

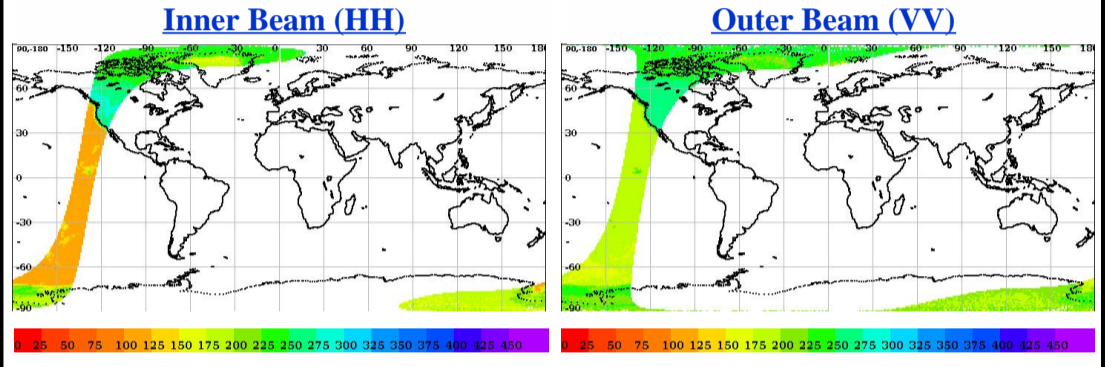
# SCATSAT-1 Scatterometer Level-1B Data Quality Evaluation Report

## Table of Contents

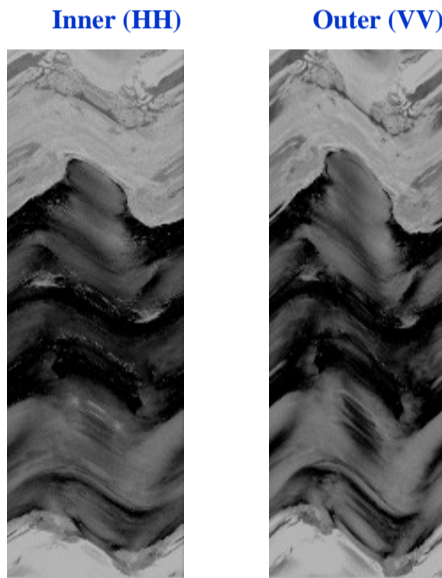
- Half-Orbit Coverage using BT & Sigma-0
- Invariant Site Sigma-0 Statistics (if Available)
- Half-Orbit Data Statistics
- Half Orbit wise - Dynamic Parameter (Sigma-0, Kp, SNR) Behaviour
- Dynamic Range (Data Histogram)
- Half Orbit Wise Behaviour - Static Parameters
- Doppler Variation (Across/Along 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>           | 18393        | <b>Total Scans</b>            | 1016 |
| <b>Sensor Name</b>           | Scatterometer | <b>End Orbit</b>             | 18394        | <b>No Of Inner FootPrints</b> | 281  |
| <b>Processor Version</b>     | v1.1.4        | <b>Rev. Number</b>           | 18393_18394  | <b>No Of Outer FootPrints</b> | 282  |
| <b>Half Orbit Direction</b>  | NS            | <b>Data Production Date</b>  | 18-03-2020   | <b>No. Of Inner Slices</b>    | 9    |
| <b>Equator Crossing Date</b> | 17-03-2020    | <b>Equator Crossing Time</b> | 17:03:53.000 | <b>No Of Outer Slices</b>     | 15   |

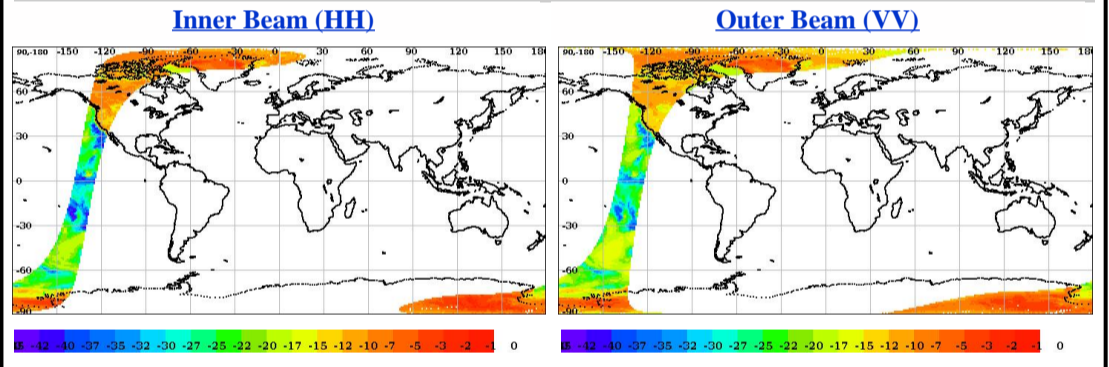
## Brightness Temperature(k) Footprint trace



## Image Snapshot for Inner & Outer Beam



## Sigma0(dB) Footprint trace



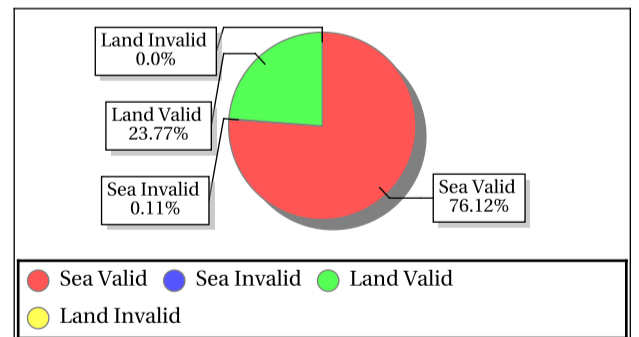
## Invalid and Poor Sigma-0 Quality Flag Statistics for Inner/Outer Slices\*

| Sigma-0 Flags                            | Inner Beam | Outer Beam |
|--|------------|------------|
| Invalid Sigma0(%)                        | 0.11       | 0.11       |
| 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(%)                           | 22.21      | 13.33      |
| 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 (%)                         | 0.056083   | 0.107526   |

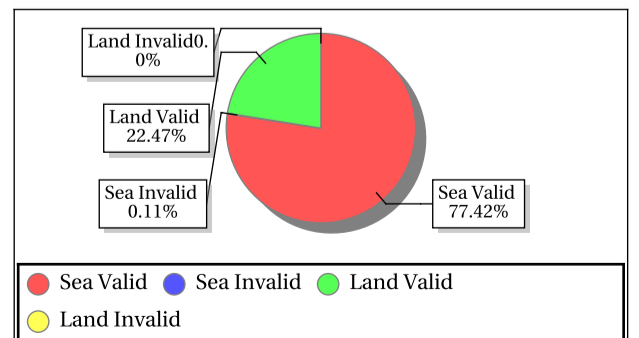
\*DP Format Document

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

### Inner Beam (HH)



### Outer Beam (VV)



## Invariant Site Sigma-0 Statistics for Ascending/Descending, Fore/Aft in HH/VV beams

| Site Name   | Center Lat | Center Lon | Beam  | Node | ScanDir | Sigma0 Min | Sigma0 Max | Sigma0 Mean | Sigma0 Std | BT Min | BT Max | BT Mean | BT Std |
|-------------|------------|------------|-------|------|---------|------------|------------|-------------|------------|--------|--------|---------|--------|
| GreenLand_2 | 77.50      | -41.50     | Inner | DSC  | Aft     | -6.26      | -4.89      | -5.43       | 0.43       | 159.12 | 186.77 | 171.81  | 8.77   |
| ANT_1       | -75.00     | 121.00     | Outer | DSC  | Fore    | -9.61      | -7.46      | -8.80       | 0.68       | 196.16 | 227.74 | 206.02  | 9.87   |
| GreenLand_2 | 77.50      | -41.50     | Outer | DSC  | Aft     | -5.41      | -4.49      | -5.10       | 0.33       | 197.32 | 257.56 | 233.18  | 20.96  |
| GreenLand_1 | 74.69      | -42.50     | Outer | DSC  | Aft     | -10.65     | -8.15      | -9.73       | 0.65       | 208.79 | 248.41 | 228.56  | 10.85  |



## 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    | 305.96 | 0.41 | 4.294        | 0.12     | 301.26 | 0.41 | 4.258        | 0.12     | 0.15  | 0.12  | 0.000        | 0.12      | 0.16  | 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>      | -34.99  | 26.52  | 4.76 | 0.306        | -34.92   | 27.47  | 4.42 | 0.564        | 4.09     | 28.54 | 19.59 | 18.407       | 2.58      | 29.35 | 20.60 | 26.763       |

| 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    | 229.48 | 0.35 | 3.333        | 0.09     | 187.57 | 0.34 | 3.478        | 0.09     | 0.14  | 0.09  | 0.000        | 0.09      | 0.14  | 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>      | -34.91  | 20.45  | 2.71 | 0.000        | -34.03   | 19.90  | 2.50 | 0.000        | 0.40     | 22.80 | 13.37 | 0.052        | 0.73      | 23.34 | 14.21 | 0.383        |

| 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> | 48.66           | 49.29     | 49.00   | 0.000        | 57.46           | 58.14     | 57.87   | 0.000        | Inci.(Inner)             | 47.10   | 49.90   |
| <b>Azimuth Diff. (deg)</b>   | 0.0029          | 206.85    | 1.27    | 2.632        | 0.0000          | 287.50    | 1.27    | 3.742        | Inci.(Outer)             | 57.30   | 58.90   |
| <b>Range(Km)</b>             | 1030.82         | 1077.53   | 1049.57 | 0.000        | 1207.10         | 1265.56   | 1229.60 | 4.900        | Azimuth Diff.            | 0.60    | 2.00    |
| <b>X Factor(dbm)</b>         | -91.42          | -89.63    | -90.14  | 0.000        | -92.82          | -91.67    | -91.99  | 0.000        | Range(Inner)             | 1025.00 | 1095.70 |
| <b>Across Distance (Km)</b>  | 99999.99        | -99999.99 | 0.00    | 0.000        | 99999.99        | -99999.99 | 0.00    | 0.000        | Range(Outer)             | 1210.00 | 1280.00 |
| <b>Along Distance (Km)</b>   | 18.85           | 854.94    | 21.35   | 3.000        | 18.46           | 1104.73   | 21.75   | 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   |

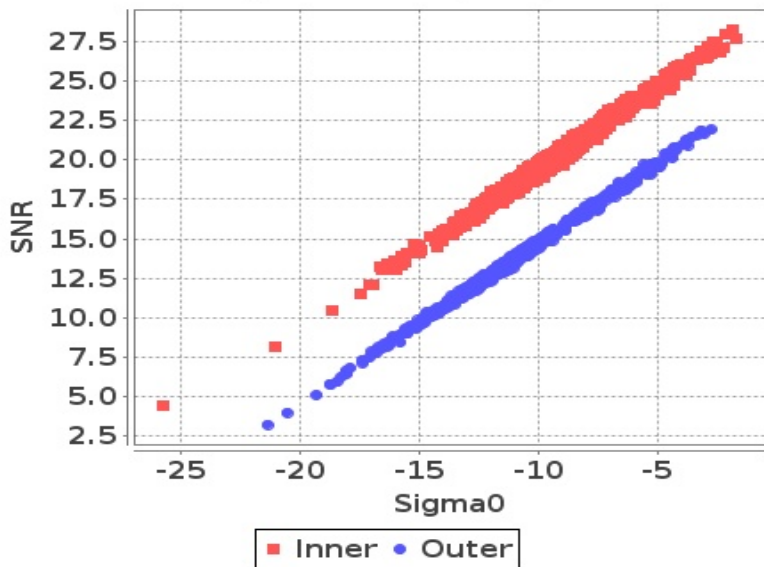
- Normal
- Deviations
- Alarming
- High Errors



## Sigma0 Behaviour (Sigma0 Vs SNR)

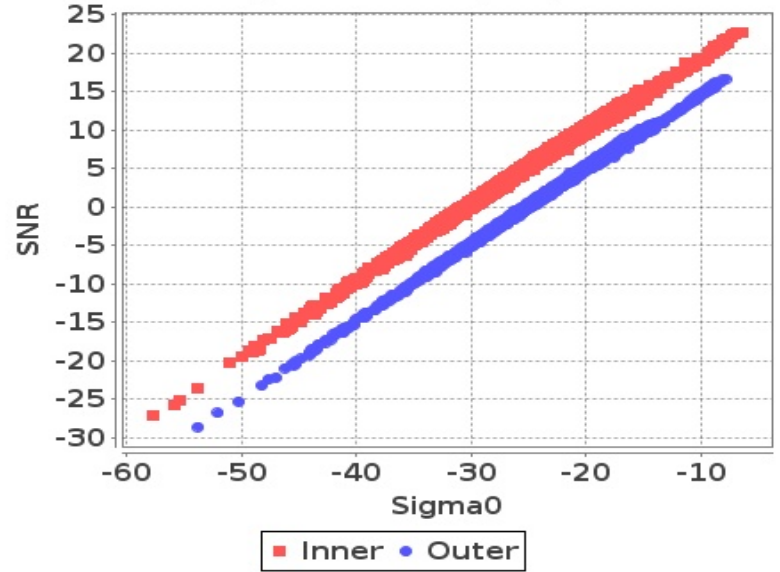
**Footprint-Land**

Sigma0 Vs SNR (Land)



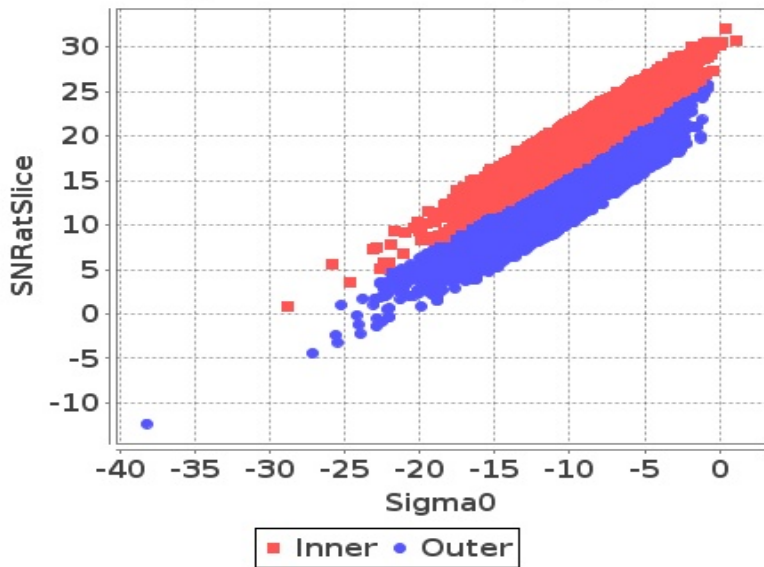
**Footprint-Sea**

Sigma0 Vs SNR (Sea)



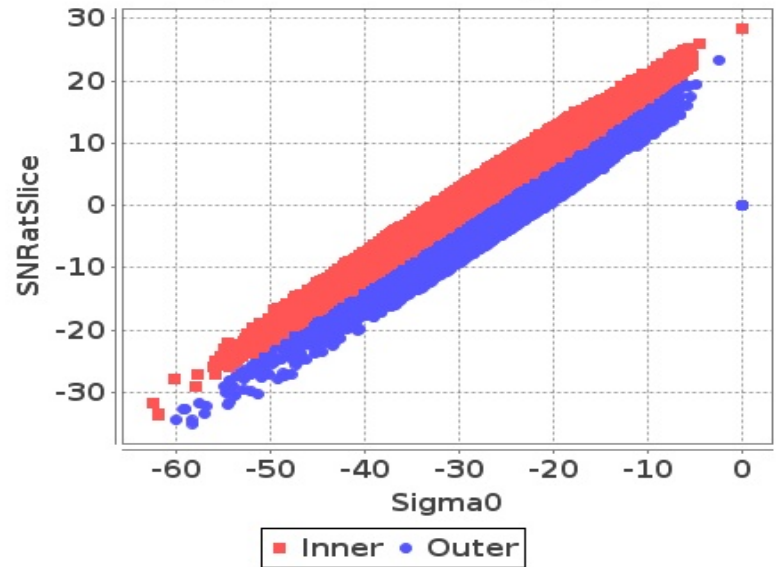
**Slice-Land**

Sigma0 Vs SNRatSlice (Land)



**Slice-Sea**

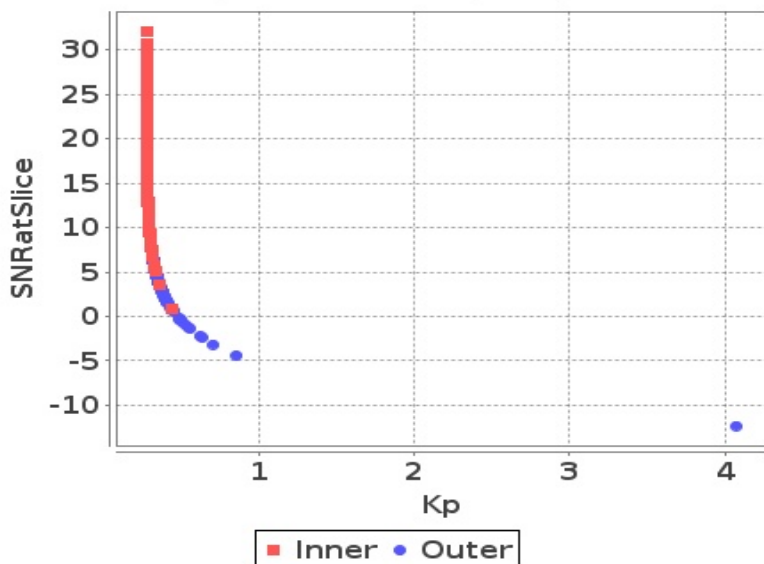
Sigma0 Vs SNRatSlice (Sea)



## Sigma0 Behaviour (Kp Vs SNR)

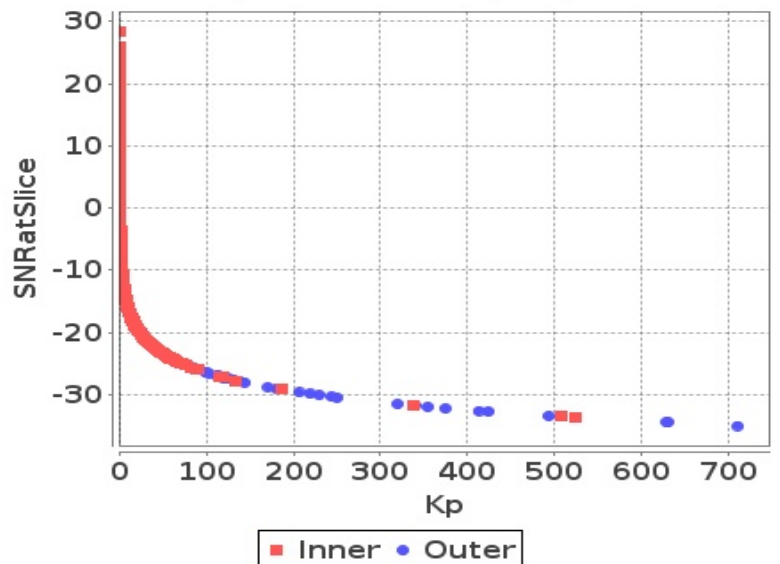
**Slice**

Kp Vs SNRatSlice (Land)



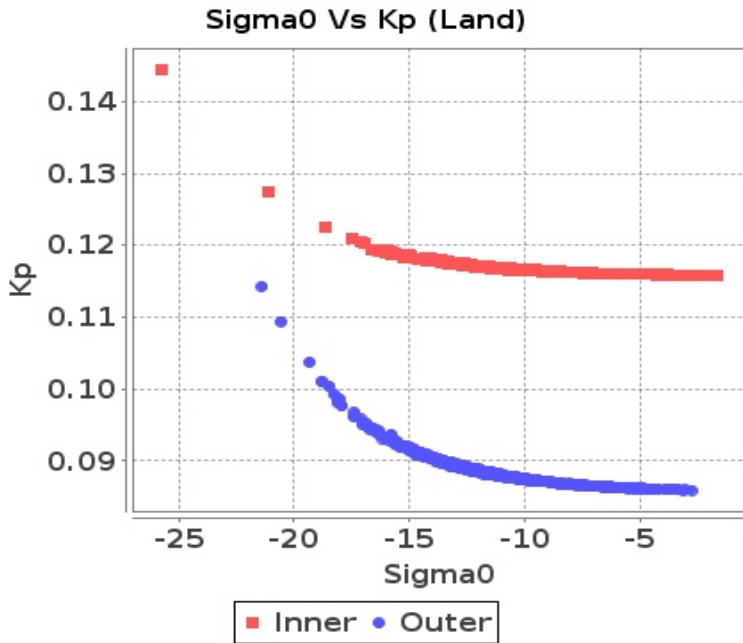
**Slice**

Kp Vs SNRatSlice (Sea)

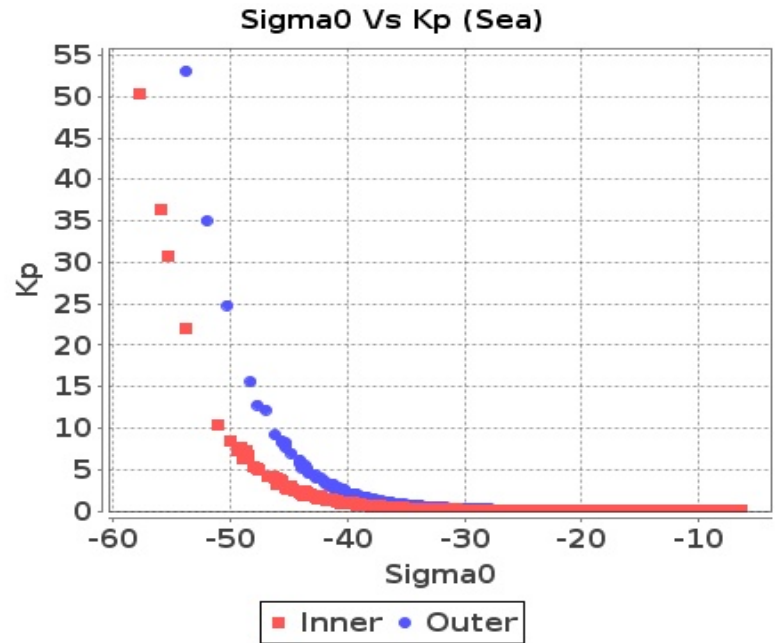


# Sigma0 Behaviour(Sigma0 Vs Kp)

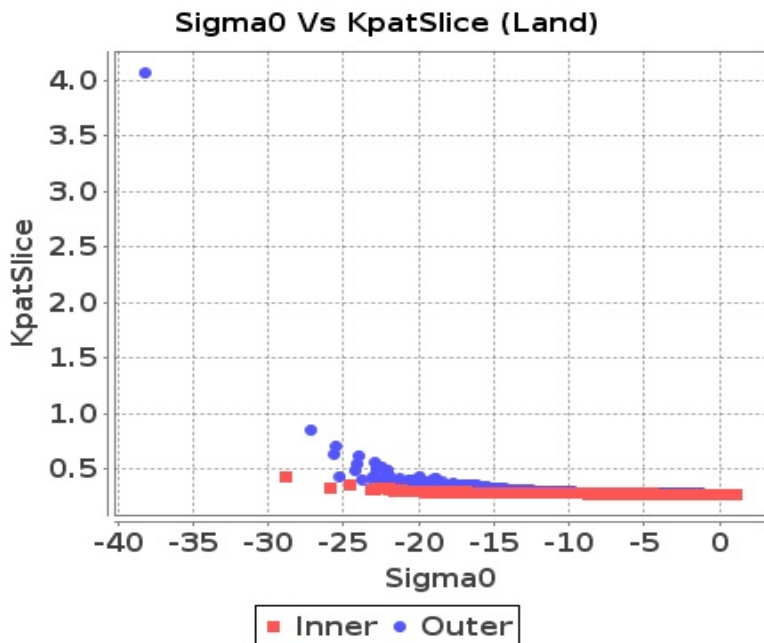
## Footprint-Land



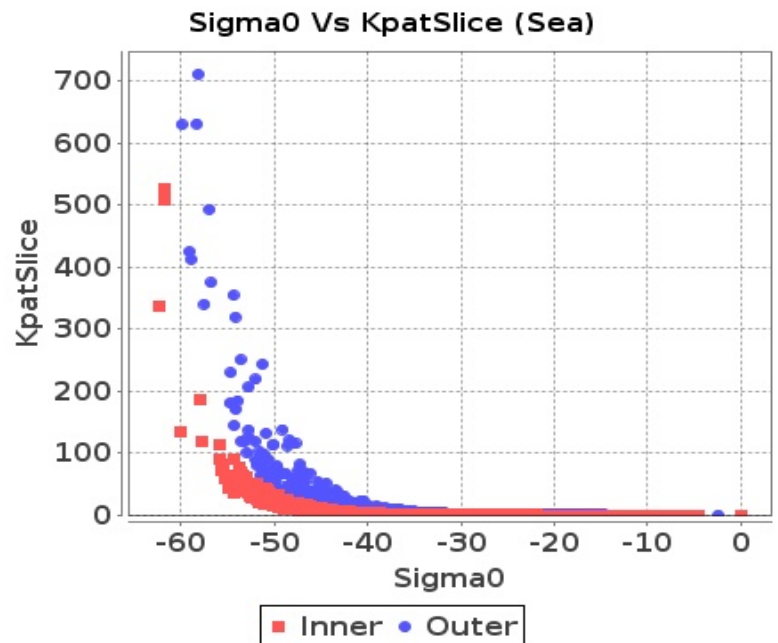
## Footprint-Sea



## Slice-Land



## Slice-Sea

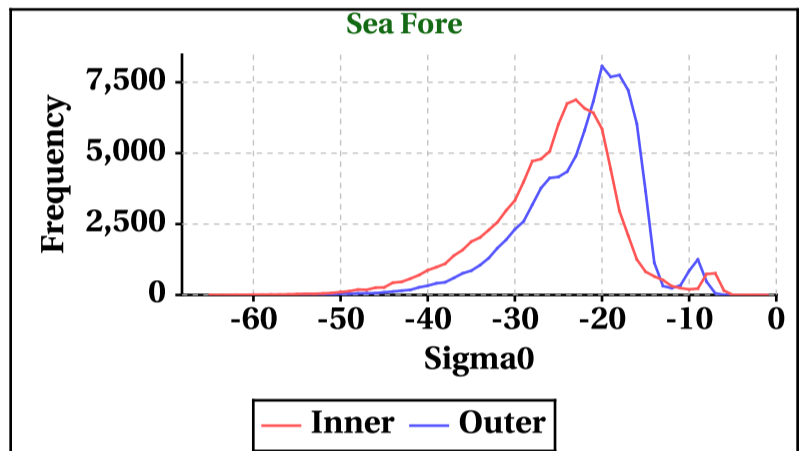
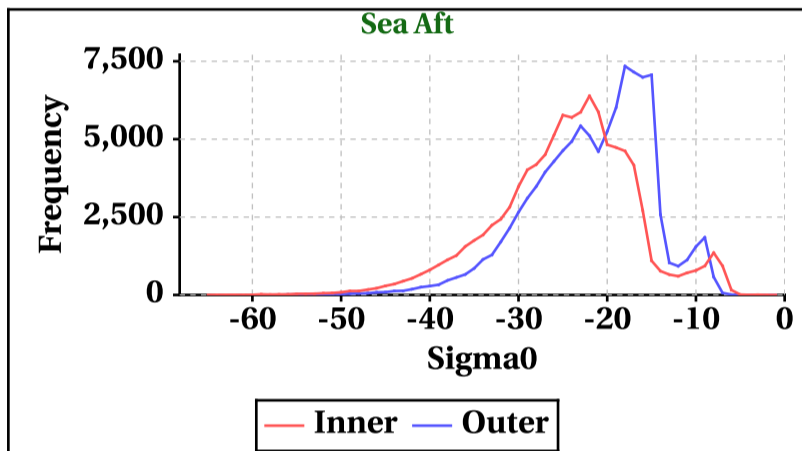
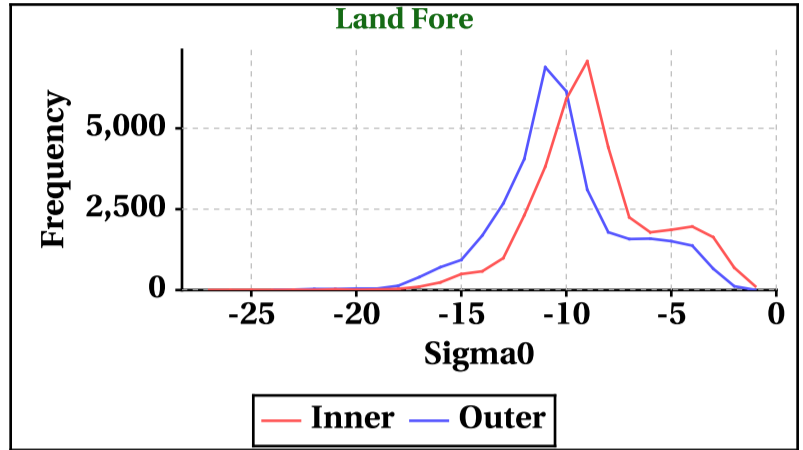
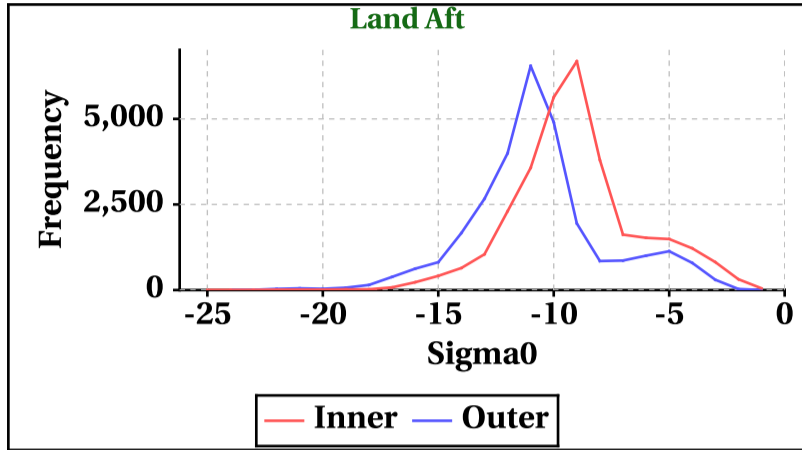


# Dynamic Range (Data Histograms)

## Sigma0(db)

| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -25      | -27       | -65     | -65      |
| Max             | 0        | 0         | 0       | 0        |

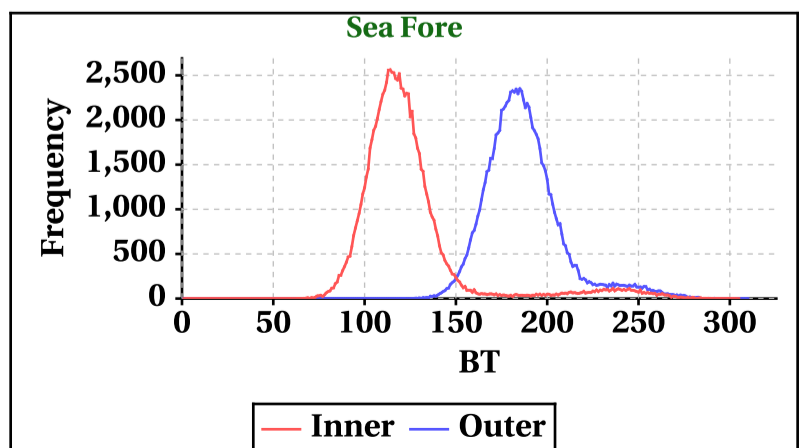
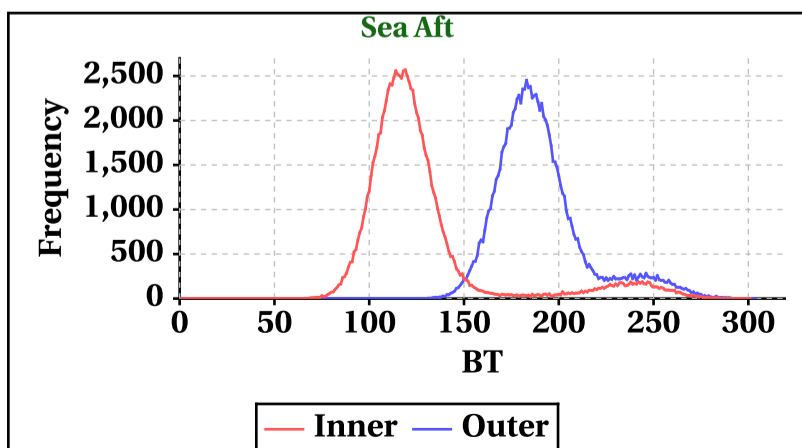
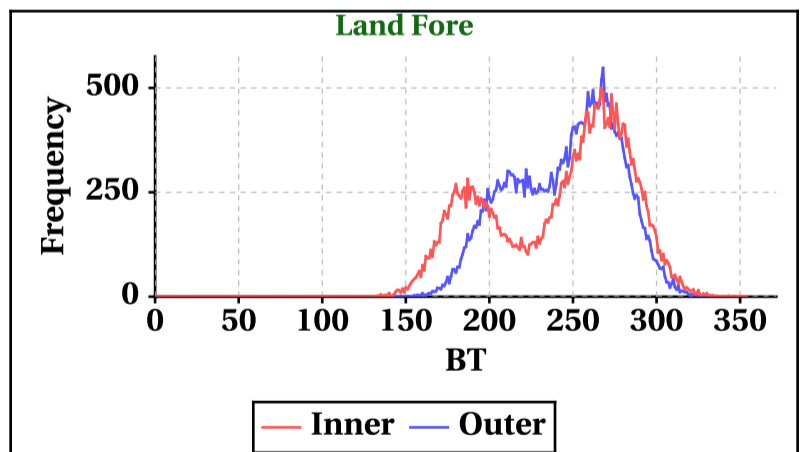
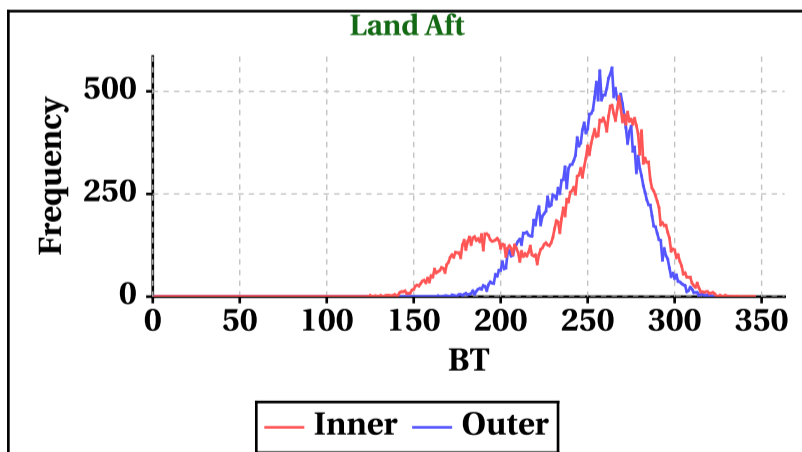
| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -24      | -24       | -59     | -59      |
| Max             | 0        | 0         | 0       | 0        |



## Brightness Temperature(K)

| Inner Beam(HH) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 346      | 354       | 301     | 305      |

| Outer Beam(VV) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 332      | 334       | 304     | 310      |

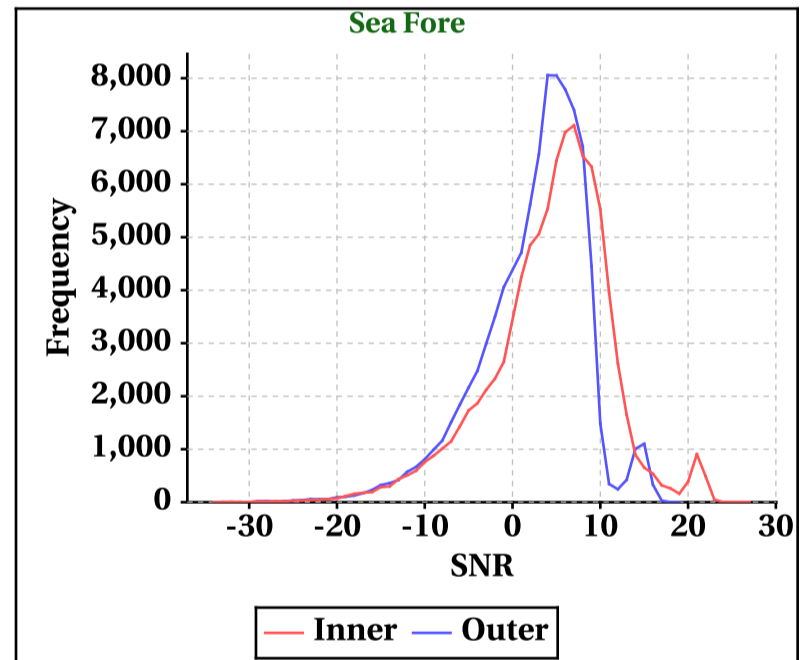
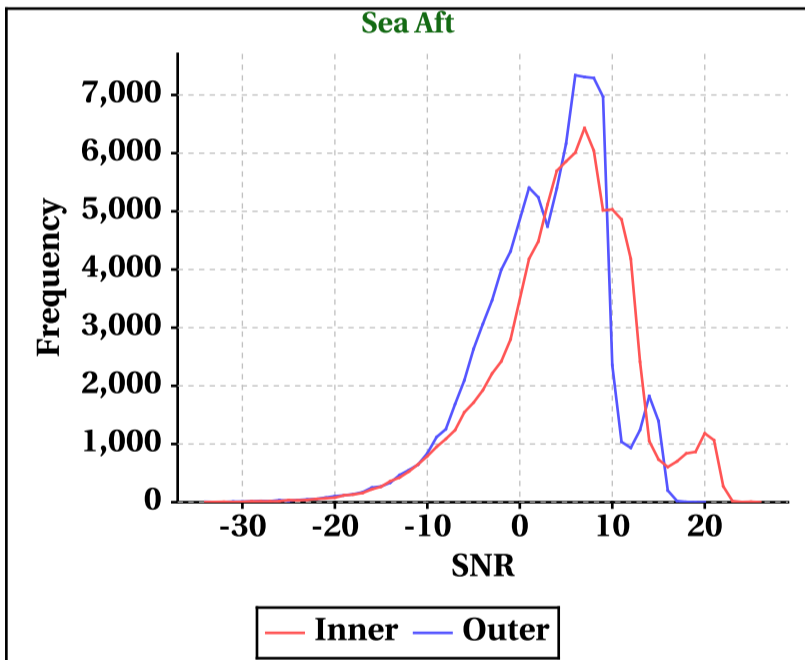
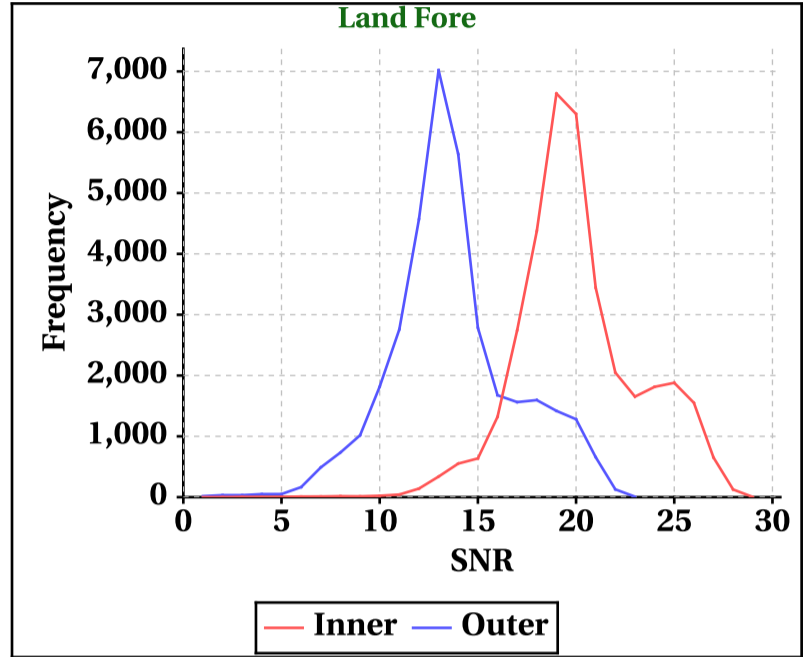
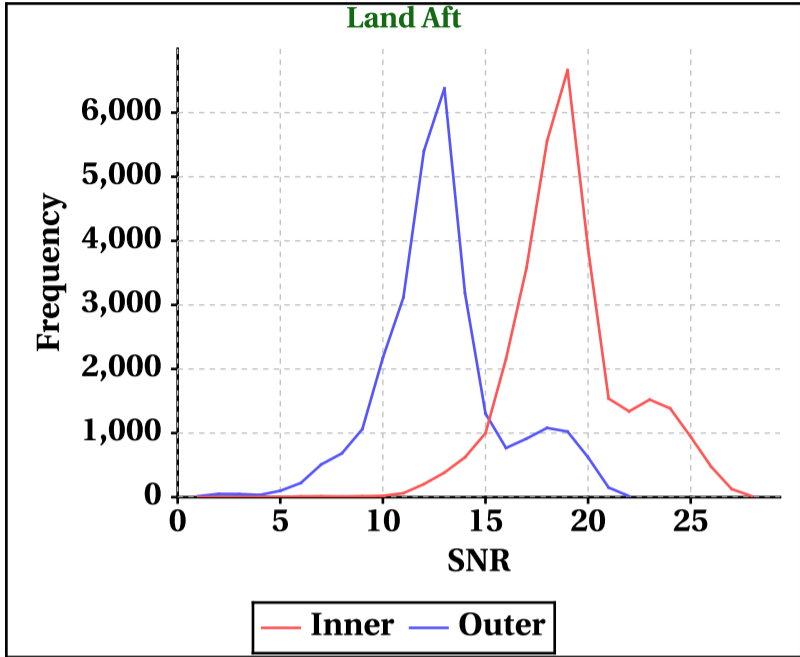


# Dynamic Range (Data Histograms)

## SNR(dBm)

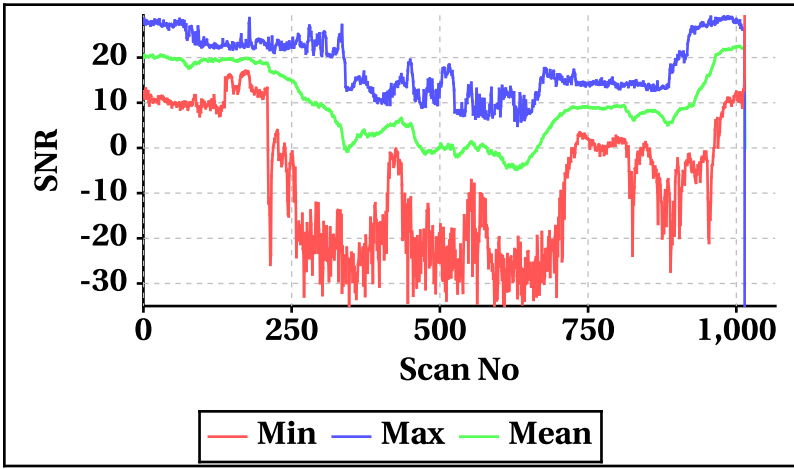
| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | 0        | 0         | -34     | -34      |
| Max             | 28       | 29        | 26      | 27       |

| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | 0        | 0         | -34     | -34      |
| Max             | 22       | 23        | 20      | 19       |

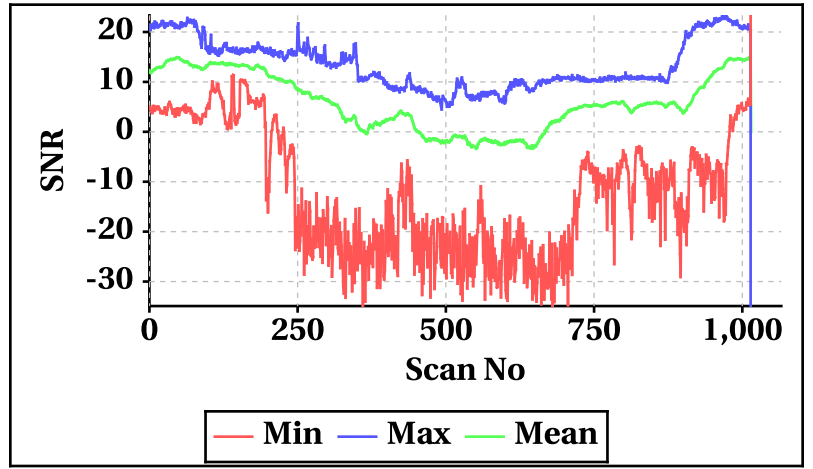


## Orbit-wise behaviour of SNR

Inner Beam (HH)

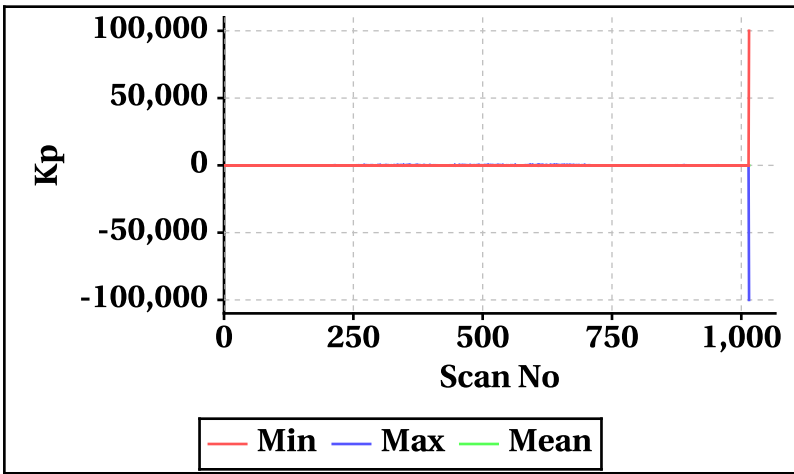


Outer Beam(VV)

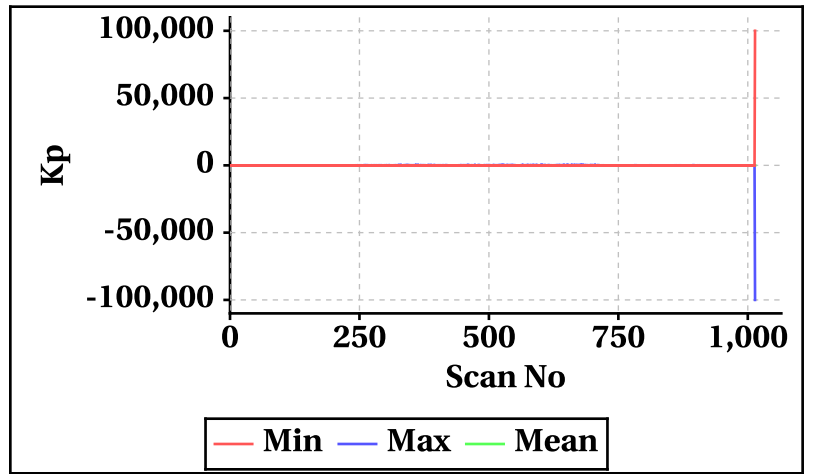


## Orbit-wise behaviour of Kp,Kpa,Kpb,Kpc

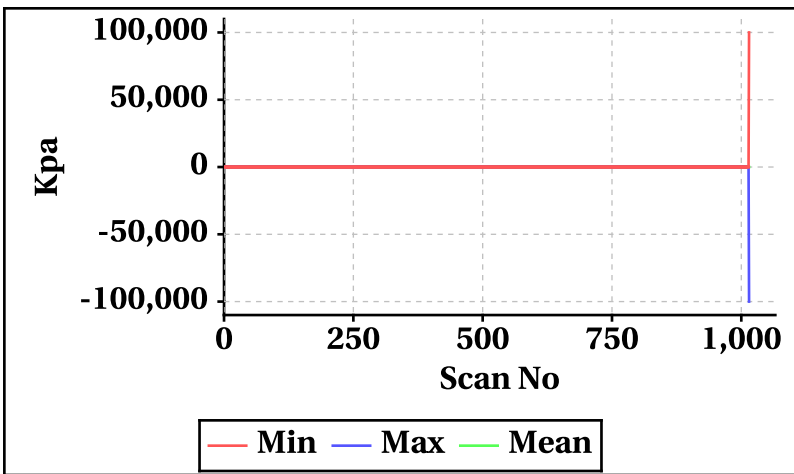
Inner Beam(HH)



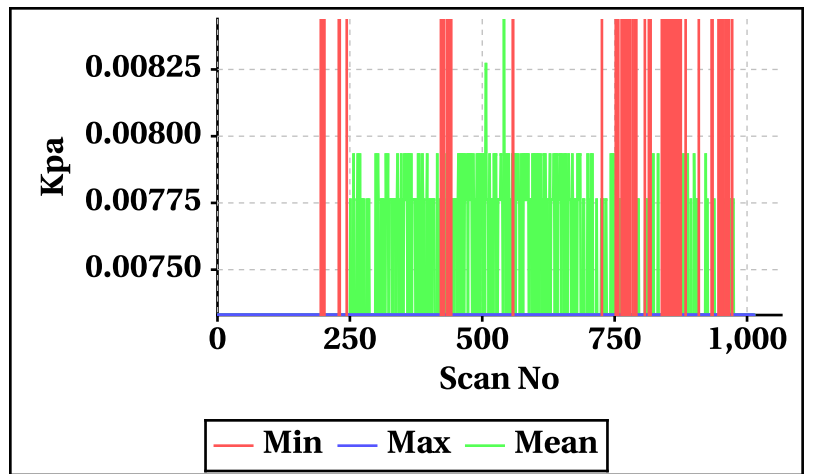
Outer Beam(VV)



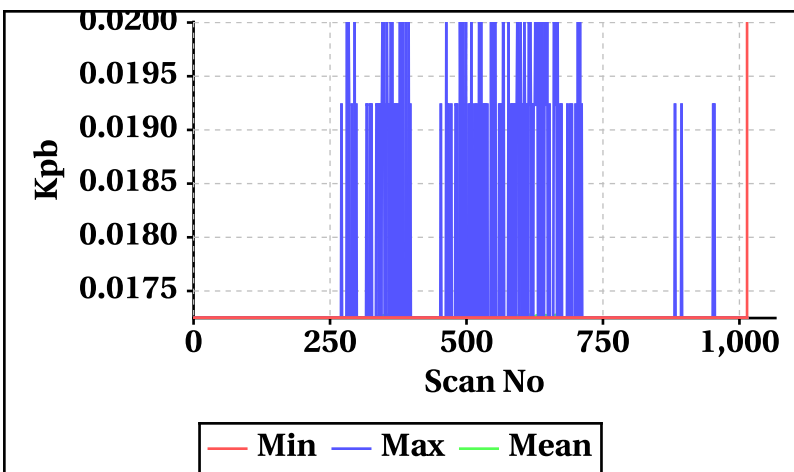
Inner Beam(HH)



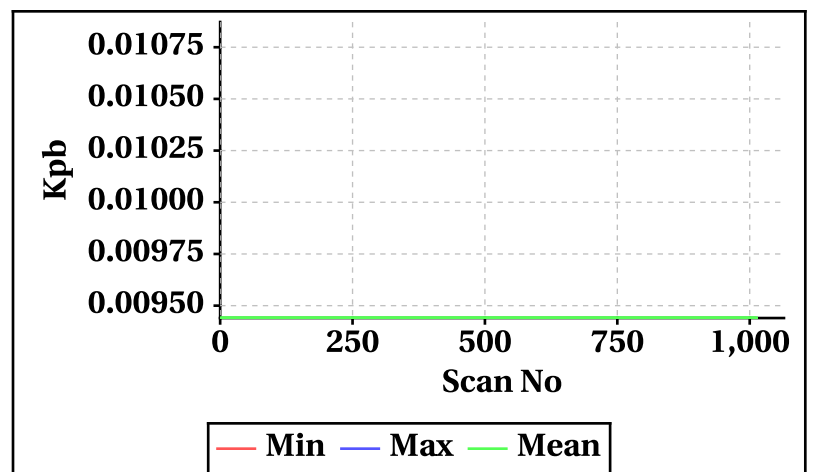
Outer Beam(VV)



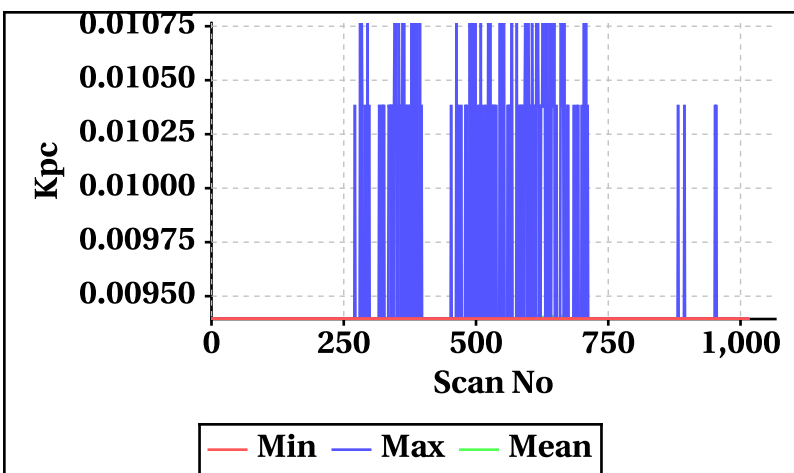
Inner Beam(HH)



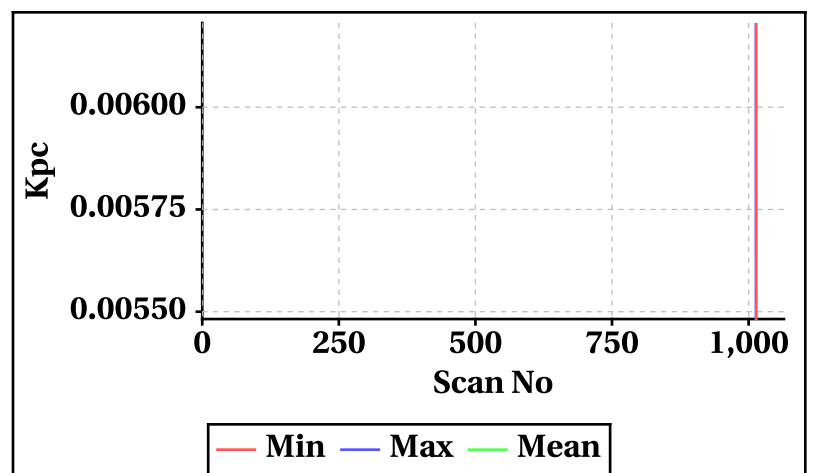
Outer Beam(VV)



Inner Beam(HH)



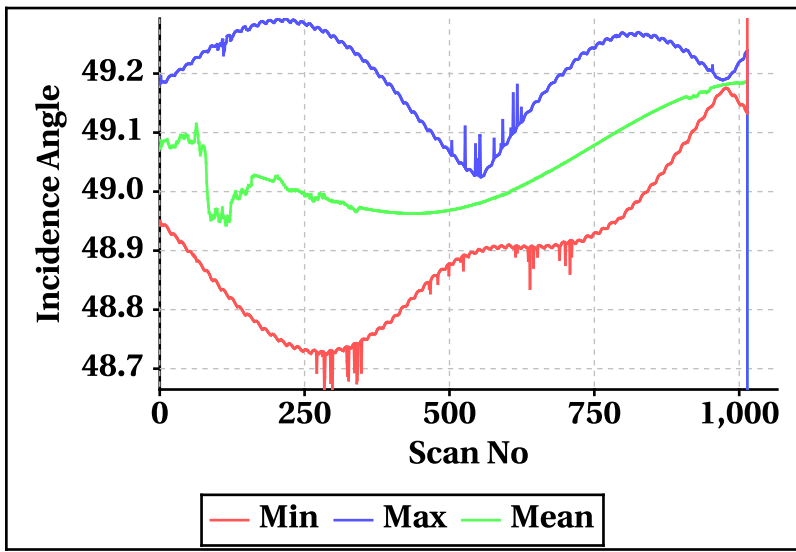
Outer Beam(VV)



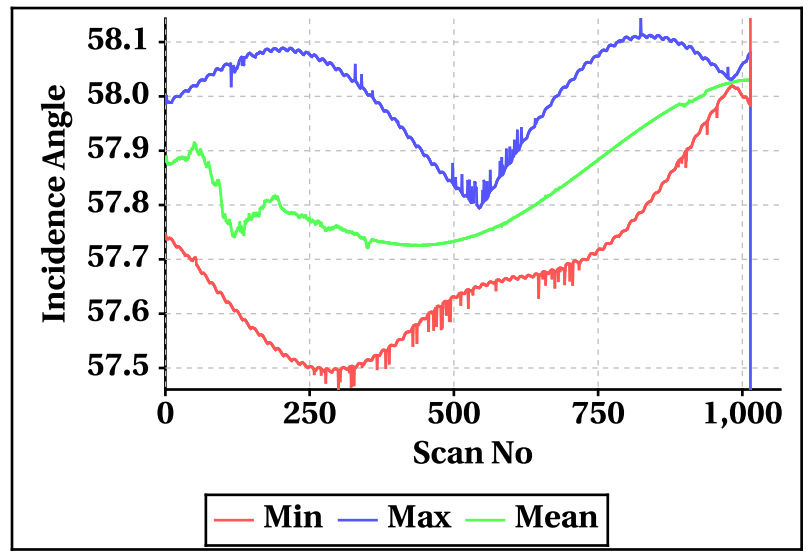


Orbit-wise behaviour of Incidence, Azimuth, Range, X-Factor

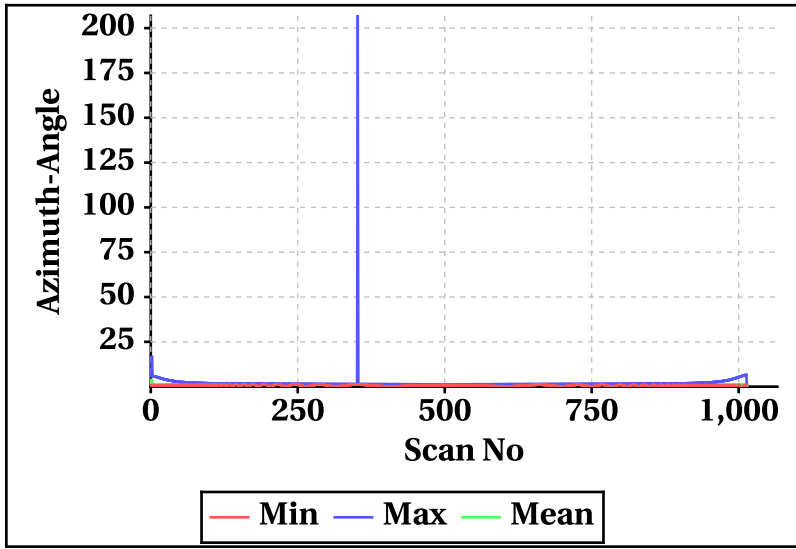
Inner Beam (HH)



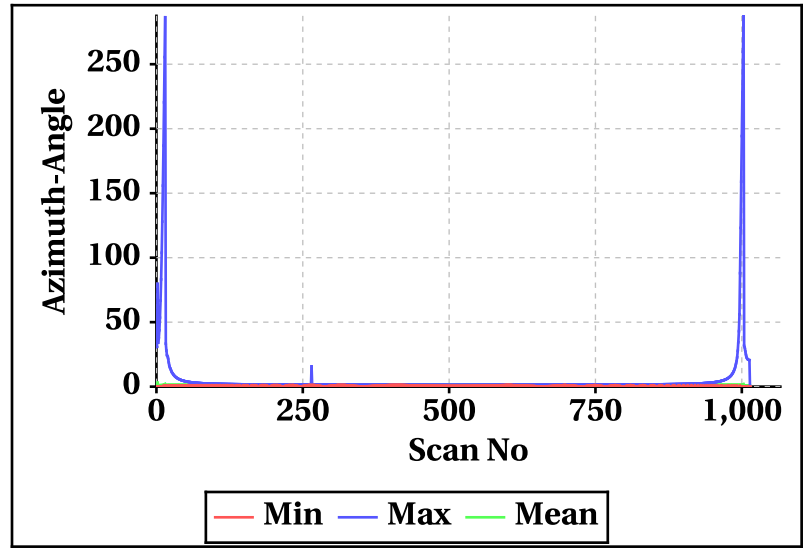
Outer Beam(VV)



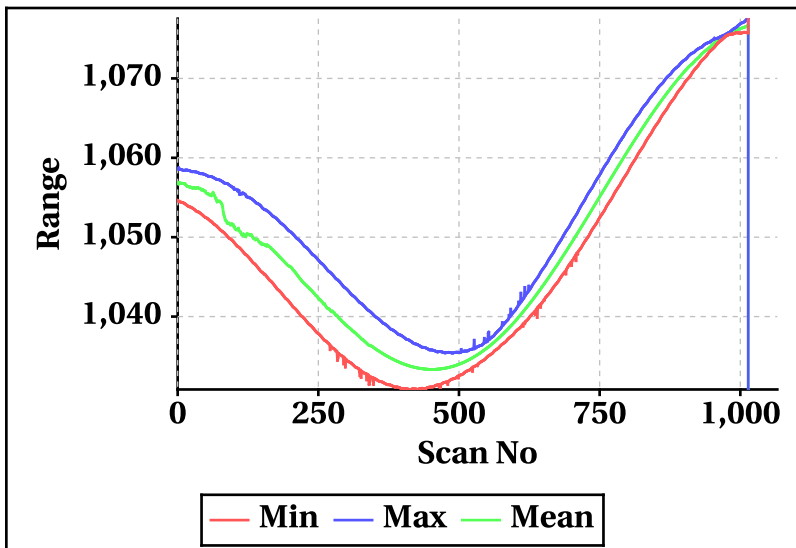
Inner Beam (HH)



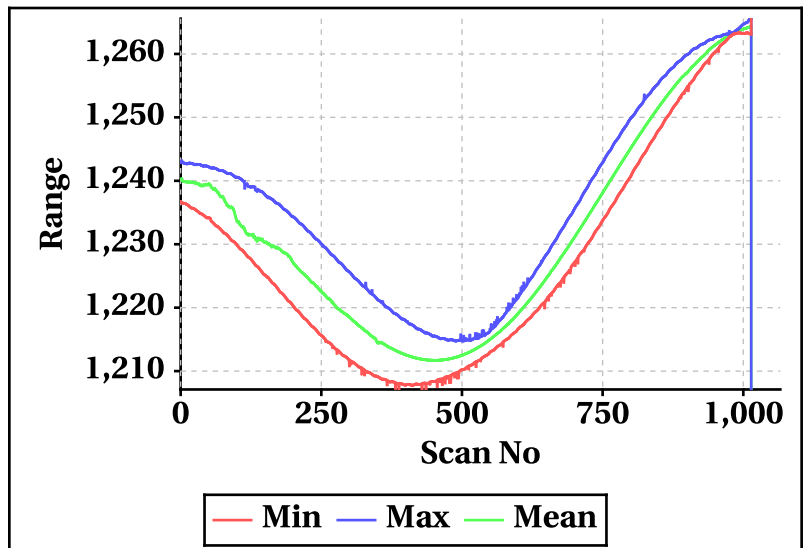
Outer Beam(VV)



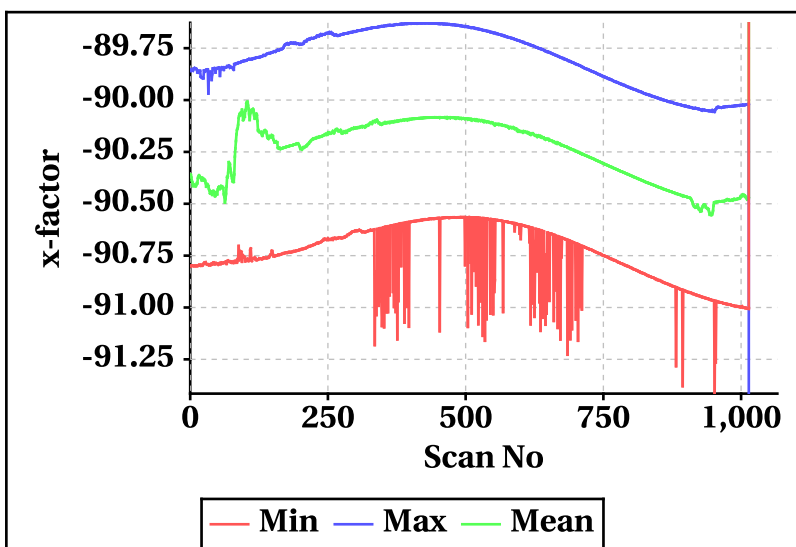
Inner Beam (HH)



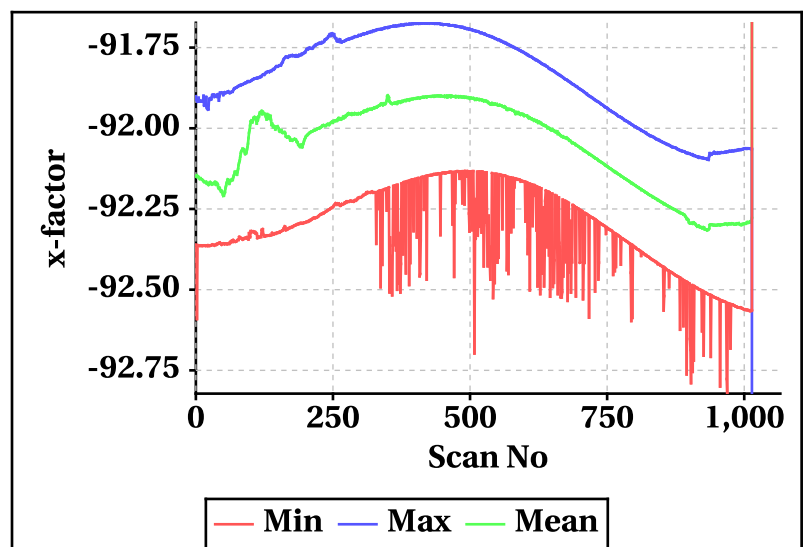
Outer Beam(VV)



Inner Beam (HH)



Outer Beam(VV)

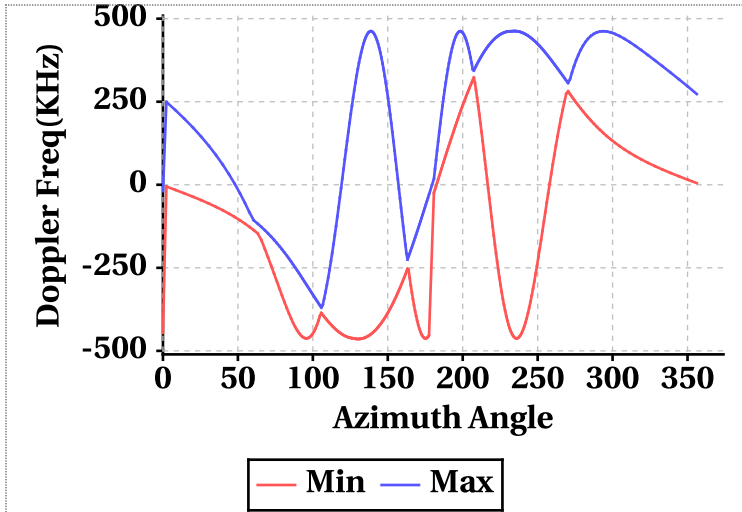


# Doppler Frequency Variation

Doppler Frequency(KHz) variation statistics Over the half Orbit

|     | Inner Beam (HH) | Outer Beam (VV) |
|-----|-----------------|-----------------|
| Min | -464.26         | -520.12         |
| Max | 462.72          | 518.74          |

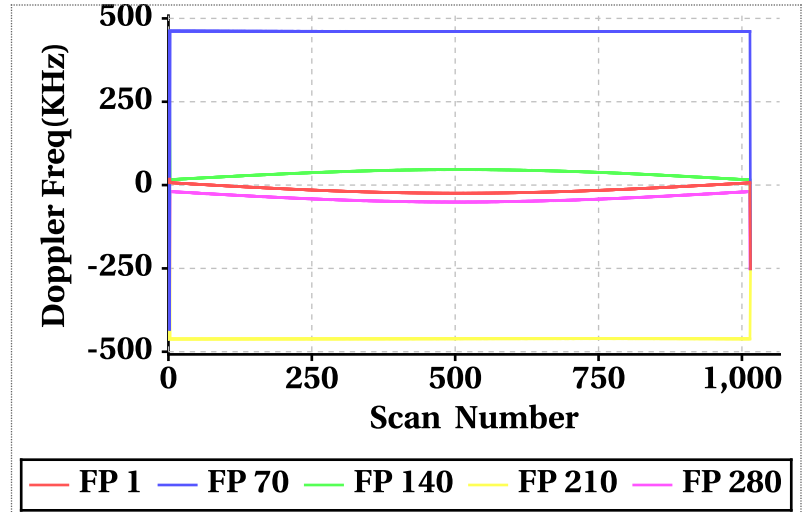
Footprint wise Doppler frequency variation Inner Beam (HH)



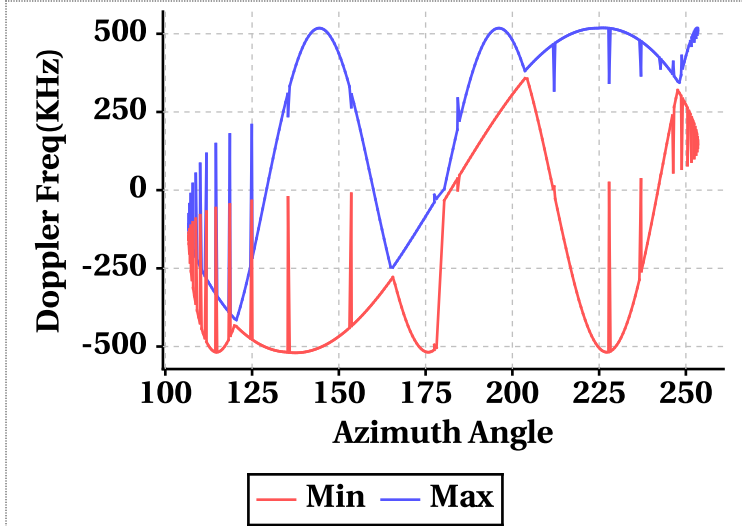
Doppler Frequency(KHz) variation

| Doppler_FP  | Inner Beam (HH) |        |         | Outer Beam (VV) |        |         |
|-------------|-----------------|--------|---------|-----------------|--------|---------|
|             | Min             | Max    | Mean    | Min             | Max    | Mean    |
| Doppler_1   | -251.12         | 17.74  | -13.17  | -286.02         | 3.82   | -20.28  |
| Doppler_70  | -432.84         | 462.02 | 459.43  | -479.16         | 517.66 | 514.65  |
| Doppler_140 | -251.12         | 295.90 | 35.20   | -286.02         | 318.94 | 33.73   |
| Doppler_210 | -461.72         | 237.82 | -460.30 | -517.68         | 280.36 | -516.22 |
| Doppler_280 | -445.90         | -19.02 | -40.19  | -495.14         | -15.42 | -39.07  |

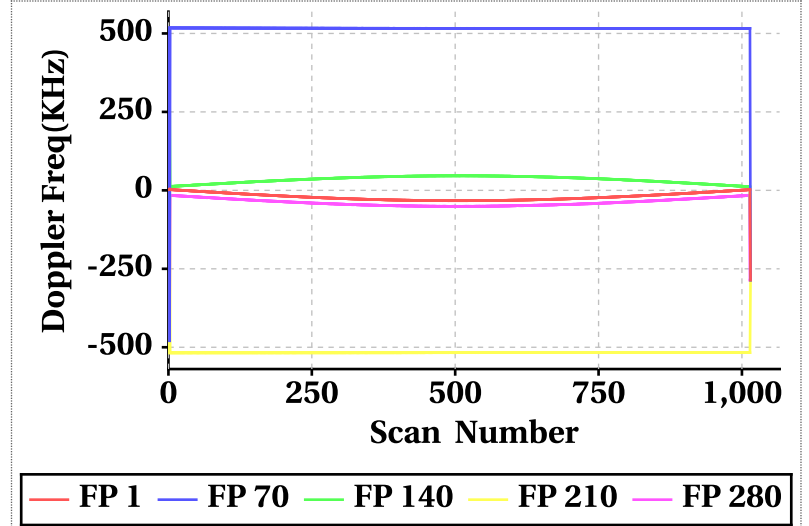
Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Inner Beam (HH)



Footprint wise Doppler frequency variation Outer Beam (VV)

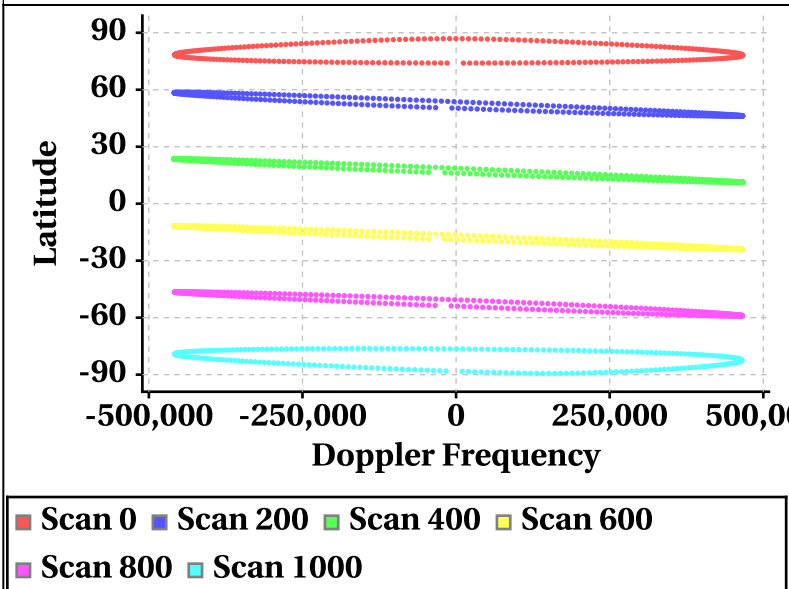


Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Outer Beam (VV)

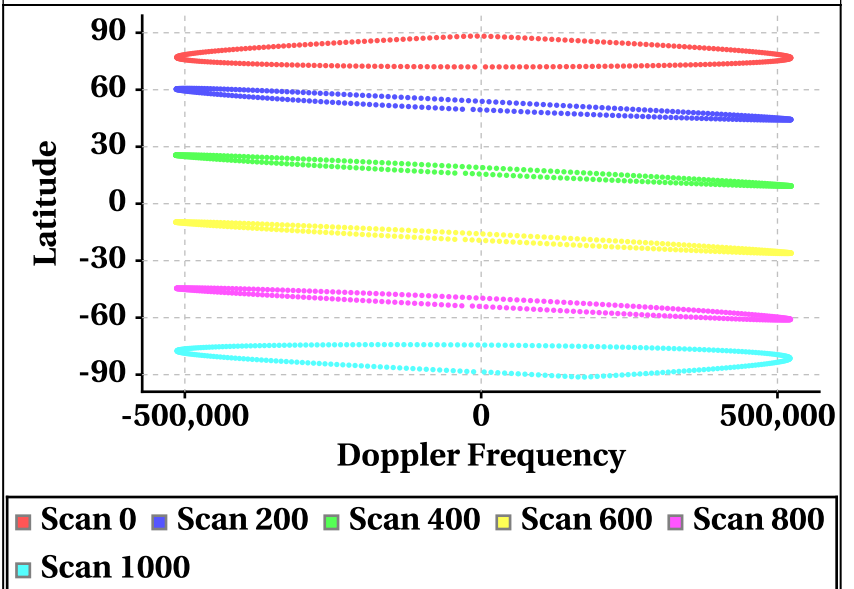


# Latitude Vs Doppler Frequency

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



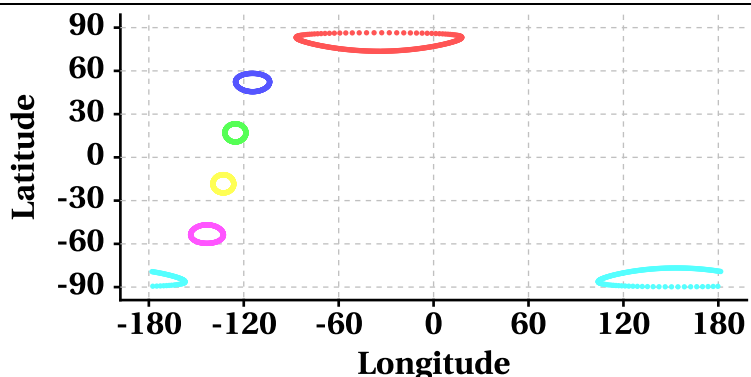
Doppler Frequency at Scan Interval of 200 [Outer Beam(VV)]



# Parameter as a function of Latitude

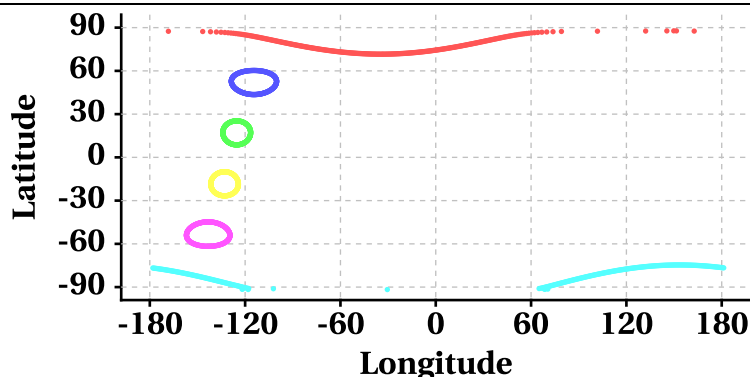
## Latitude Vs Longitude

Scan Trace [Inner Beam(HH)]



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

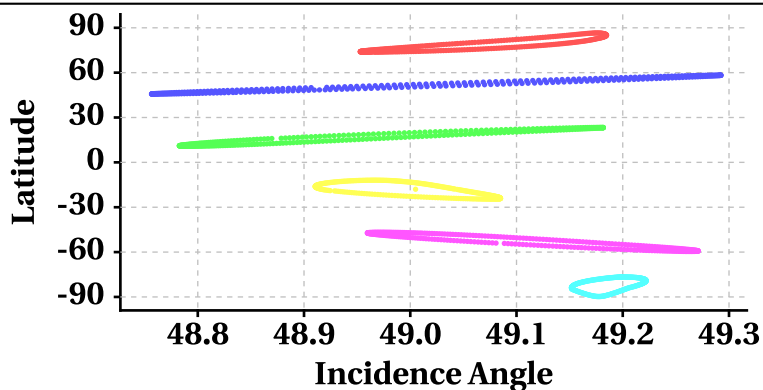
Scan Trace [Outer Beam (VV)]



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

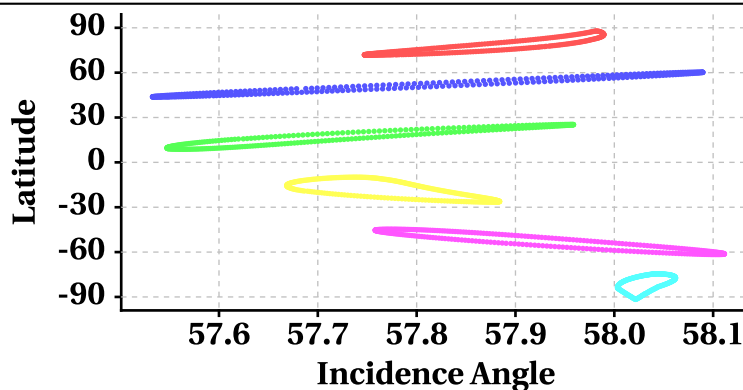
## Latitude Vs Incidence Angle

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



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

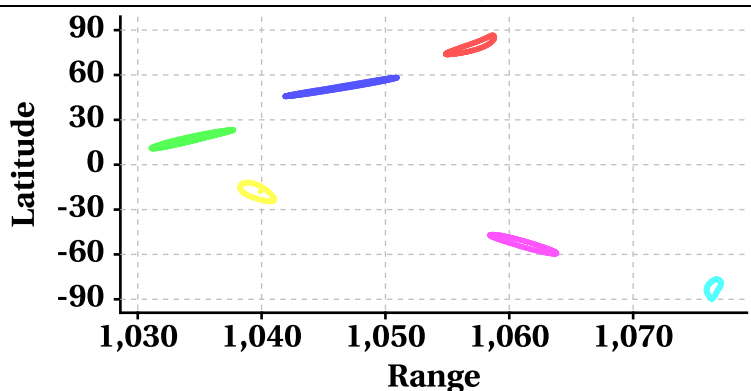
Incidence Angle at Scan Interval of 200 [Outer Beam (VV)]



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

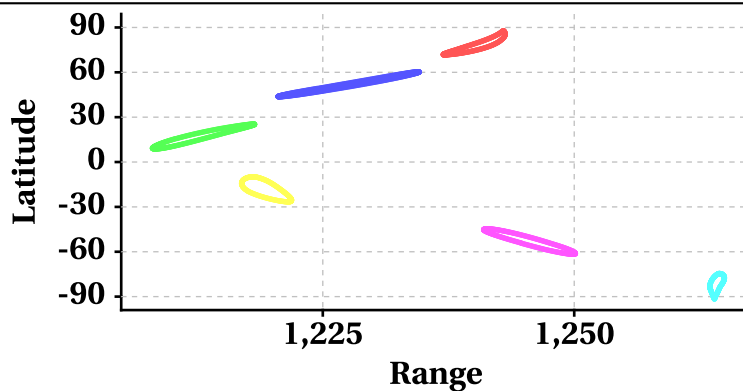
## Latitude Vs Range

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



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

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



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



# Variation in Orbit and Attitude Parameters

