpa | 0.01            | 0.01   | 0.01 | 0.000        | 0.01     | 0.01   | 0.01 | 0.000        | 0.01     | 0.01  | 0.01  | 0.000        | 0.01      | 0.01  | 0.01  | 0.000        |
| Kpb | 0.01            | 0.01   | 0.01 | 0.000        | 0.01     | 0.01   | 0.01 | 0.000        | 0.01     | 0.01  | 0.01  | 0.000        | 0.01      | 0.01  | 0.01  | 0.000        |
| Kpc | 0.01            | 0.01   | 0.01 | 0.000        | 0.01     | 0.01   | 0.01 | 0.000        | 0.01     | 0.01  | 0.01  | 0.000        | 0.01      | 0.01  | 0.01  | 0.000        |
| SNR | -34.86          | 17.22  | 1.14 | 0.000        | -34.58   | 17.84  | 1.42 | 0.000        | 0.96     | 22.88 | 12.41 | 0.290        | 1.58      | 23.70 | 13.53 | 0.754        |

| 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)

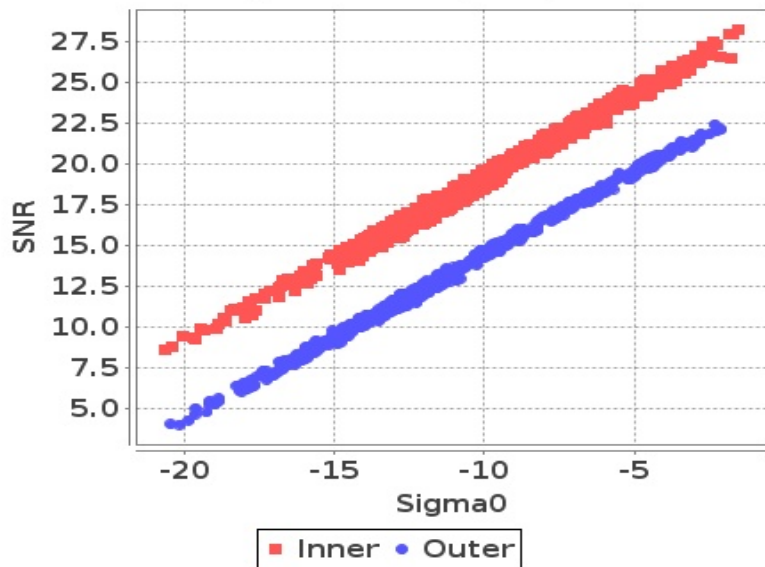
|                       | Inner Beam (HH) |          |         |              | Outer Beam (VV) |          |         |              | Parameter Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         |         |
|-----------------------|-----------------|----------|---------|--------------|-----------------|----------|---------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|
|                       | Min             | Max      | Mean    | Bad Occ. (%) | Min             | Max      | Mean    | Bad Occ. (%) | Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Min     | Max     |
| Incidence Angle (deg) | 48.71           | 49.37    | 49.02   | 0.000        | 57.54           | 58.17    | 57.91   | 0.000        | Inci.(Inner)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 47.10   | 49.90   |
| Azimuth Diff. (deg)   | 0.0000          | 206.95   | 1.28    | 2.728        | 0.0000          | 288.68   | 1.27    | 3.895        | Inci.(Outer)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 57.30   | 58.90   |
| Range(Km)             | 1038.90         | 1077.42  | 1056.52 | 0.000        | 1219.03         | 1265.58  | 1239.19 | 0.000        | Azimuth Diff.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.60    | 2.00    |
| X Factor(dbm)         | -91.82          | -90.12   | -90.66  | 0.000        | -93.16          | -92.15   | -92.29  | 0.000        | Range(Inner)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1025.00 | 1095.70 |
| Across Distance (Km)  | 15.84           | 16.39    | 16.05   | 0.000        | 10.19           | 23.31    | 21.09   | 2.000        | Range(Outer)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1210.00 | 1280.00 |
| Along Distance (Km)   | 18.57           | 10978.89 | 41.25   | 3.000        | 18.36           | 11178.70 | 41.59   | 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   |
|                       |                 |          |         |              |                 |          |         |              | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: green; border: 1px solid black;"></span> Normal</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: yellow; border: 1px solid black;"></span> Deviations</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: orange; border: 1px solid black;"></span> Alarming</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: red; border: 1px solid black;"></span> High Errors</li> </ul> |         |         |



## Sigma0 Behaviour (Sigma0 Vs SNR)

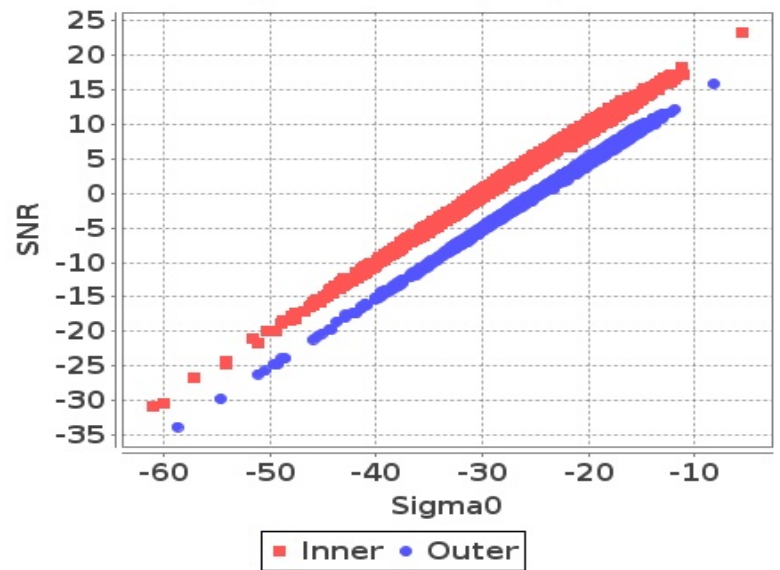
Footprint-Land

Sigma0 Vs SNR (Land)



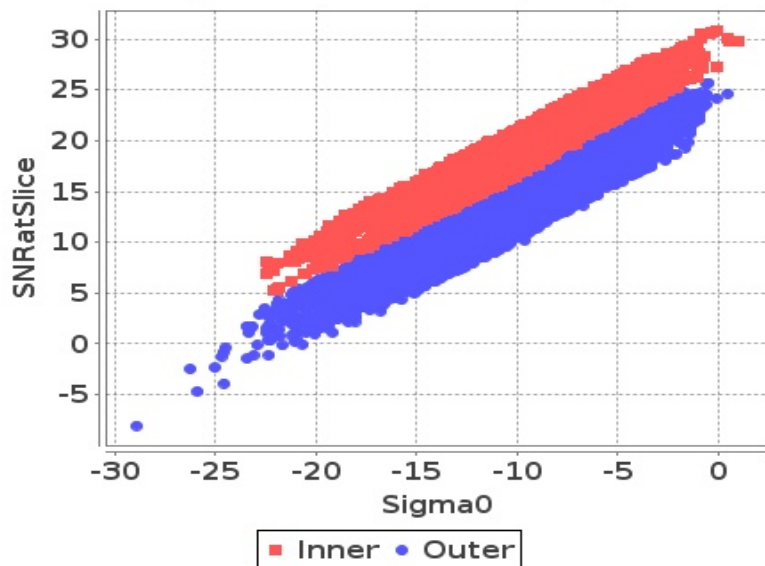
Footprint-Sea

Sigma0 Vs SNR (Sea)



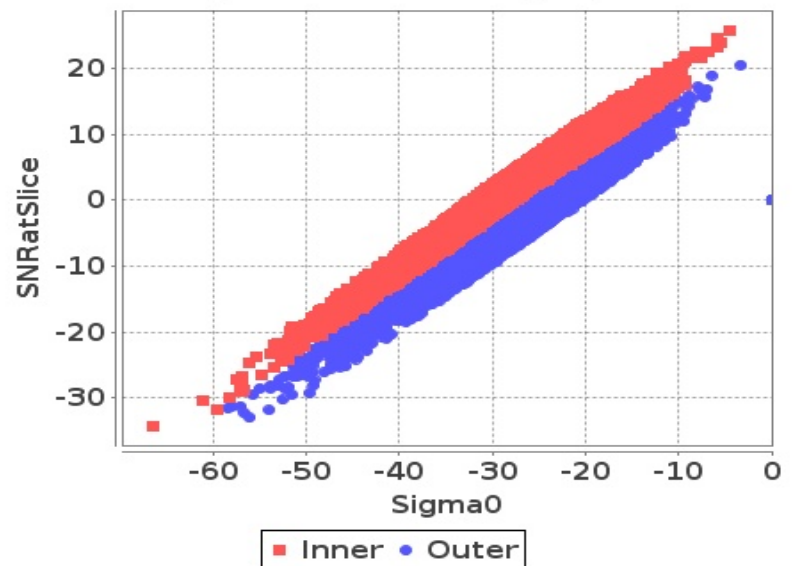
Slice-Land

Sigma0 Vs SNRatSlice (Land)



Slice-Sea

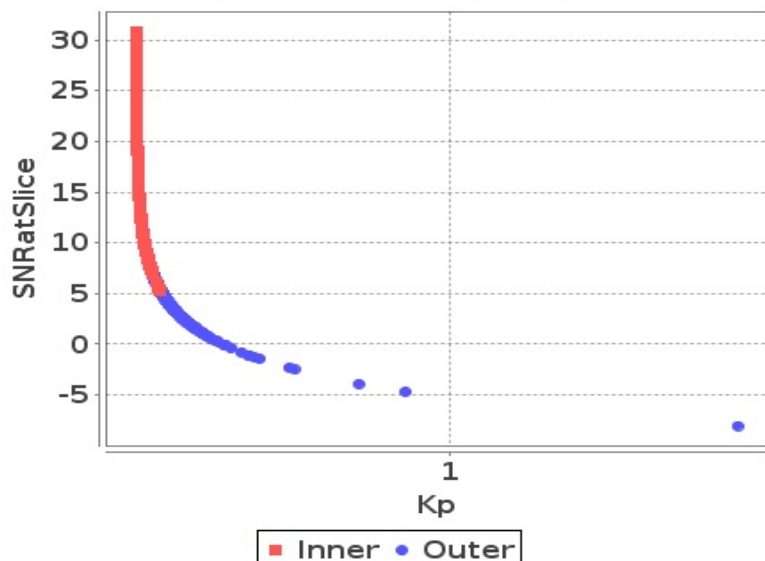
Sigma0 Vs SNRatSlice (Sea)



## Sigma0 Behaviour (Kp Vs SNR)

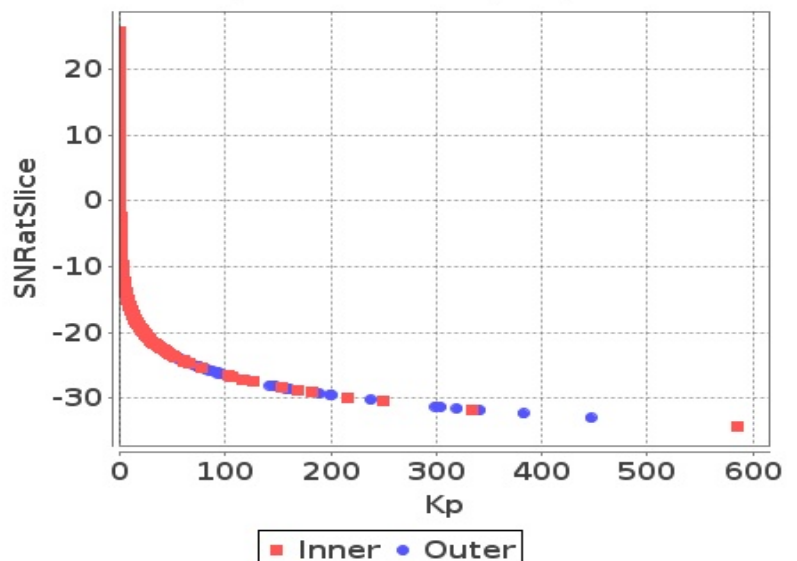
Slice

Kp Vs SNRatSlice (Land)



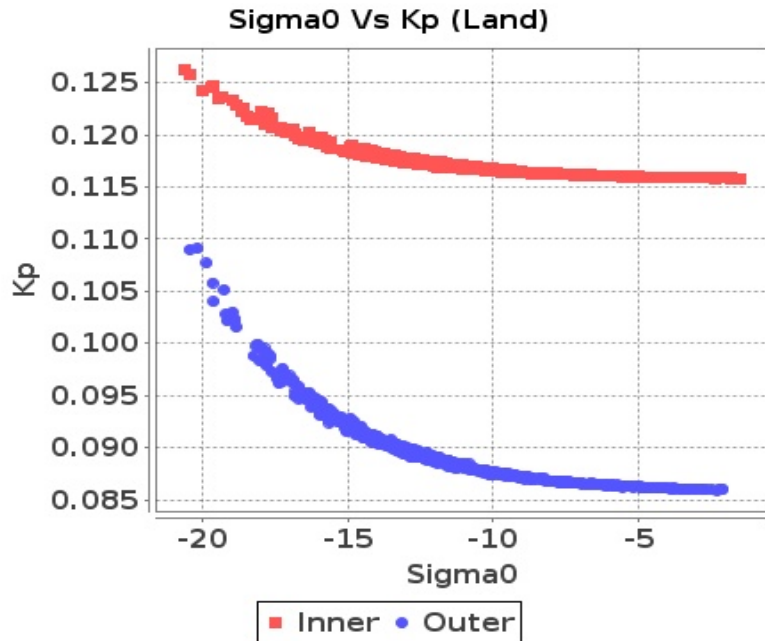
Slice

Kp Vs SNRatSlice (Sea)

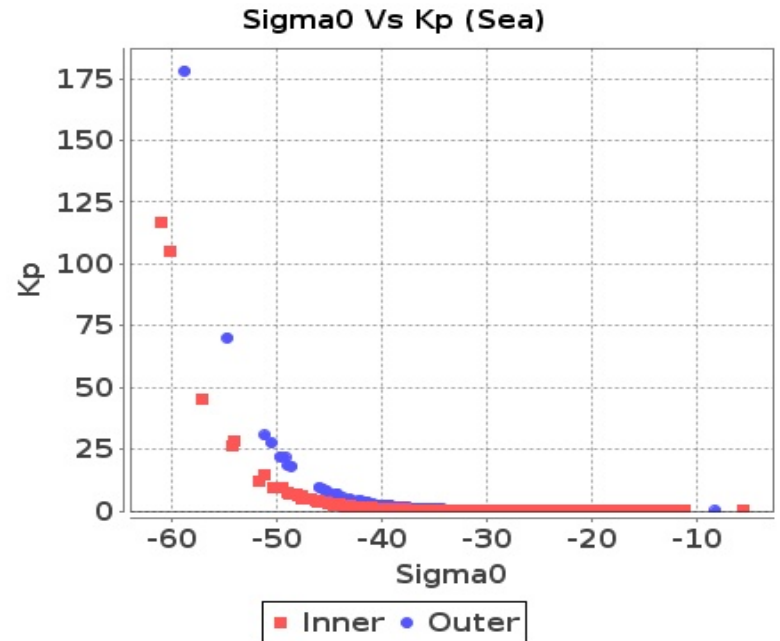


# Sigma0 Behaviour(Sigma0 Vs Kp)

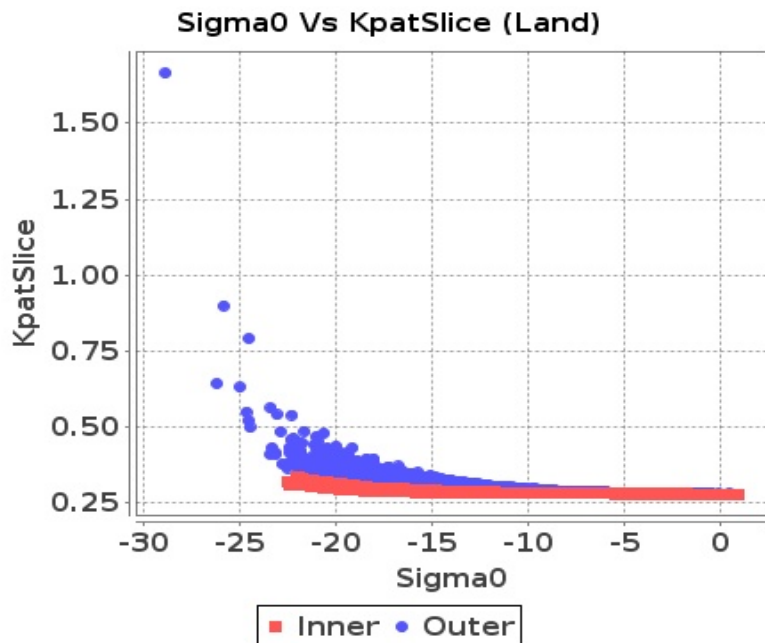
Footprint-Land



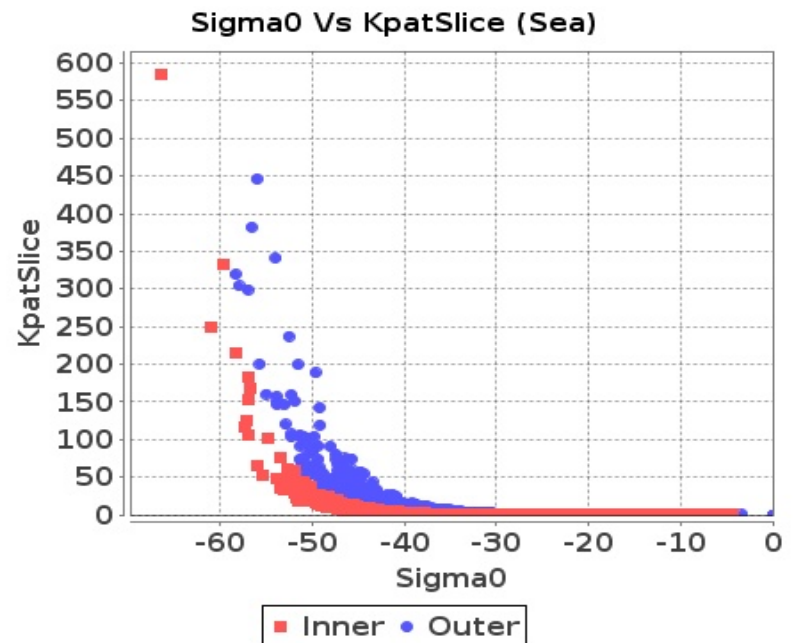
Footprint-Sea



Slice-Land



Slice-Sea

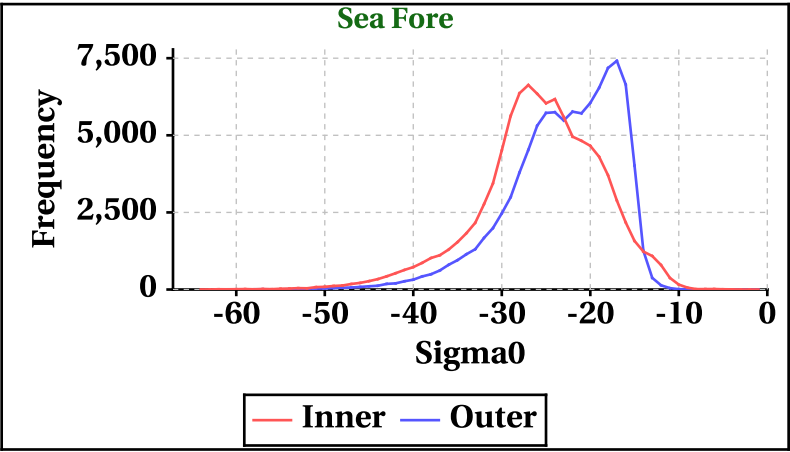
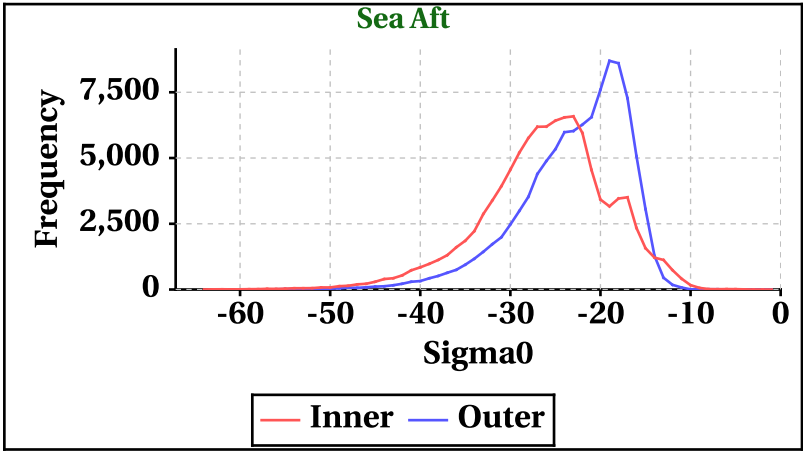
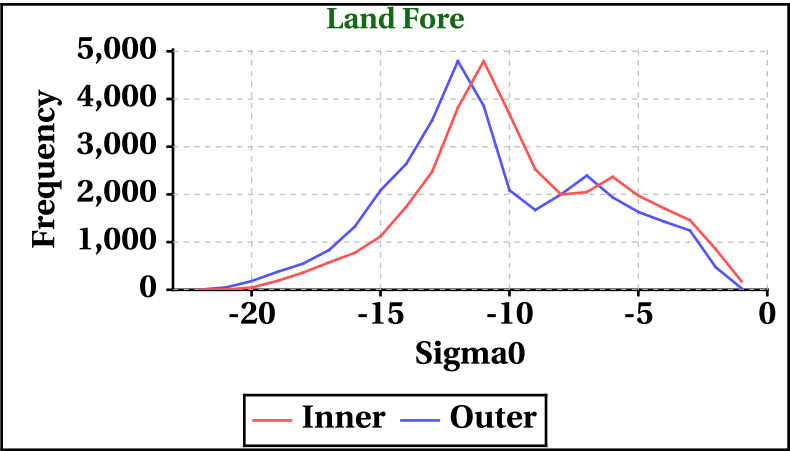
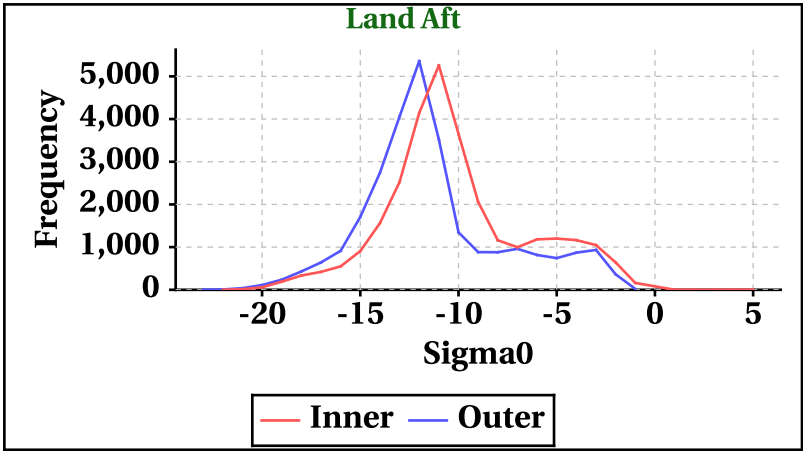


Dynamic Range (Data Histograms)

Sigma0(db)

| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -22      | -22       | -64     | -64      |
| Max             | 5        | 0         | 0       | 0        |

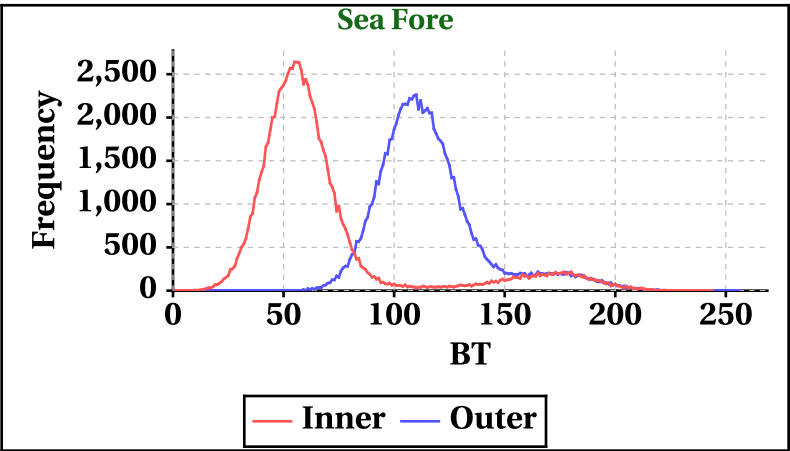
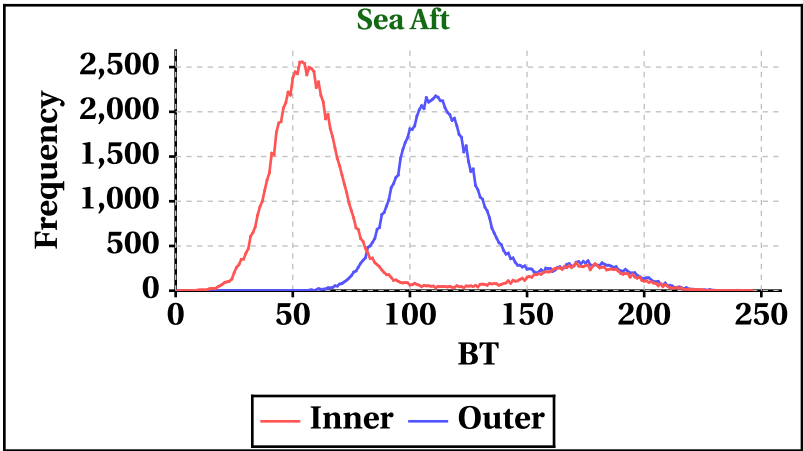
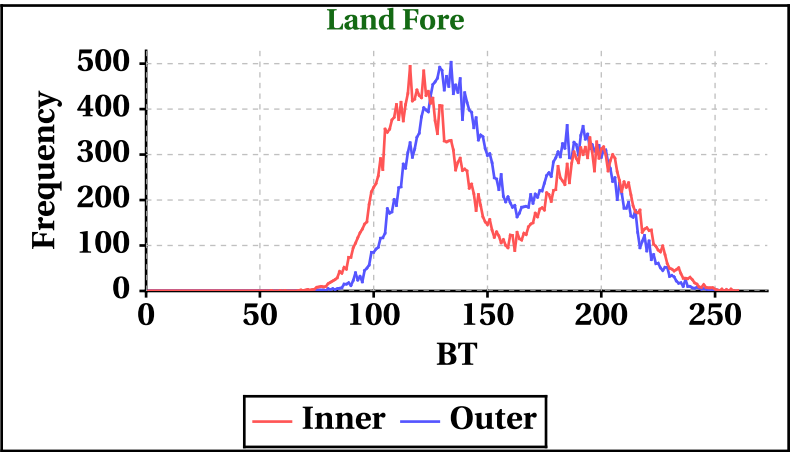
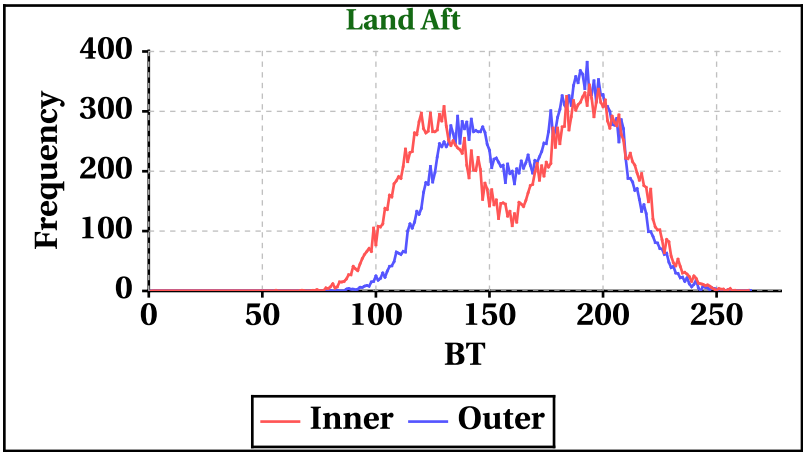
| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -23      | -22       | -59     | -59      |
| Max             | 0        | 0         | 0       | 0        |



Brightness Temperature(K)

| Inner Beam(HH) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 264      | 260       | 246     | 244      |

| Outer Beam(VV) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 265      | 258       | 243     | 256      |

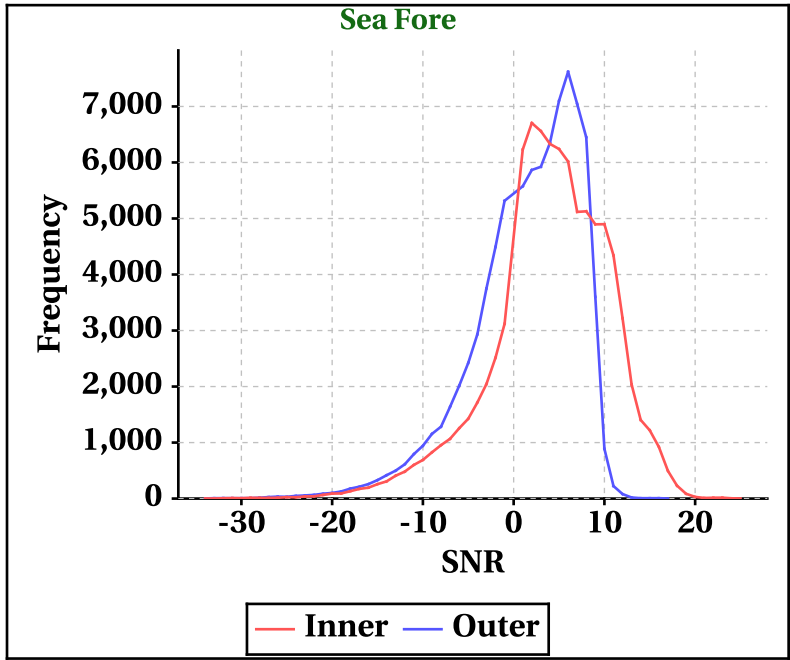
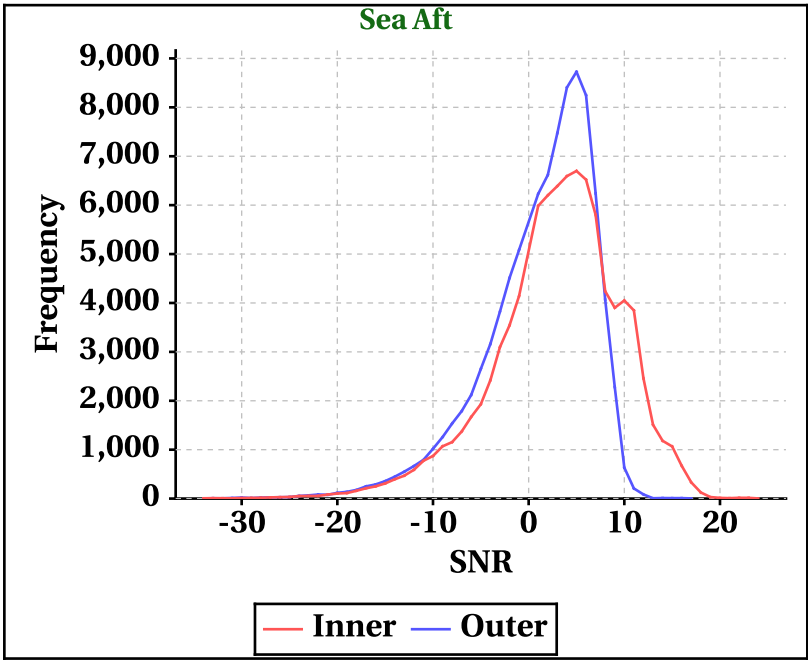
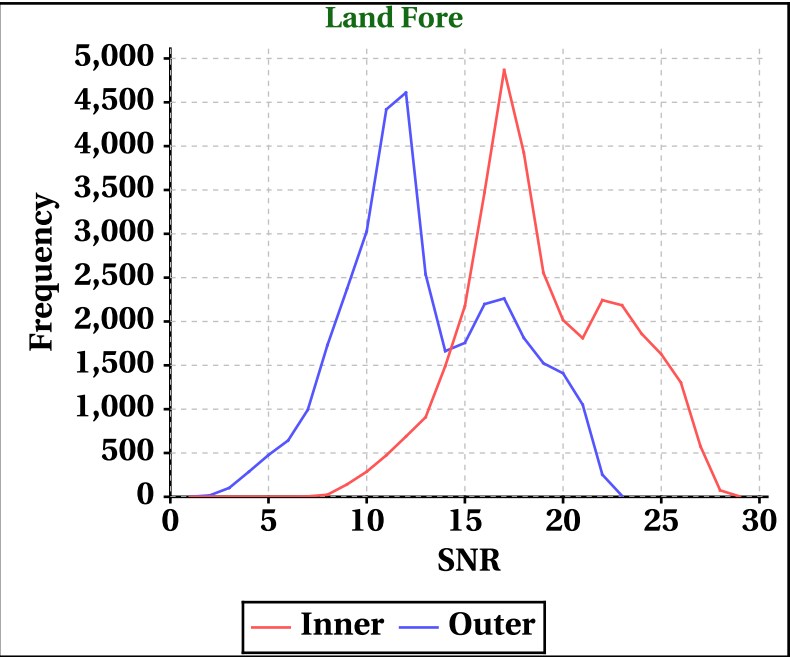
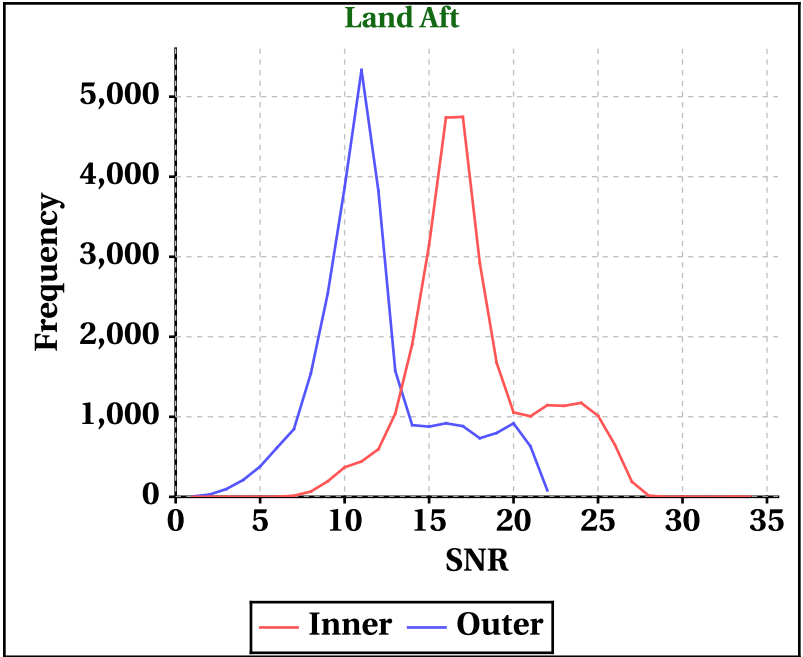


Dynamic Range (Data Histograms)

SNR(dBm)

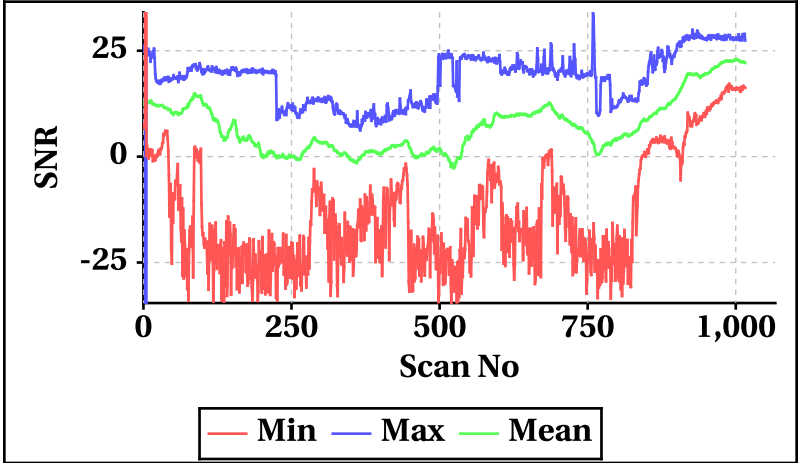
| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | 0        | 0         | -34     | -34      |
| Max             | 34       | 29        | 24      | 25       |

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

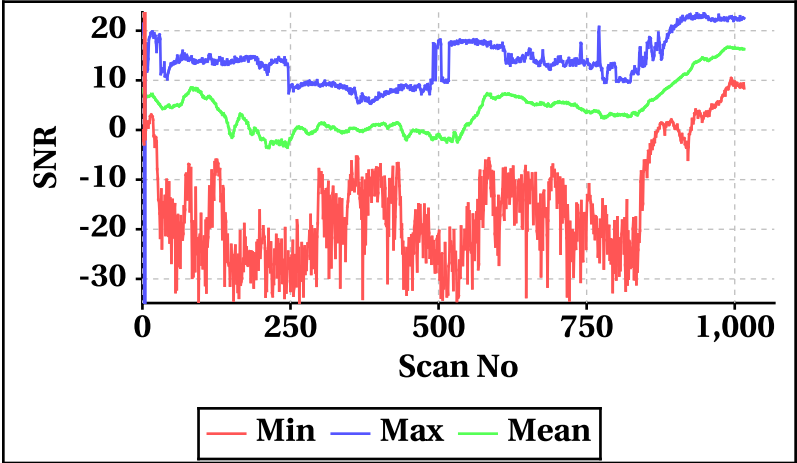


## Orbit-wise behaviour of SNR

Inner Beam (HH)

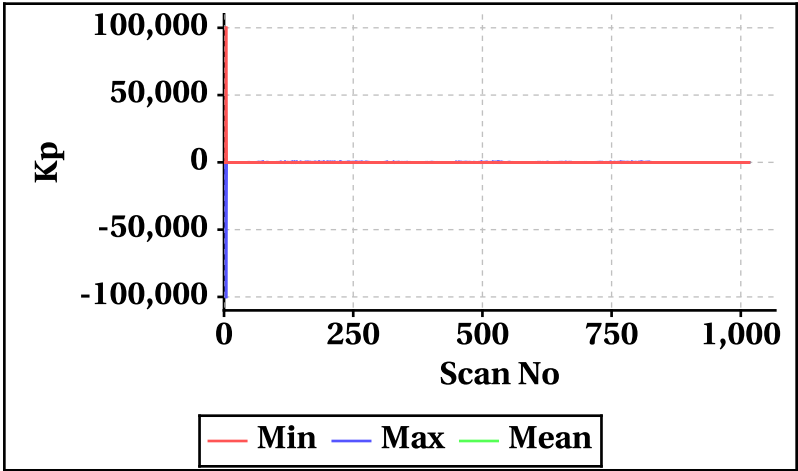


Outer Beam(VV)

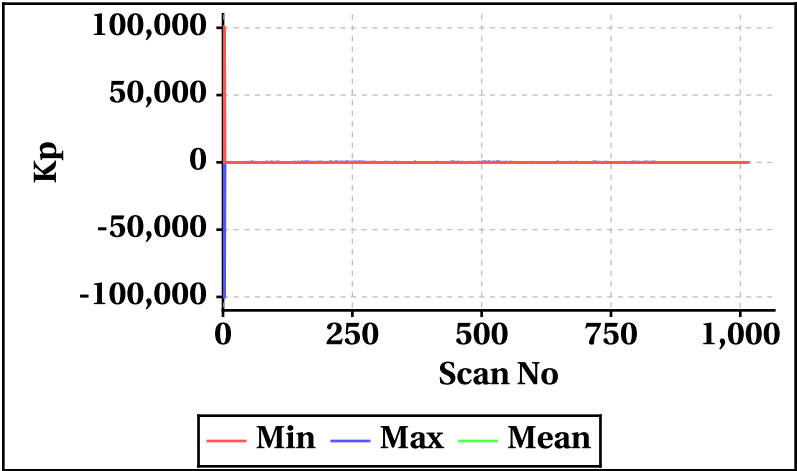


## Orbit-wise behaviour of Kp,Kpa,Kpb,Kpc

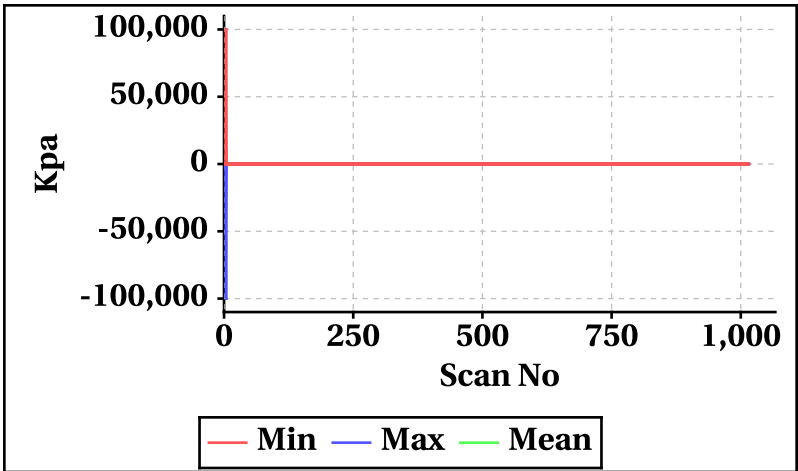
Inner Beam(HH)



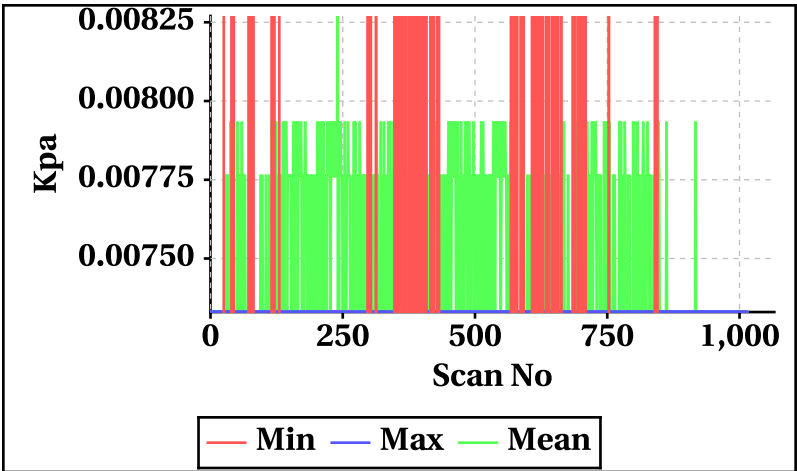
Outer Beam(VV)



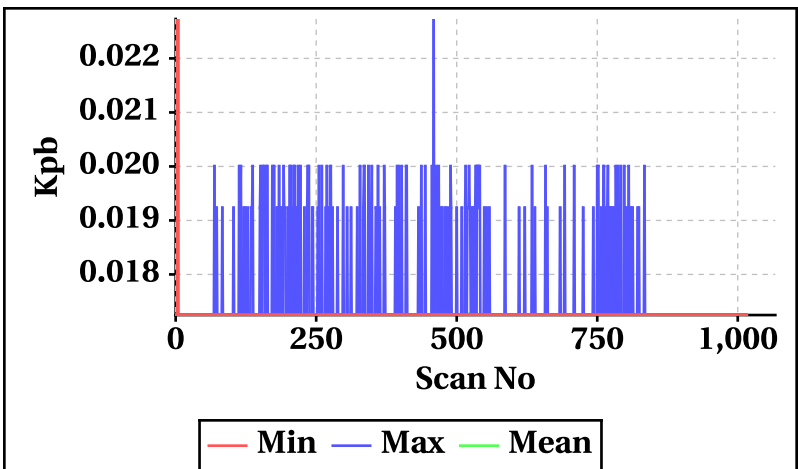
Inner Beam(HH)



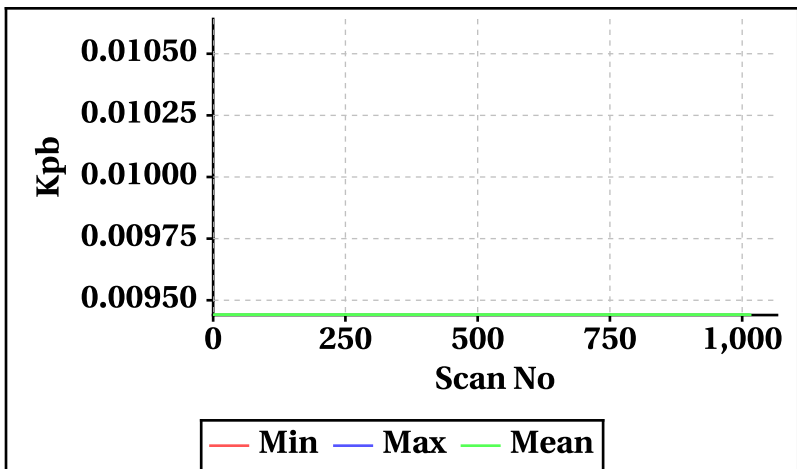
Outer Beam(VV)



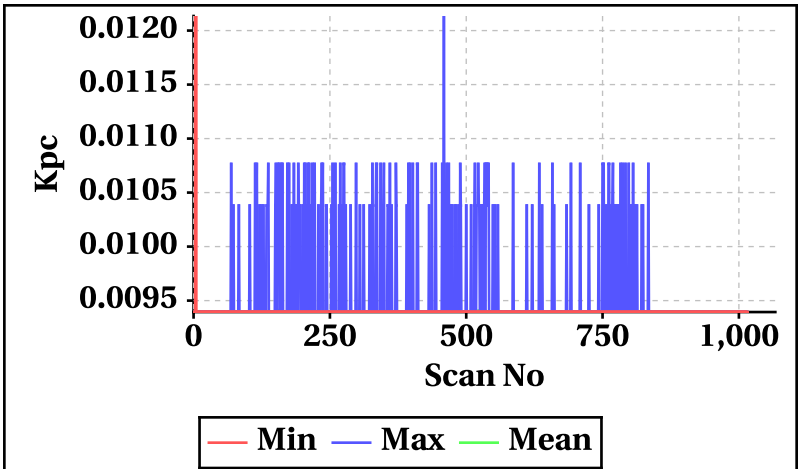
Inner Beam(HH)



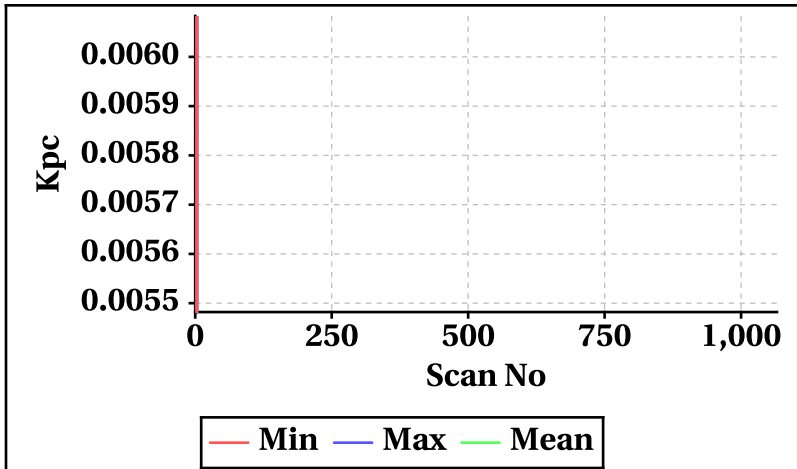
Outer Beam(VV)



Inner Beam(HH)

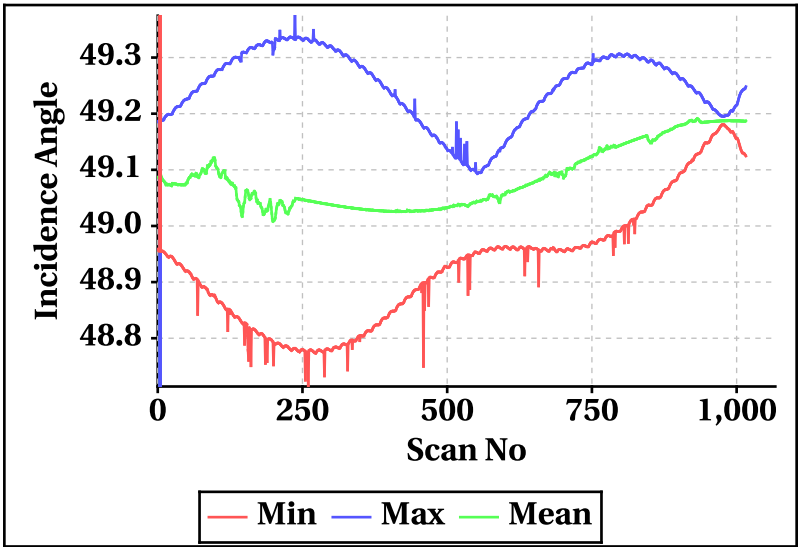


Outer Beam(VV)

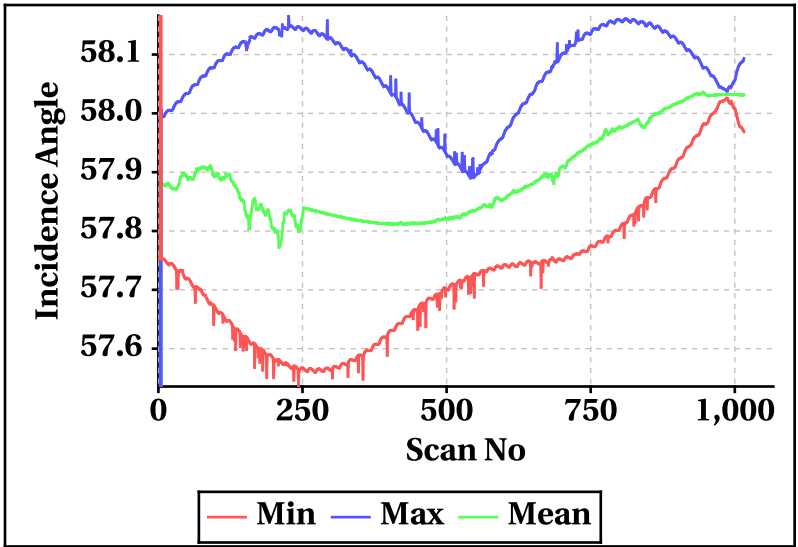


Orbit-wise behaviour of Incidence,Azimuth,Range,X-Factor

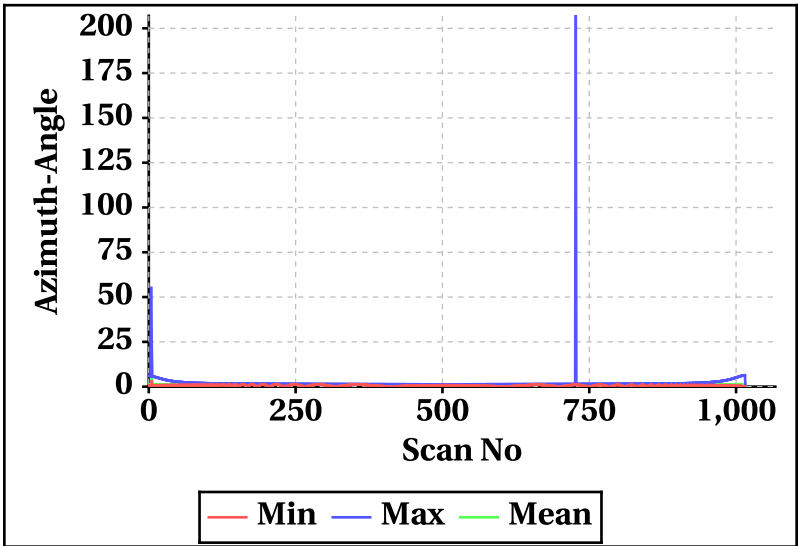
Inner Beam (HH)



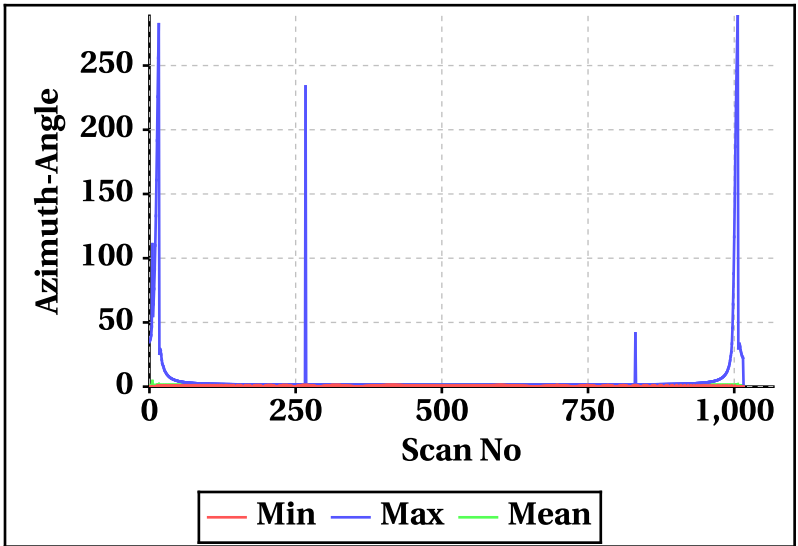
Outer Beam(VV)



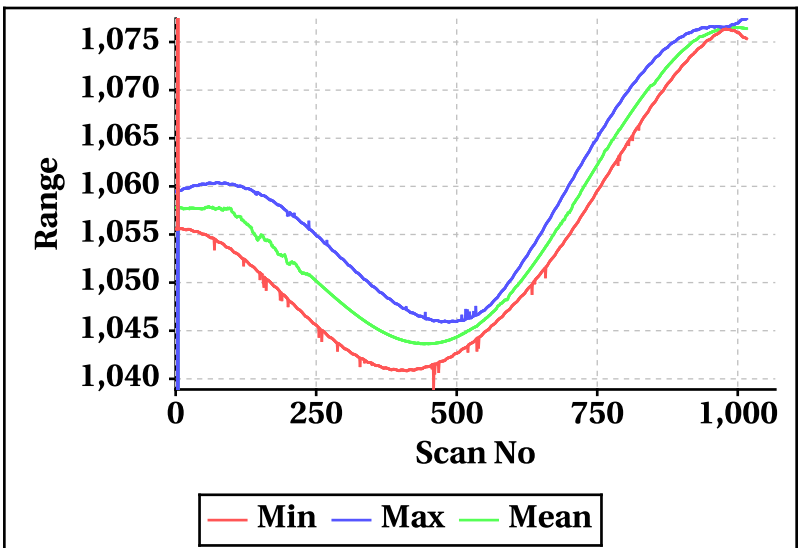
Inner Beam (HH)



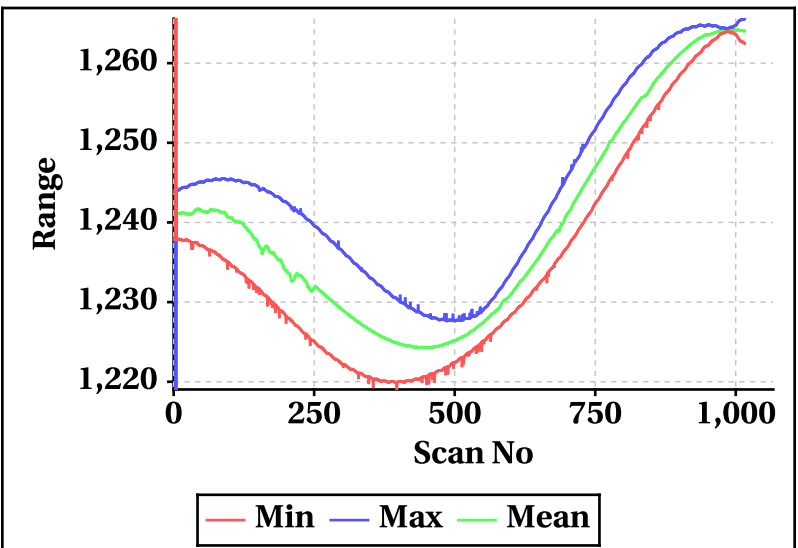
Outer Beam(VV)



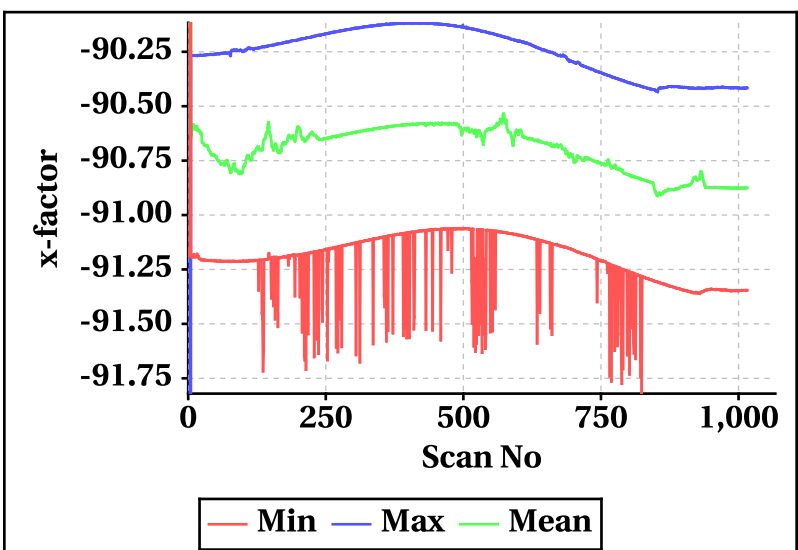
Inner Beam (HH)



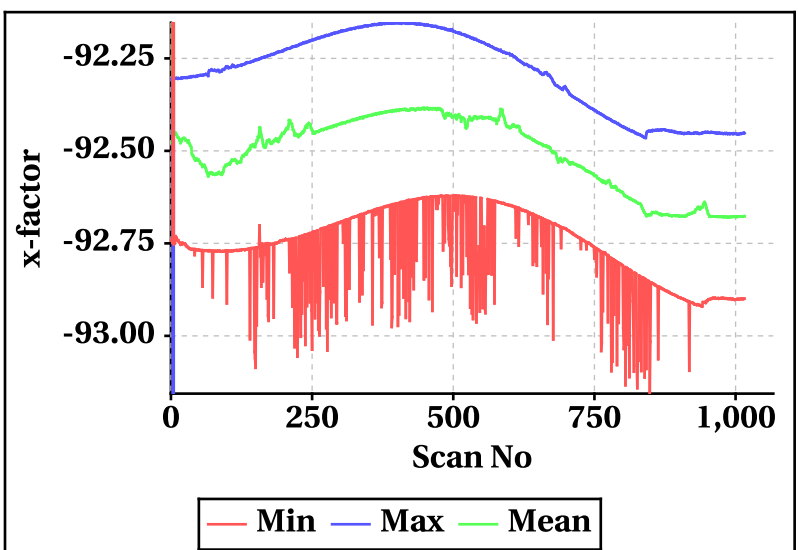
Outer Beam(VV)



Inner Beam (HH)



Outer Beam(VV)

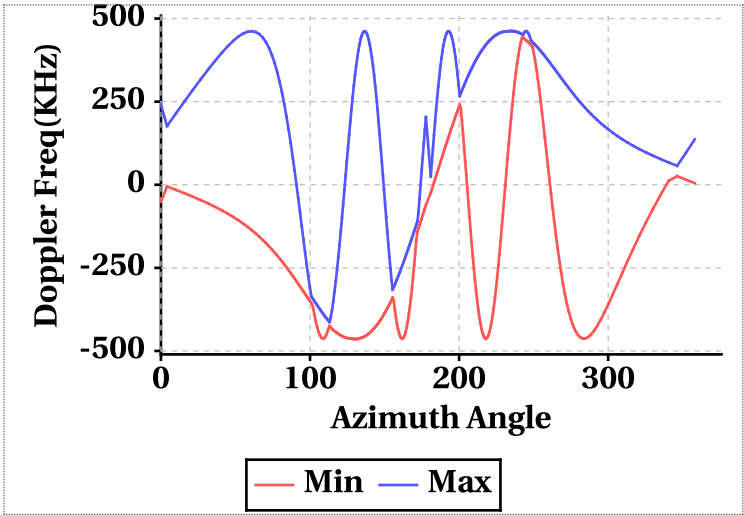


# Doppler Frequency Variation

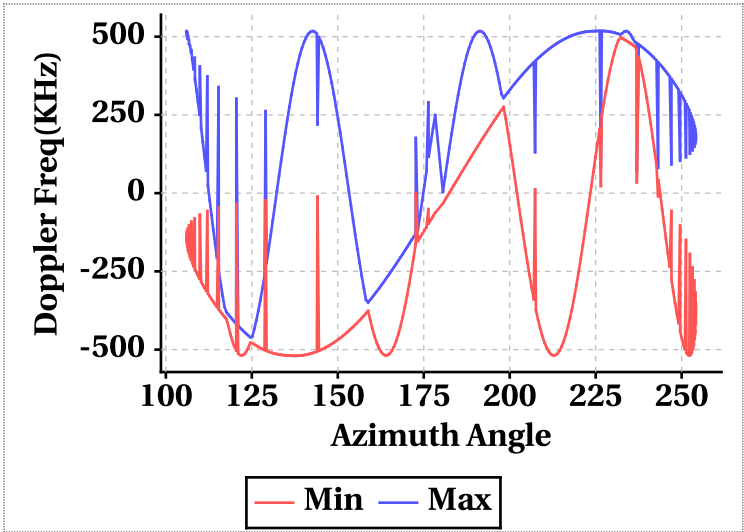
Doppler Frequency(KHz) variation statistics Over the half Orbit

|     | Inner Beam (HH) | Outer Beam (VV) |
|-----|-----------------|-----------------|
| Min | -463.94         | -519.72         |
| Max | 462.36          | 518.30          |

Footprint wise Doopler frequency variation Inner Beam (HH)



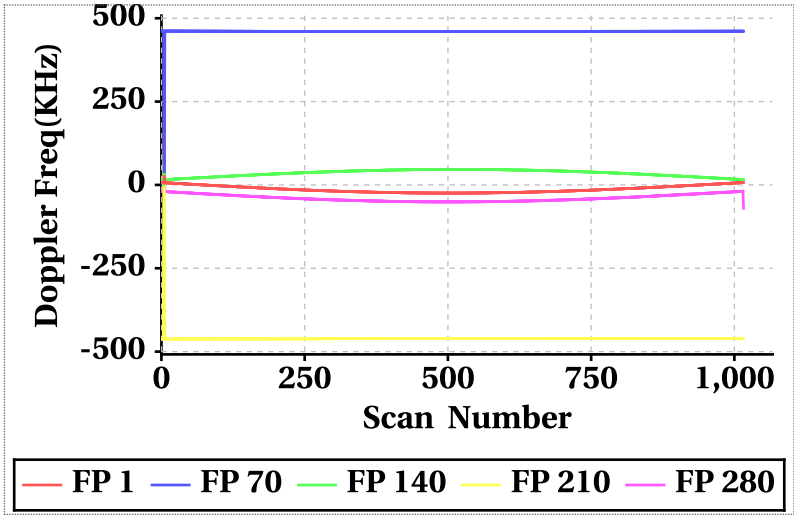
Footprint wise Doopler frequency variation Outer Beam (VV)



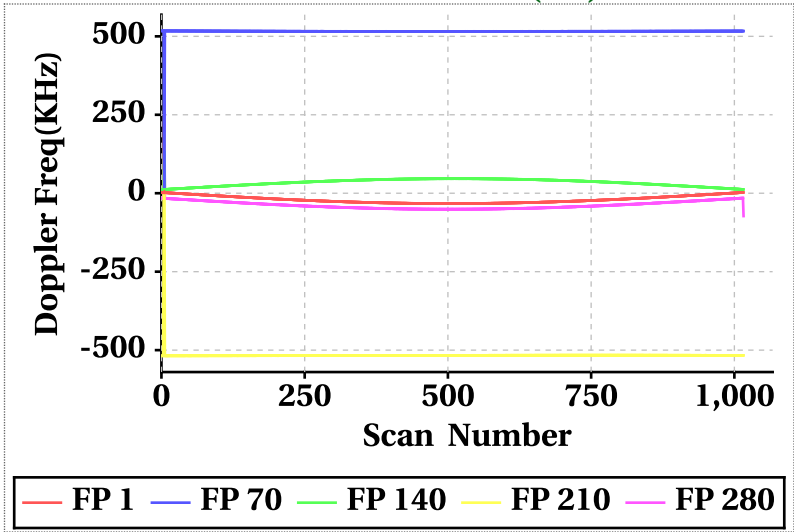
Doppler Frequency(KHz) variation

|             | Inner Beam (HH) |        |         | Outer Beam (VV) |        |         |
|-------------|-----------------|--------|---------|-----------------|--------|---------|
| Doppler_FP  | Min             | Max    | Mean    | Min             | Max    | Mean    |
| Doppler_1   | -24.48          | 24.76  | -12.90  | -32.92          | 4.30   | -19.98  |
| Doppler_70  | 39.52           | 461.58 | 460.37  | 20.86           | 517.28 | 515.67  |
| Doppler_140 | 1.66            | 96.00  | 35.29   | 2.08            | 130.86 | 33.87   |
| Doppler_210 | -462.16         | 150.94 | -459.86 | -518.08         | 191.58 | -515.72 |
| Doppler_280 | -70.16          | 240.56 | -39.08  | -72.82          | 289.74 | -37.80  |

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

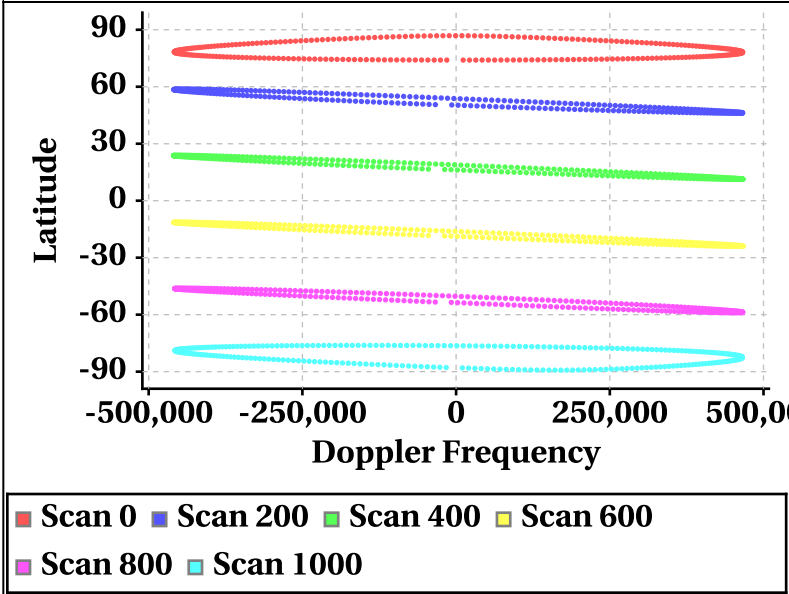


Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Outer Beam (VV)

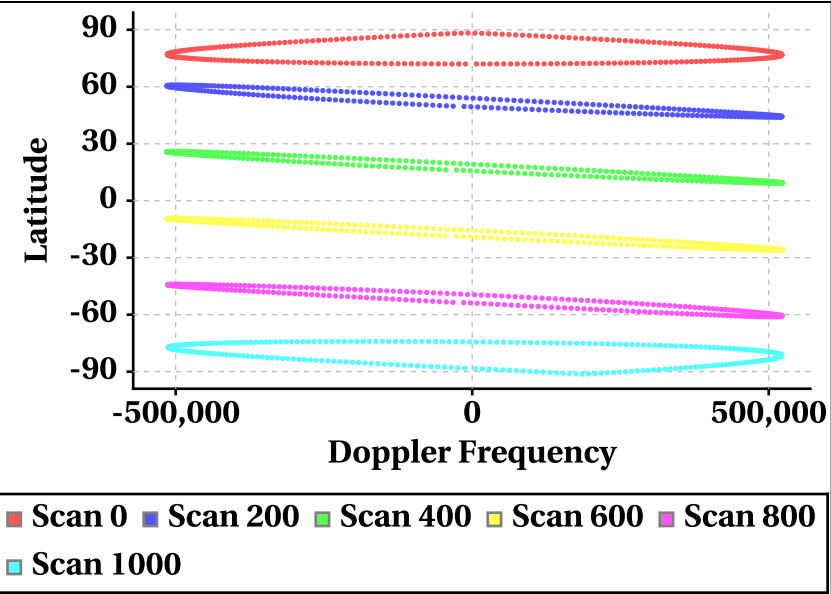


## Latitude Vs Doppler Frequency

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



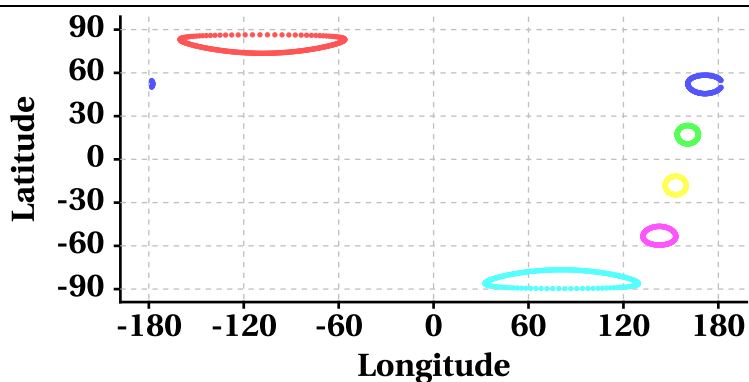
Doppler Frequency at Scan Interval of 200 [Outer Beam(VV)]



# Parameter as a function of Latitude

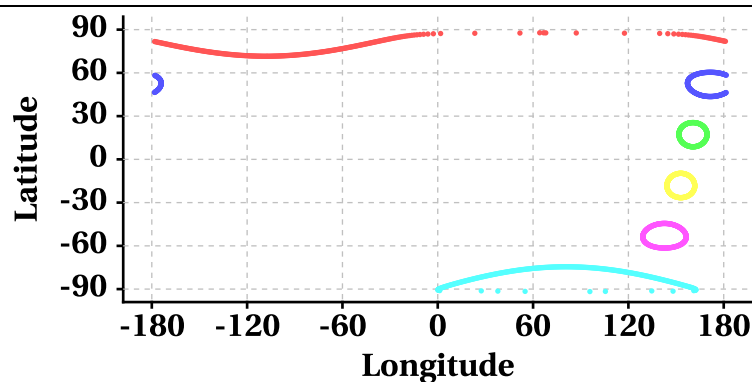
## Latitude Vs Longitude

Scan Trace [Inner Beam(HH)]



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

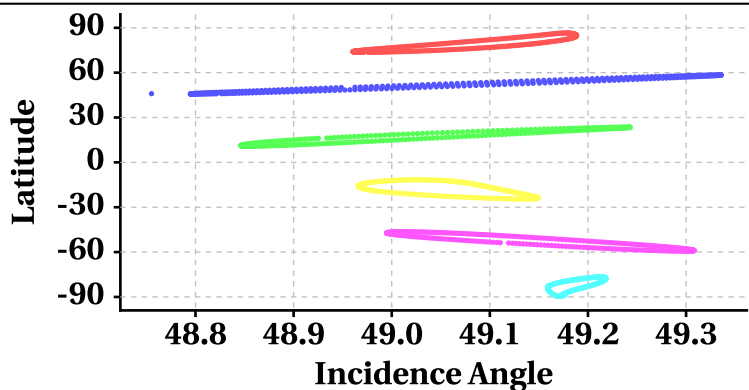
Scan Trace [Outer Beam (VV)]



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

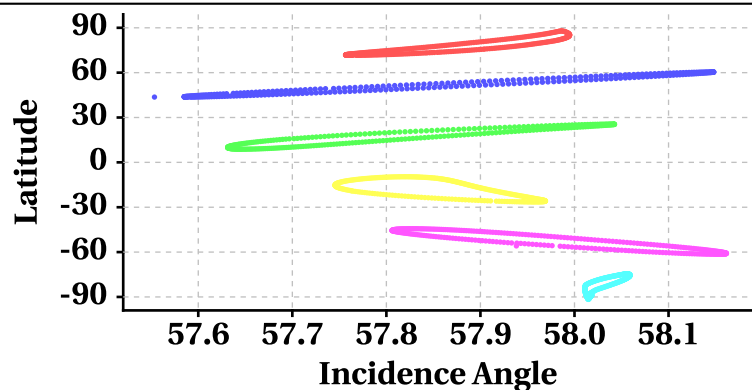
## Latitude Vs Incidence Angle

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



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

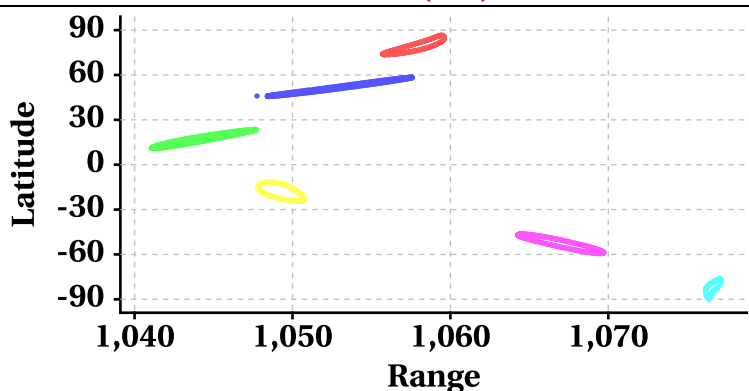
Incidence Angle at Scan Interval of 200  
[Outer Beam (VV)]



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

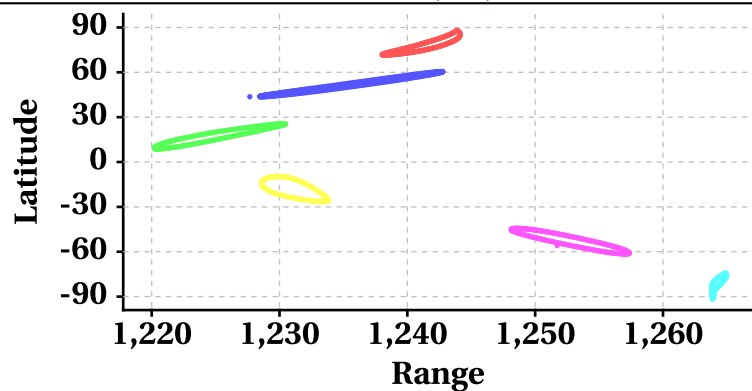
## Latitude Vs Range

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

