

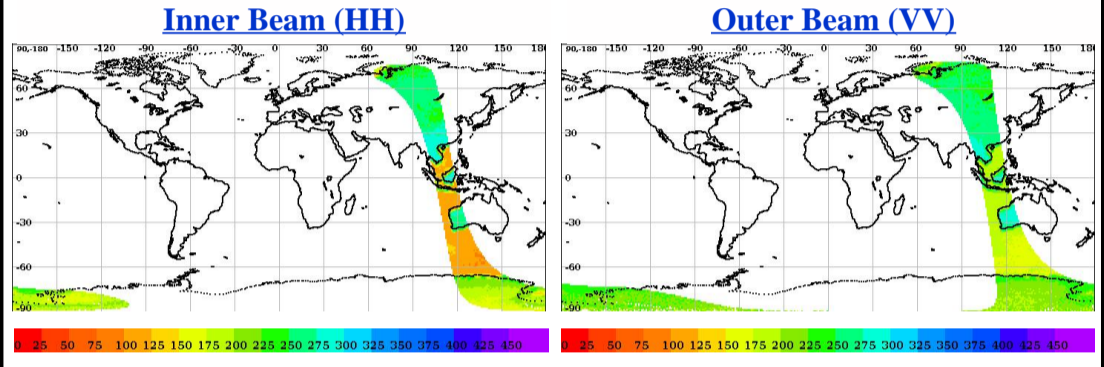
# SCATSAT-1 Scatterometer Level-1B Data Quality Evaluation Report

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- Half Orbit OAT Behaviour

|                              |               |                              |              |                               |     |
|------------------------------|---------------|------------------------------|--------------|-------------------------------|-----|
| <b>Satellite Id</b>          | ScatSat-1     | <b>Start Orbit</b>           | 16679        | <b>Total Scans</b>            | 916 |
| <b>Sensor Name</b>           | Scatterometer | <b>End Orbit</b>             | 16680        | <b>No of Inner FootPrints</b> | 281 |
| <b>Processor Version</b>     | v1.1.3        | <b>Rev. Number</b>           | 16679_16680  | <b>No Of Outer FootPrints</b> | 282 |
| <b>Half Orbit Direction</b>  | SN            | <b>Data Production Date</b>  | 20-11-2019   | <b>No. Of Inner Slices</b>    | 9   |
| <b>Equator Crossing Date</b> | 20-11-2019    | <b>Equator Crossing Time</b> | 13:01:56.000 | <b>No Of Outer Slices</b>     | 15  |

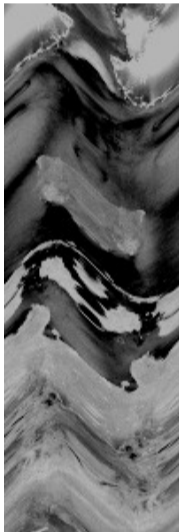
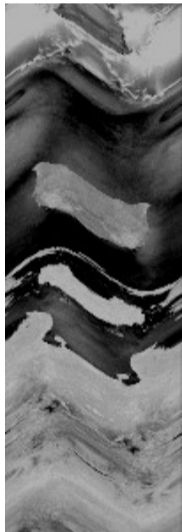
## Brightness Temperature(k) Footprint trace



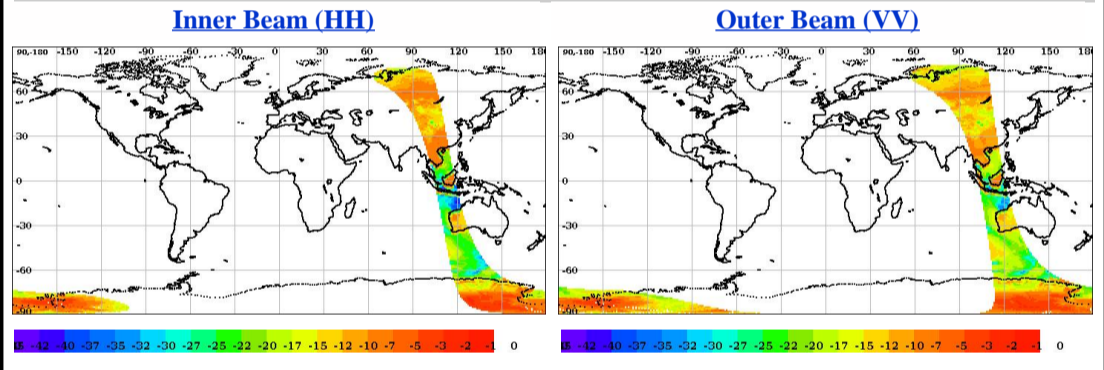
## Image Snapshot for Inner & Outer Beam

Inner (HH)

Outer (VV)



## Sigma0(dB) Footprint trace



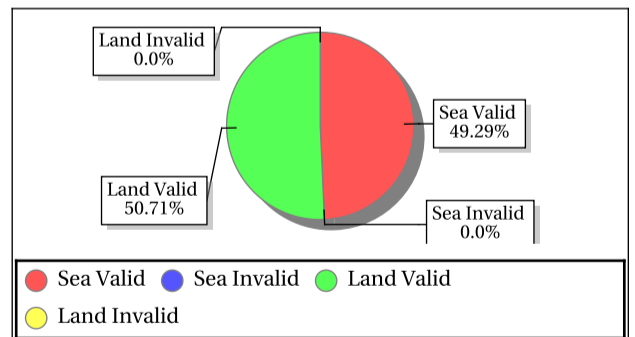
## Invalid and Poor Sigma-0 Quality Flag Statistics for Inner/Outer Slices\*

| Sigma-0 Flags                            | Inner Beam | Outer Beam |
|--|------------|------------|
| Invalid Sigma0(%)                        | 0.00       | 0.00       |
| Data Not Available From Payload (%)      | 0.0        | 0.0        |
| Slice not within sample array limits (%) | 0.00       | 0.00       |
| C(S+N) - C(N) < 0.1 (%)                  | 0.00       | 0.00       |
| Poor Sigma0(%)                           | 22.23      | 13.34      |
| Noise samples for blending Saturated     | 0.0        | 0.0        |
| Count samp. for interpol. saturated (%)  | 0.00       | 0.00       |
| Sigma0 < lower bound (-96dB) (%)         | 0.0        | 0.0        |
| Sigma0 > upper bound (0 dB) (%)          | 0.00       | 0.00       |
| SNR < -65 dB (%)                         | 0.024861   | 0.052241   |

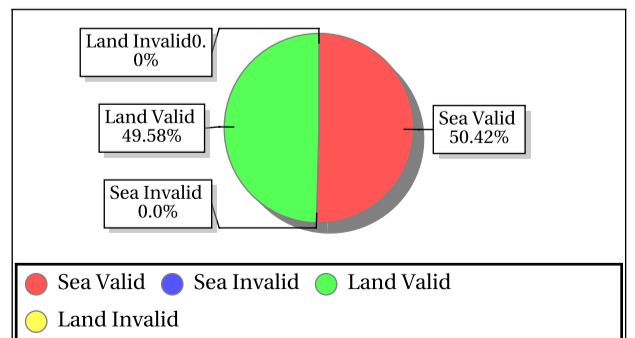
\*DP Format Document

## 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 | ASC  | Aft     | -9.60      | -5.55      | -7.73       | 0.95       | 159.57 | 227.44 | 192.15  | 13.86  |
| ANT_1     | -75.00     | 121.00     | Inner | ASC  | Fore    | -9.02      | -5.81      | -7.71       | 0.86       | 144.39 | 217.59 | 191.51  | 18.15  |
| Australia | -23.00     | 118.00     | Inner | ASC  | Aft     | -11.08     | -7.35      | -9.03       | 0.91       | 239.12 | 310.23 | 272.53  | 16.61  |
| Australia | -23.00     | 118.00     | Inner | ASC  | Fore    | -10.61     | -6.74      | -8.68       | 1.01       | 244.59 | 321.98 | 281.06  | 13.38  |
| ANT_1     | -75.00     | 121.00     | Outer | ASC  | Aft     | -9.53      | -6.62      | -8.29       | 0.91       | 166.79 | 225.70 | 202.01  | 16.74  |
| ANT_1     | -75.00     | 121.00     | Outer | ASC  | Fore    | -9.50      | -7.13      | -8.09       | 0.77       | 166.84 | 235.85 | 207.07  | 17.74  |
| Australia | -23.00     | 118.00     | Outer | ASC  | Aft     | -12.31     | -9.45      | -10.64      | 0.71       | 248.00 | 301.98 | 278.13  | 13.18  |
| Australia | -23.00     | 118.00     | Outer | ASC  | Fore    | -11.93     | -9.00      | -10.33      | 0.63       | 239.49 | 317.67 | 276.16  | 17.85  |



## 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    | 305.87 | 0.30 | 2.192        | 0.12     | 215.09 | 0.26 | 1.897        | 0.12     | 0.64  | 0.12  | 0.000        | 0.12      | 0.29  | 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  | 22.55  | 4.96 | 0.009        | -33.46   | 23.84  | 6.13 | 0.012        | -7.50    | 30.10 | 18.51 | 11.522       | -3.04     | 29.73 | 18.91 | 13.296       |

| 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    | 189.58 | 0.22 | 1.625        | 0.09     | 170.01 | 0.21 | 1.531        | 0.09     | 3.75  | 0.09  | 0.002        | 0.09      | 1.03  | 0.09  | 0.002        |
| <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>      | -34.08  | 16.90  | 3.01 | 0.000        | -33.61   | 17.14  | 3.94 | 0.000        | -16.97   | 22.82 | 12.61 | 0.026        | -11.17    | 23.68 | 12.69 | 0.187        |

| 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)

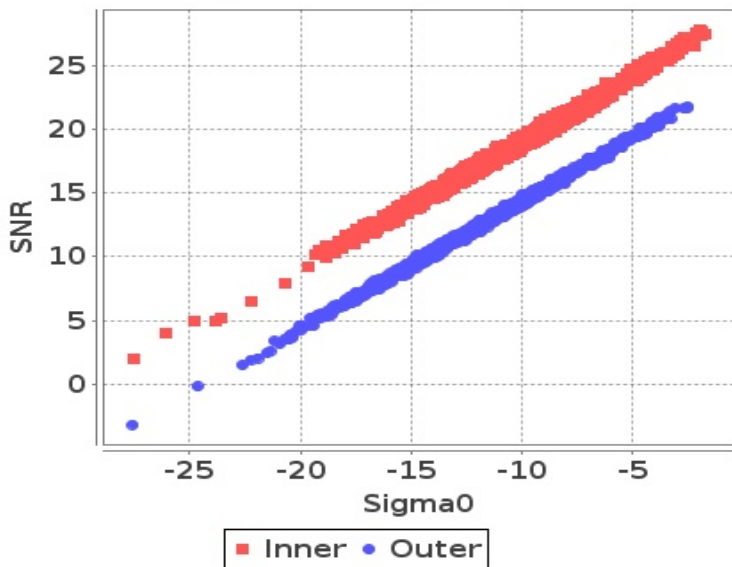
|                              | Inner Beam (HH) |         |         |              | Outer Beam (VV) |         |         |              | Parameter Specifications   |  |         |
|------------------------------|-----------------|---------|---------|--------------|-----------------|---------|---------|--------------|--|--|---------|
|                              | Min             | Max     | Mean    | Bad Occ. (%) | Min             | Max     | Mean    | Bad Occ. (%) | Parameter  | Min  | Max     |
| <b>Incidence Angle (deg)</b> | 48.84           | 49.41   | 49.07   | 0.000        | 57.61           | 58.26   | 57.96   | 0.000        | Inci.(Inner)   | 47.10  | 49.90   |
| <b>Azimuth Diff. (deg)</b>   | 0.0027          | 6.45    | 1.27    | 1.534        | 0.0000          | 282.09  | 1.27    | 2.404        | Inci.(Outer)   | 57.30  | 58.90   |
| <b>Range(Km)</b>             | 1041.75         | 1078.66 | 1056.05 | 0.000        | 1220.98         | 1267.54 | 1241.53 | 0.000        | Azimuth Diff.  | 0.60   | 2.00    |
| <b>X Factor(dbm)</b>         | -91.60          | -90.08  | -90.58  | 0.000        | -93.20          | -92.12  | -92.36  | 0.000        | Range(Inner)   | 1025.00  | 1095.70 |
| <b>Across Distance (Km)</b>  | 15.59           | 16.11   | 15.77   | 0.000        | 20.46           | 21.12   | 20.74   | 0.000        | Range(Outer)   | 1210.00  | 1280.00 |
| <b>Along Distance (Km)</b>   | 18.63           | 20.81   | 19.72   | 0.000        | 7.92            | 36.59   | 19.62   | 2.000        | X-Factor   | -100.00  | -80.00  |
|                              |                 |         |         |              |                 |         |         |              | Ac.Distance(Inner)   | 15.00  | 20.00   |
|                              |                 |         |         |              |                 |         |         |              | Ac.Distance(Outer)   | 15.00  | 22.00   |
|                              |                 |         |         |              |                 |         |         |              | Al.Distance(Inner)   | 15.00  | 30.00   |
|                              |                 |         |         |              |                 |         |         |              | Al.Distance(Outer)   | 10.00  | 30.00   |
|                              |                 |         |         |              |                 |         |         |              | <span style="display: inline-block; width: 15px; height: 15px; background-color: green; border: 1px solid black; margin-right: 5px;"></span> Normal      | <span style="display: inline-block; width: 15px; height: 15px; background-color: orange; border: 1px solid black; margin-right: 5px;"></span> Alarming |         |
|                              |                 |         |         |              |                 |         |         |              | <span style="display: inline-block; width: 15px; height: 15px; background-color: yellow; border: 1px solid black; margin-right: 5px;"></span> Deviations | <span style="display: inline-block; width: 15px; height: 15px; background-color: red; border: 1px solid black; margin-right: 5px;"></span> High Errors |         |



## Sigma0 Behaviour (Sigma0 Vs SNR)

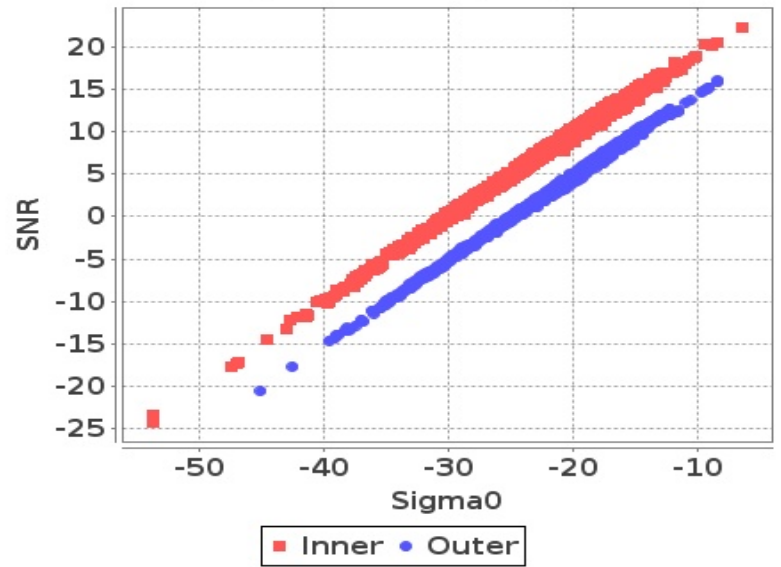
Footprint-Land

Sigma0 Vs SNR (Land)



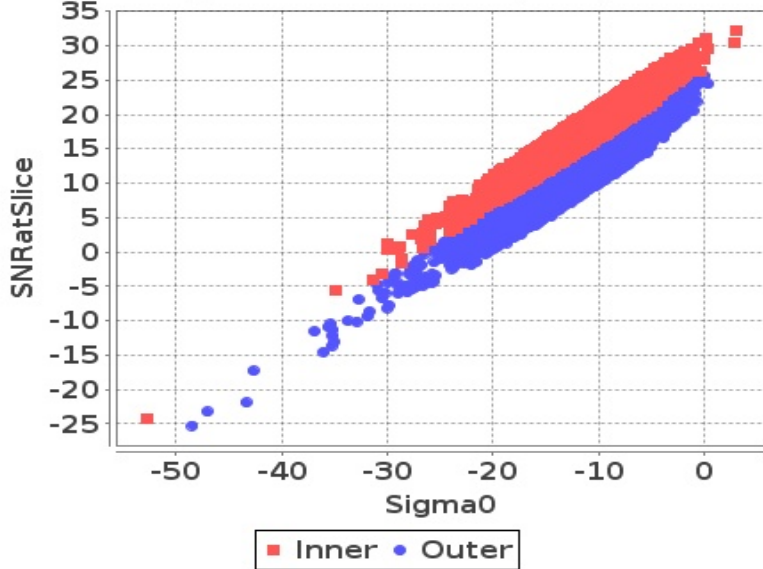
Footprint-Sea

Sigma0 Vs SNR (Sea)



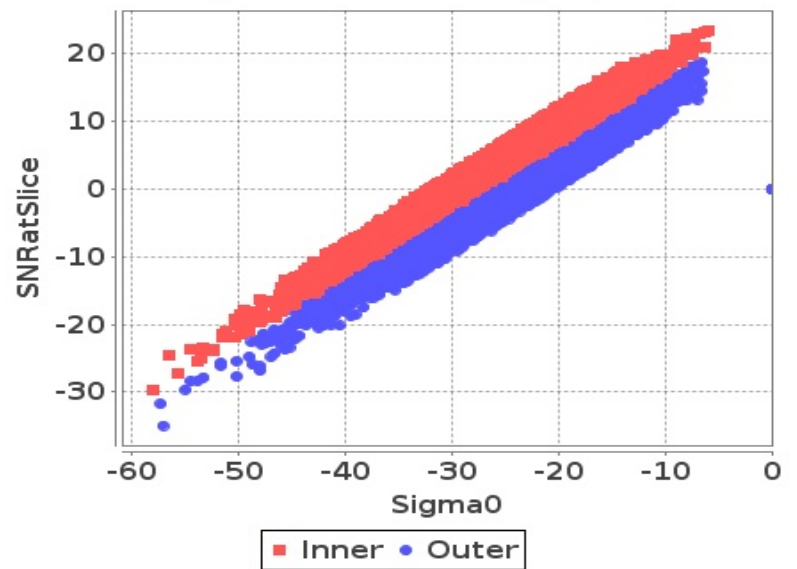
Slice-Land

Sigma0 Vs SNRatSlice (Land)



Slice-Sea

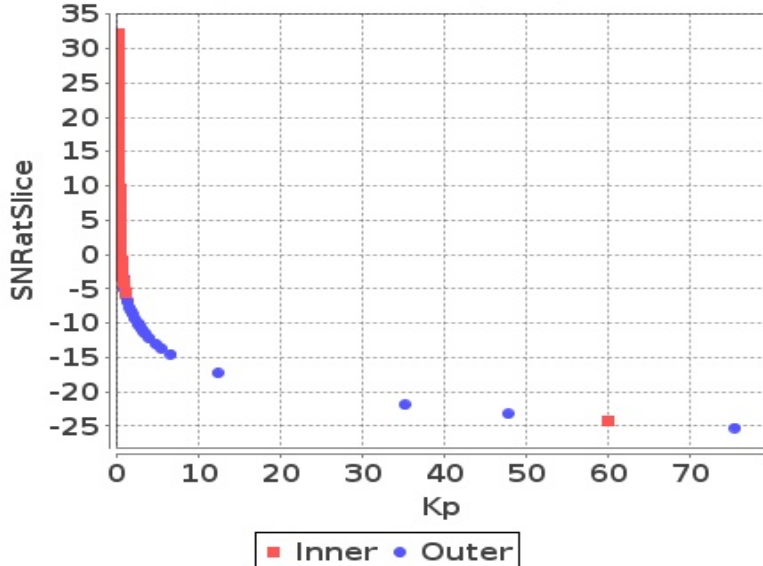
Sigma0 Vs SNRatSlice (Sea)



## Sigma0 Behaviour (Kp Vs SNR)

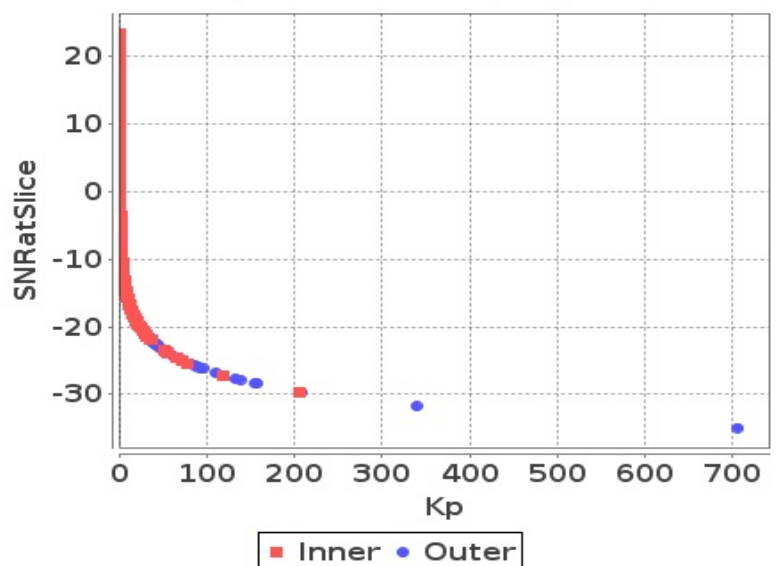
Slice

Kp Vs SNRatSlice (Land)



Slice

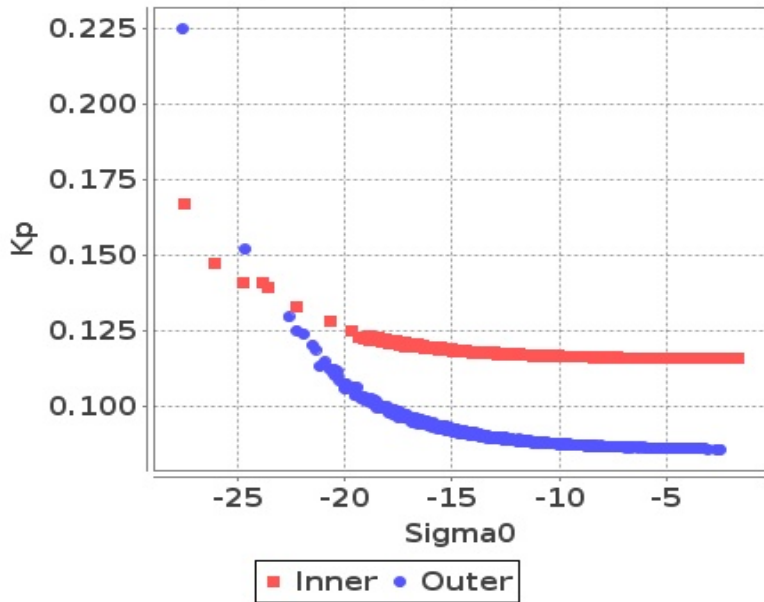
Kp Vs SNRatSlice (Sea)



# Sigma0 Behaviour(Sigma0 Vs Kp)

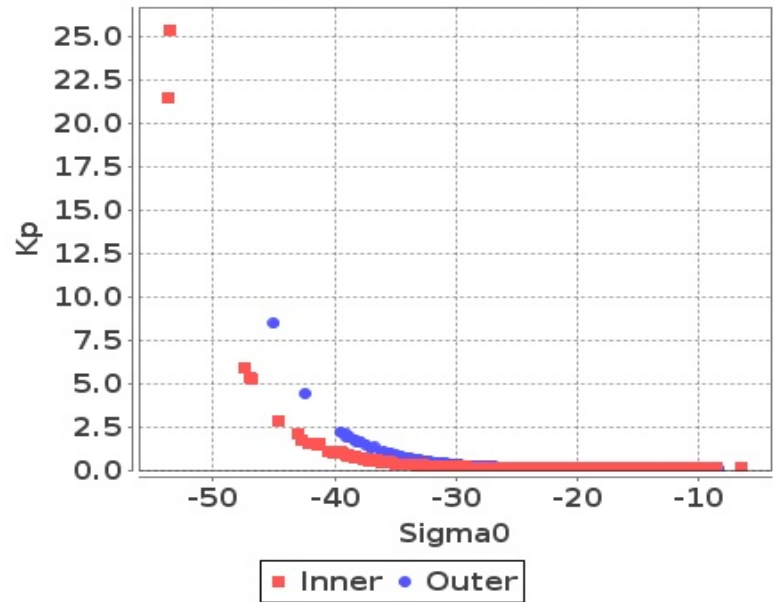
## Footprint-Land

### Sigma0 Vs Kp (Land)



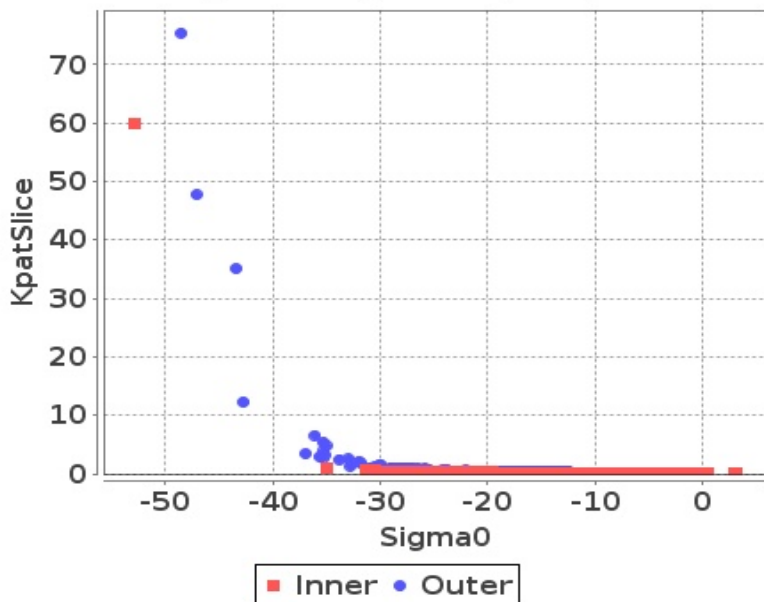
## Footprint-Sea

### Sigma0 Vs Kp (Sea)



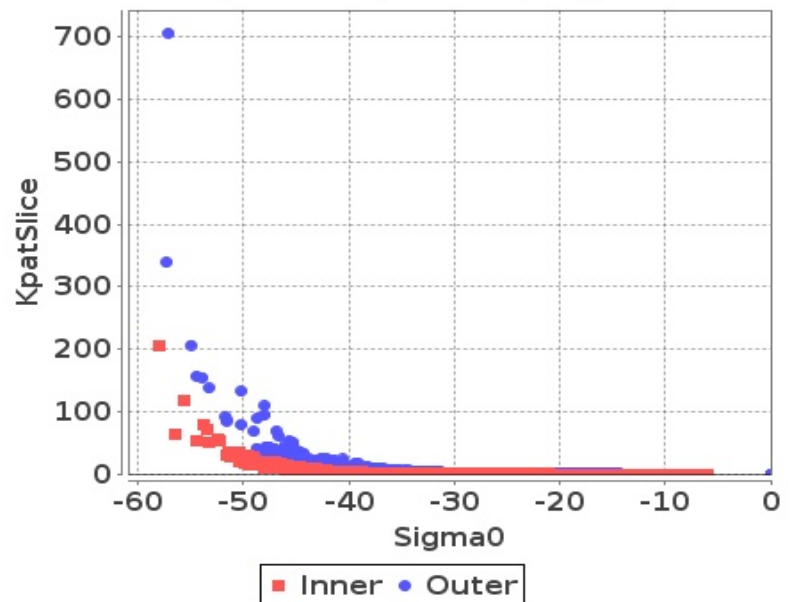
## Slice-Land

### Sigma0 Vs KpatSlice (Land)



## Slice-Sea

### Sigma0 Vs KpatSlice (Sea)

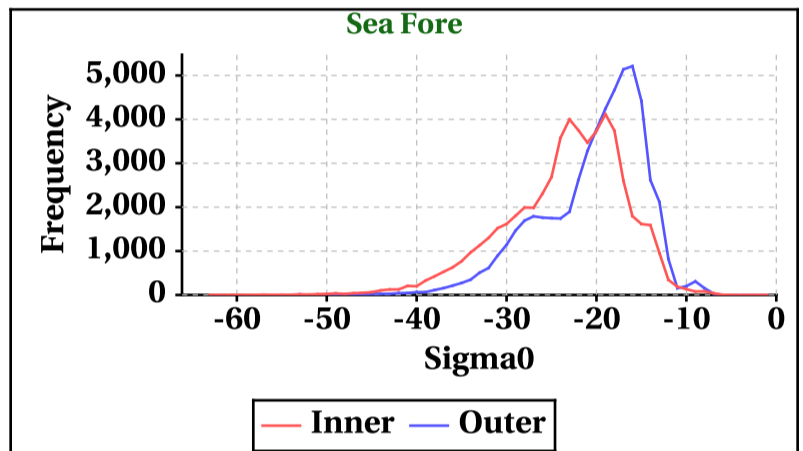
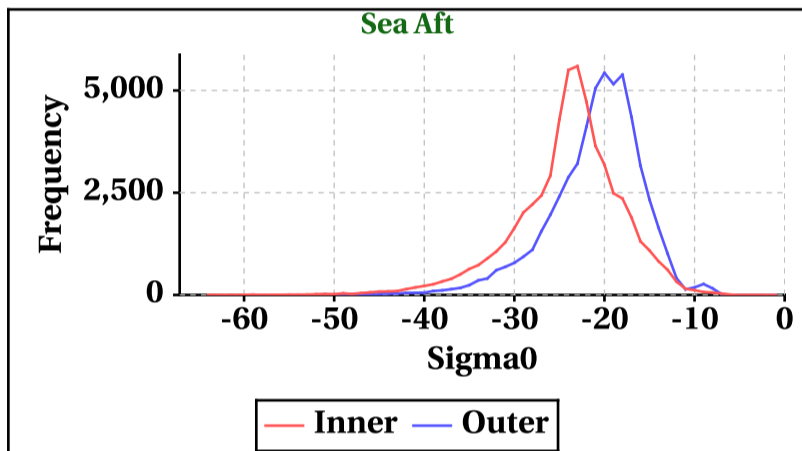
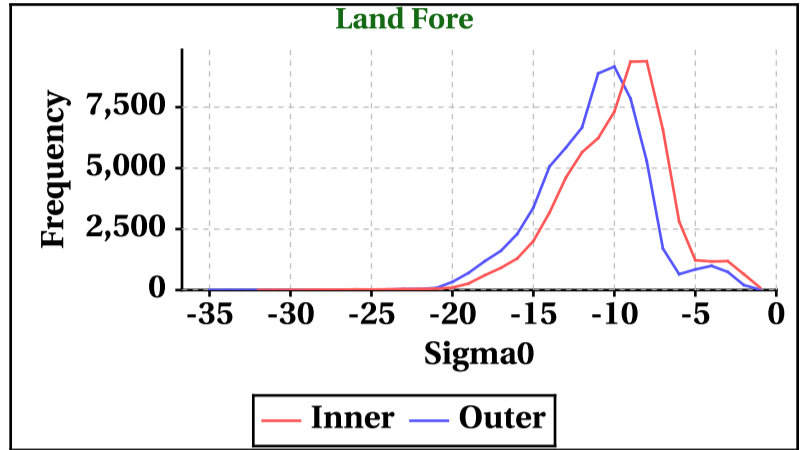
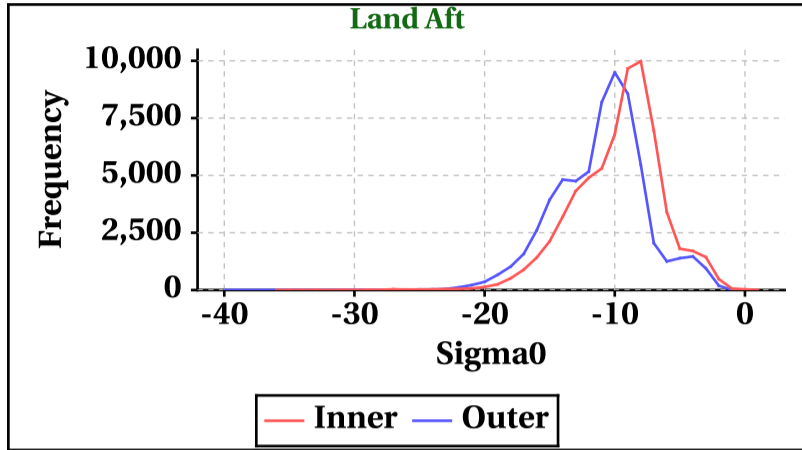


# Dynamic Range (Data Histograms)

## Sigma0(db)

| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -36      | -32       | -64     | -63      |
| Max             | 1        | 0         | 0       | 0        |

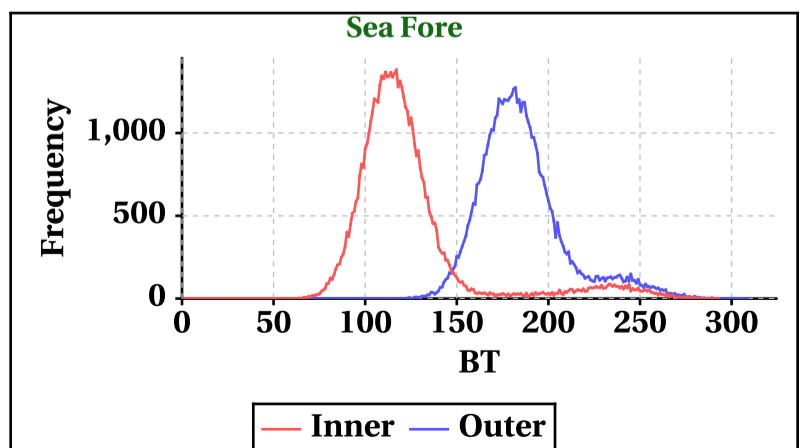
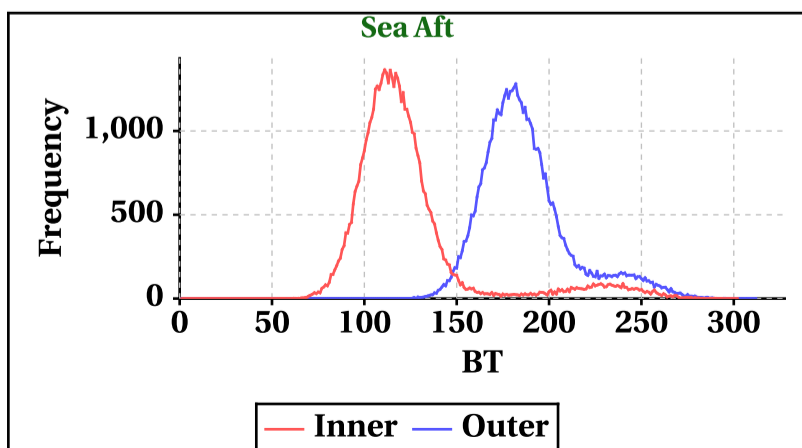
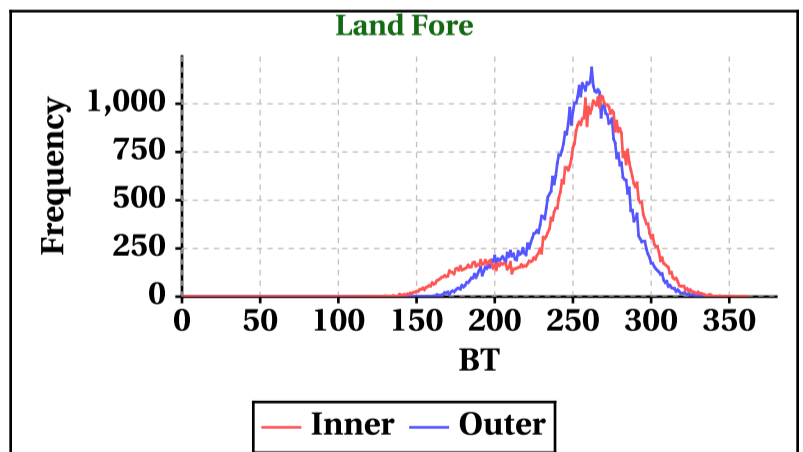
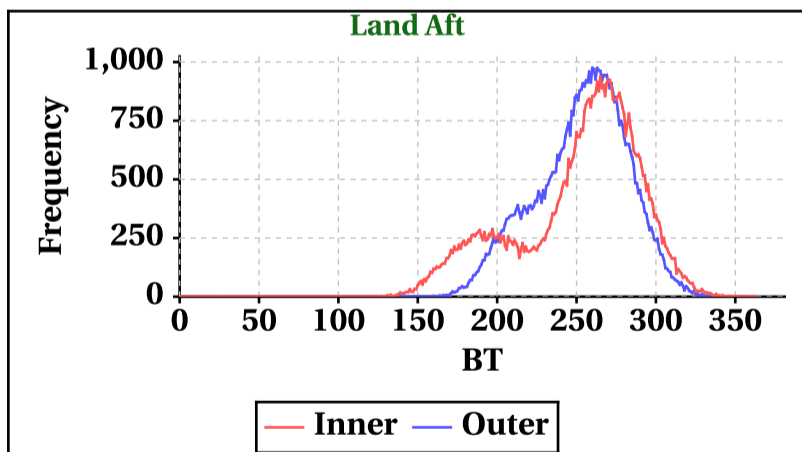
| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -40      | -35       | -58     | -58      |
| Max             | 0        | 0         | 0       | 0        |



## Brightness Temperature(K)

| Inner Beam(HH) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 363      | 362       | 302     | 293      |

| Outer Beam(VV) |          |           |         |          |
|----------------|----------|-----------|---------|----------|
|                | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min            | 0        | 0         | 0       | 0        |
| Max            | 357      | 350       | 312     | 309      |

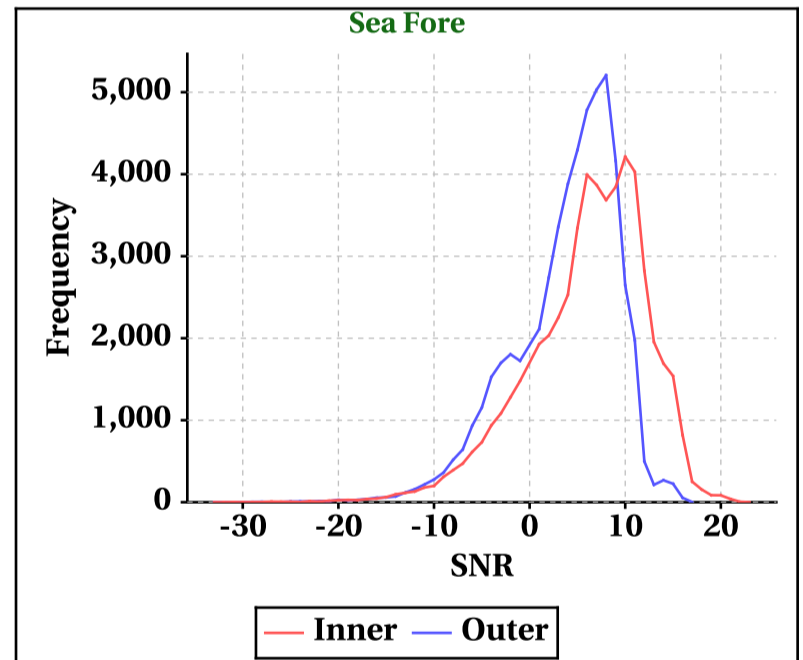
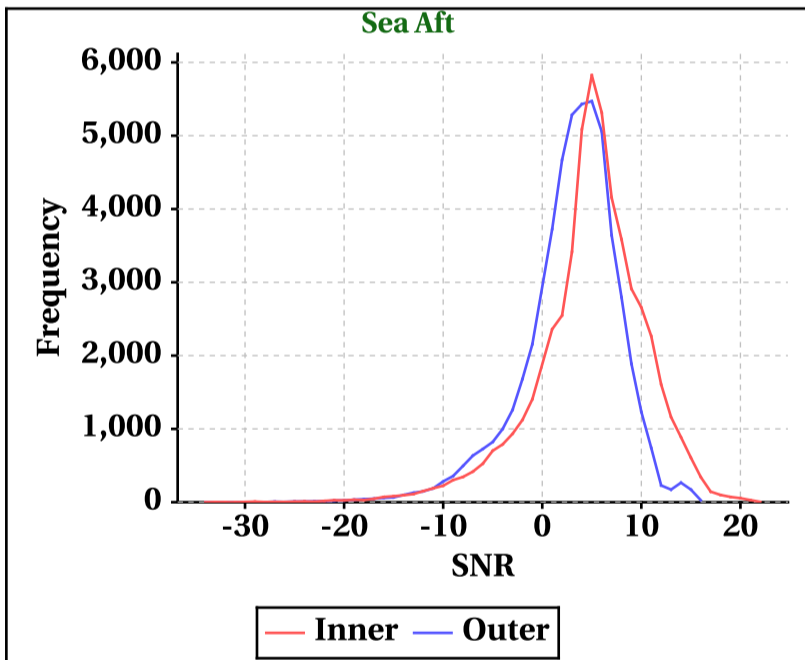
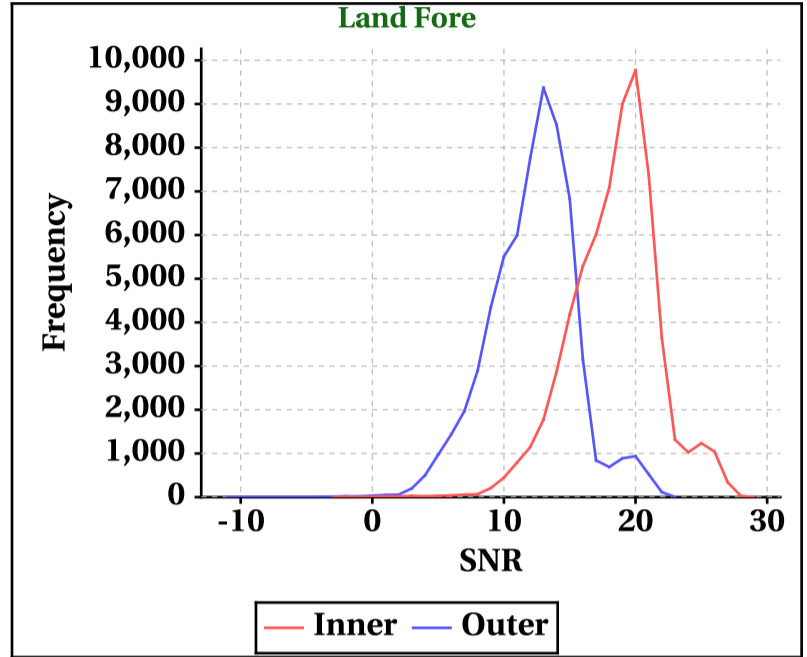
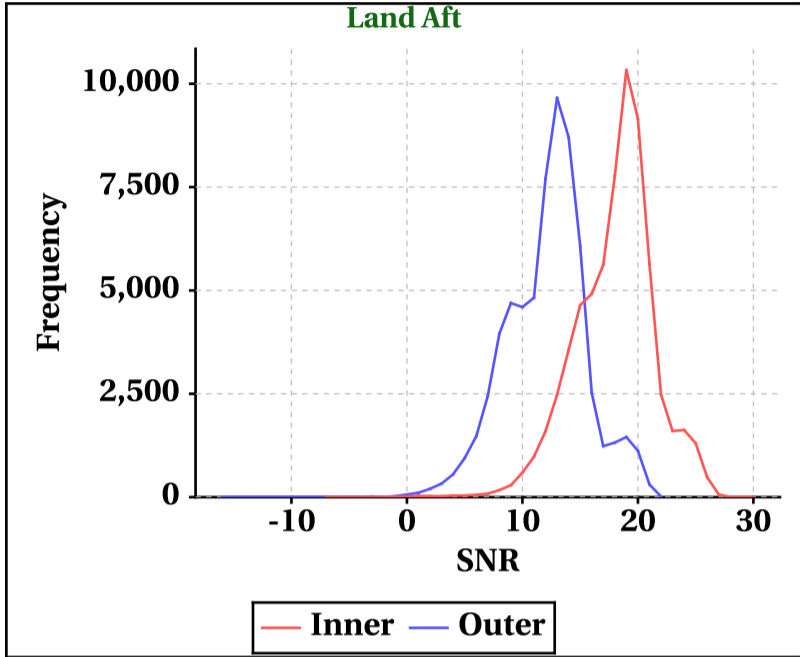


# Dynamic Range (Data Histograms)

## SNR(dBm)

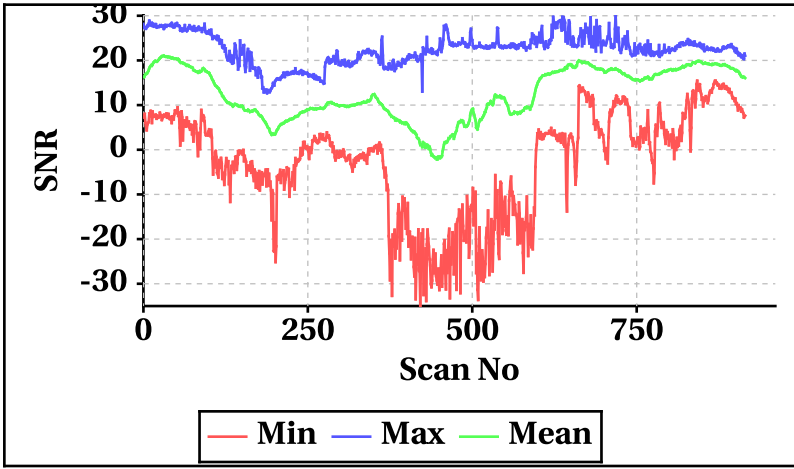
| Inner Beam (HH) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -7       | -3        | -34     | -33      |
| Max             | 30       | 29        | 22      | 23       |

| Outer Beam (VV) |          |           |         |          |
|-----------------|----------|-----------|---------|----------|
|                 | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min             | -16      | -11       | -34     | -33      |
| Max             | 22       | 23        | 16      | 17       |

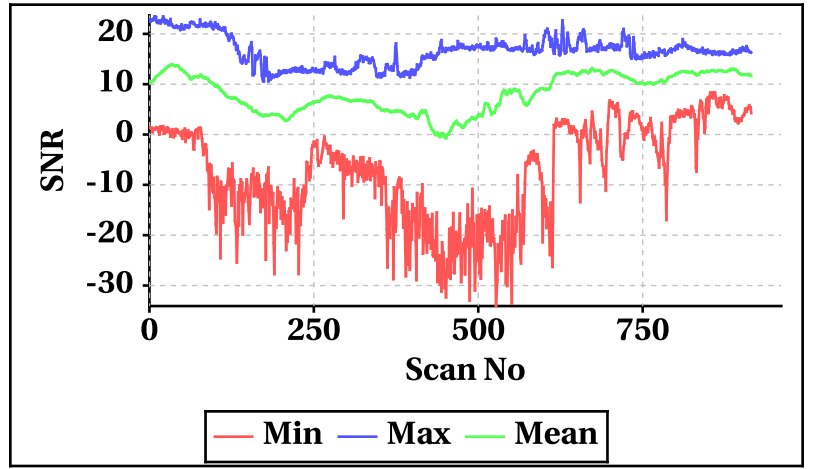


## Orbit-wise behaviour of SNR

Inner Beam (HH)

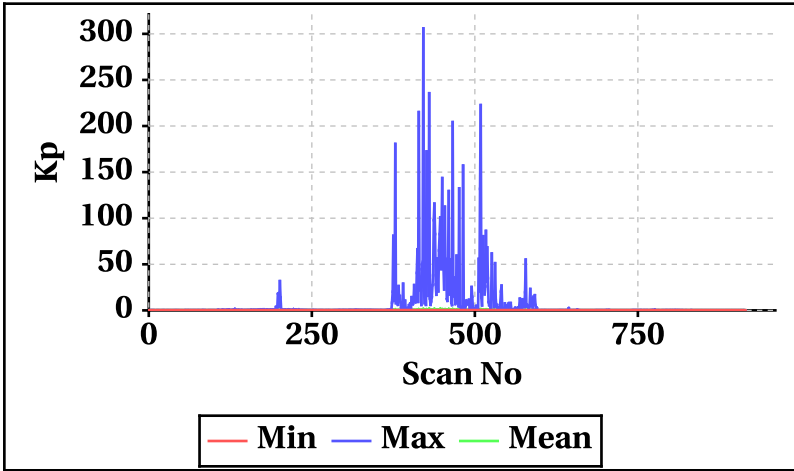


Outer Beam(VV)

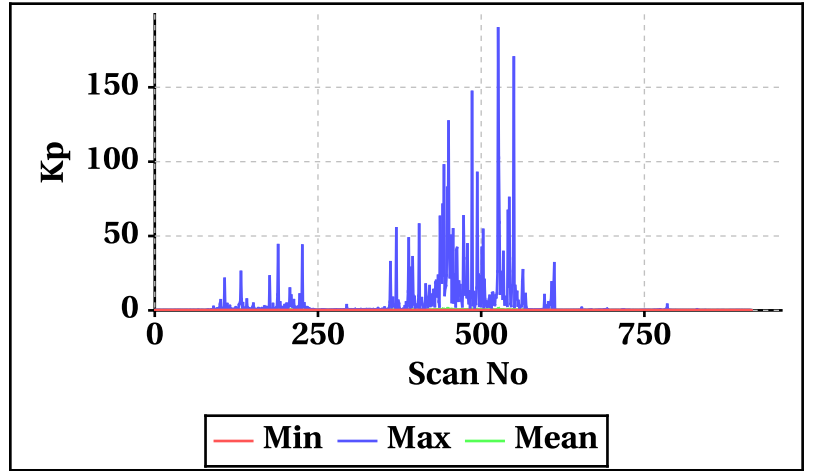


## Orbit-wise behaviour of Kp,Kpa,Kpb,Kpc

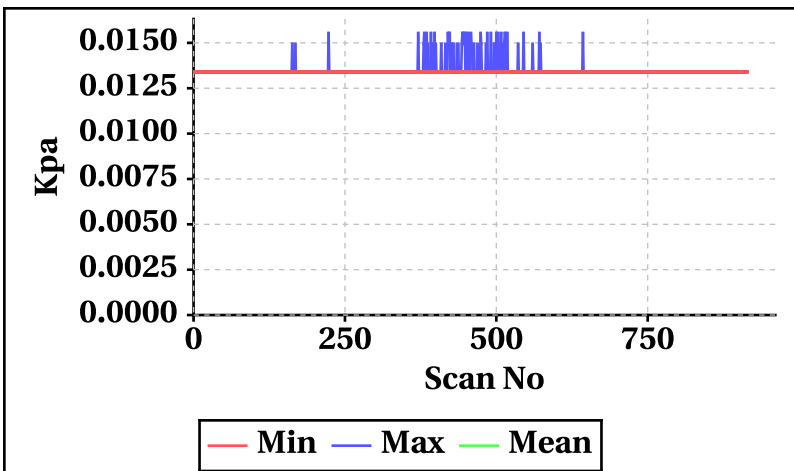
Inner Beam(HH)



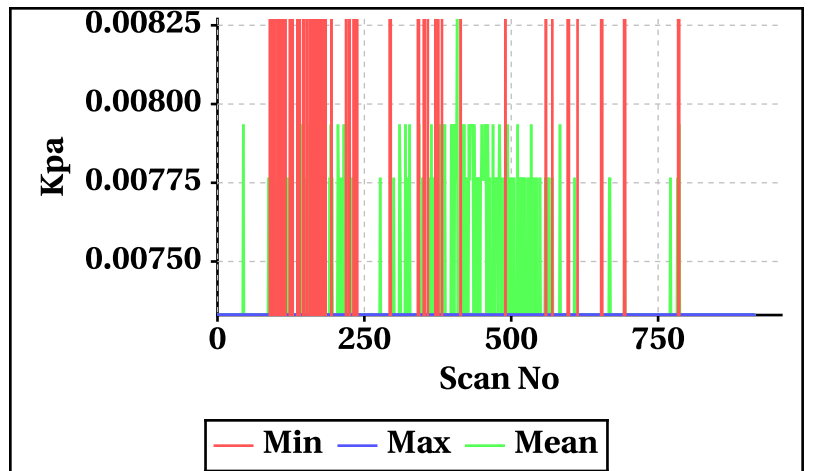
Outer Beam(VV)



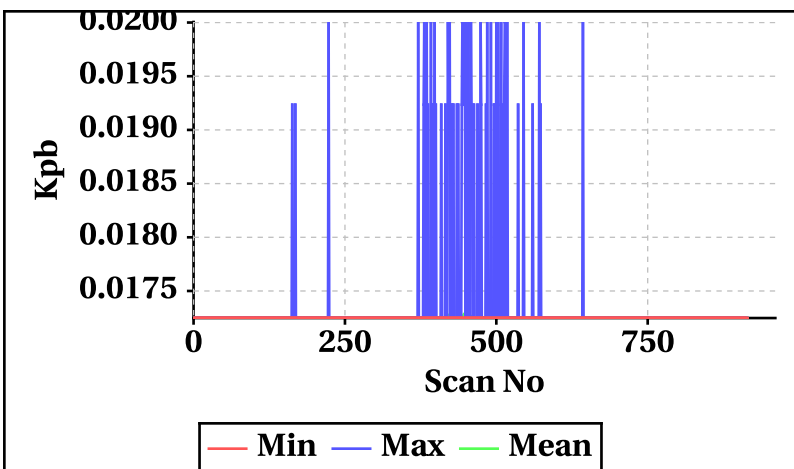
Inner Beam(HH)



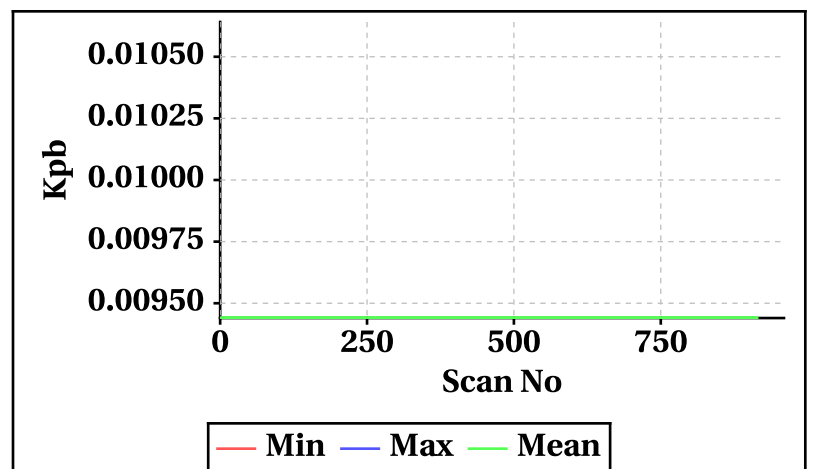
Outer Beam(VV)



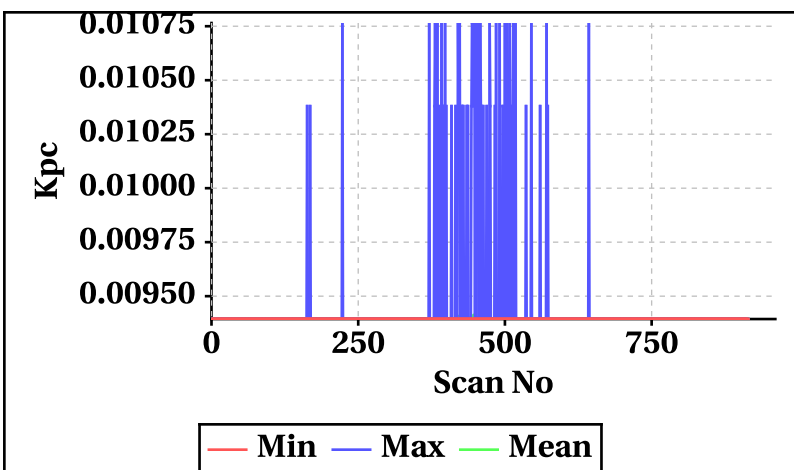
Inner Beam(HH)



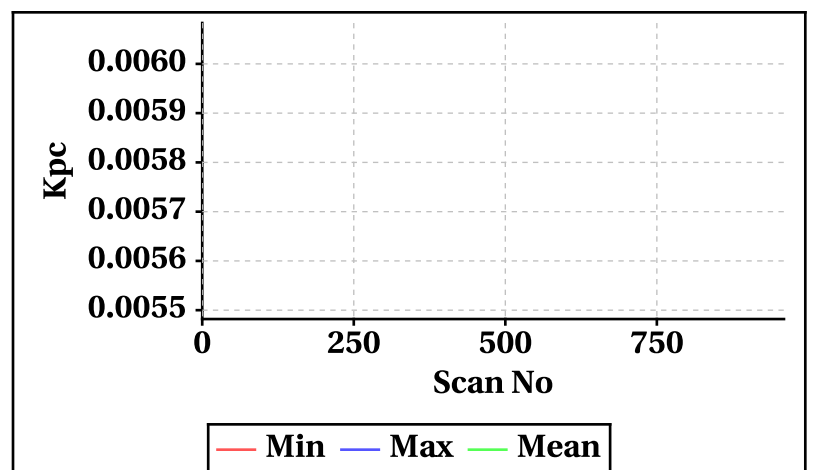
Outer Beam(VV)



Inner Beam(HH)



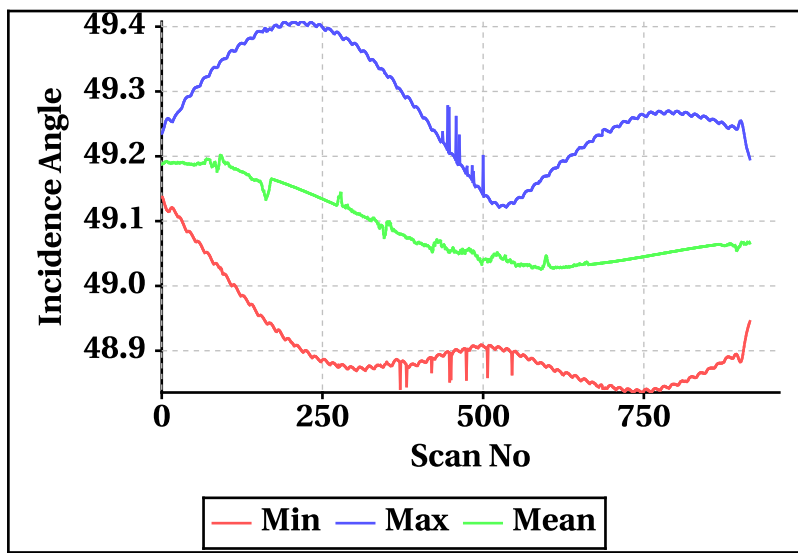
Outer Beam(VV)



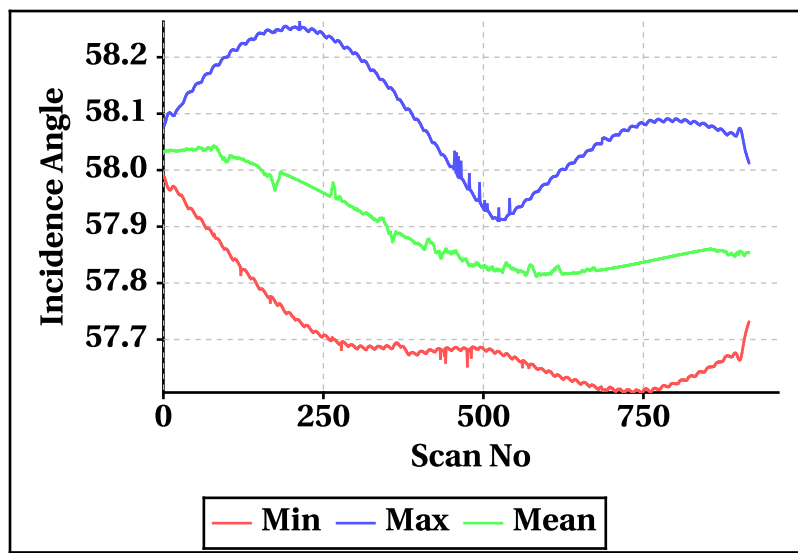


Orbit-wise behaviour of Incidence, Azimuth, Range, X-Factor

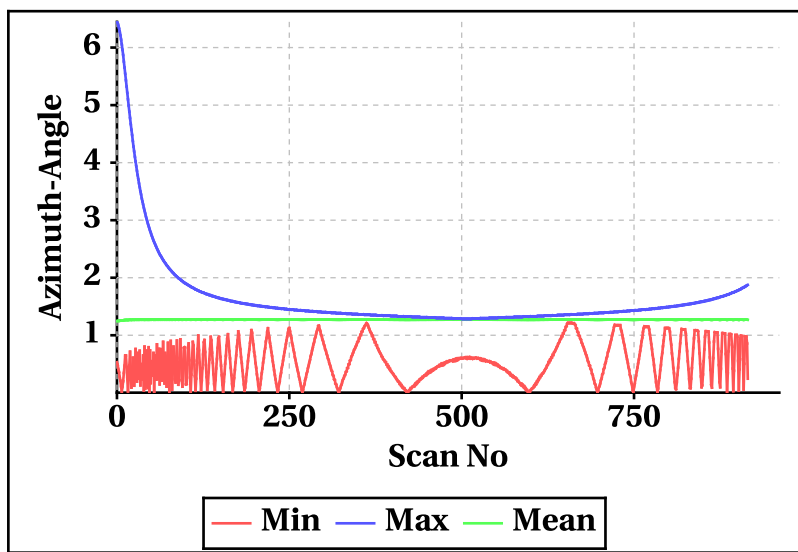
Inner Beam (HH)



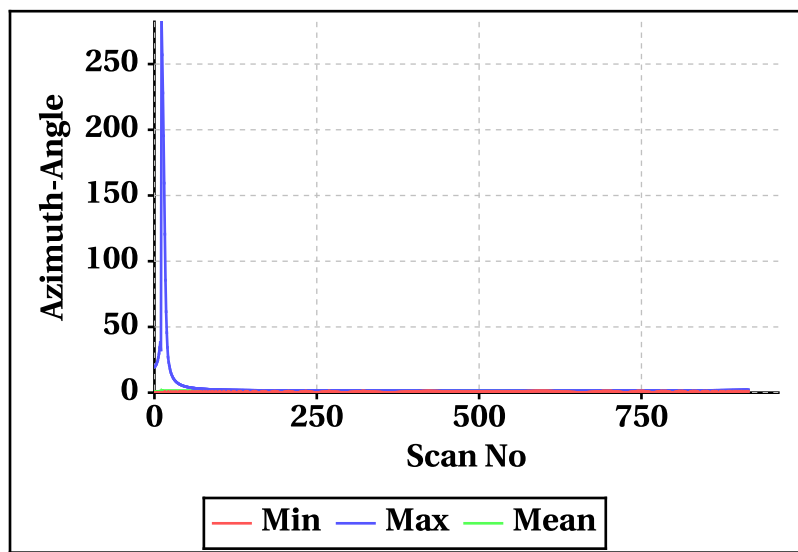
Outer Beam(VV)



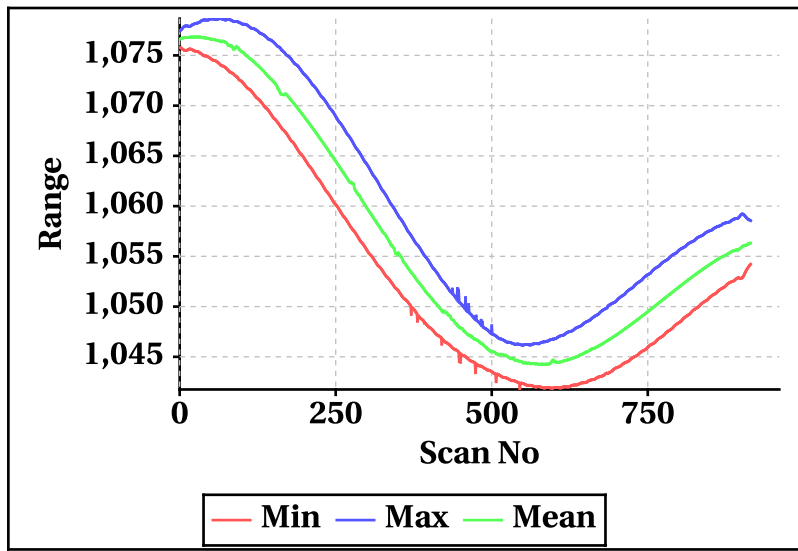
Inner Beam (HH)



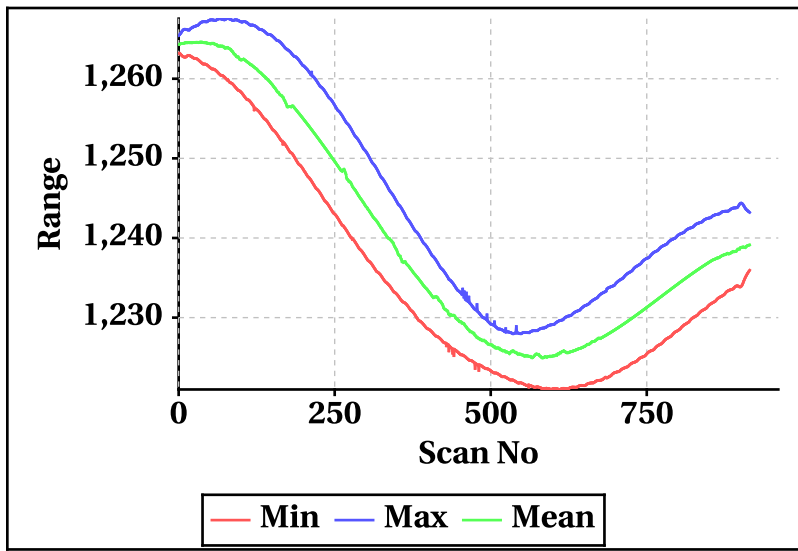
Outer Beam(VV)



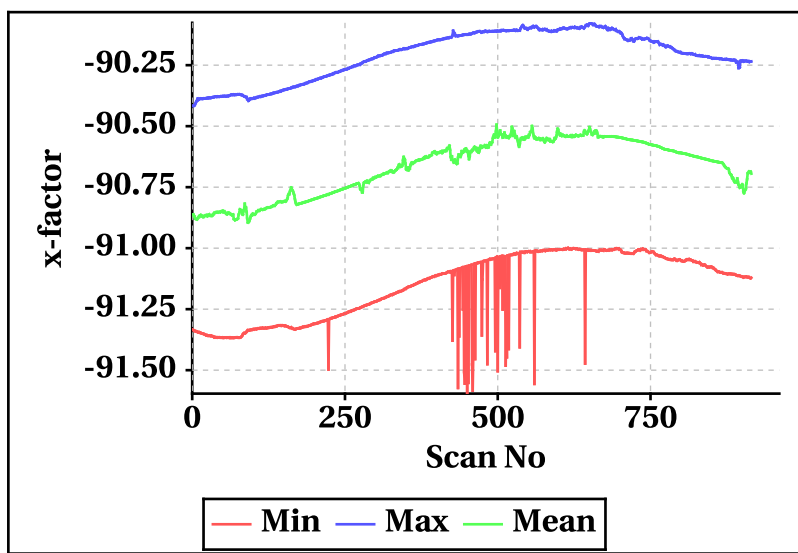
Inner Beam (HH)



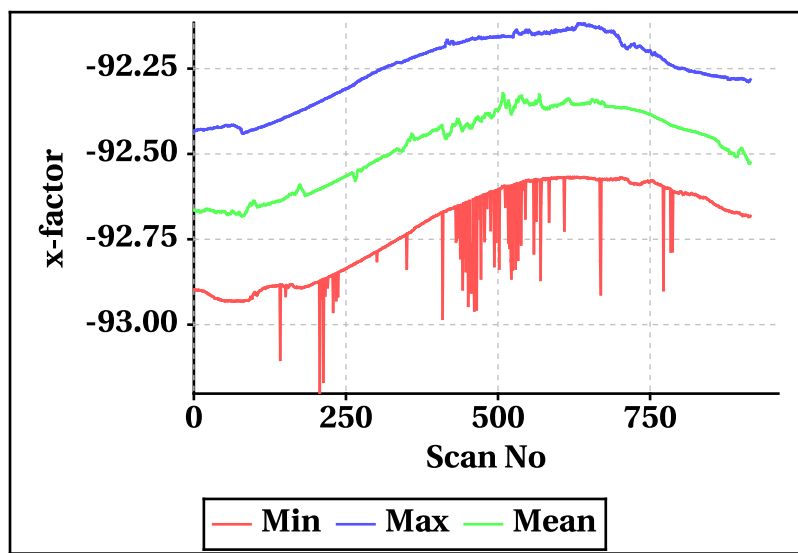
Outer Beam(VV)



Inner Beam (HH)



Outer Beam(VV)

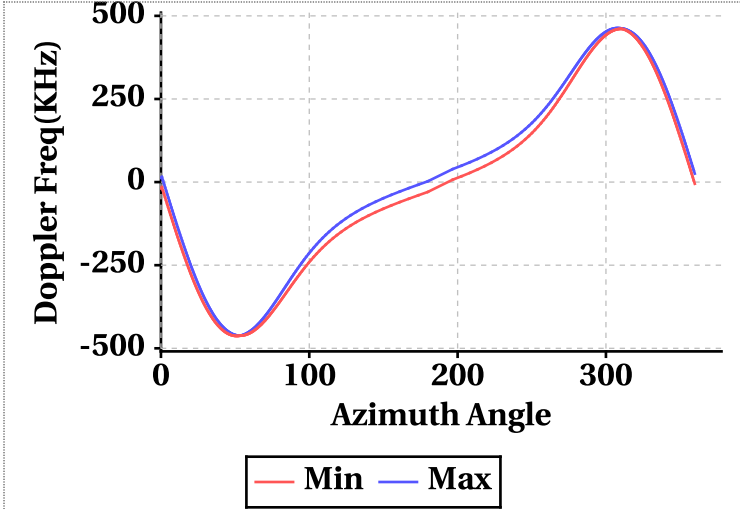


# Doppler Frequency Variation

Doppler Frequency(KHz) variation statistics Over the half Orbit

|     | Inner Beam (HH) | Outer Beam (VV) |
|-----|-----------------|-----------------|
| Min | -462.90         | -518.78         |
| Max | 463.30          | 519.14          |

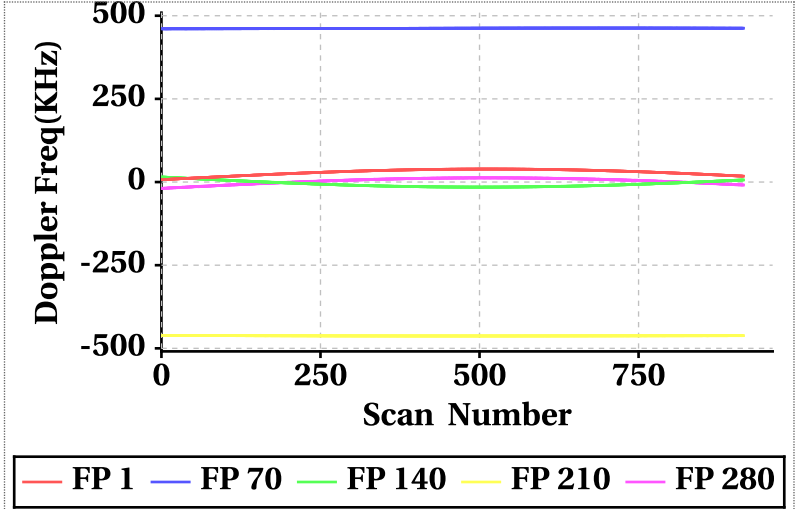
Footprint wise Doppler frequency variation Inner Beam (HH)



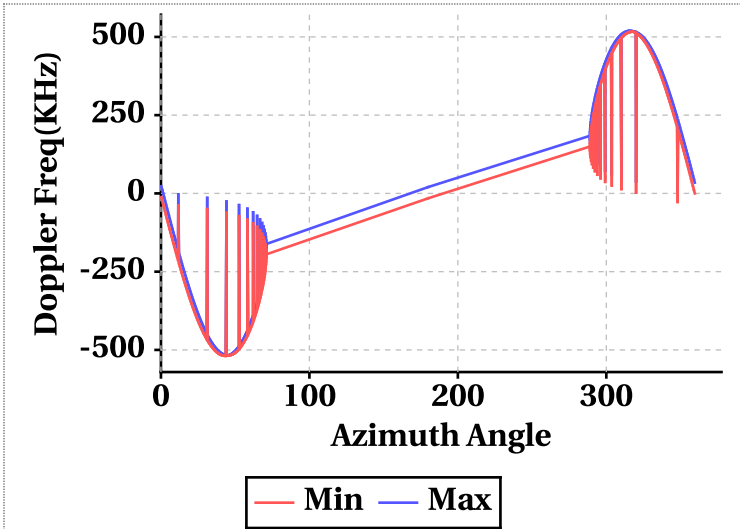
Doppler Frequency(KHz) variation

| Doppler_FP  | Inner Beam (HH) |         |         | Outer Beam (VV) |         |         |
|-------------|-----------------|---------|---------|-----------------|---------|---------|
|             | Min             | Max     | Mean    | Min             | Max     | Mean    |
| Doppler_1   | 7.14            | 39.02   | 29.19   | 2.50            | 38.06   | 27.08   |
| Doppler_70  | 460.66          | 462.92  | 462.08  | 516.28          | 518.90  | 518.00  |
| Doppler_140 | -15.40          | 15.24   | -5.81   | -23.16          | 11.36   | -12.37  |
| Doppler_210 | -462.82         | -461.36 | -462.33 | -518.56         | -517.18 | -518.11 |
| Doppler_280 | -19.34          | 12.76   | 2.79    | -15.68          | 20.16   | 9.00    |

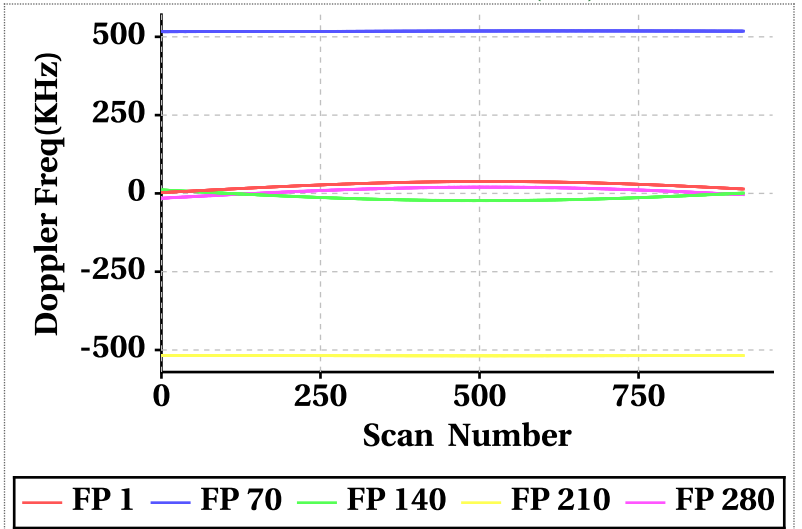
Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Inner Beam (HH)



Footprint wise Doppler frequency variation Outer Beam (VV)

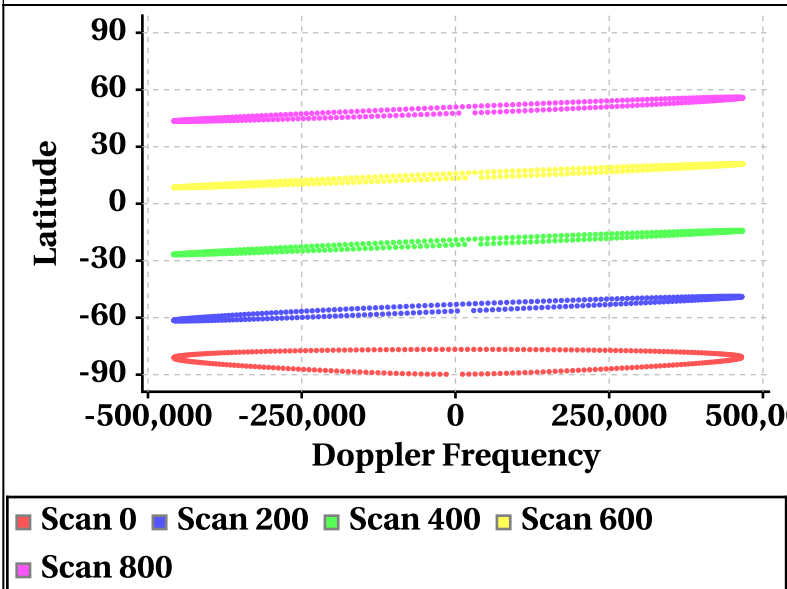


Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Outer Beam (VV)

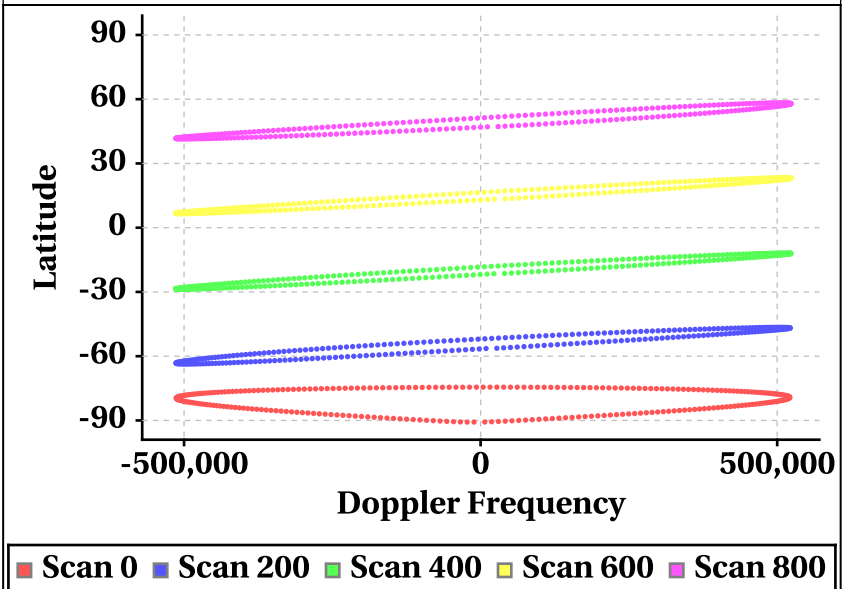


# Latitude Vs Doppler Frequency

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



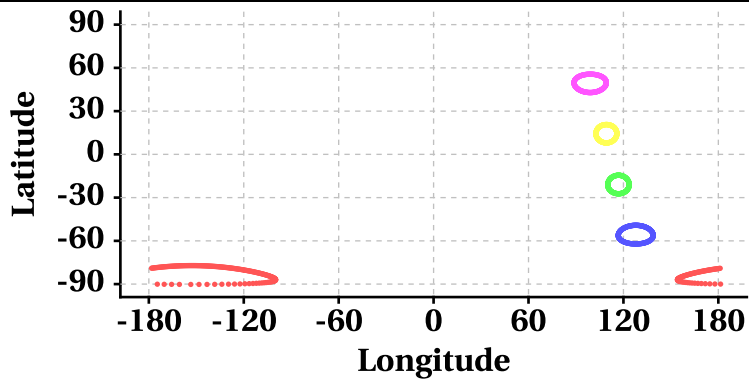
Doppler Frequency at Scan Interval of 200 [Outer Beam(VV)]



# Parameter as a function of Latitude

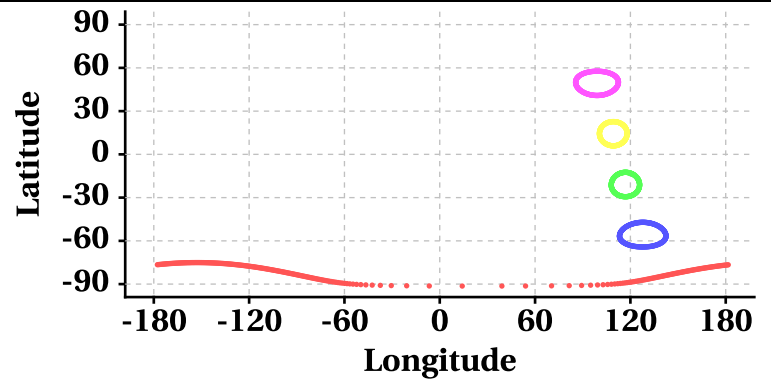
## Latitude Vs Longitude

Scan Trace [Inner Beam(HH)]



Scan 0 Scan 200 Scan 400 Scan 600  
Scan 800

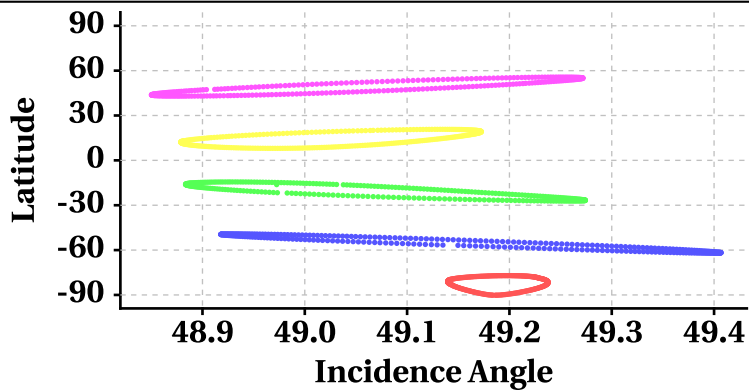
Scan Trace [Outer Beam (VV)]



Scan 0 Scan 200 Scan 400 Scan 600  
Scan 800

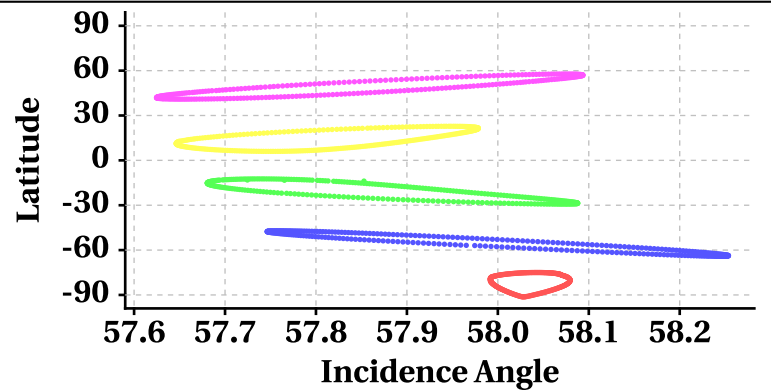
## Latitude Vs Incidence Angle

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



Scan 0 Scan 200 Scan 400 Scan 600  
Scan 800

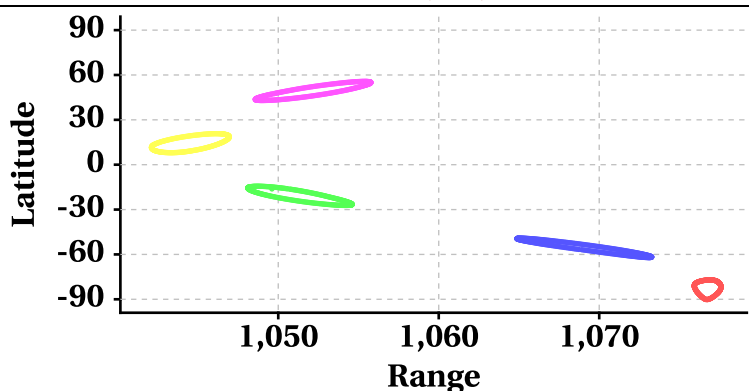
Incidence Angle at Scan Interval of 200 [Outer Beam (VV)]



Scan 0 Scan 200 Scan 400 Scan 600  
Scan 800

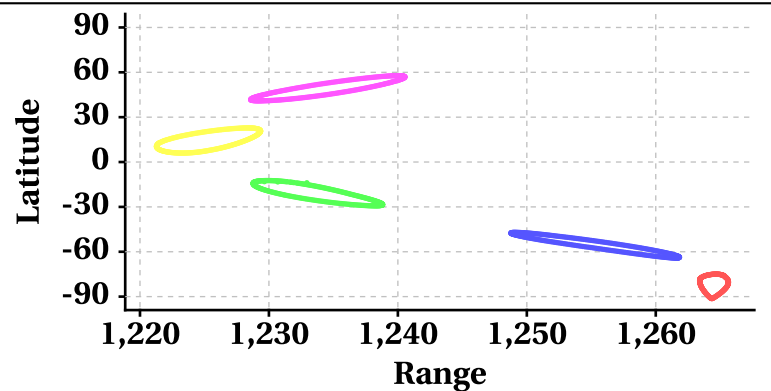
## Latitude Vs Range

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



Scan 0 Scan 200 Scan 400 Scan 600  
Scan 800

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



Scan 0 Scan 200 Scan 400 Scan 600  
Scan 800



# Variation in Orbit and Attitude Parameters

