

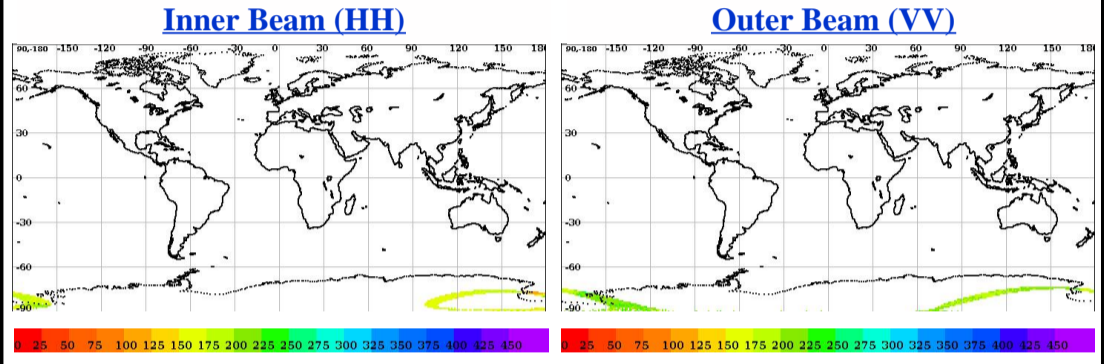
# SCATSAT-1 Scatterometer Level-1B Data Quality Evaluation Report

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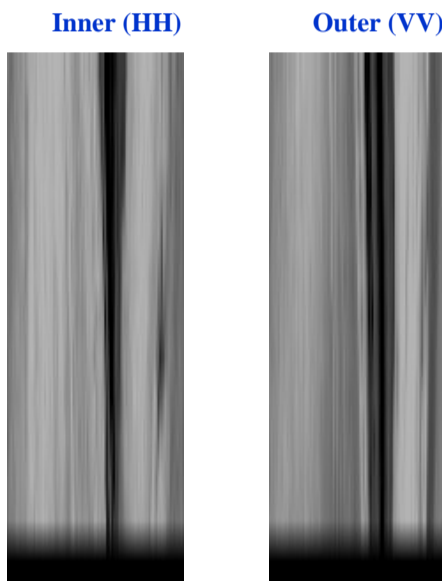
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|                              |               |                              |             |                               |     |
|------------------------------|---------------|------------------------------|-------------|-------------------------------|-----|
| <b>Satellite Id</b>          | ScatSat-1     | <b>Start Orbit</b>           | 12983       | <b>Total Scans</b>            | 12  |
| <b>Sensor Name</b>           | Scatterometer | <b>End Orbit</b>             | 12984       | <b>No of Inner FootPrints</b> | 281 |
| <b>Processor Version</b>     | v1.1.3        | <b>Rev. Number</b>           | 12983_12984 | <b>No Of Outer FootPrints</b> | 282 |
| <b>Half Orbit Direction</b>  | SN            | <b>Data Production Date</b>  | 10-03-2019  | <b>No. Of Inner Slices</b>    | 9   |
| <b>Equator Crossing Date</b> | 01-01-1970    | <b>Equator Crossing Time</b> | null        | <b>No Of Outer Slices</b>     | 15  |

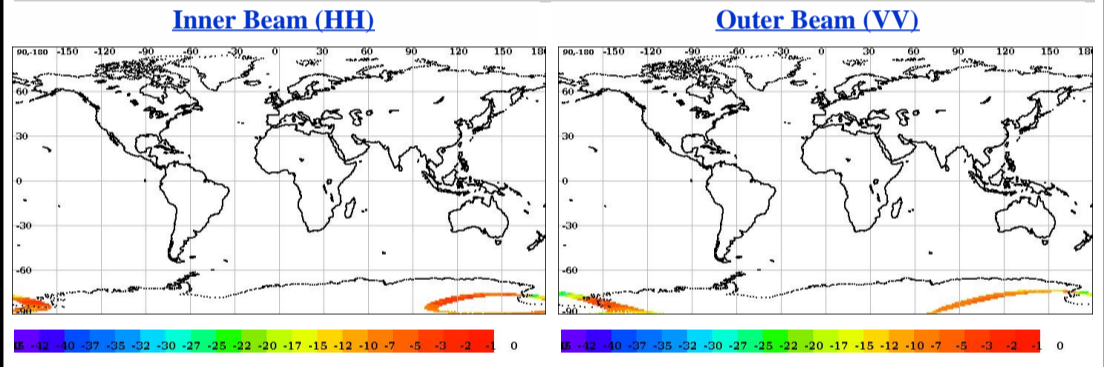
## Brightness Temperature(k) Footprint trace



## Image Snapshot for Inner & Outer Beam



## Sigma0(dB) Footprint trace

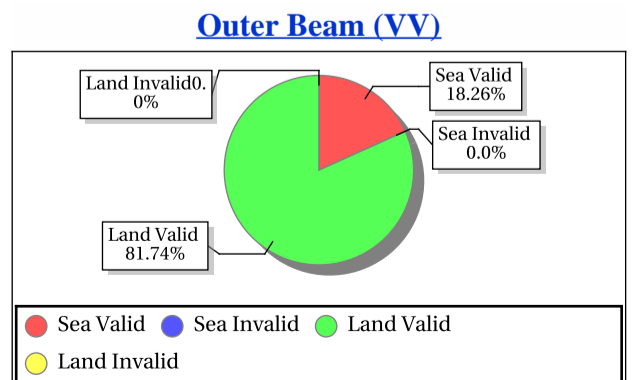
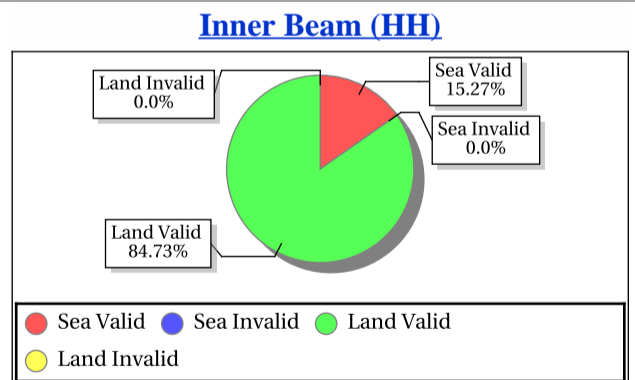


## Invalid and Poor Sigma-0 Quality Flag Statistics for Inner/Outer Slices\*

| <b>Sigma-0 Flags</b>                            | <b>Inner Beam</b> | <b>Outer Beam</b> |
|---|-------------------|-------------------|
| <b>Invalid Sigma0(%)</b>                        | 0.00              | 0.00              |
| <b>Data Not Available From Payload (%)</b>      | 0.0               | 0.0               |
| <b>Slice not within sample array limits (%)</b> | 0.00              | 0.00              |
| <b>C(S+N) - C(N) &lt; 0.1 (%)</b>               | 0.00              | 0.00              |
| <b>Poor Sigma0(%)</b>                           | 22.22             | 13.33             |
| <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>                      | 0.0               | 0.0               |

\*DP Format Document

## Sigma-0 Quality Flag Statistics for Inner/Outer Footprints



## 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     | Outer | ASC  | Fore    | -8.90      | -7.08      | -8.20       | 0.65       | 167.11 | 226.20 | 201.92  | 19.74  |



## 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    | 0.17  | 0.13  | 0.000        | 10000.00 | -10000.00 | 0.00 | 0.000        | 0.12     | 0.12  | 0.12  | 0.000        | 0.12      | 0.12  | 0.12  | 0.000        |
| <b>Kpa</b>      | 0.01    | 0.01  | 0.01  | 0.000        | 10000.00 | -10000.00 | 0.00 | 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        | 10000.00 | -10000.00 | 0.00 | 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        | 10000.00 | -10000.00 | 0.00 | 0.000        | 0.01     | 0.01  | 0.01  | 0.000        | 0.01      | 0.01  | 0.01  | 0.000        |
| <b>SNR</b>      | 1.77    | 17.25 | 10.80 | 0.000        | 10000.00 | -10000.00 | 0.00 | 0.000        | 9.49     | 27.10 | 22.61 | 64.120       | 18.30     | 29.45 | 24.69 | 89.244       |

| 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    | 0.65  | 0.12 | 0.000        | 10000.00 | -10000.00 | 0.00 | 0.000        | 0.09     | 0.10  | 0.09  | 0.000        | 0.09      | 0.09  | 0.09  | 0.000        |
| <b>Kpa</b>      | 0.01    | 0.01  | 0.01 | 0.000        | 10000.00 | -10000.00 | 0.00 | 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        | 10000.00 | -10000.00 | 0.00 | 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        | 10000.00 | -10000.00 | 0.00 | 0.000        | 0.01     | 0.01  | 0.01  | 0.000        | 0.01      | 0.01  | 0.01  | 0.000        |
| <b>SNR</b>      | -8.96   | 10.32 | 4.99 | 0.000        | 10000.00 | -10000.00 | 0.00 | 0.000        | 7.35     | 22.28 | 16.16 | 0.187        | 10.68     | 21.03 | 16.12 | 0.000        |

| 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> | 49.10           | 49.26   | 49.18   | 0.000        | 57.95           | 58.10   | 58.03   | 0.000        | Inci.(Inner)             | 47.10   | 49.90   |
| <b>Azimuth Diff. (deg)</b>   | 0.0249          | 5.64    | 1.27    | 14.810       | 0.0026          | 279.15  | 1.38    | 11.080       | Inci.(Outer)             | 57.30   | 58.90   |
| <b>Range(Km)</b>             | 1074.25         | 1077.47 | 1075.92 | 0.000        | 1261.14         | 1265.61 | 1263.48 | 0.000        | Azimuth Diff.            | 0.60    | 2.00    |
| <b>X Factor(dbm)</b>         | -91.23          | -90.24  | -90.70  | 0.000        | -92.80          | -92.29  | -92.52  | 0.000        | Range(Inner)             | 1025.00 | 1095.70 |
| <b>Across Distance (Km)</b>  | 15.85           | 16.35   | 16.04   | 0.000        | 20.95           | 22.82   | 21.11   | 2.000        | Range(Outer)             | 1210.00 | 1280.00 |
| <b>Along Distance (Km)</b>   | 18.97           | 19.63   | 17.73   | 0.000        | 18.74           | 19.70   | 17.58   | 0.000        | X-Factor                 | -100.00 | -80.00  |
|                              |                 |         |         |              |                 |         |         |              | Ac.Distance(Inner)       | 15.00   | 20.00   |
|                              |                 |         |         |              |                 |         |         |              | Ac.Distance(Outer)       | 15.00   | 22.00   |
|                              |                 |         |         |              |                 |         |         |              | Al.Distance(Inner)       | 15.00   | 30.00   |
|                              |                 |         |         |              |                 |         |         |              | Al.Distance(Outer)       | 10.00   | 30.00   |

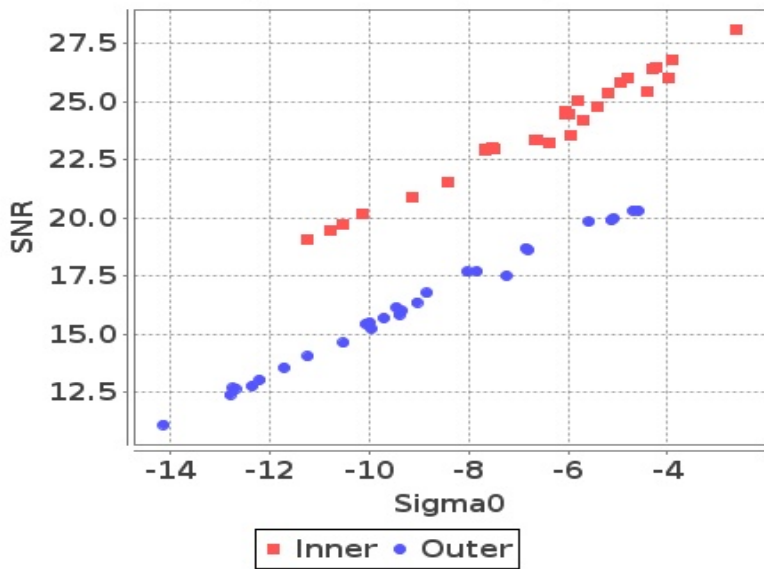
- Normal
- Deviations
- Alarming
- High Errors



## Sigma0 Behaviour (Sigma0 Vs SNR)

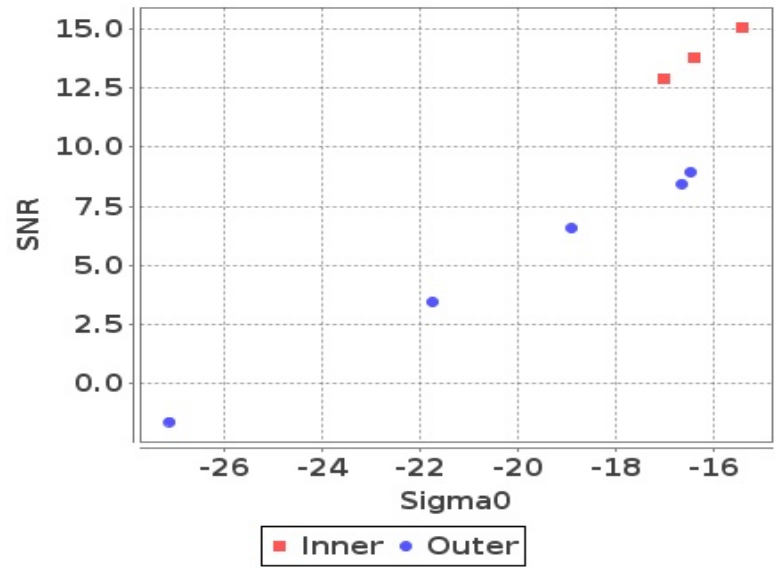
**Footprint-Land**

Sigma0 Vs SNR (Land)



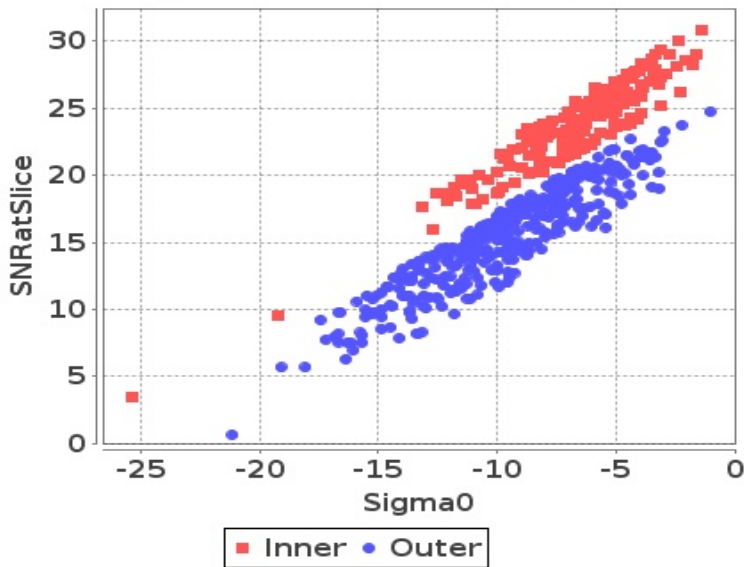
**Footprint-Sea**

Sigma0 Vs SNR (Sea)



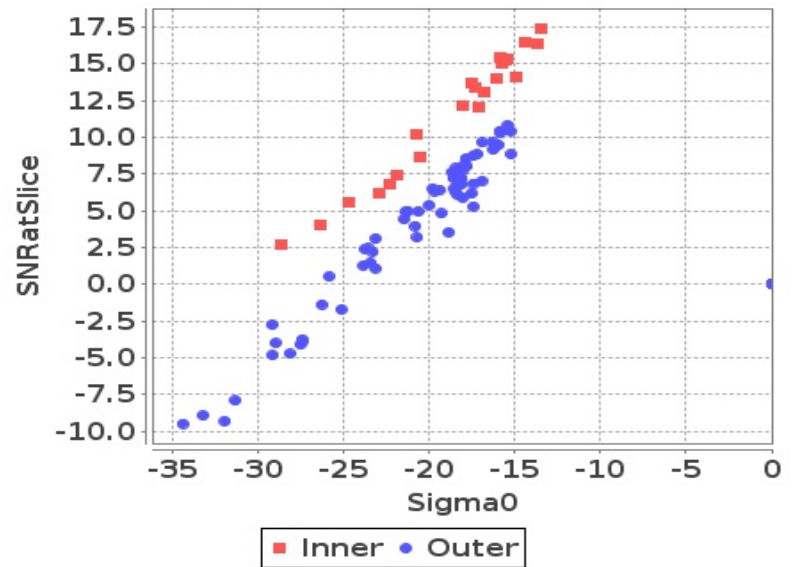
**Slice-Land**

Sigma0 Vs SNRatSlice (Land)



**Slice-Sea**

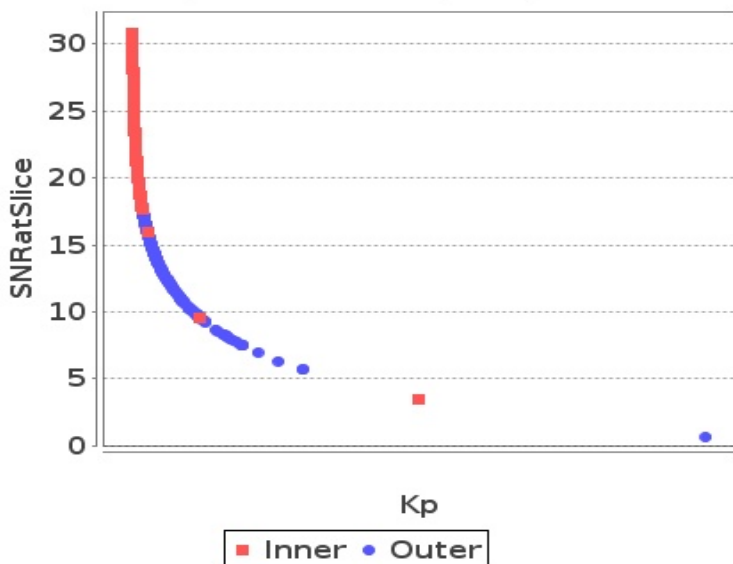
Sigma0 Vs SNRatSlice (Sea)



## Sigma0 Behaviour (Kp Vs SNR)

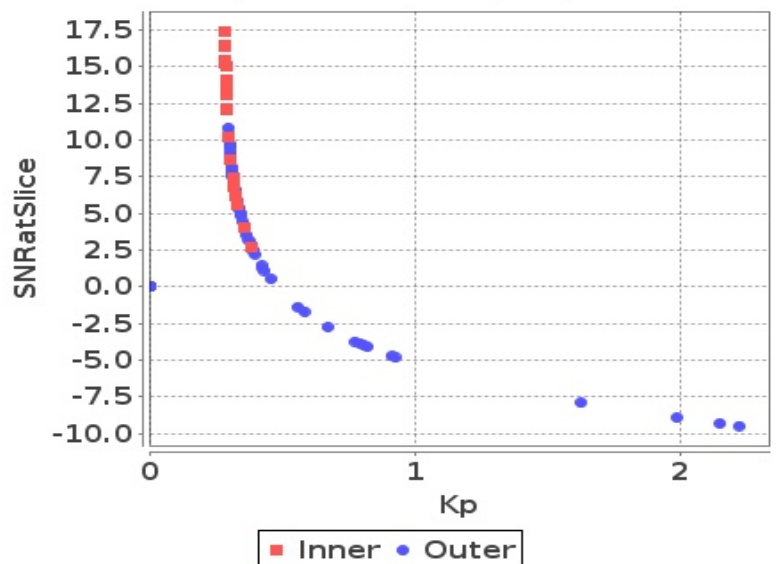
**Slice**

Kp Vs SNRatSlice (Land)



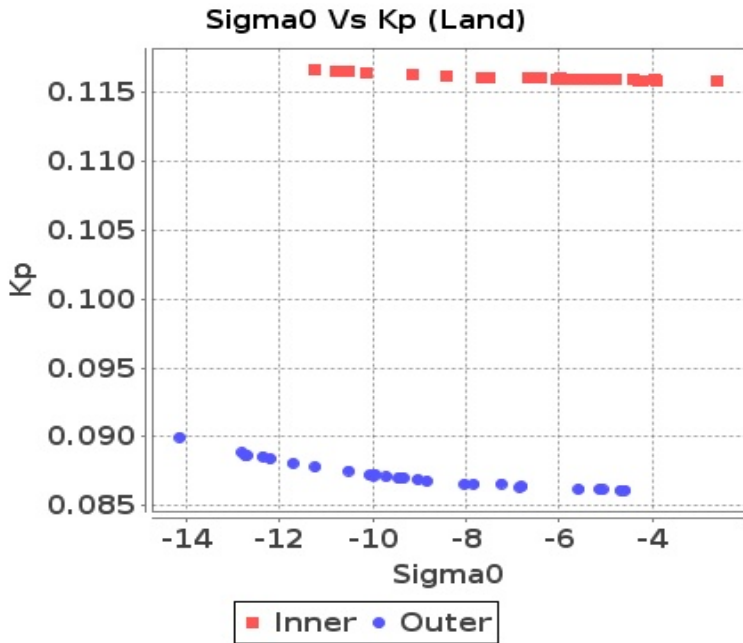
**Slice**

Kp Vs SNRatSlice (Sea)

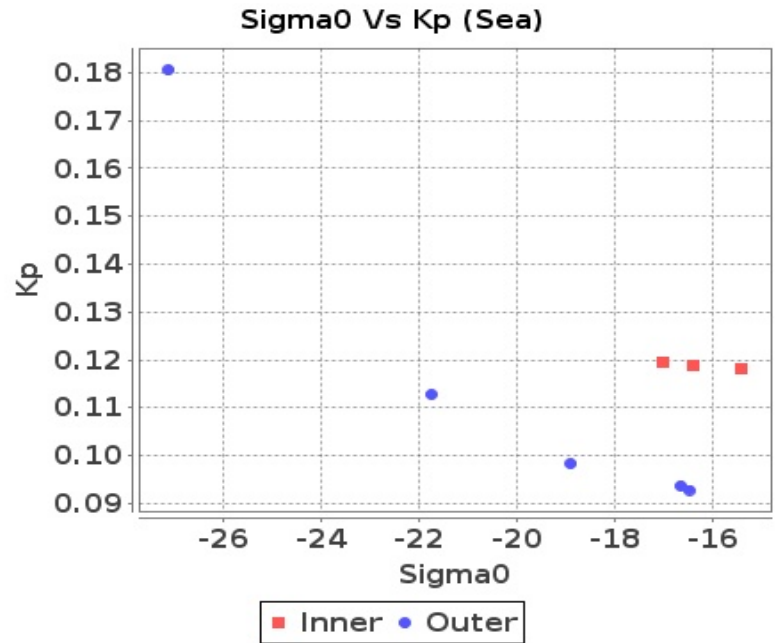


# Sigma0 Behaviour(Sigma0 Vs Kp)

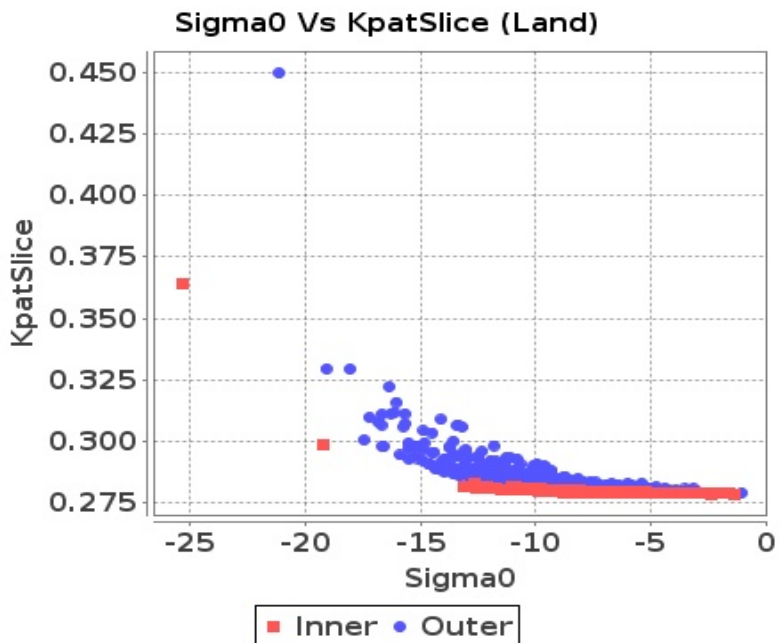
## Footprint-Land



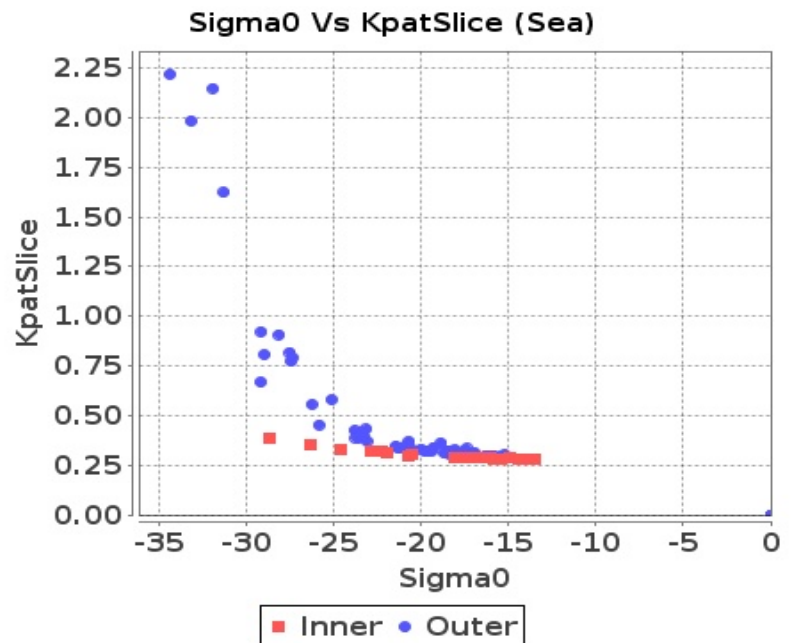
## Footprint-Sea



## Slice-Land



## Slice-Sea

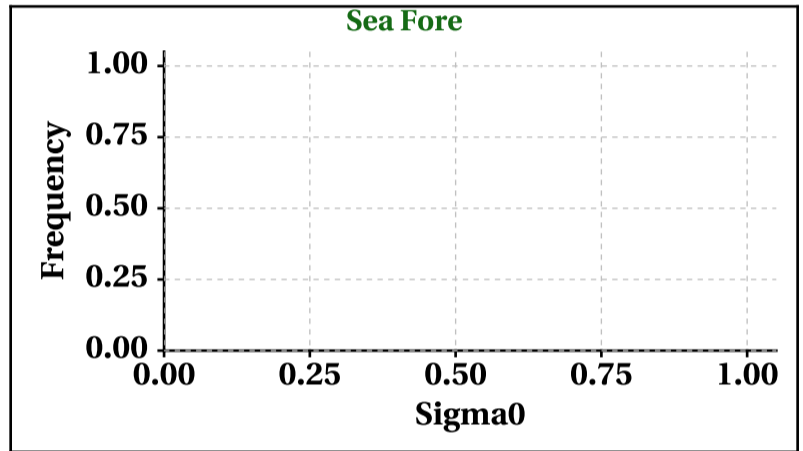
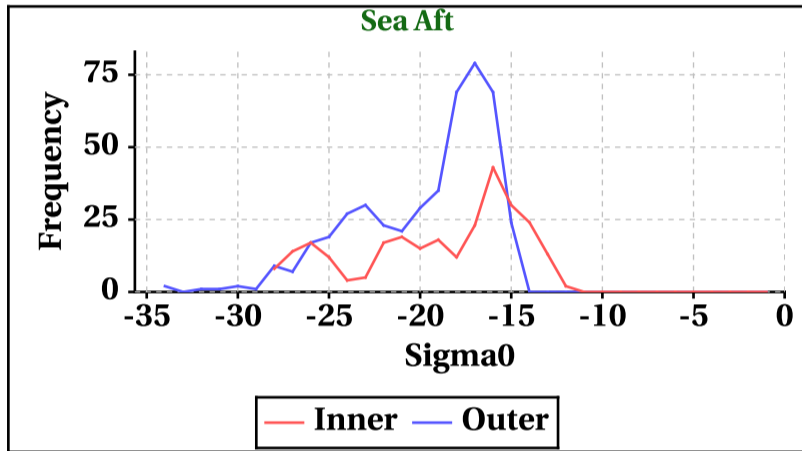
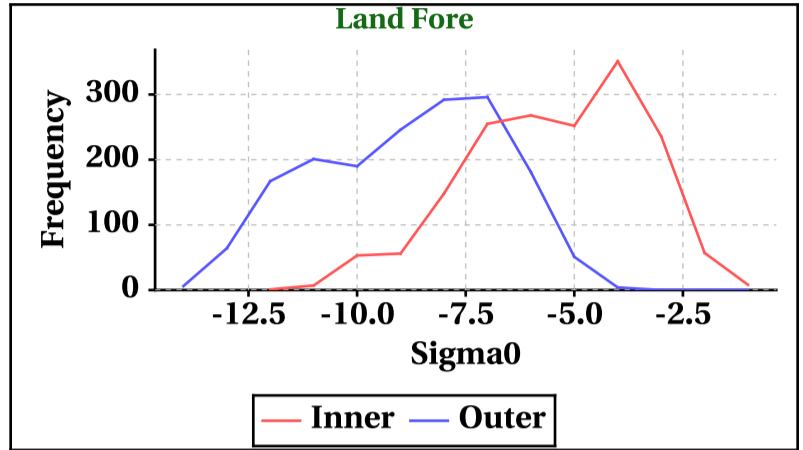
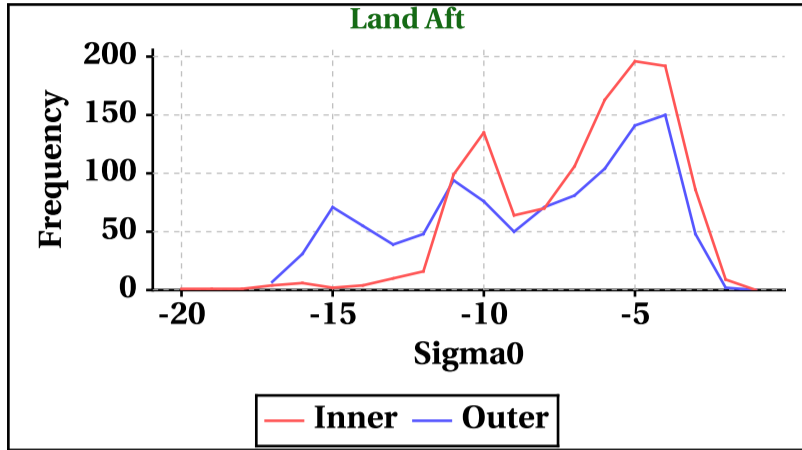


# Dynamic Range (Data Histograms)

## Sigma0(db)

| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -20      | -12       | -28     | 0        |
| Max             | 0        | 0         | 0       | 0        |

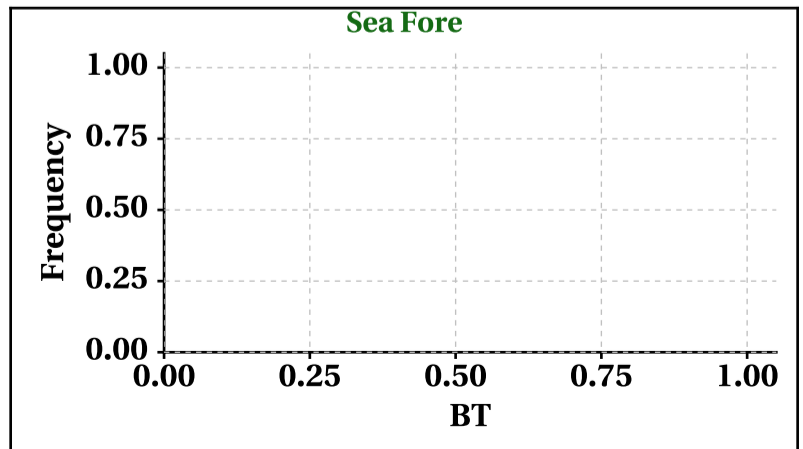
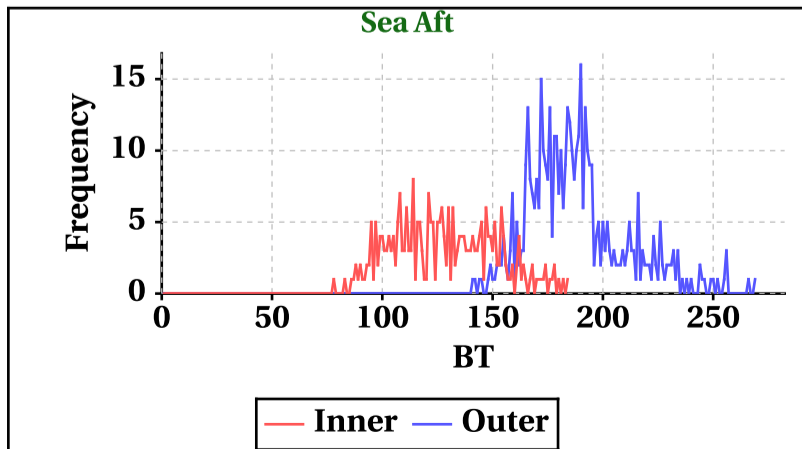
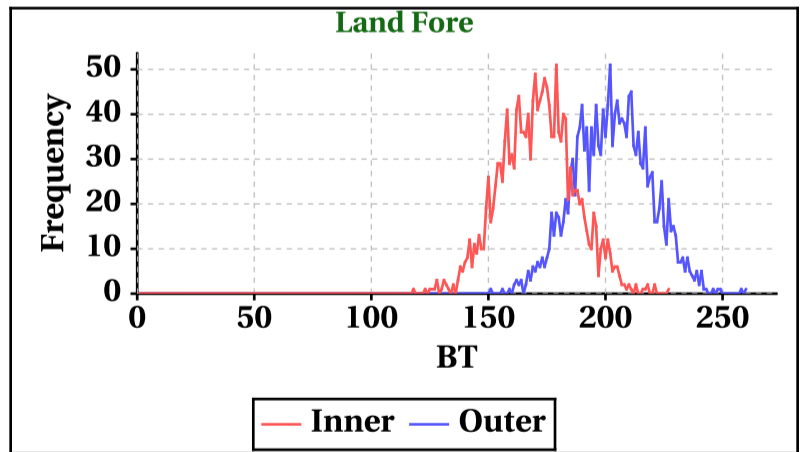
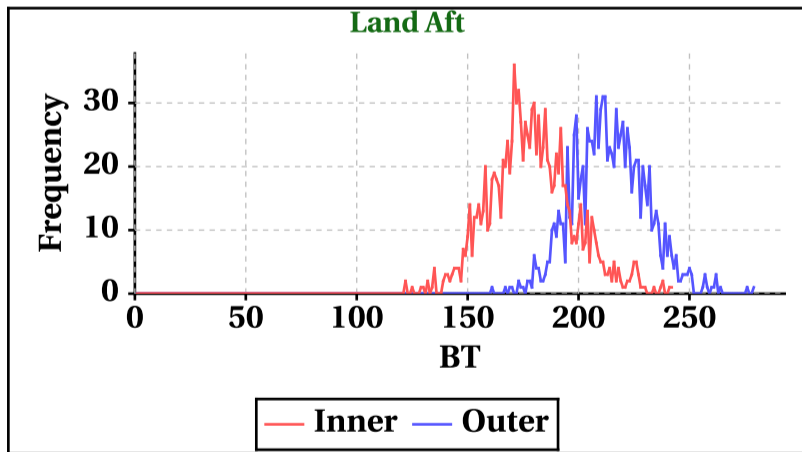
| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -17      | -14       | -34     | 0        |
| Max             | 0        | 0         | 0       | 0        |



## Brightness Temperature(K)

| Inner Beam(HH) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 242      | 227       | 184     | 0        |

| Outer Beam(VV) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 279      | 260       | 269     | 0        |

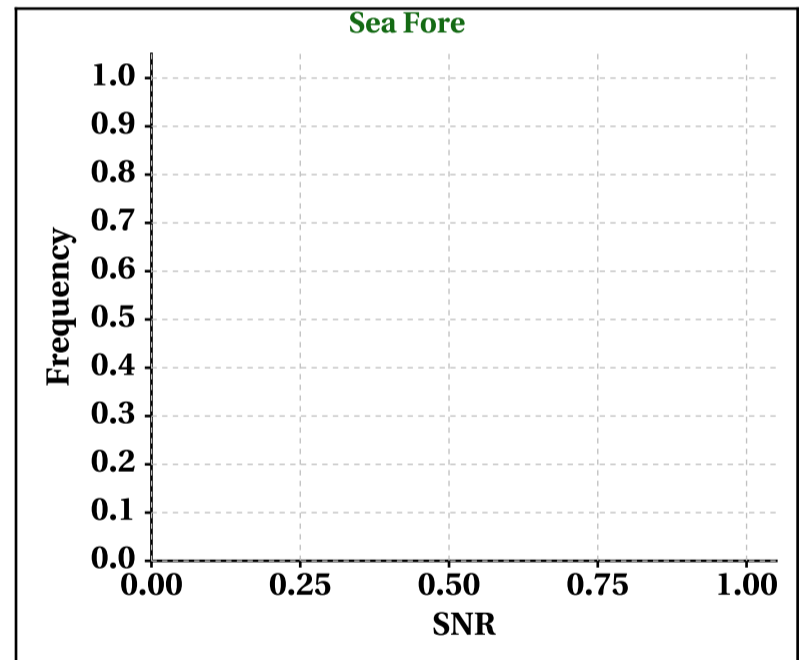
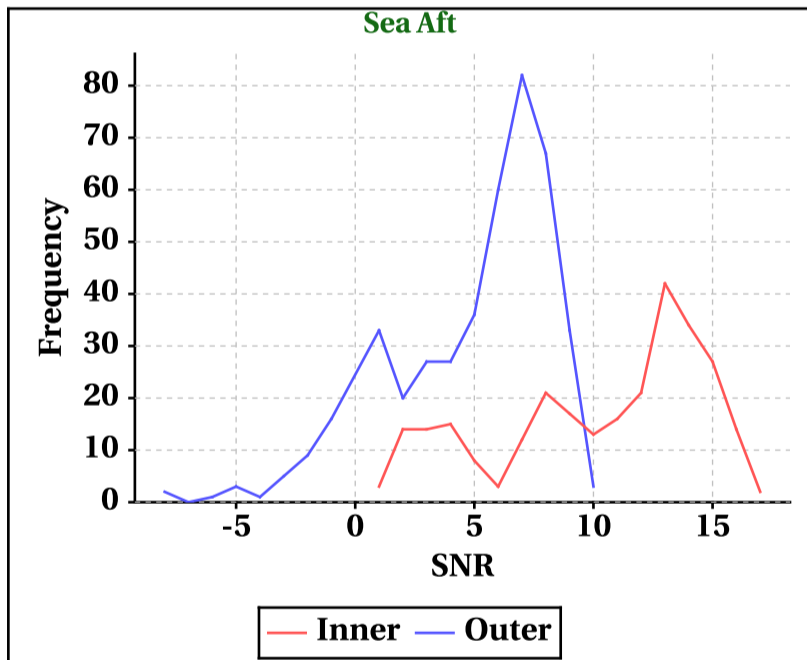
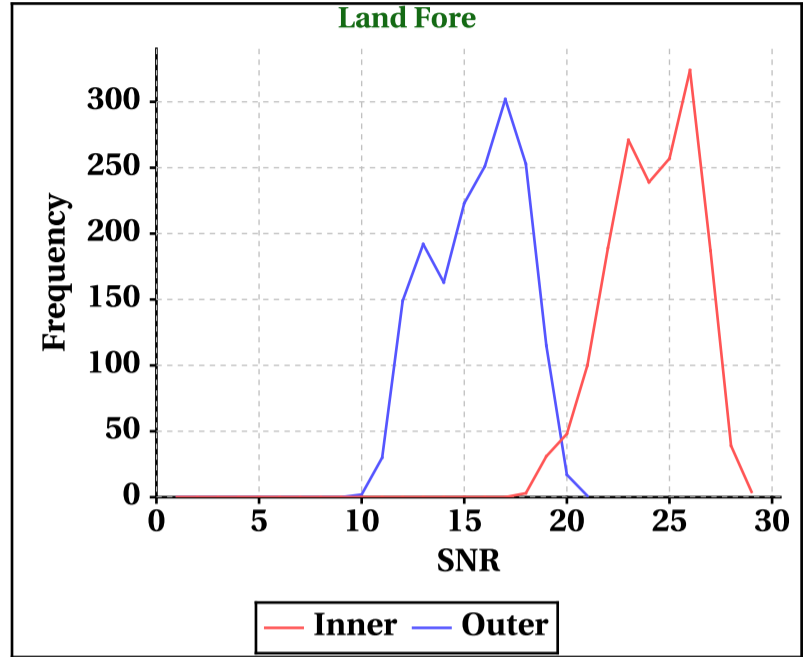
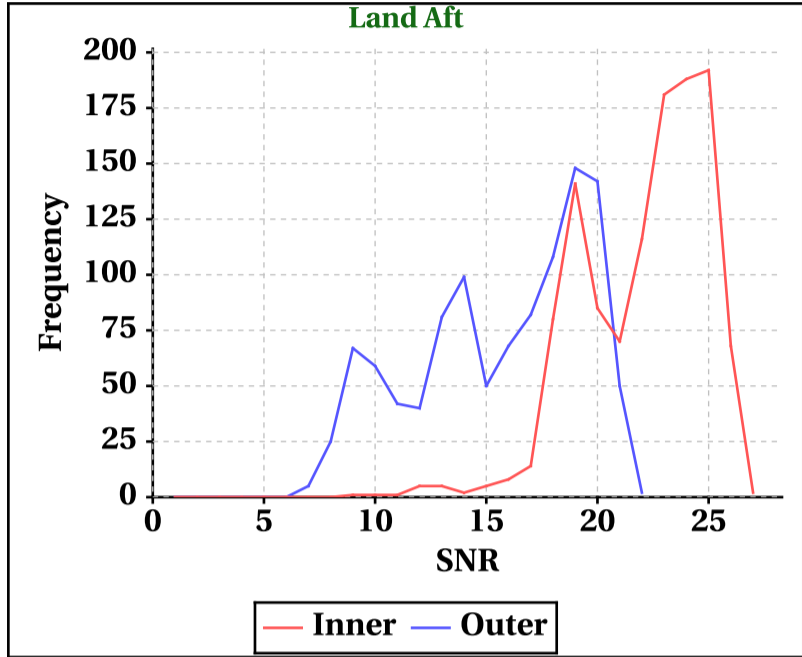


# Dynamic Range (Data Histograms)

## SNR(dBm)

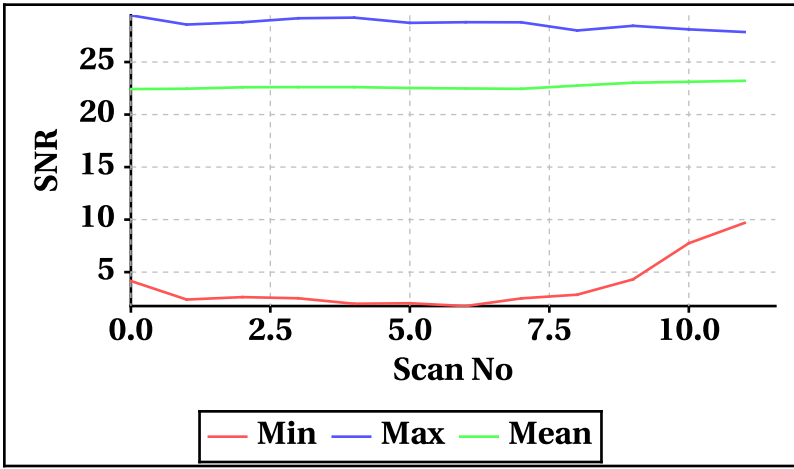
| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | 0        | 0         | 0       | 0        |
| Max             | 27       | 29        | 17      | 0        |

| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | 0        | 0         | -8      | 0        |
| Max             | 22       | 21        | 10      | 0        |

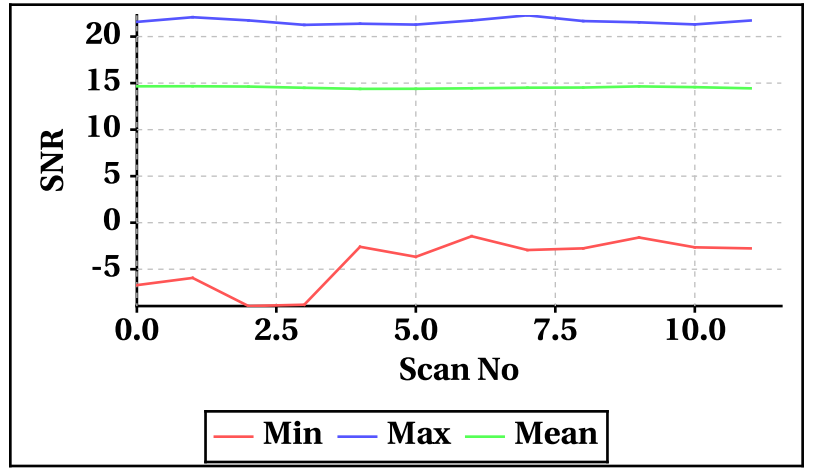


## Orbit-wise behaviour of SNR

**Inner Beam (HH)**

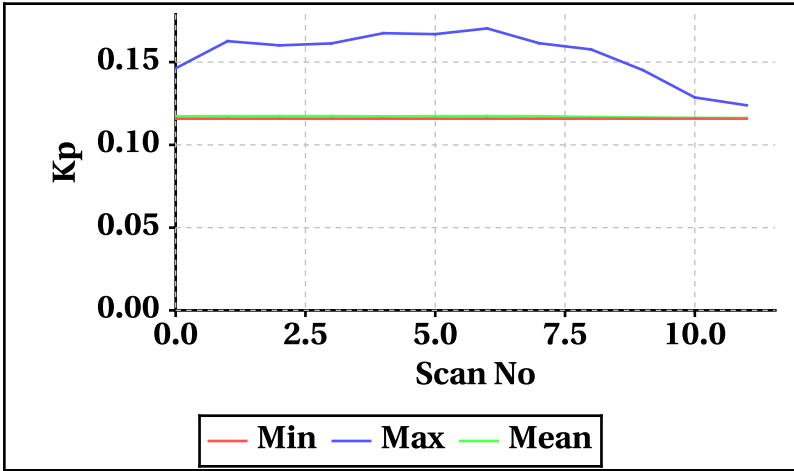


**Outer Beam (VV)**

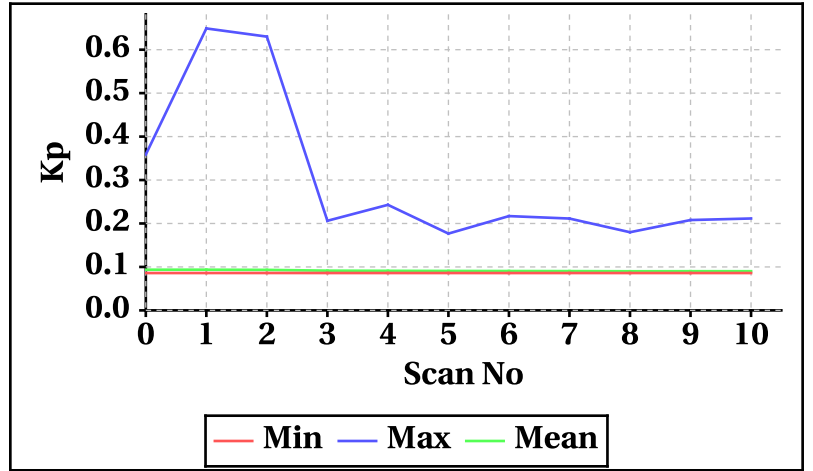


## Orbit-wise behaviour of Kp, Kpa, Kpb, Kpc

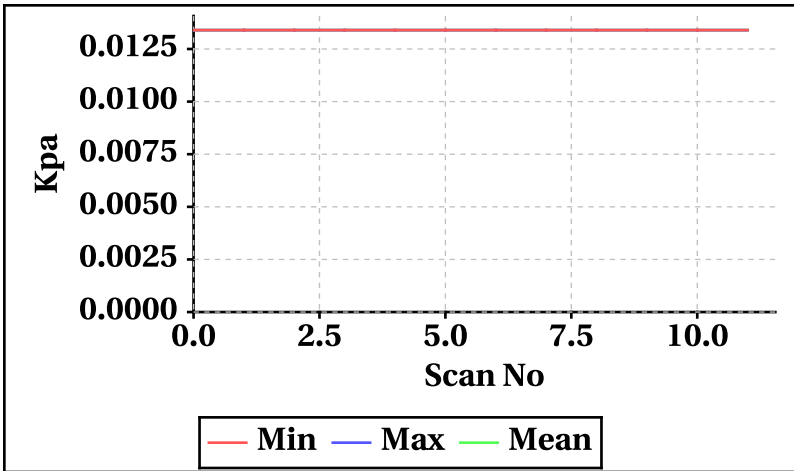
**Inner Beam (HH)**



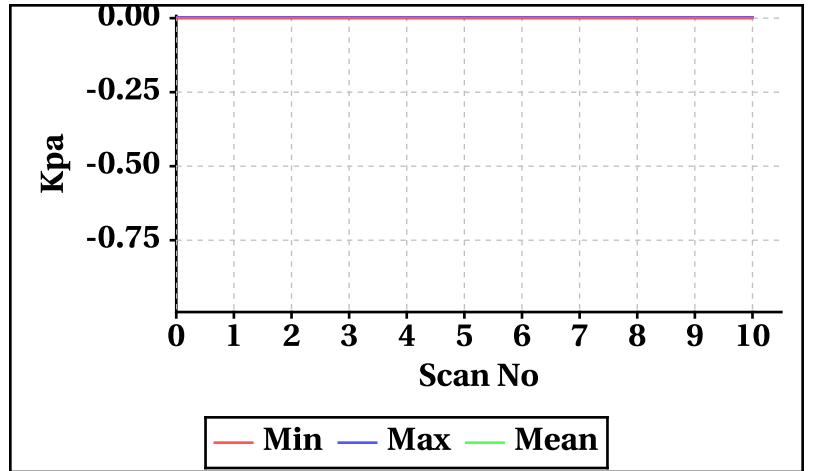
**Outer Beam (VV)**



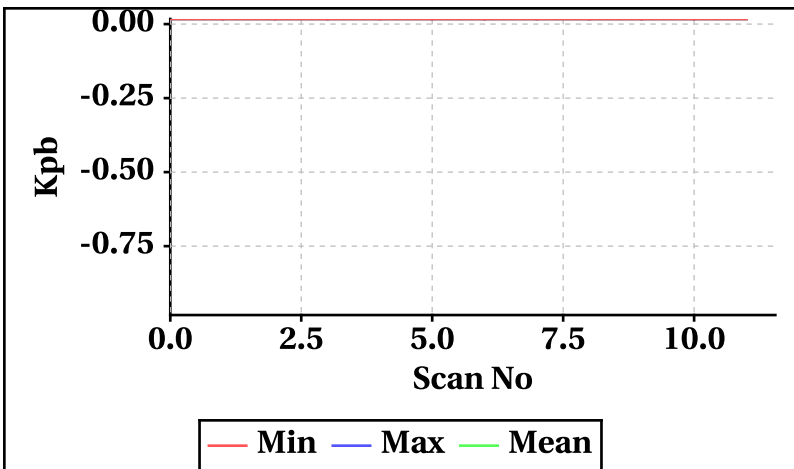
**Inner Beam (HH)**



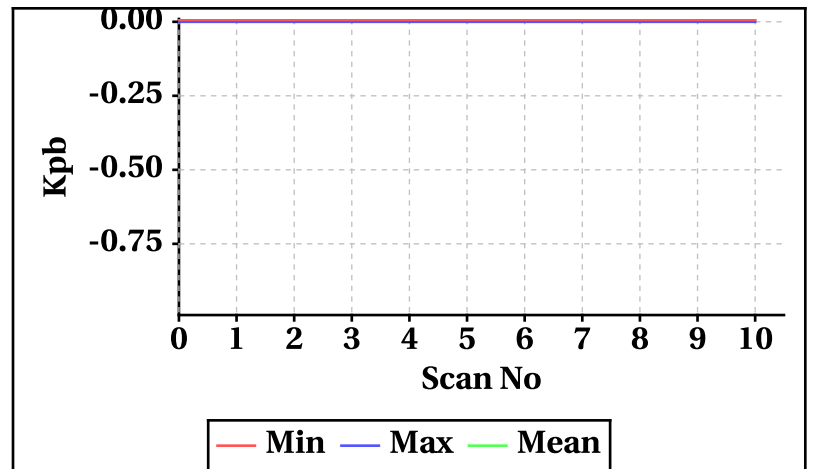
**Outer Beam (VV)**



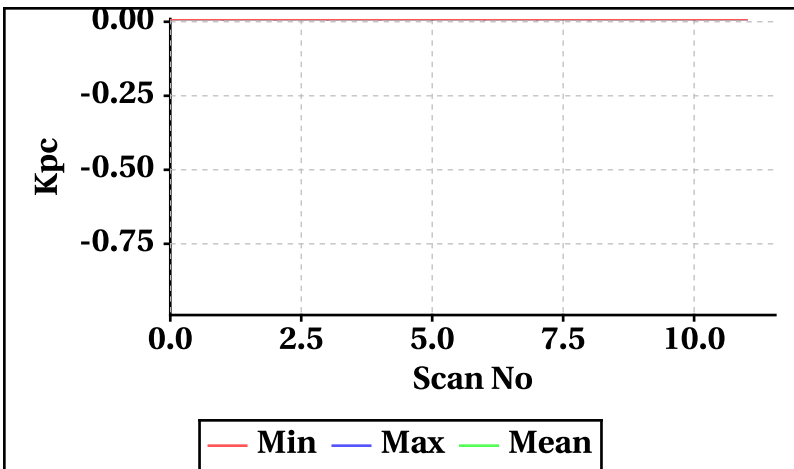
**Inner Beam (HH)**



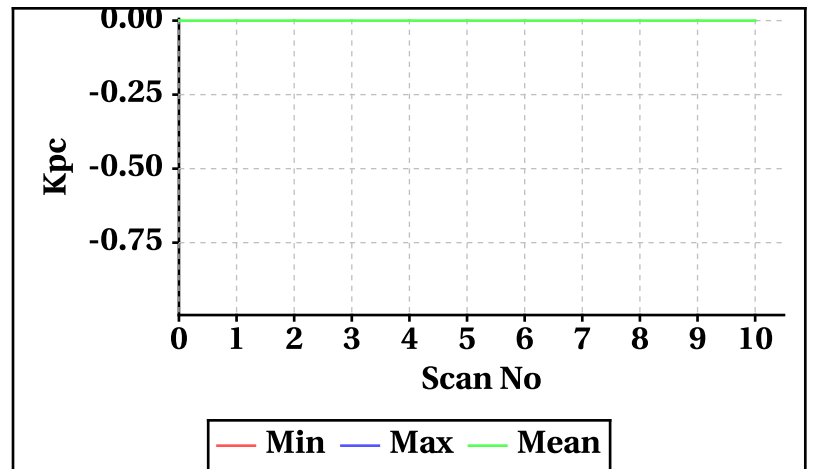
**Outer Beam (VV)**



**Inner Beam (HH)**



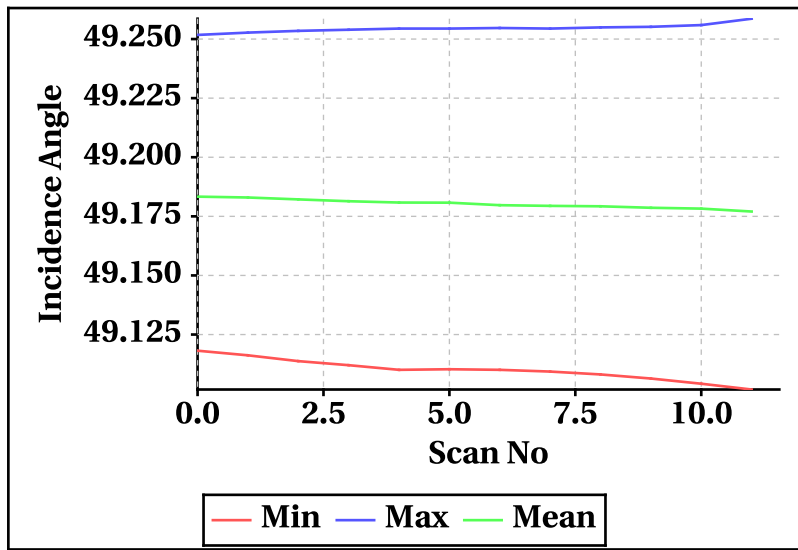
**Outer Beam (VV)**



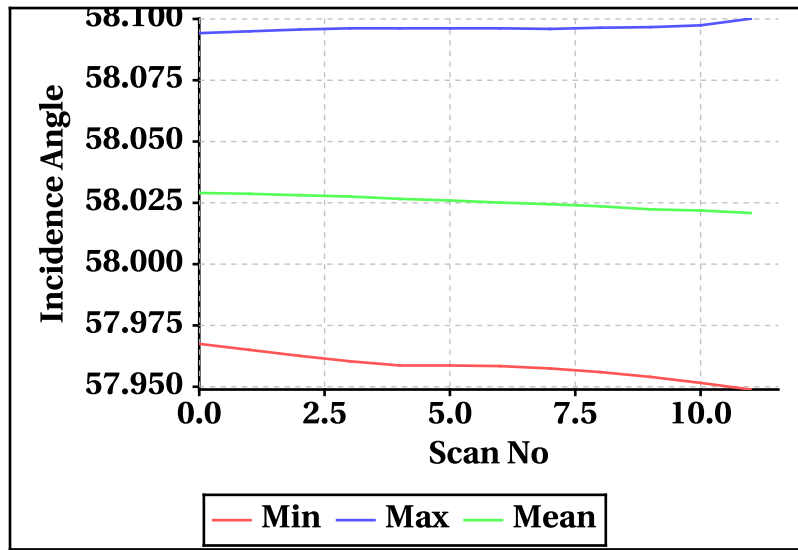


# Orbit-wise behaviour of Incidence, Azimuth, Range, X-Factor

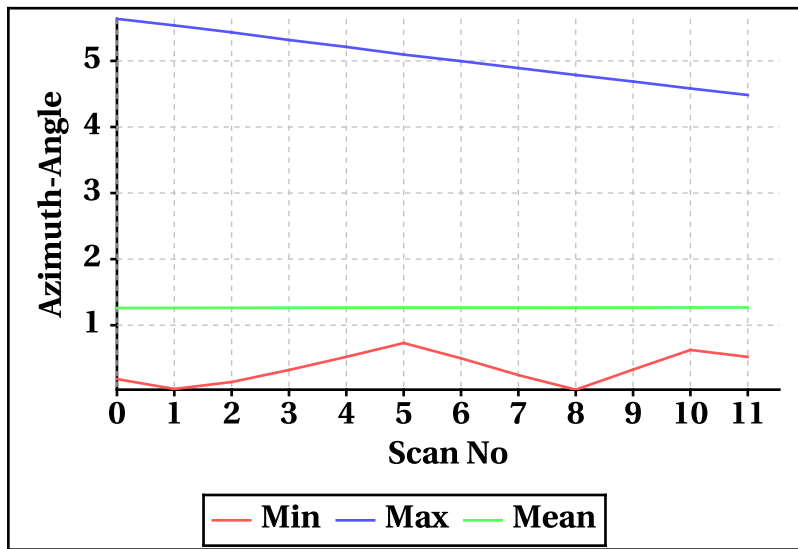
**Inner Beam (HH)**



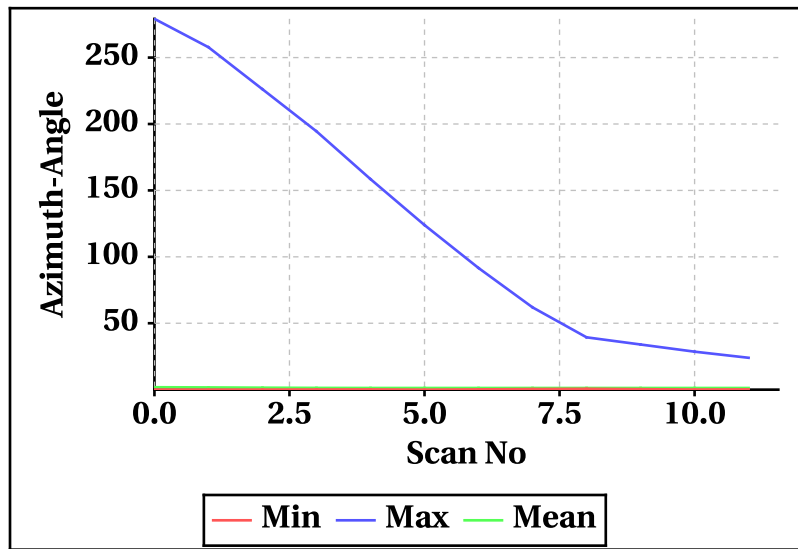
**Outer Beam(VV)**



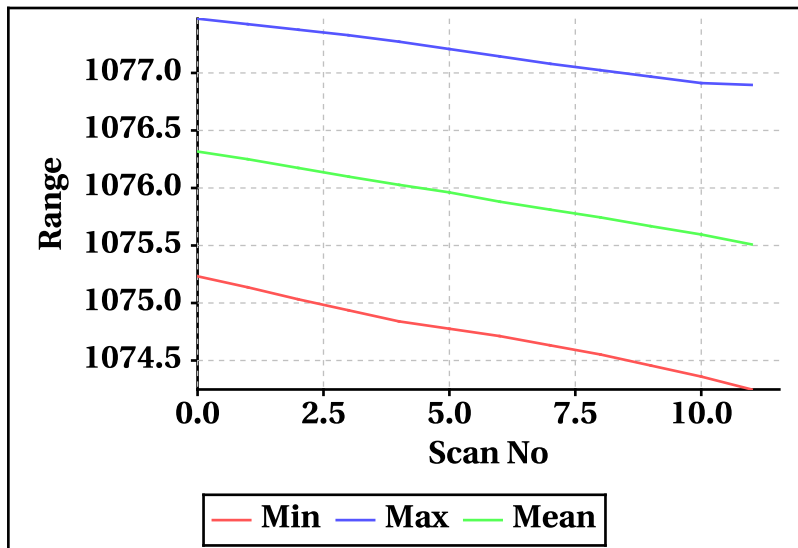
**Inner Beam (HH)**



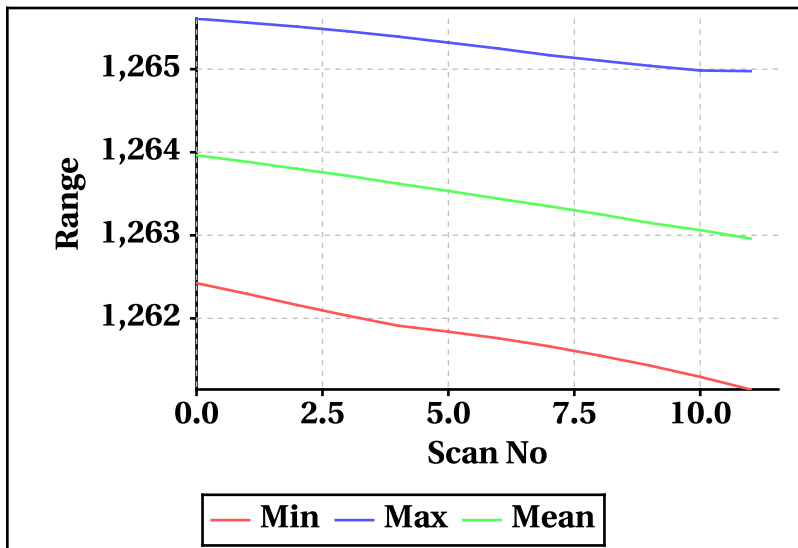
**Outer Beam(VV)**



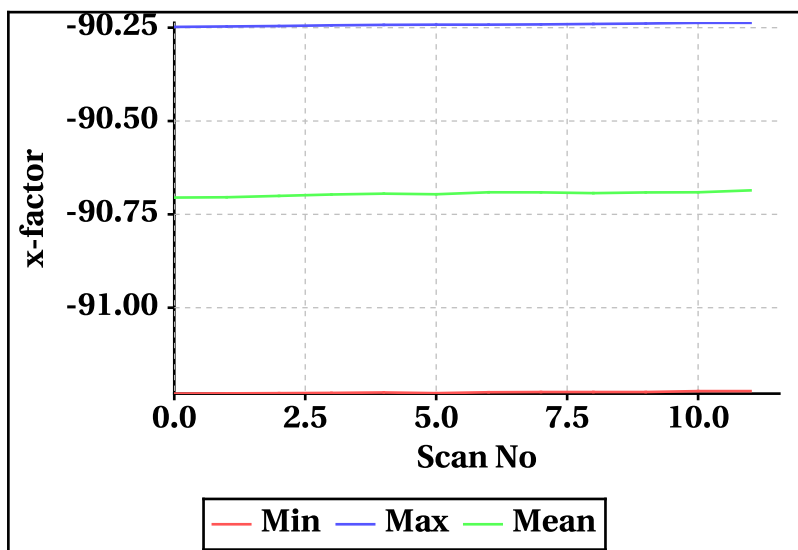
**Inner Beam (HH)**



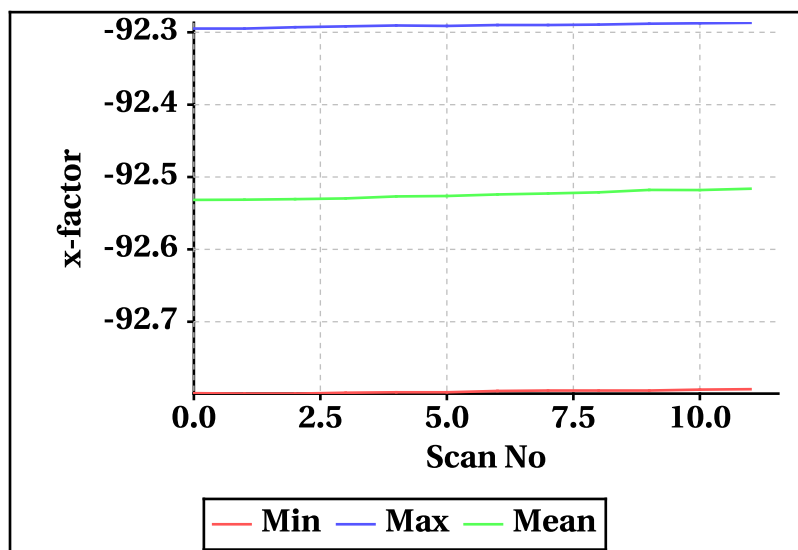
**Outer Beam(VV)**



**Inner Beam (HH)**



**Outer Beam(VV)**

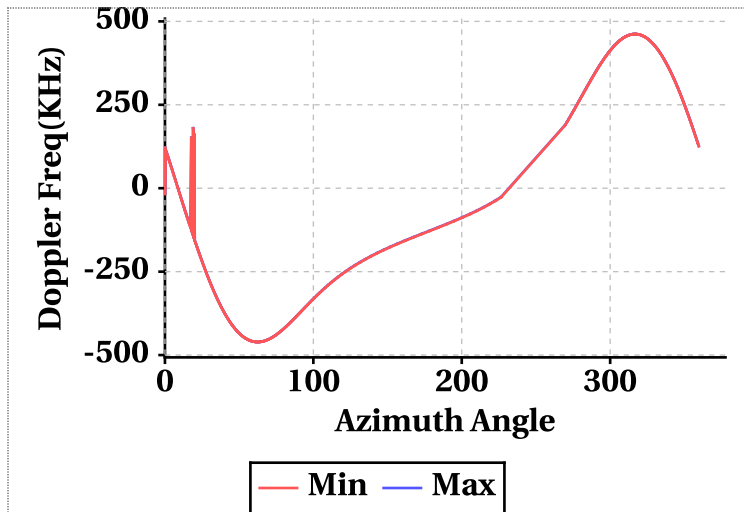


# Doppler Frequency Variation

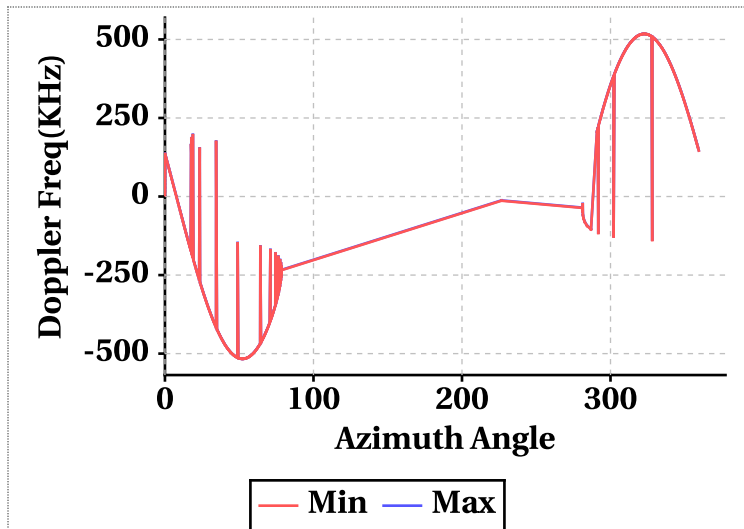
**Doppler Frequency(KHz) variation statistics Over the half Orbit**

|            | Inner Beam (HH) | Outer Beam (VV) |
|------------|-----------------|-----------------|
| <b>Min</b> | -460.82         | -516.56         |
| <b>Max</b> | 462.00          | 517.64          |

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



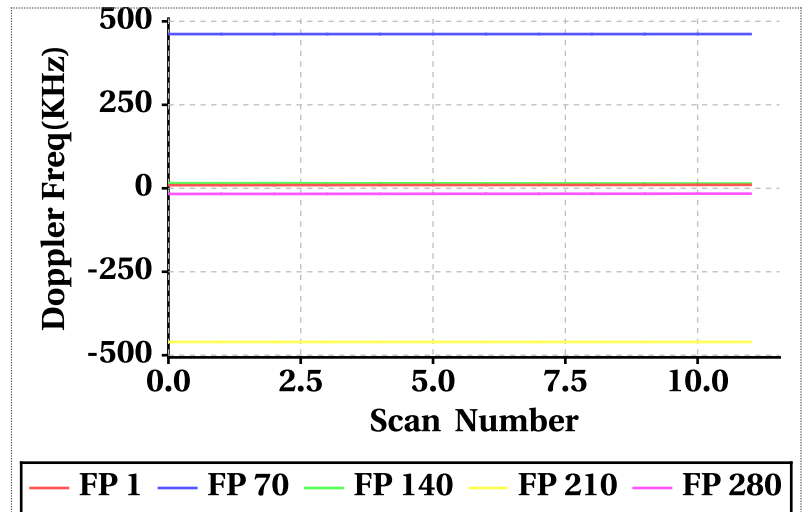
**Footprint wise Doppler frequency variation Outer Beam (VV)**



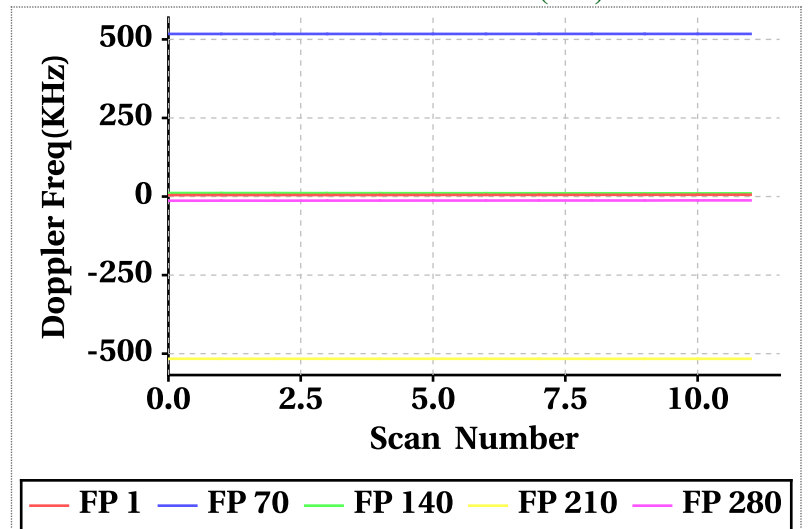
**Doppler Frequency(KHz) variation**

| Doppler_FP  | Inner Beam (HH) |         |         | Outer Beam (VV) |         |         |
|-------------|-----------------|---------|---------|-----------------|---------|---------|
|             | Min             | Max     | Mean    | Min             | Max     | Mean    |
| Doppler_1   | 9.24            | 10.30   | 9.78    | 4.58            | 5.76    | 5.18    |
| Doppler_70  | 461.88          | 461.96  | 461.92  | 517.38          | 517.46  | 517.42  |
| Doppler_140 | 14.28           | 15.34   | 14.80   | 10.02           | 11.20   | 10.59   |
| Doppler_210 | -460.38         | -460.32 | -460.35 | -516.32         | -516.26 | -516.29 |
| Doppler_280 | -17.02          | -16.04  | -16.52  | -13.38          | -12.26  | -12.80  |

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

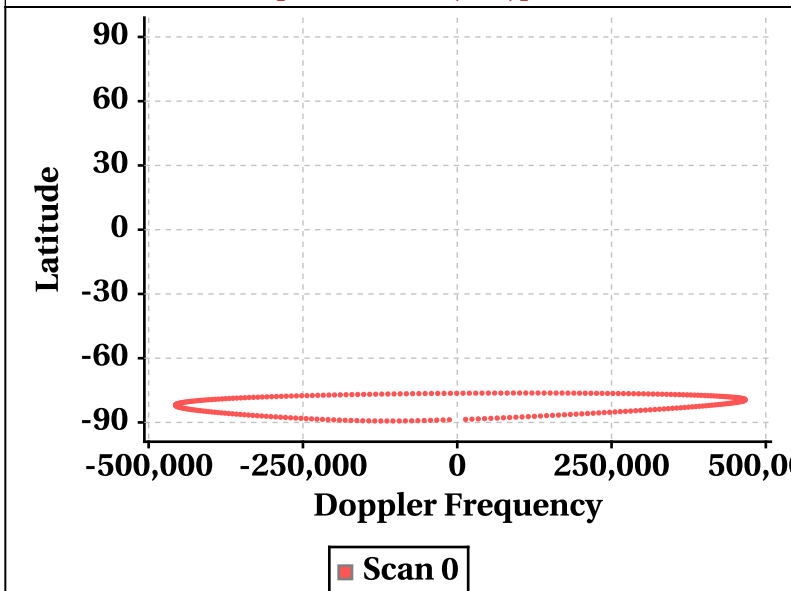


**Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Outer Beam (VV)**

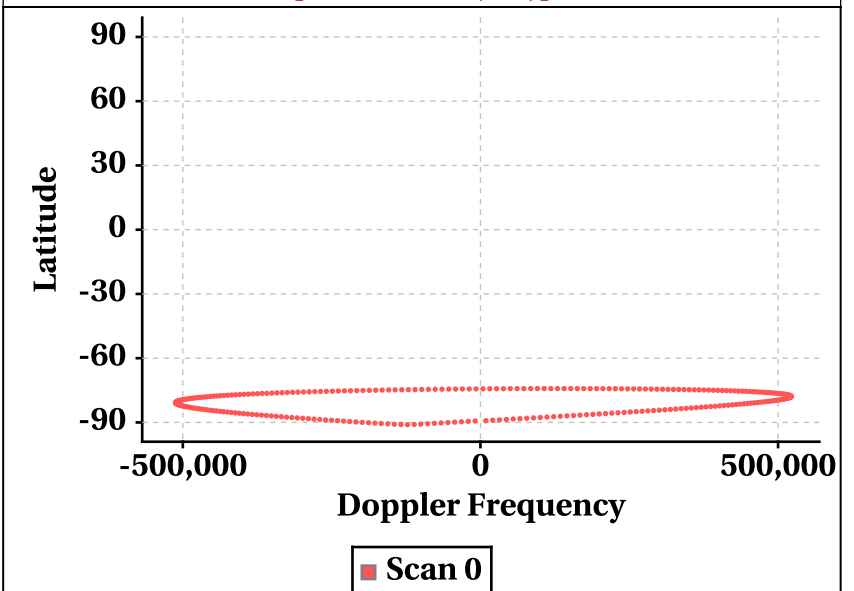


# Latitude Vs Doppler Frequency

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



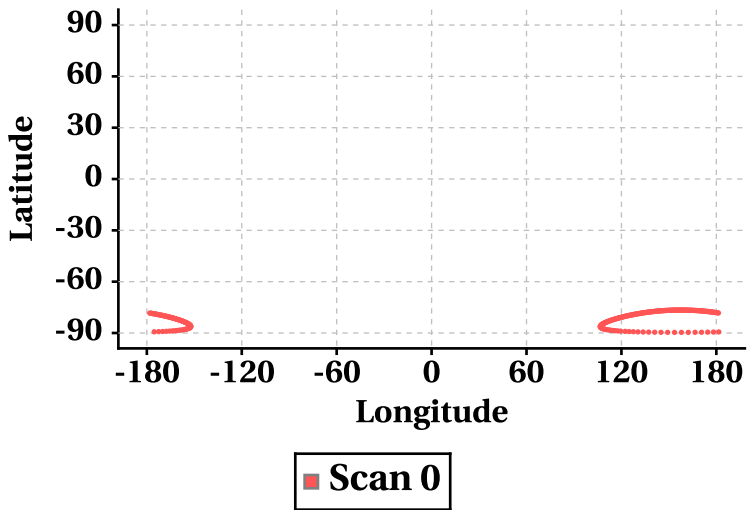
**Doppler Frequency at Scan Interval of 200 [Outer Beam(VV)]**



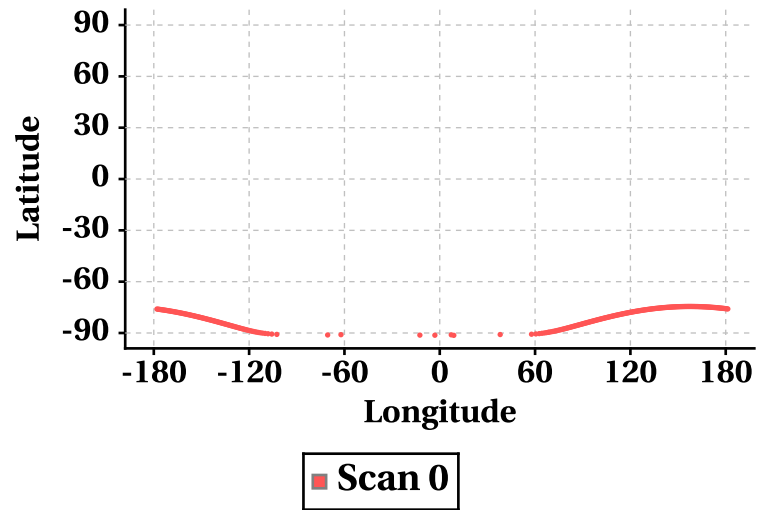
# Parameter as a function of Latitude

## Latitude Vs Longitude

### Scan Trace [Inner Beam(HH)]

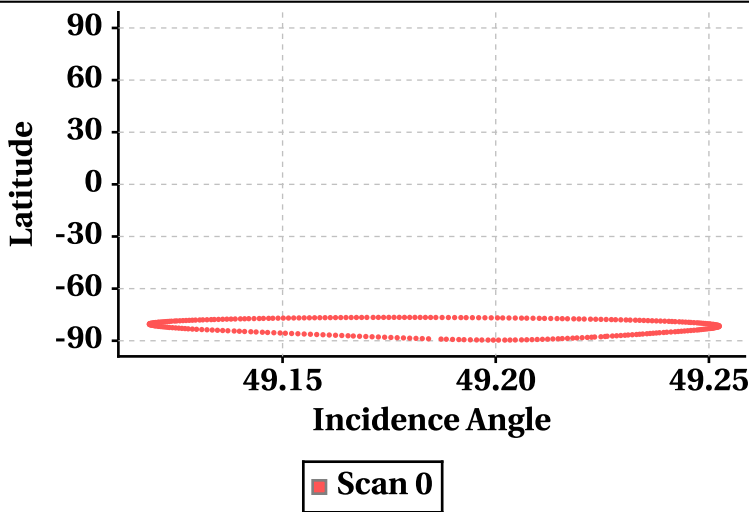


### Scan Trace [Outer Beam (VV)]

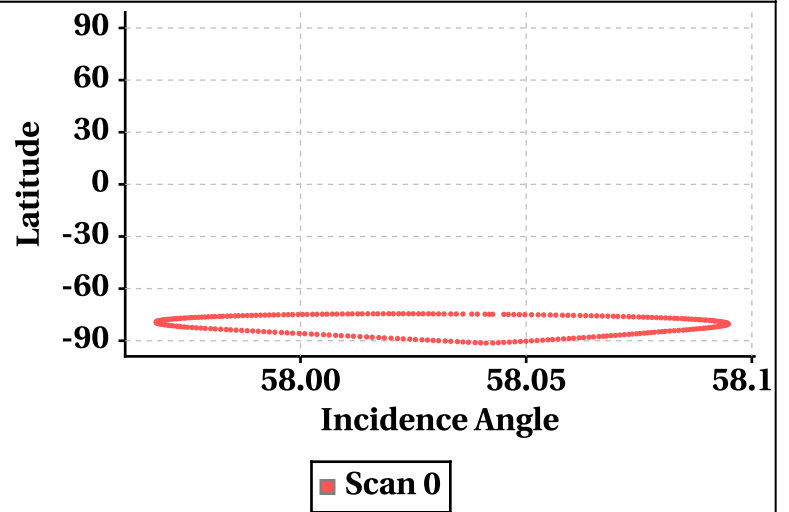


## Latitude Vs Incidence Angle

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

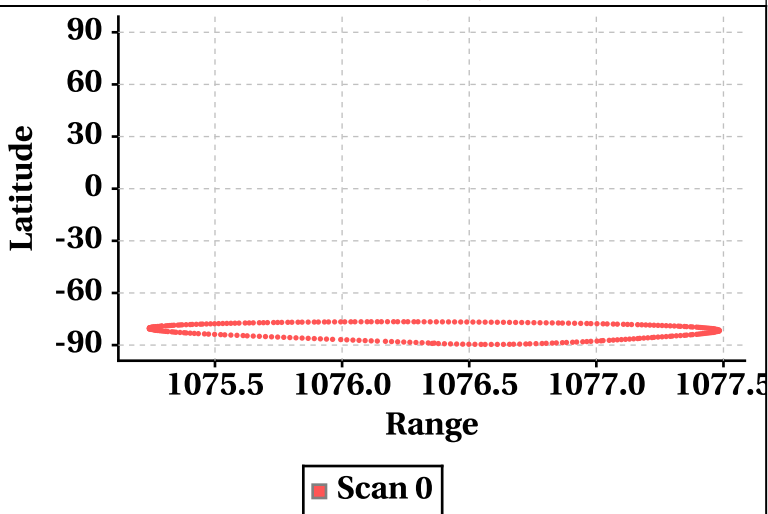


### Incidence Angle at Scan Interval of 200 [Outer Beam (VV)]

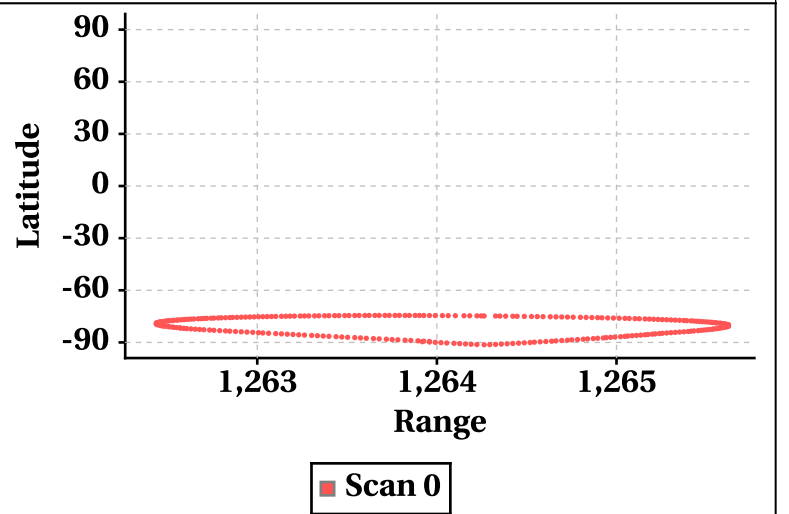


## Latitude Vs Range

### Range at Scan Interval of 200 [Inner Beam(HH)]



### Range at Scan Interval of 200 [Outer Beam(VV)]



# Variation in Orbit and Attitude Parameters

