

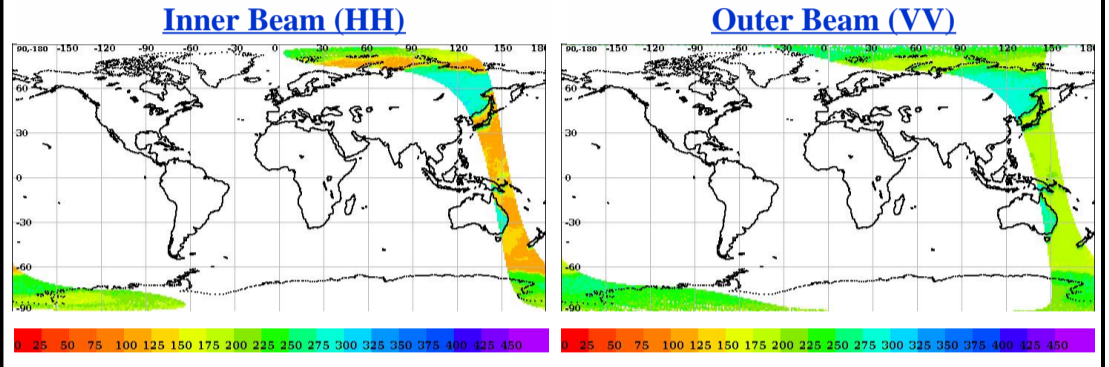
# SCATSAT-1 Scatterometer Level-1B Data Quality Evaluation Report

## Table of Contents

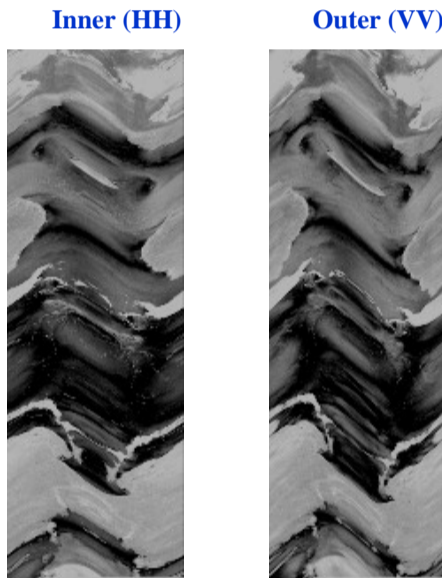
- Half-Orbit Coverage using BT & Sigma-0
- Invariant Site Sigma-0 Statistics (if Available)
- Half-Orbit Data Statistics
- Half Orbit wise - Dynamic Parameter (Sigma-0, Kp, SNR) Behaviour
- Dynamic Range (Data Histogram)
- Half Orbit Wise Behaviour - Static Parameters
- Doppler Variation (Across/Along Track for HH/VV Beam)
- LIB Parameter as a function of Latitude
- Half Orbit OAT Behaviour

|                              |               |                              |              |                               |      |
|------------------------------|---------------|------------------------------|--------------|-------------------------------|------|
| <b>Satellite Id</b>          | ScatSat-1     | <b>Start Orbit</b>           | 15358        | <b>Total Scans</b>            | 1017 |
| <b>Sensor Name</b>           | Scatterometer | <b>End Orbit</b>             | 15359        | <b>No of Inner FootPrints</b> | 281  |
| <b>Processor Version</b>     | v1.1.3        | <b>Rev. Number</b>           | 15358_15359  | <b>No Of Outer FootPrints</b> | 282  |
| <b>Half Orbit Direction</b>  | SN            | <b>Data Production Date</b>  | 21-08-2019   | <b>No. Of Inner Slices</b>    | 9    |
| <b>Equator Crossing Date</b> | 21-08-2019    | <b>Equator Crossing Time</b> | 10:37:09.000 | <b>No Of Outer Slices</b>     | 15   |

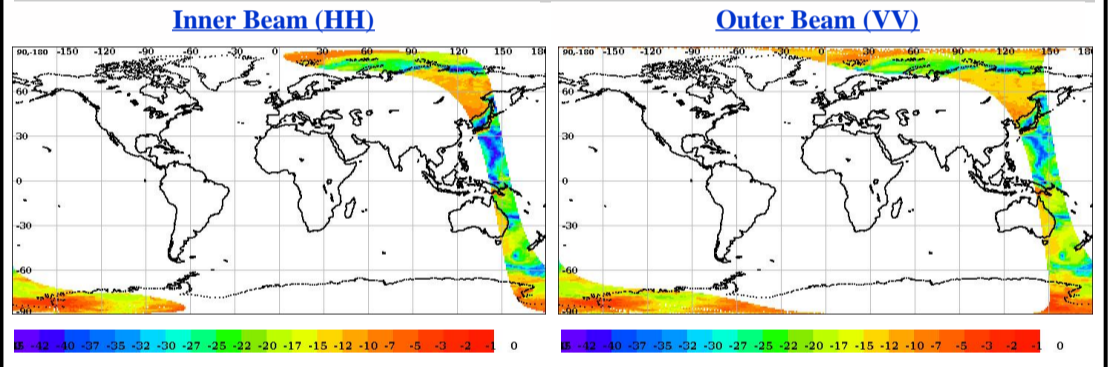
## Brightness Temperature(k) Footprint trace



## Image Snapshot for Inner & Outer Beam



## Sigma0(dB) Footprint trace



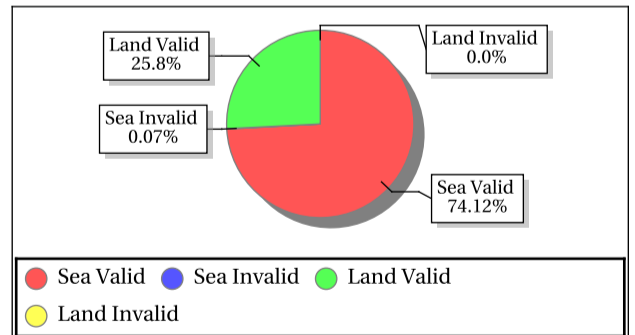
## Invalid and Poor Sigma-0 Quality Flag Statistics for Inner/Outer Slices\*

| Sigma-0 Flags                                   | Inner Beam | Outer Beam |
|---|------------|------------|
| <b>Invalid Sigma0(%)</b>                        | 0.07       | 0.07       |
| <b>Data Not Available From Payload (%)</b>      | 100.0      | 98.94213   |
| <b>Slice not within sample array limits (%)</b> | 0.00       | 1.06       |
| <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>                      | 0.059506   | 0.118706   |

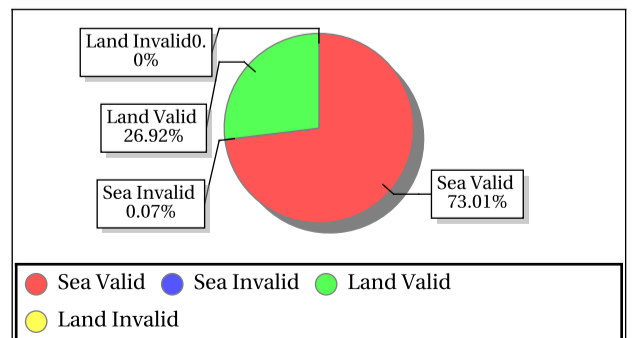
\*DP Format Document

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

### Inner Beam (HH)



### Outer Beam (VV)



## 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    | 295.78 | 0.56 | 6.559        | 0.12     | 283.44 | 0.49 | 5.030        | 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>      | -34.85  | 22.76  | 3.84 | 0.005        | -34.66   | 24.00  | 4.88 | 0.222        | 5.45     | 30.22 | 17.61 | 8.920        | 6.08      | 29.80 | 18.40 | 8.945        |

| 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    | 215.78 | 0.43 | 5.166        | 0.09     | 226.36 | 0.38 | 4.041        | 0.09     | 0.14  | 0.09  | 0.000        | 0.09      | 0.11  | 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>      | -34.64  | 15.96  | 1.79 | 0.000        | -34.85   | 16.68  | 2.39 | 0.000        | 0.46     | 22.63 | 12.38 | 0.051        | 4.25      | 22.87 | 12.68 | 0.084        |

| 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> | 48.81           | 49.51   | 49.08   | 0.000        | 57.53           | 58.36   | 57.97   | 0.000        | Inci.(Inner)             | 47.10   | 49.90   |
| <b>Azimuth Diff. (deg)</b>   | 0.0027          | 281.40  | 1.27    | 2.581        | 0.0000          | 280.67  | 1.27    | 3.749        | Inci.(Outer)             | 57.30   | 58.90   |
| <b>Range(Km)</b>             | 1037.50         | 1086.14 | 1054.91 | 0.000        | 1215.59         | 1276.88 | 1236.65 | 0.000        | Azimuth Diff.            | 0.60    | 2.00    |
| <b>X Factor(dbm)</b>         | -91.87          | -90.06  | -90.53  | 0.000        | -93.23          | -92.11  | -92.33  | 0.000        | Range(Inner)             | 1025.00 | 1095.70 |
| <b>Across Distance (Km)</b>  | 15.50           | 15.93   | 15.49   | 0.000        | 20.43           | 21.79   | 20.39   | 0.000        | Range(Outer)             | 1210.00 | 1280.00 |
| <b>Along Distance (Km)</b>   | 18.74           | 39.67   | 19.73   | 1.000        | 18.51           | 39.18   | 19.63   | 1.000        | 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   |
|                              |                 |         |         |              |                 |         |         |              |                          |         |         |

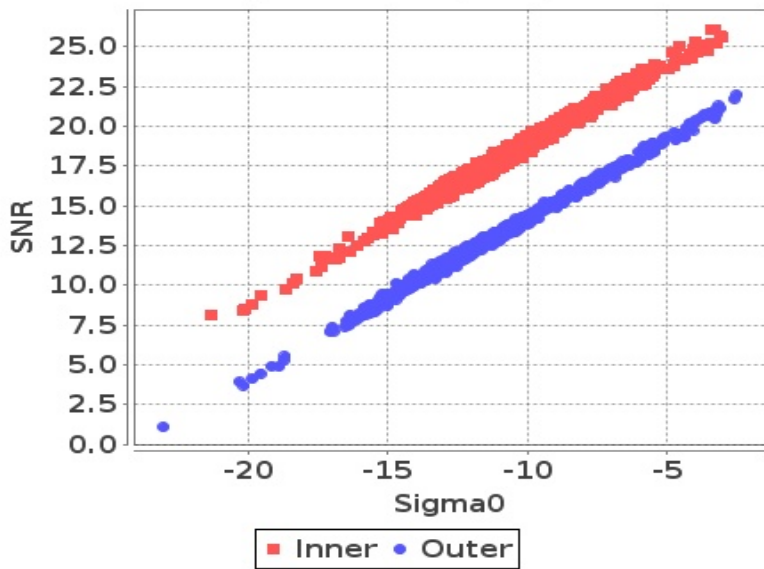
- Normal
- Deviations
- Alarming
- High Errors



## Sigma0 Behaviour (Sigma0 Vs SNR)

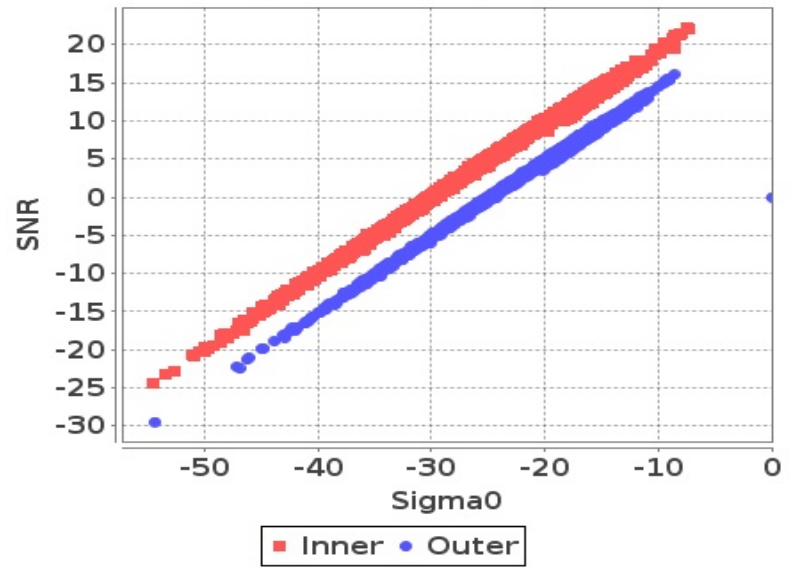
Footprint-Land

Sigma0 Vs SNR (Land)



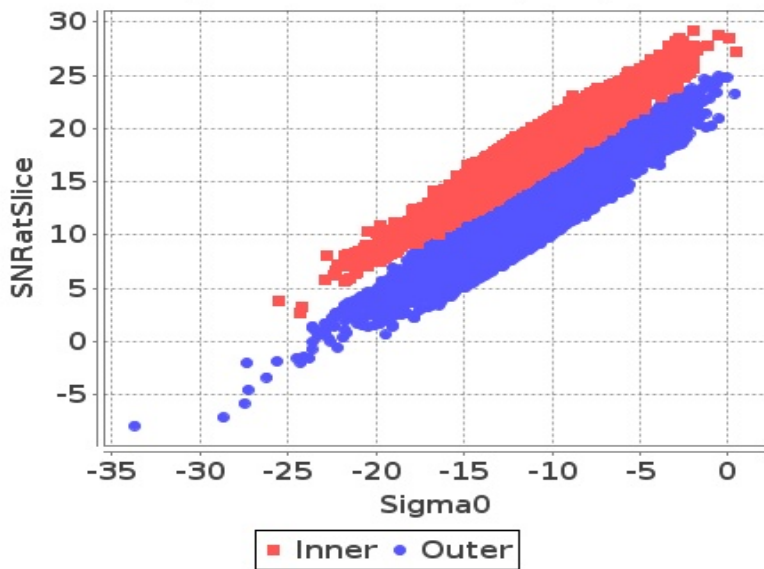
Footprint-Sea

Sigma0 Vs SNR (Sea)



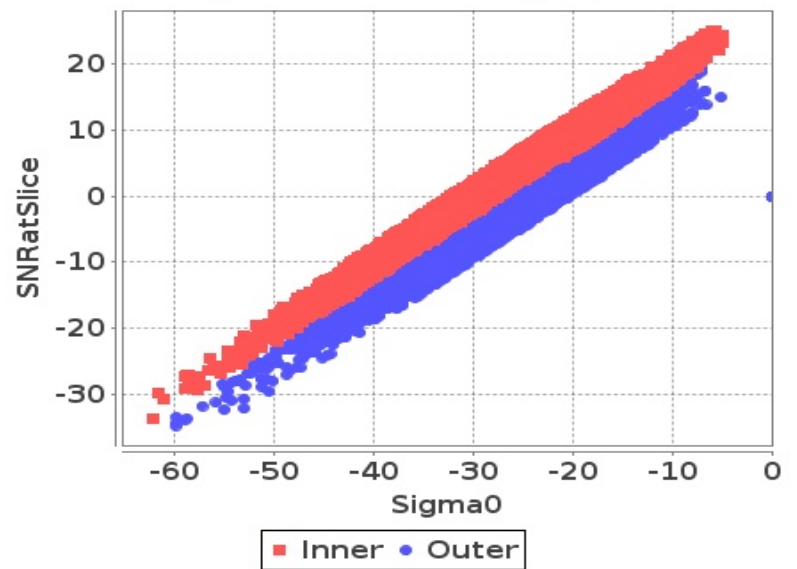
Slice-Land

Sigma0 Vs SNRatSlice (Land)



Slice-Sea

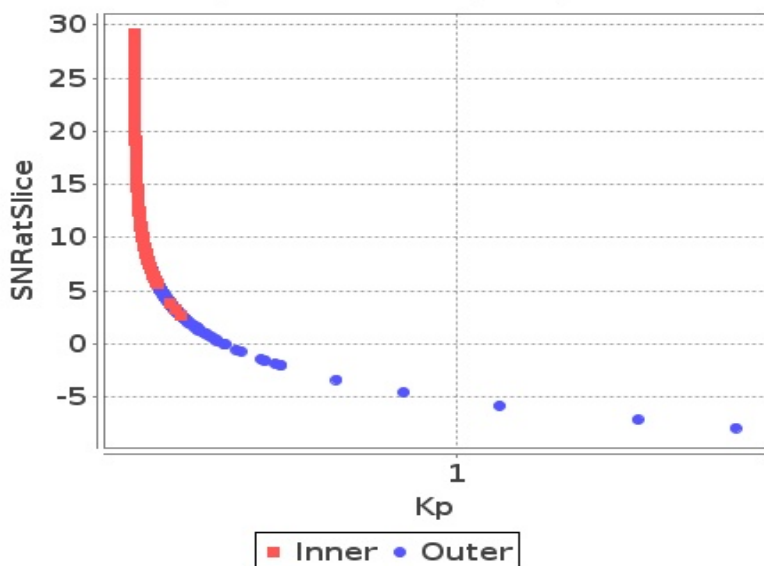
Sigma0 Vs SNRatSlice (Sea)



## Sigma0 Behaviour (Kp Vs SNR)

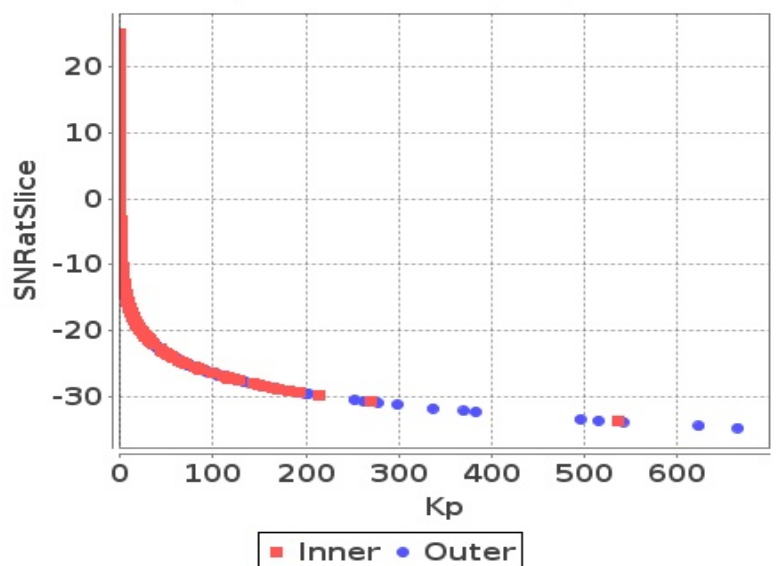
Slice

Kp Vs SNRatSlice (Land)



Slice

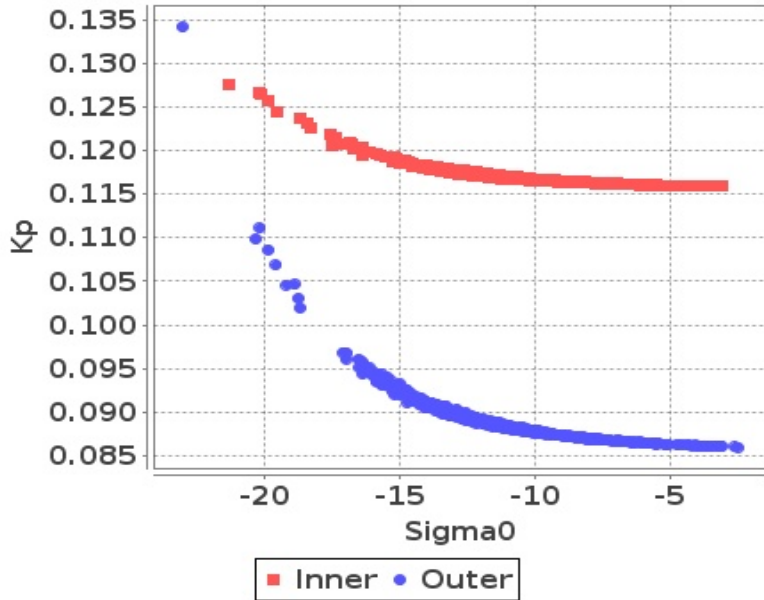
Kp Vs SNRatSlice (Sea)



# Sigma0 Behaviour(Sigma0 Vs Kp)

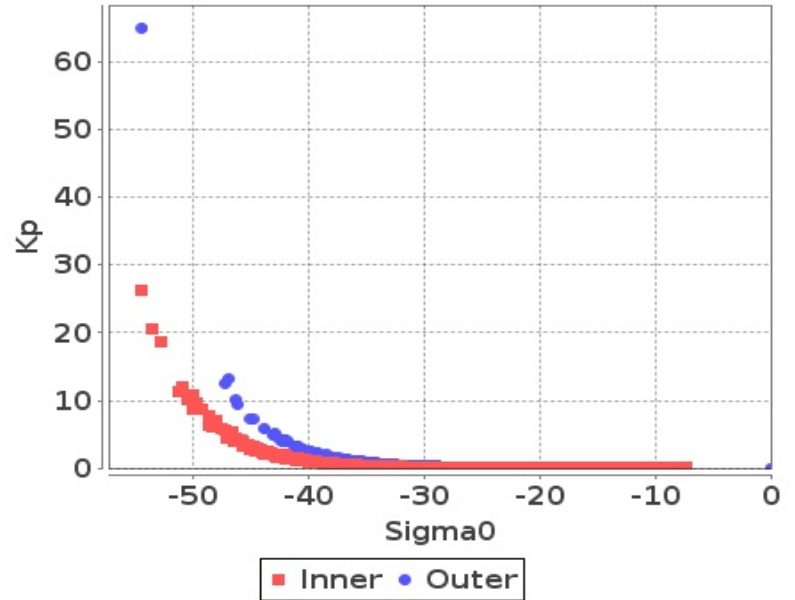
## Footprint-Land

### Sigma0 Vs Kp (Land)



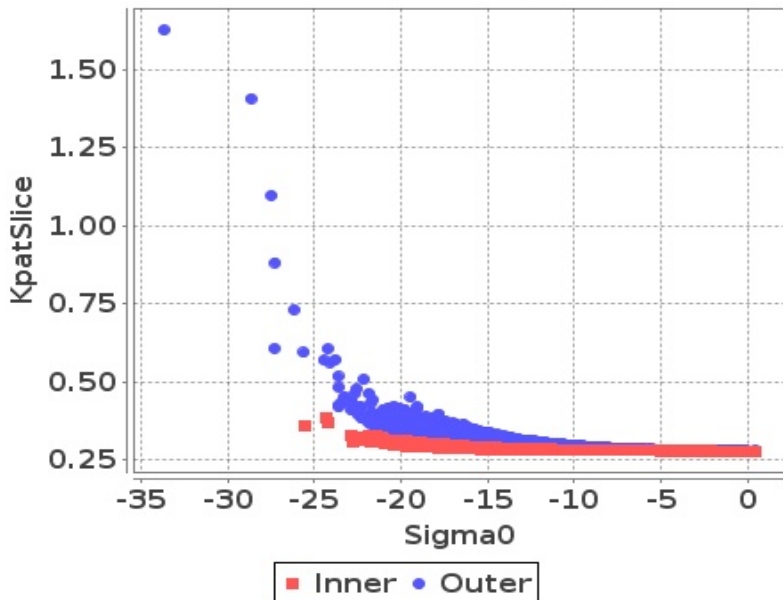
## Footprint-Sea

### Sigma0 Vs Kp (Sea)



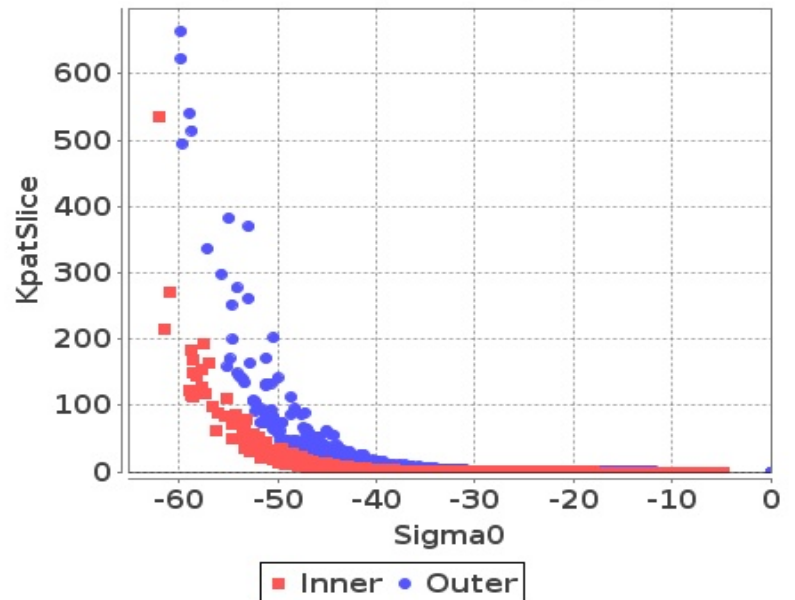
## Slice-Land

### Sigma0 Vs KpatSlice (Land)



## Slice-Sea

### Sigma0 Vs KpatSlice (Sea)

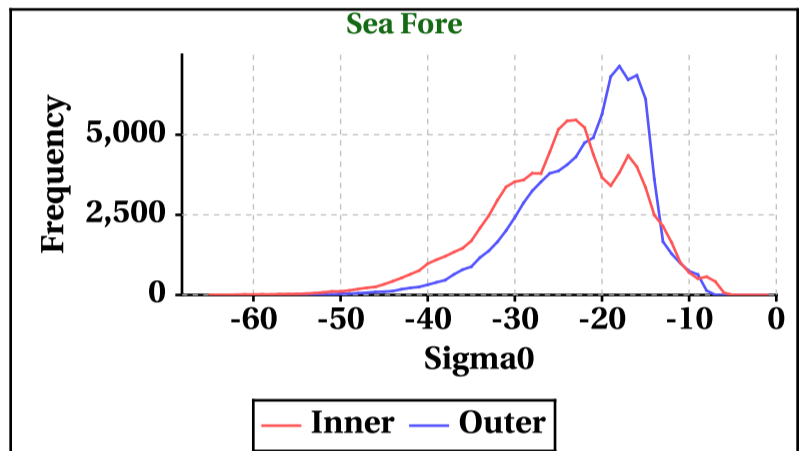
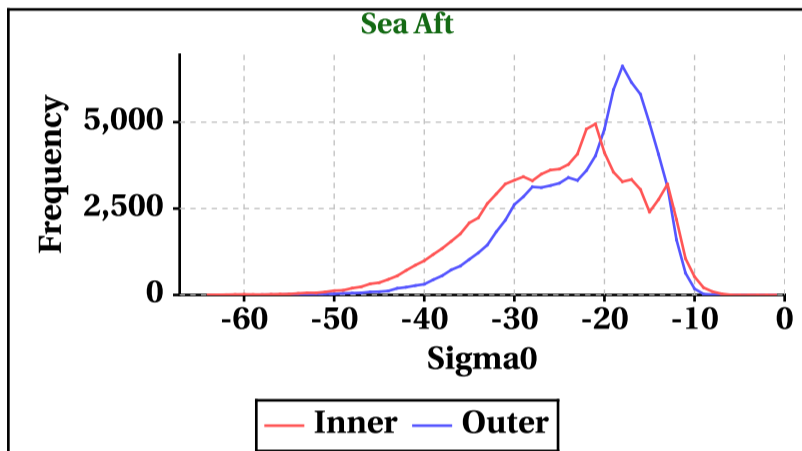
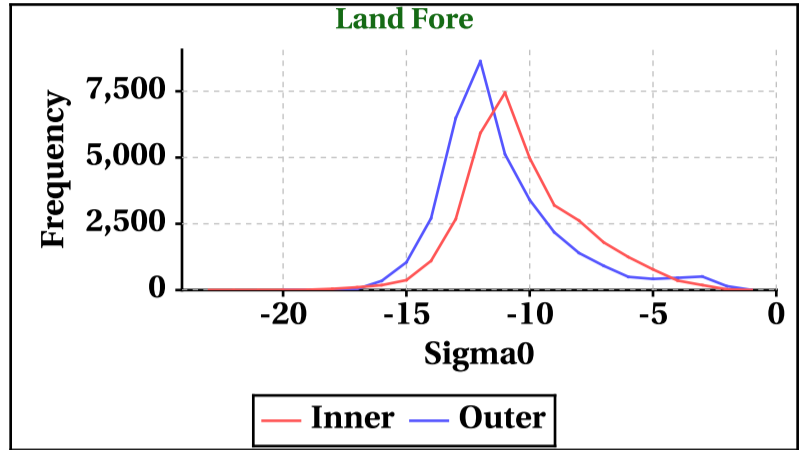
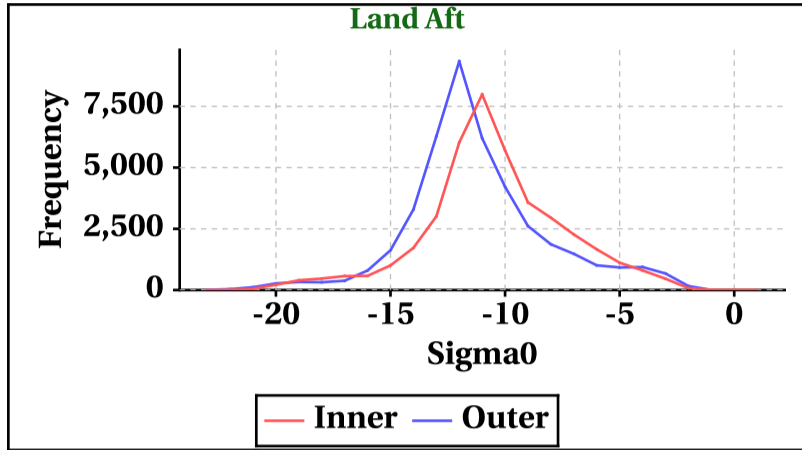


# Dynamic Range (Data Histograms)

## Sigma0(db)

| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -23      | -23       | -64     | -65      |
| Max             | 1        | 0         | 0       | 0        |

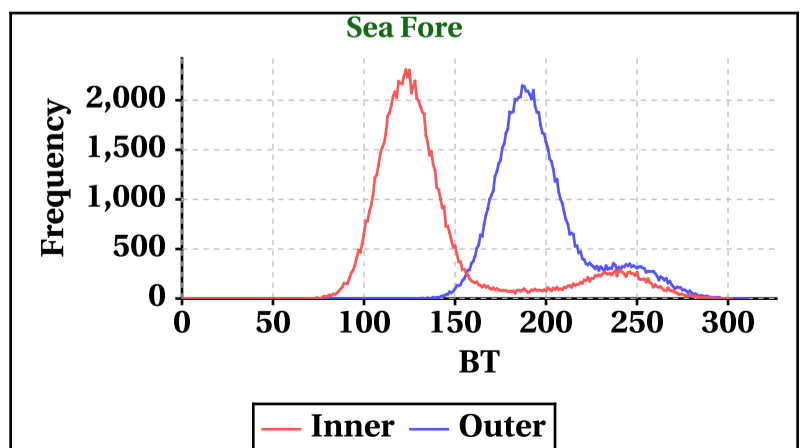
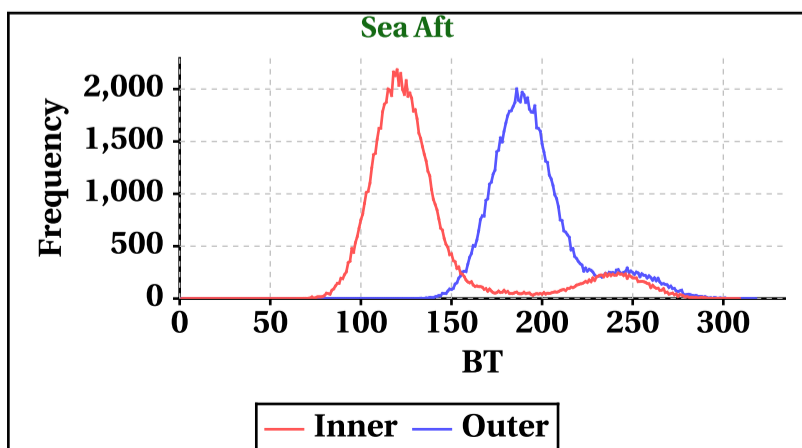
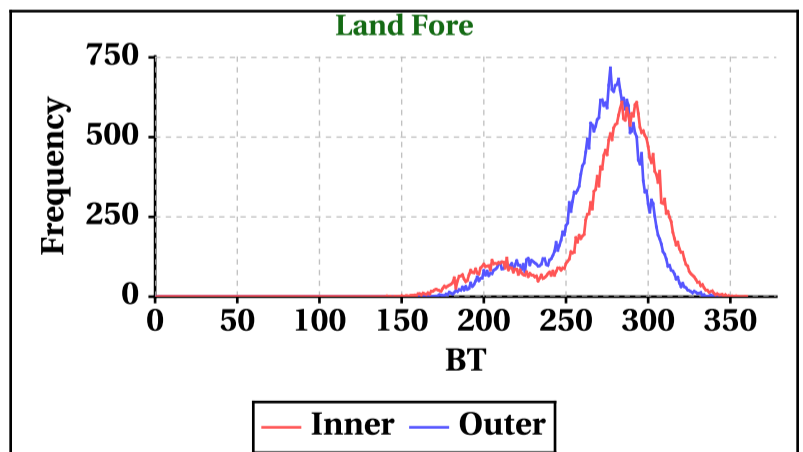
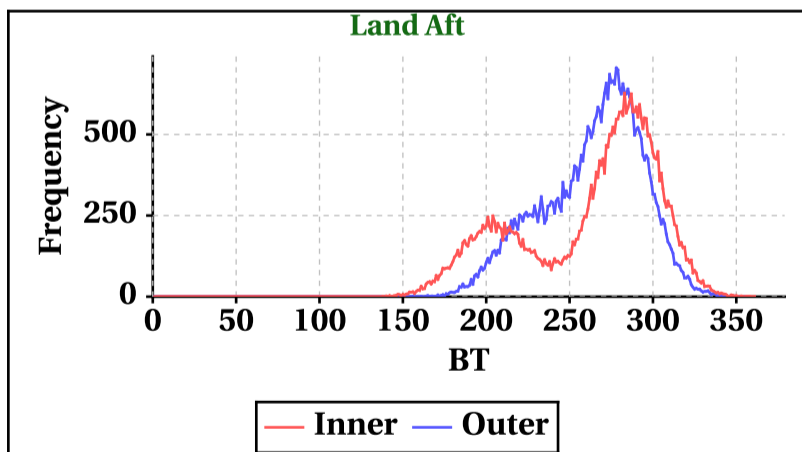
| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -23      | -20       | -59     | -59      |
| Max             | 0        | 0         | 0       | 0        |



## Brightness Temperature(K)

| Inner Beam(HH) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 361      | 360       | 309     | 302      |

| Outer Beam(VV) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 357      | 354       | 318     | 311      |

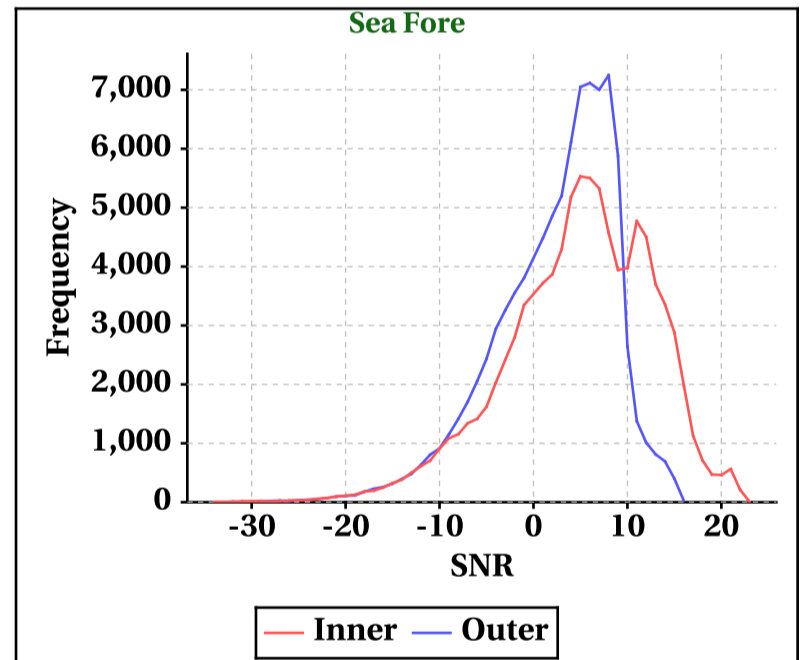
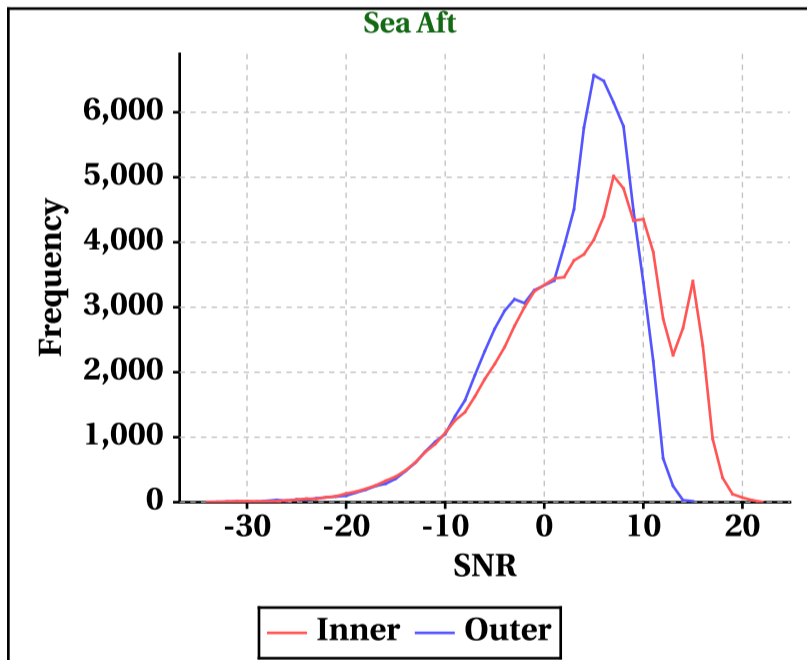
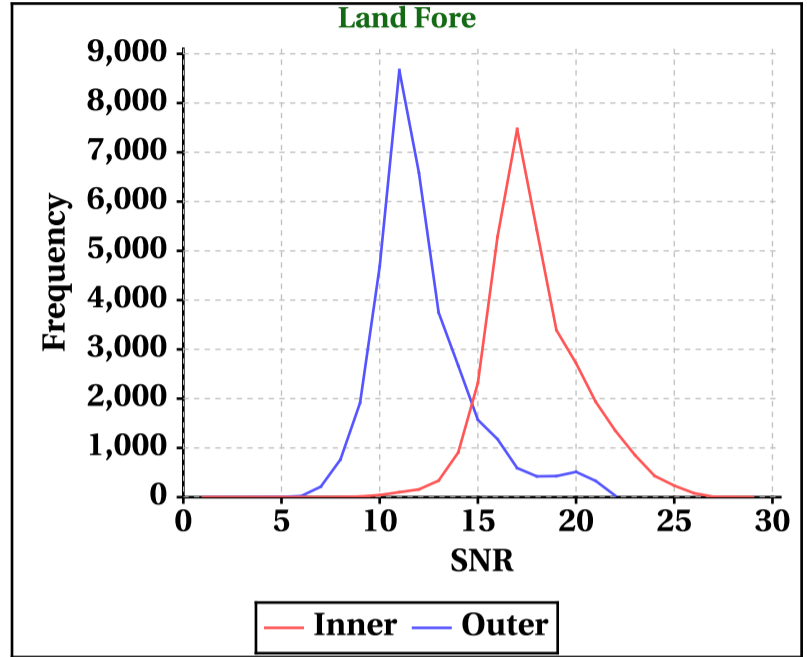
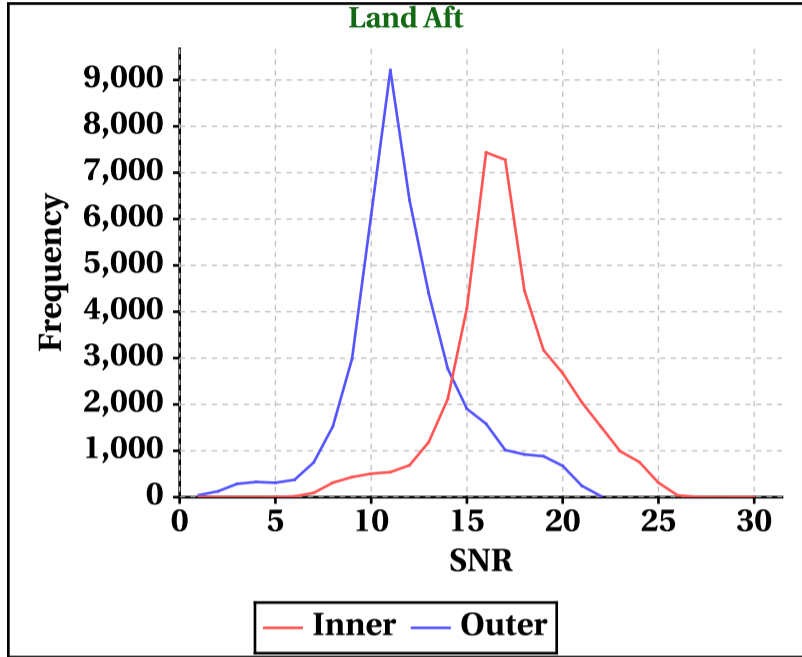


# Dynamic Range (Data Histograms)

## SNR(dBm)

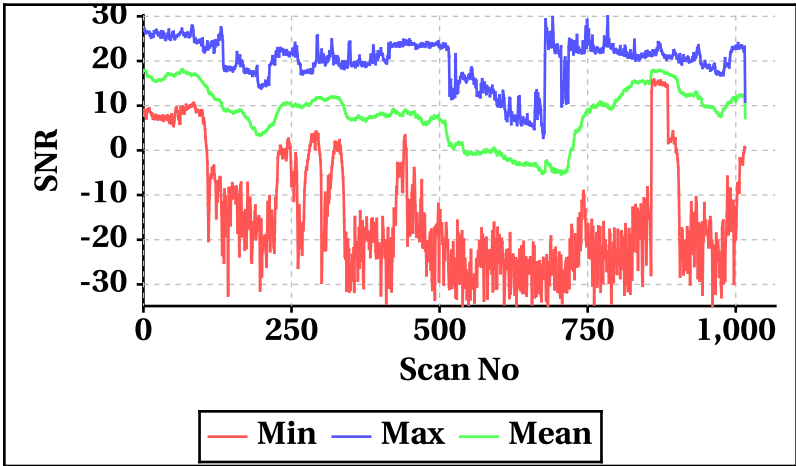
| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | 0        | 0         | -34     | -34      |
| Max             | 30       | 29        | 22      | 23       |

| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | 0        | 0         | -34     | -34      |
| Max             | 22       | 22        | 15      | 16       |

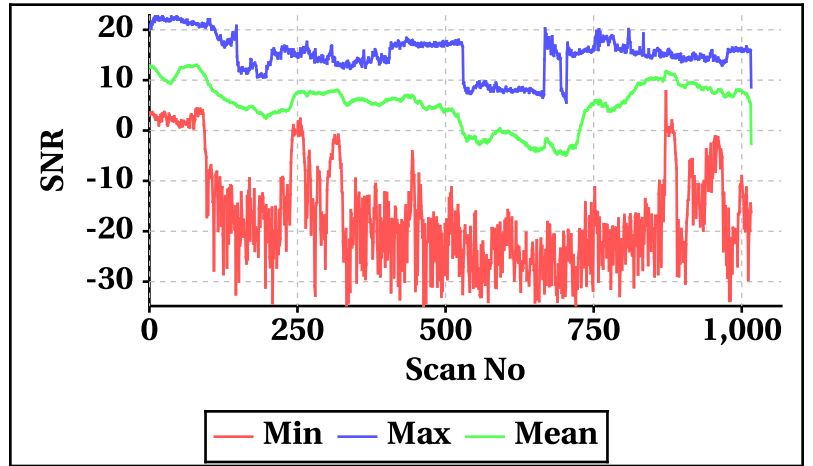


## Orbit-wise behaviour of SNR

**Inner Beam (HH)**

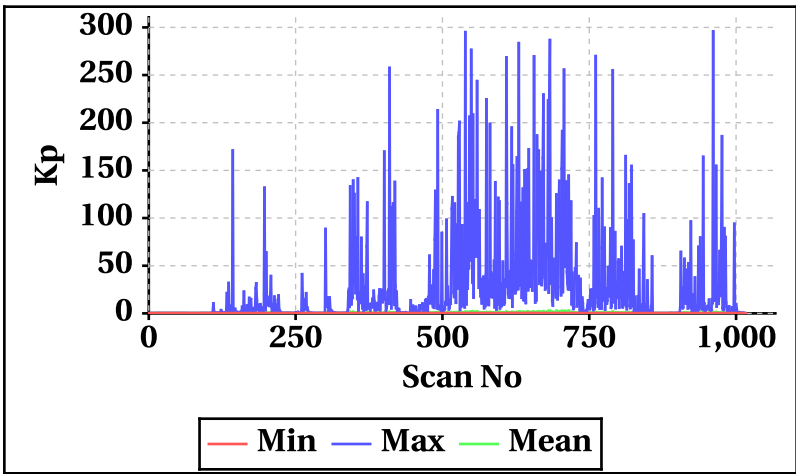


**Outer Beam(VV)**

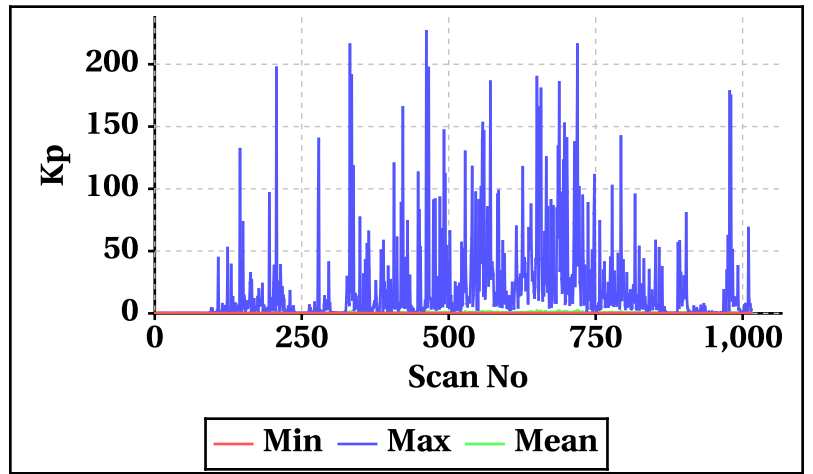


## Orbit-wise behaviour of Kp,Kpa,Kpb,Kpc

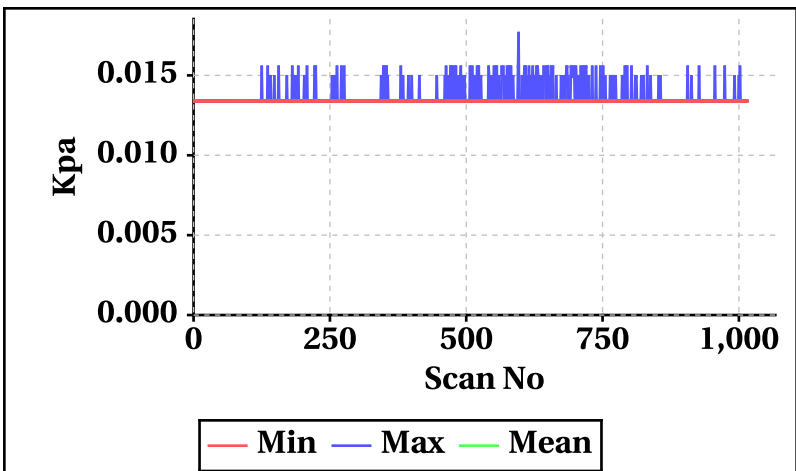
**Inner Beam(HH)**



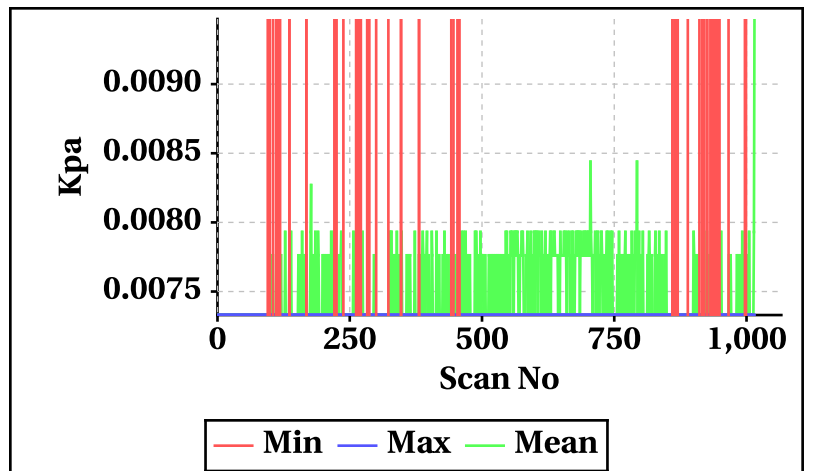
**Outer Beam(VV)**



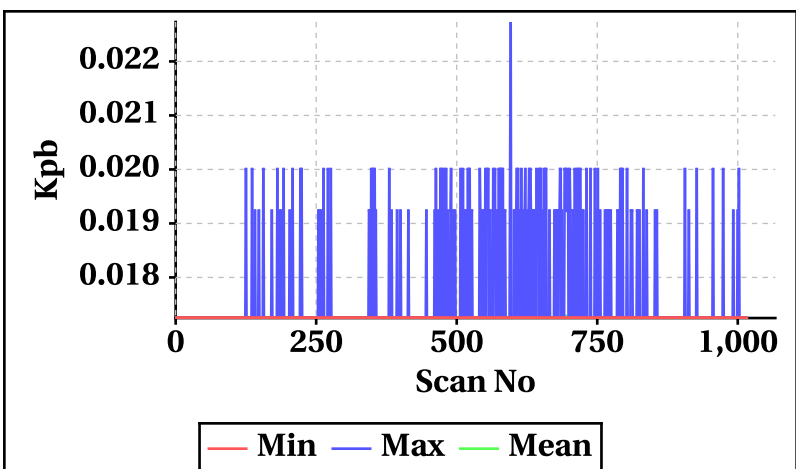
**Inner Beam(HH)**



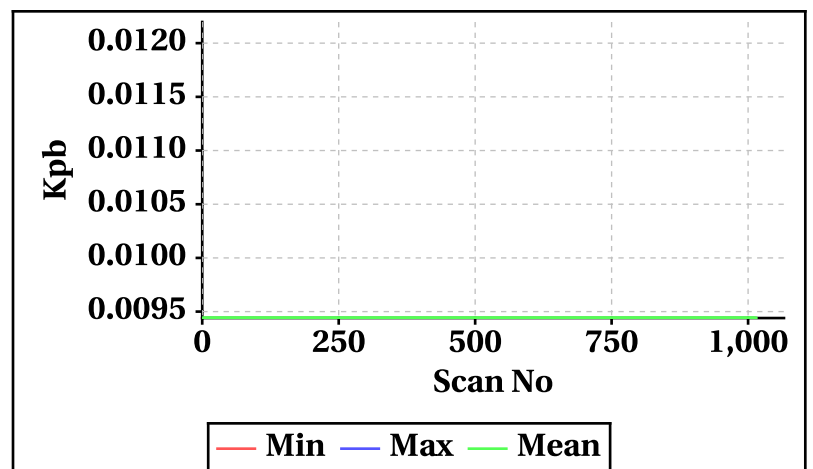
**Outer Beam(VV)**



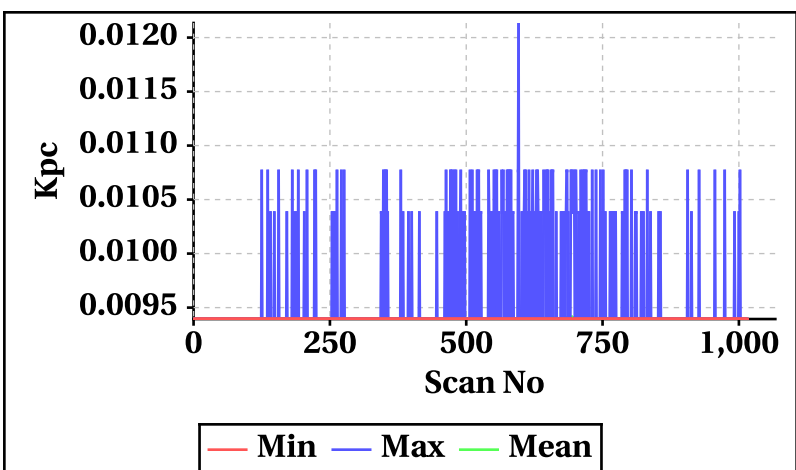
**Inner Beam(HH)**



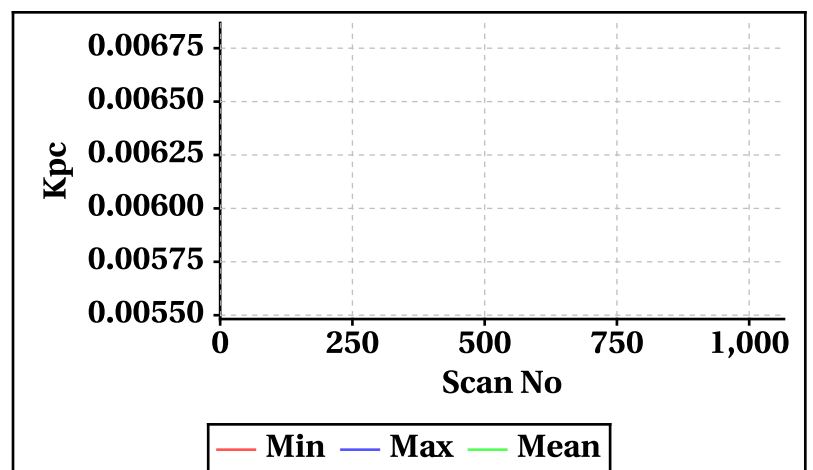
**Outer Beam(VV)**



**Inner Beam(HH)**

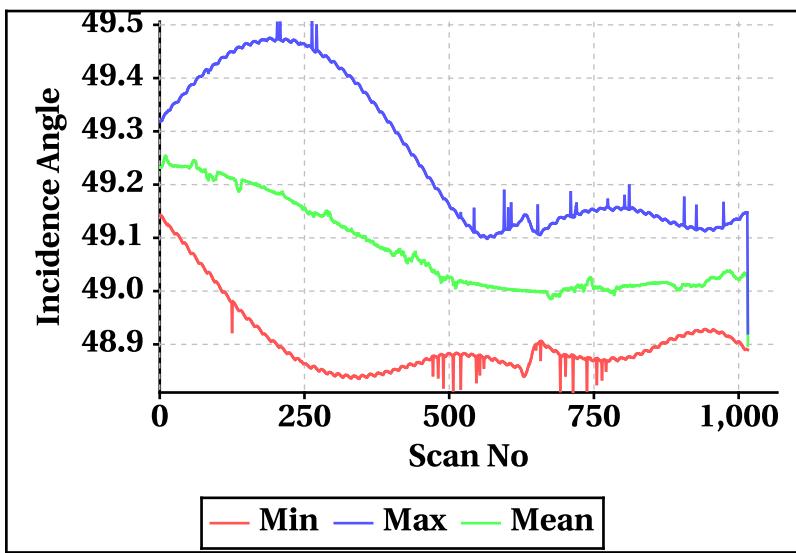


**Outer Beam(VV)**

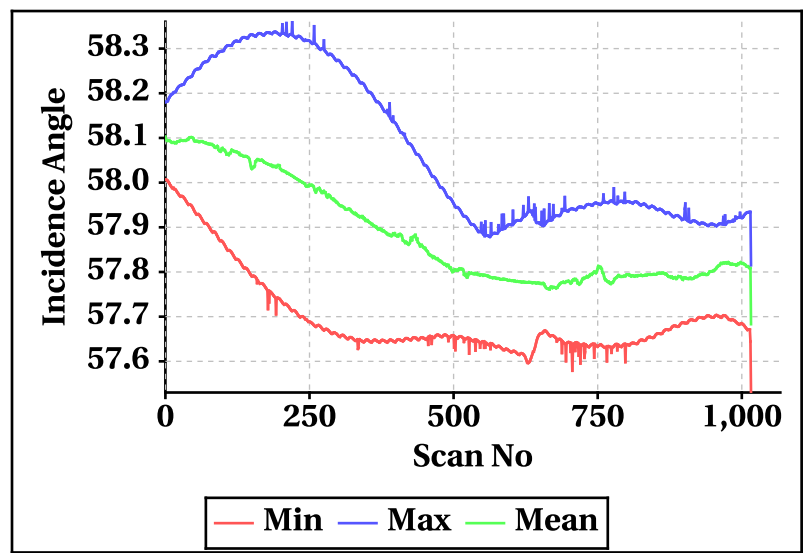


# Orbit-wise behaviour of Incidence, Azimuth, Range, X-Factor

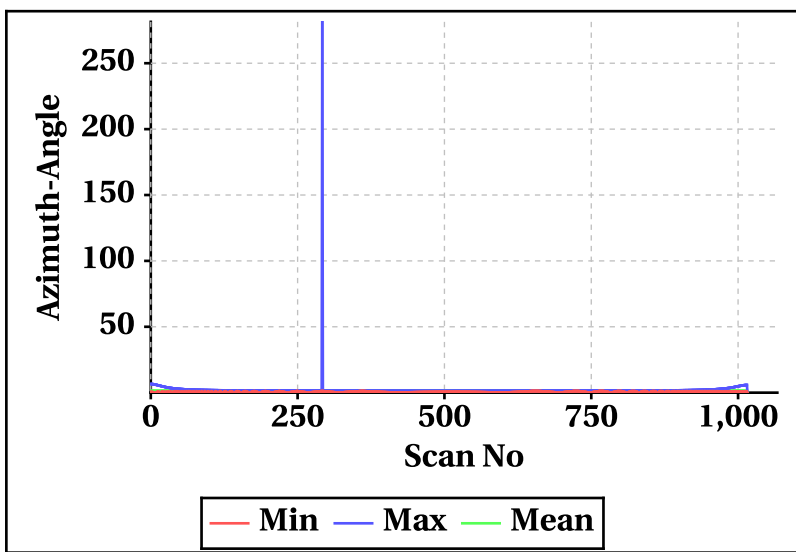
**Inner Beam (HH)**



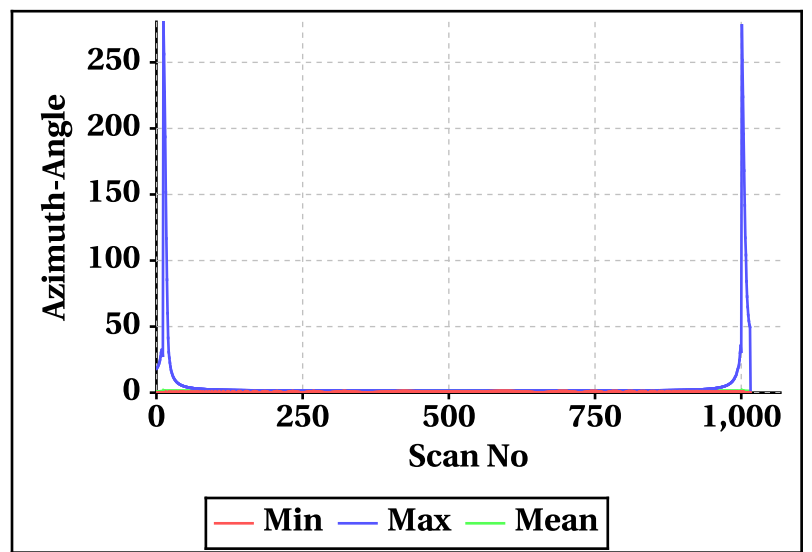
**Outer Beam(VV)**



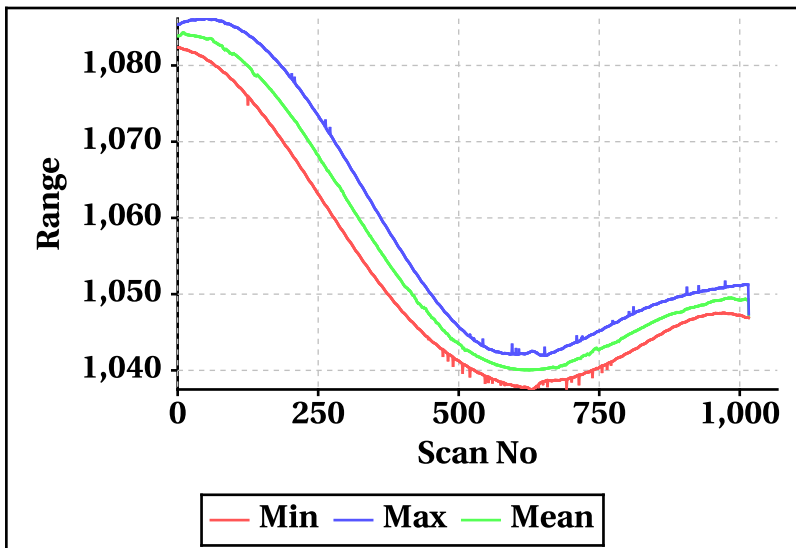
**Inner Beam (HH)**



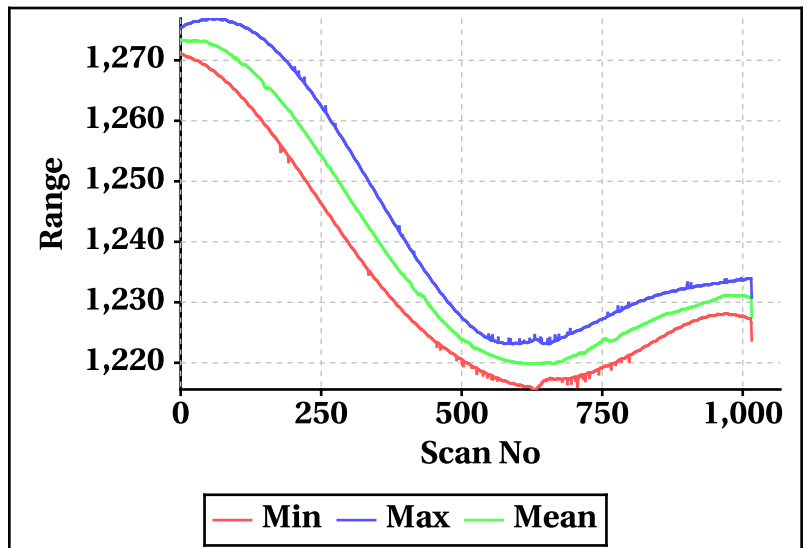
**Outer Beam(VV)**



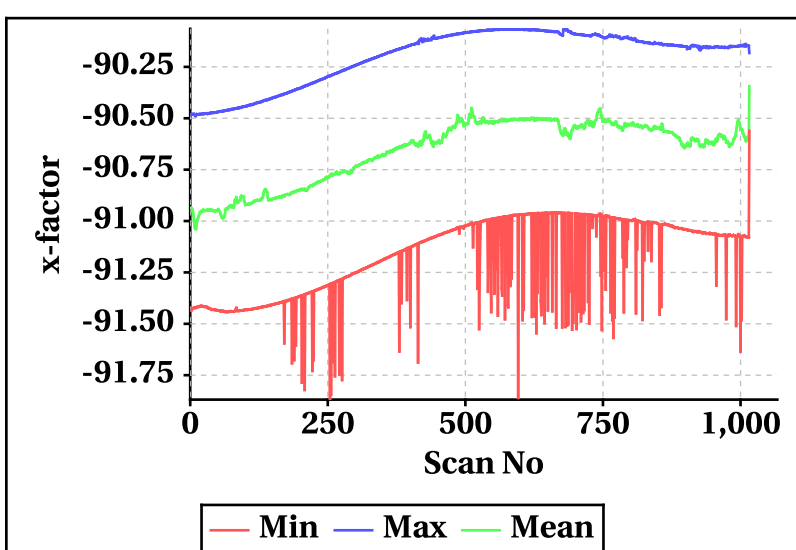
**Inner Beam (HH)**



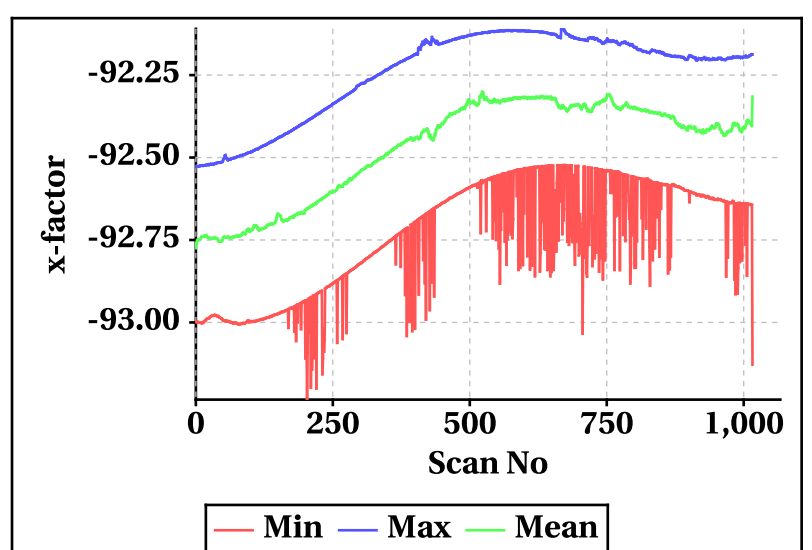
**Outer Beam(VV)**



**Inner Beam (HH)**



**Outer Beam(VV)**



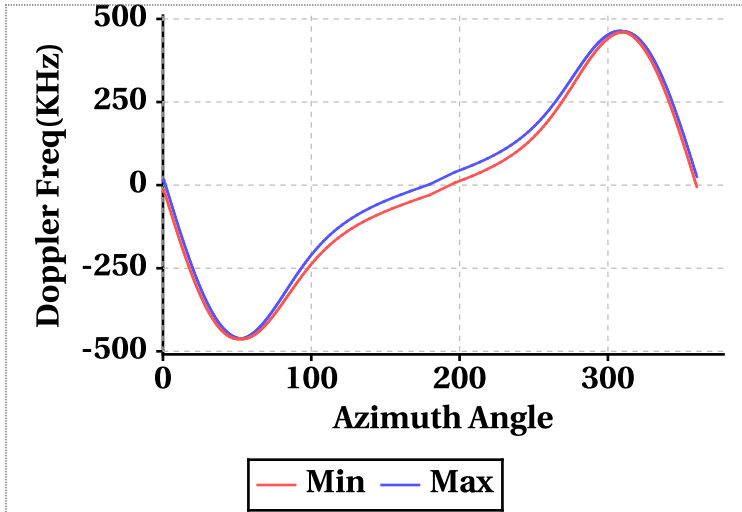


# Doppler Frequency Variation

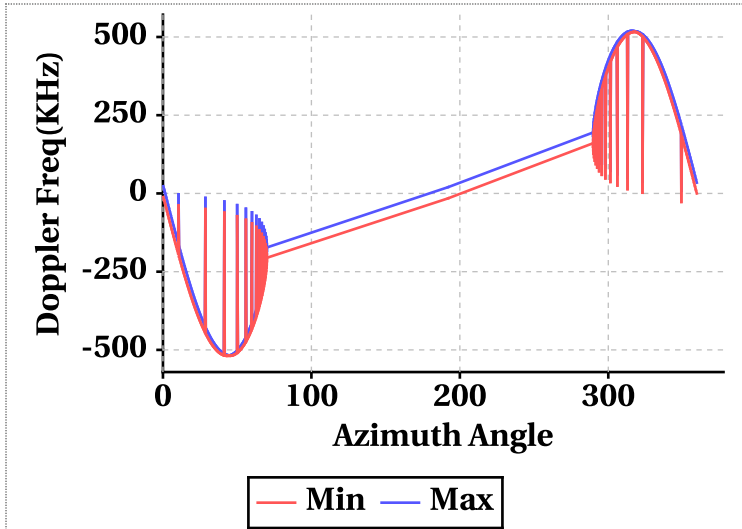
**Doppler Frequency(KHz) variation statistics Over the half Orbit**

|            | Inner Beam (HH) | Outer Beam (VV) |
|------------|-----------------|-----------------|
| <b>Min</b> | -462.94         | -518.86         |
| <b>Max</b> | 463.52          | 519.38          |

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



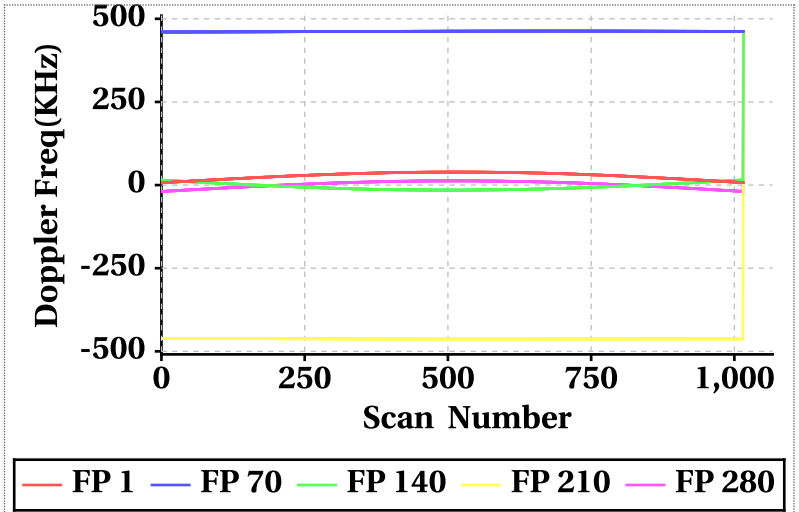
**Footprint wise Doppler frequency variation Outer Beam (VV)**



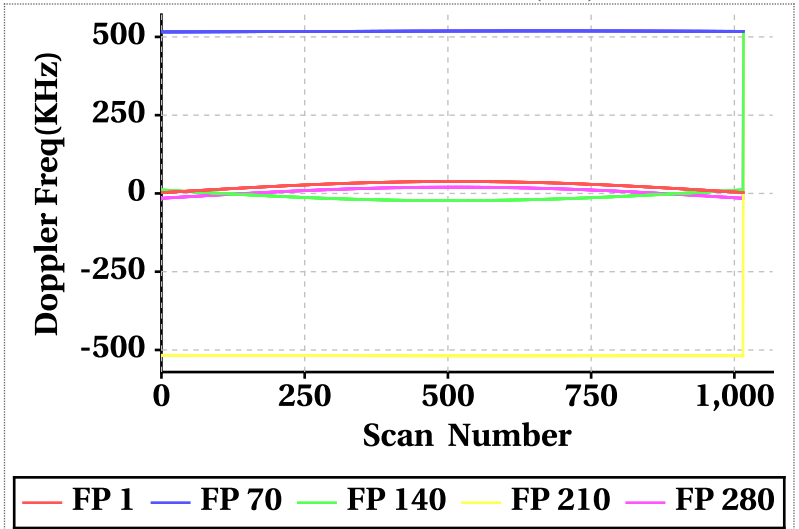
**Doppler Frequency(KHz) variation**

| Doppler_FP  | Inner Beam (HH) |        |         | Outer Beam (VV) |        |         |
|-------------|-----------------|--------|---------|-----------------|--------|---------|
|             | Min             | Max    | Mean    | Min             | Max    | Mean    |
| Doppler_1   | 7.00            | 39.08  | 27.52   | 2.38            | 38.12  | 25.22   |
| Doppler_70  | 460.24          | 463.16 | 462.12  | 515.84          | 519.18 | 518.03  |
| Doppler_140 | -15.30          | 461.98 | -3.76   | -23.08          | 517.72 | -10.06  |
| Doppler_210 | -462.86         | 461.98 | -461.49 | -518.66         | 517.72 | -517.18 |
| Doppler_280 | -19.24          | 461.98 | 1.58    | -15.54          | 517.72 | 7.65    |

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

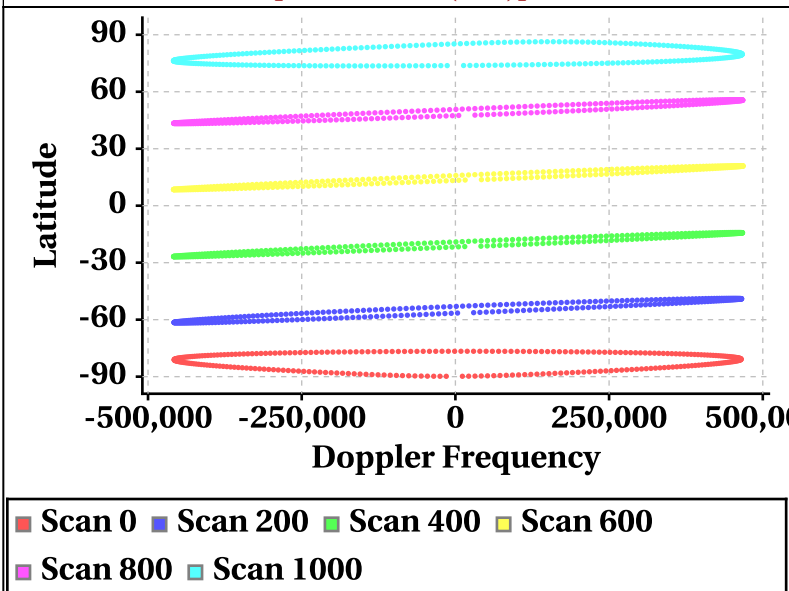


**Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Outer Beam (VV)**

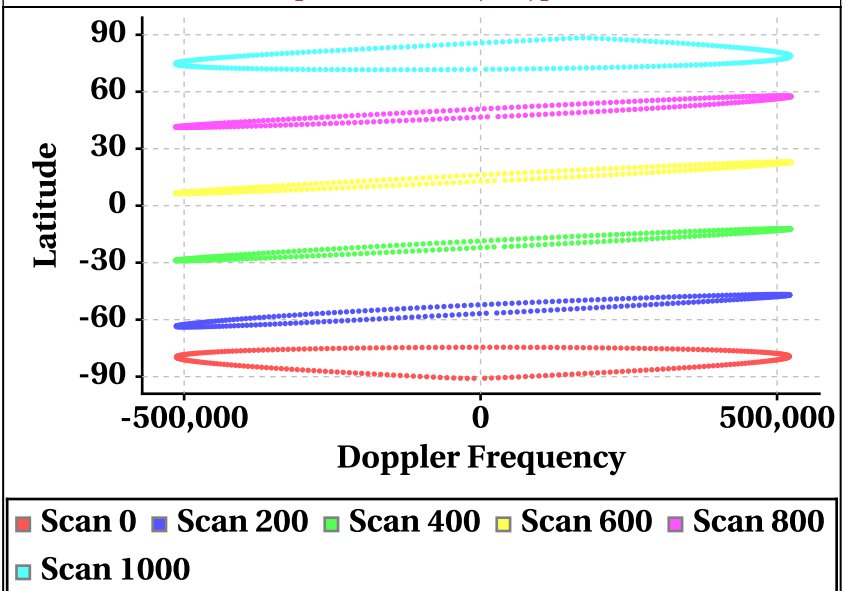


## Latitude Vs Doppler Frequency

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



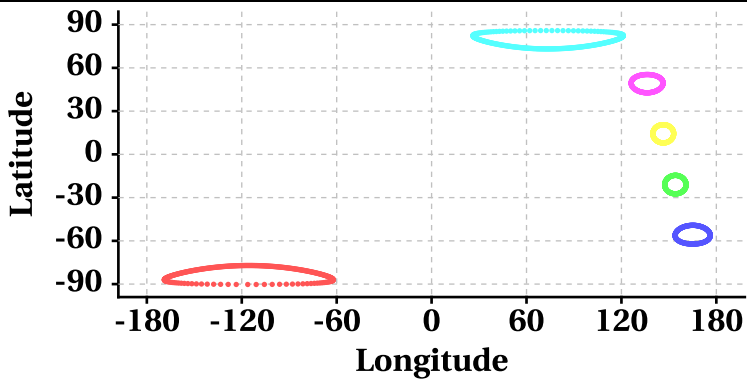
**Doppler Frequency at Scan Interval of 200 [Outer Beam(VV)]**



# Parameter as a function of Latitude

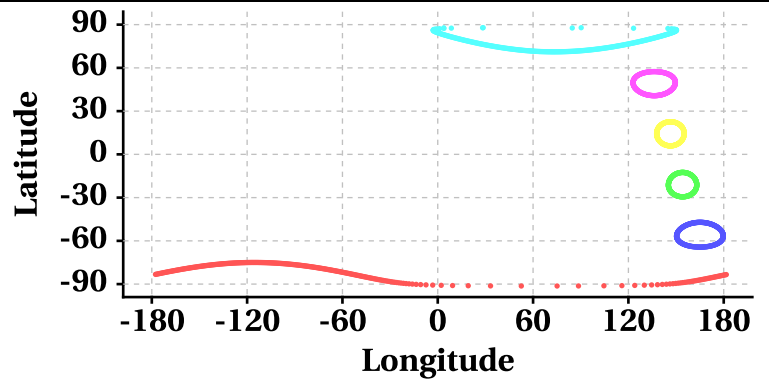
## Latitude Vs Longitude

Scan Trace [Inner Beam(HH)]



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

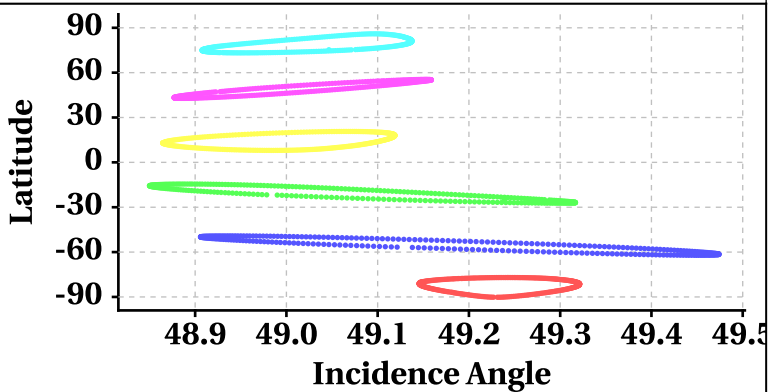
Scan Trace [Outer Beam (VV)]



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

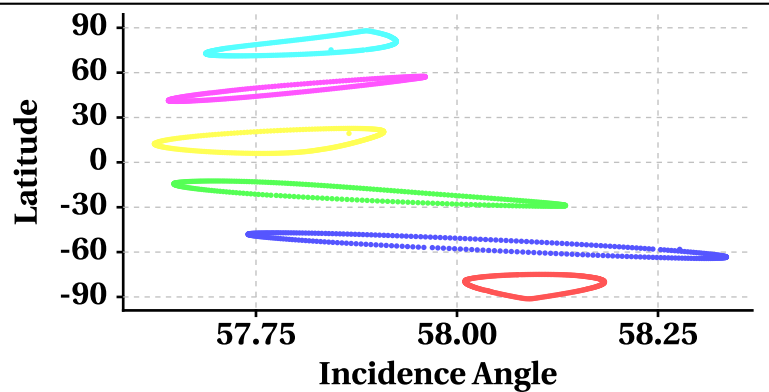
## Latitude Vs Incidence Angle

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



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

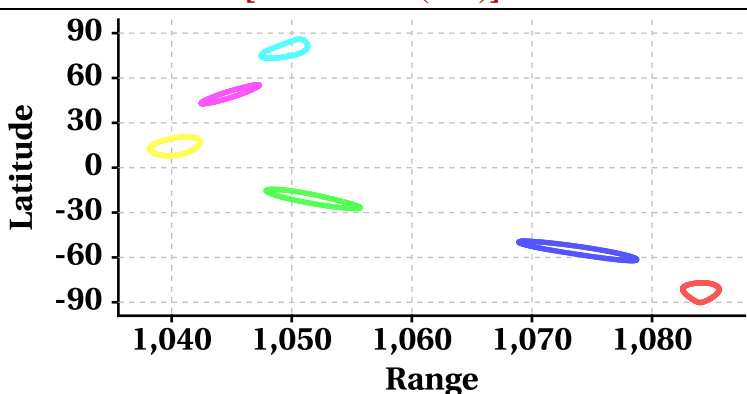
Incidence Angle at Scan Interval of 200 [Outer Beam (VV)]



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

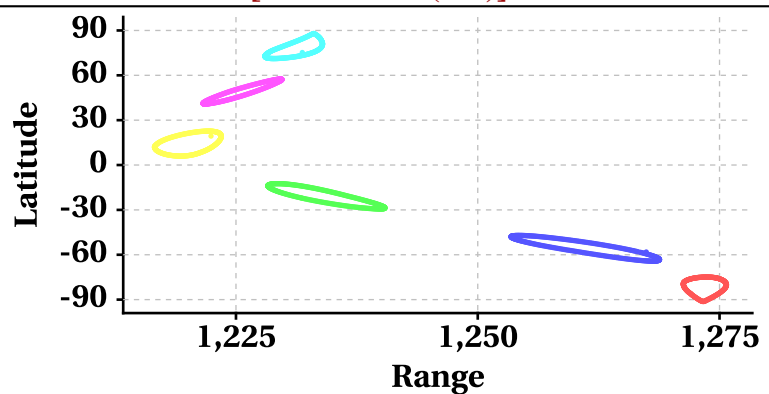
## Latitude Vs Range

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

