

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

| | | | | | |
|------------------------------|---------------|------------------------------|--------------|-------------------------------|------|
| Satellite Id | ScatSat-1 | Start Orbit | 16540 | Total Scans | 1017 |
| Sensor Name | Scatterometer | End Orbit | 16541 | No of Inner FootPrints | 281 |
| Processor Version | v1.1.3 | Rev. Number | 16540_16541 | No Of Outer FootPrints | 282 |
| Half Orbit Direction | SN | Data Production Date | 11-11-2019 | No. Of Inner Slices | 9 |
| Equator Crossing Date | 10-11-2019 | Equator Crossing Time | 22:58:11.000 | No Of Outer Slices | 15 |

Brightness Temperature(k) Footprint trace

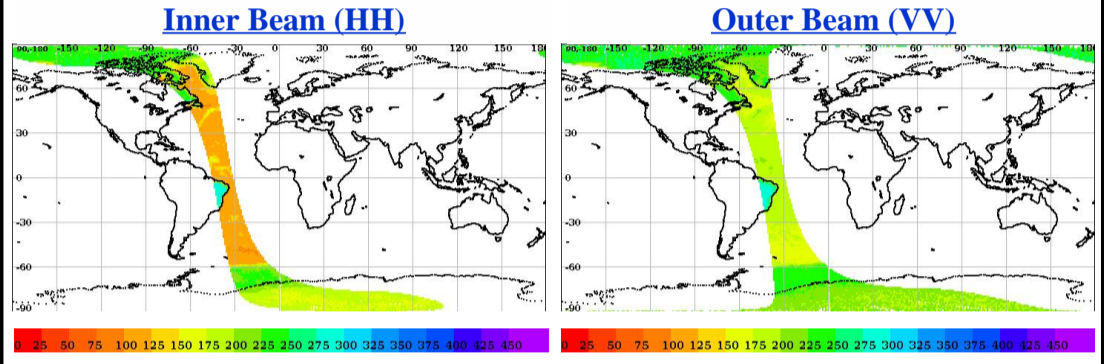
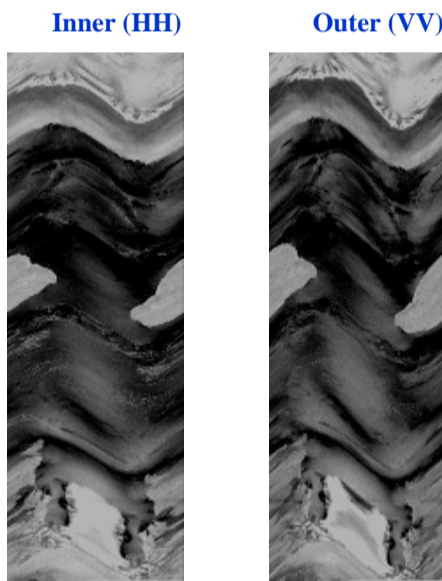
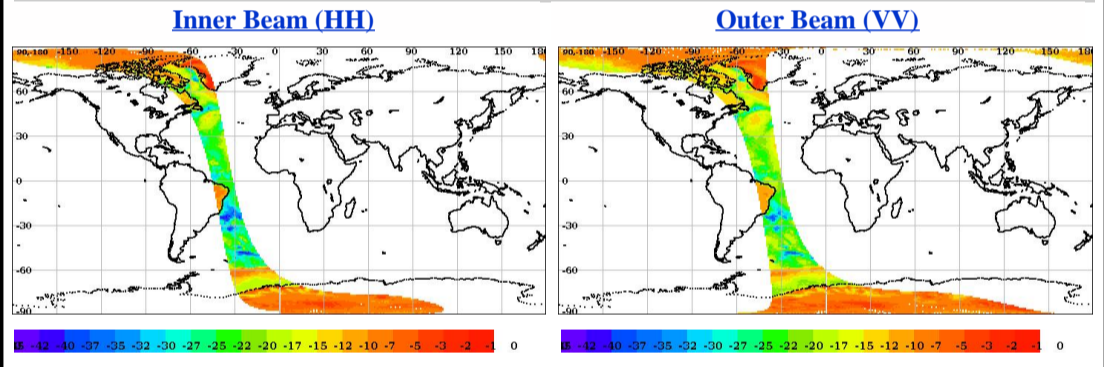


Image Snapshot for Inner & Outer Beam



Sigma0(dB) Footprint trace



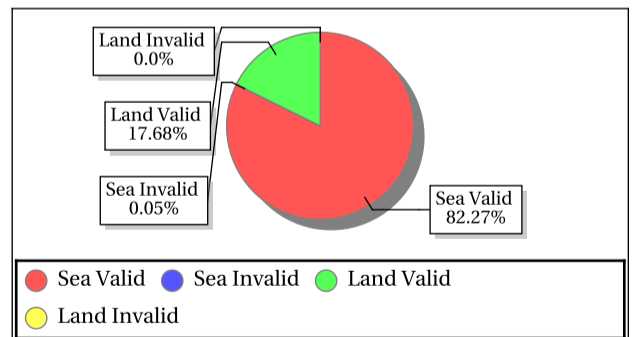
Invalid and Poor Sigma-0 Quality Flag Statistics for Inner/Outer Slices*

| Sigma-0 Flags | Inner Beam | Outer Beam |
|--|------------|------------|
| Invalid Sigma0(%) | 0.05 | 0.05 |
| Data Not Available From Payload (%) | 100.0 | 99.95701 |
| Slice not within sample array limits (%) | 0.00 | 0.04 |
| 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 (%) | 0.020479 | 0.053531 |

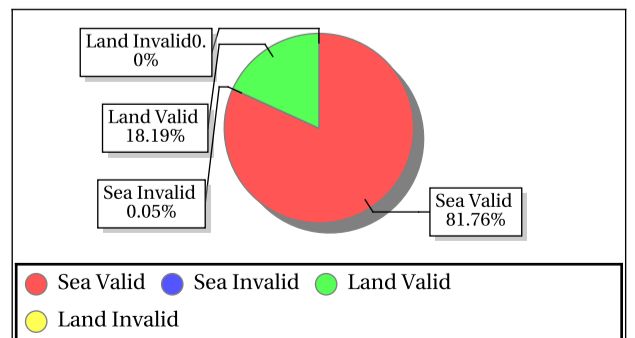
*DP Format Document

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 | Outer | ASC | Aft | -5.64 | -4.27 | -5.05 | 0.34 | 193.77 | 237.83 | 211.82 | 10.40 |
| GreenLand_2 | 77.50 | -41.50 | Outer | ASC | Fore | -5.48 | -4.56 | -5.14 | 0.28 | 188.85 | 225.65 | 207.06 | 11.39 |
| GreenLand_3 | 71.55 | -42.45 | Outer | ASC | Aft | -11.33 | -9.60 | -10.53 | 0.45 | 190.91 | 255.72 | 220.74 | 15.46 |
| GreenLand_3 | 71.55 | -42.45 | Outer | ASC | Fore | -11.93 | -9.77 | -10.65 | 0.63 | 196.02 | 257.31 | 225.62 | 14.53 |
| GreenLand_1 | 74.69 | -42.50 | Outer | ASC | Aft | -9.80 | -6.95 | -8.89 | 0.70 | 182.19 | 255.33 | 228.56 | 20.19 |
| GreenLand_1 | 74.69 | -42.50 | Outer | ASC | Fore | -11.03 | -8.14 | -9.47 | 0.74 | 203.35 | 275.94 | 231.41 | 16.27 |



Overall statistics for the Static Parameters (Footprint-wise)

| Inner Beam (HH) | | | | | | | | | | | | | | | | |
|-----------------|---------|--------|------|--------------|----------|--------|------|--------------|----------|-------|-------|--------------|-----------|-------|-------|--------------|
| | Sea Aft | | | | Sea Fore | | | | Land Aft | | | | Land fore | | | |
| | Min | Max | Mean | Bad Occ. (%) | Min | Max | Mean | Bad Occ. (%) | Min | Max | Mean | Bad Occ. (%) | Min | Max | Mean | Bad Occ. (%) |
| Kp | 0.12 | 265.31 | 0.25 | 1.642 | 0.12 | 303.00 | 0.20 | 0.867 | 0.12 | 0.13 | 0.12 | 0.000 | 0.12 | 0.14 | 0.12 | 0.000 |
| Kpa | 0.01 | 0.02 | 0.01 | 0.000 | 0.01 | 0.02 | 0.01 | 0.000 | 0.01 | 0.01 | 0.01 | 0.000 | 0.01 | 0.01 | 0.01 | 0.000 |
| Kpb | 0.02 | 0.02 | 0.02 | 0.000 | 0.02 | 0.02 | 0.02 | 0.000 | 0.02 | 0.02 | 0.02 | 0.000 | 0.02 | 0.02 | 0.02 | 0.000 |
| Kpc | 0.01 | 0.01 | 0.01 | 0.000 | 0.01 | 0.01 | 0.01 | 0.000 | 0.01 | 0.01 | 0.01 | 0.000 | 0.01 | 0.01 | 0.01 | 0.000 |
| SNR | -34.37 | 23.18 | 6.40 | 0.083 | -34.95 | 24.50 | 7.55 | 1.025 | 7.87 | 29.32 | 20.30 | 27.551 | 5.85 | 29.73 | 20.81 | 32.250 |

| Outer Beam (VV) | | | | | | | | | | | | | | | | |
|-----------------|---------|--------|------|--------------|----------|--------|------|--------------|----------|-------|-------|--------------|-----------|-------|-------|--------------|
| | Sea Aft | | | | Sea Fore | | | | Land Aft | | | | Land fore | | | |
| | Min | Max | Mean | Bad Occ. (%) | Min | Max | Mean | Bad Occ. (%) | Min | Max | Mean | Bad Occ. (%) | Min | Max | Mean | Bad Occ. (%) |
| Kp | 0.09 | 204.04 | 0.20 | 1.163 | 0.09 | 197.76 | 0.17 | 0.777 | 0.09 | 0.12 | 0.09 | 0.000 | 0.09 | 0.11 | 0.09 | 0.000 |
| Kpa | 0.01 | 0.01 | 0.01 | 0.000 | 0.01 | 0.01 | 0.01 | 0.000 | 0.01 | 0.01 | 0.01 | 0.000 | 0.01 | 0.01 | 0.01 | 0.000 |
| Kpb | 0.01 | 0.01 | 0.01 | 0.000 | 0.01 | 0.01 | 0.01 | 0.000 | 0.01 | 0.01 | 0.01 | 0.000 | 0.01 | 0.01 | 0.01 | 0.000 |
| Kpc | 0.01 | 0.01 | 0.01 | 0.000 | 0.01 | 0.01 | 0.01 | 0.000 | 0.01 | 0.01 | 0.01 | 0.000 | 0.01 | 0.01 | 0.01 | 0.000 |
| SNR | -34.40 | 16.31 | 3.95 | 0.000 | -34.26 | 17.57 | 4.60 | 0.000 | 2.00 | 22.57 | 14.65 | 0.052 | 3.86 | 23.18 | 14.63 | 0.778 |

| Parameter Specifications | | | | | |
|--------------------------|------|------|------|------|--------|
| Parameter | Kp | Kpa | Kpb | Kpc | SNR |
| Min | 0.00 | 0.00 | 0.00 | 0.00 | -65.00 |
| Max | 1.00 | 1.00 | 1.00 | 1.00 | 22.00 |

- Normal
- Deviations
- Alarming
- High Errors

Overall statistics for static parameter (Footprint-wise)

| | Inner Beam (HH) | | | | Outer Beam (VV) | | | | Parameter Specifications | | |
|------------------------------|-----------------|---------|---------|--------------|-----------------|---------|---------|--------------|--------------------------|---------|---------|
| | Min | Max | Mean | Bad Occ. (%) | Min | Max | Mean | Bad Occ. (%) | Parameter | Min | Max |
| Incidence Angle (deg) | 48.41 | 49.73 | 49.06 | 0.000 | 57.15 | 58.58 | 57.95 | 0.189 | Inci.(Inner) | 47.10 | 49.90 |
| Azimuth Diff. (deg) | 0.0027 | 6.38 | 1.27 | 2.655 | 0.0000 | 294.51 | 1.27 | 3.872 | Inci.(Outer) | 57.30 | 58.90 |
| Range(Km) | 1040.27 | 1076.21 | 1054.38 | 0.000 | 1218.39 | 1264.53 | 1239.47 | 0.000 | Azimuth Diff. | 0.60 | 2.00 |
| X Factor(dbm) | -91.79 | -90.09 | -90.57 | 0.000 | -93.11 | -92.13 | -92.31 | 0.000 | Range(Inner) | 1025.00 | 1095.70 |
| Across Distance (Km) | 15.61 | 16.06 | 15.72 | 0.000 | 20.50 | 21.07 | 20.67 | 0.000 | Range(Outer) | 1210.00 | 1280.00 |
| Along Distance (Km) | 18.86 | 20.51 | 19.73 | 0.000 | 7.61 | 34.98 | 19.64 | 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 |
| | | | | | | | | | | | |

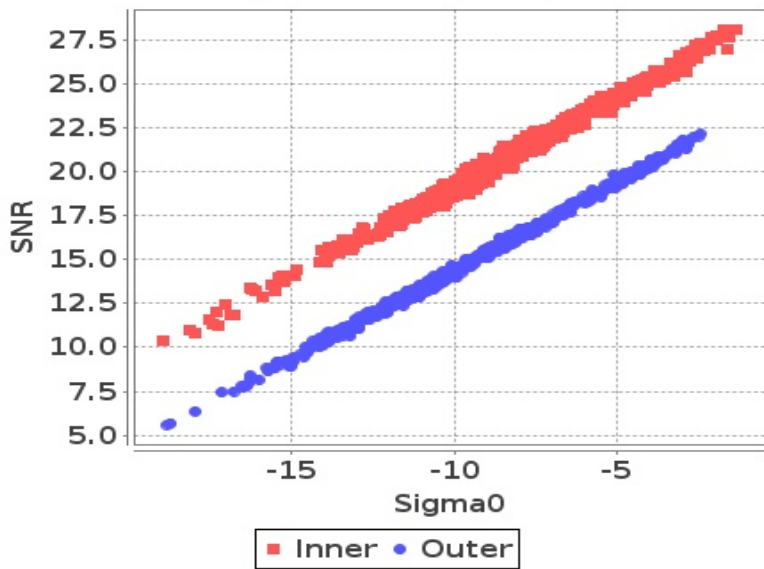
- Normal
- Deviations
- Alarming
- High Errors



Sigma0 Behaviour (Sigma0 Vs SNR)

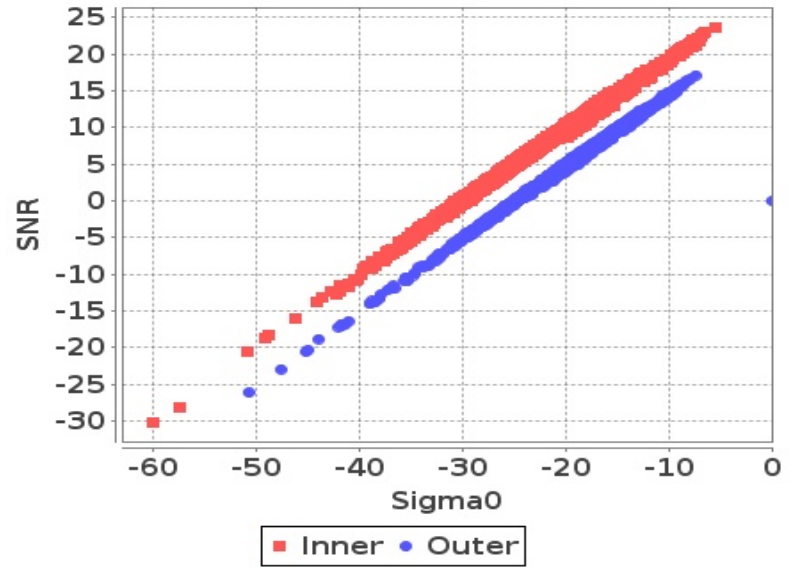
Footprint-Land

Sigma0 Vs SNR (Land)



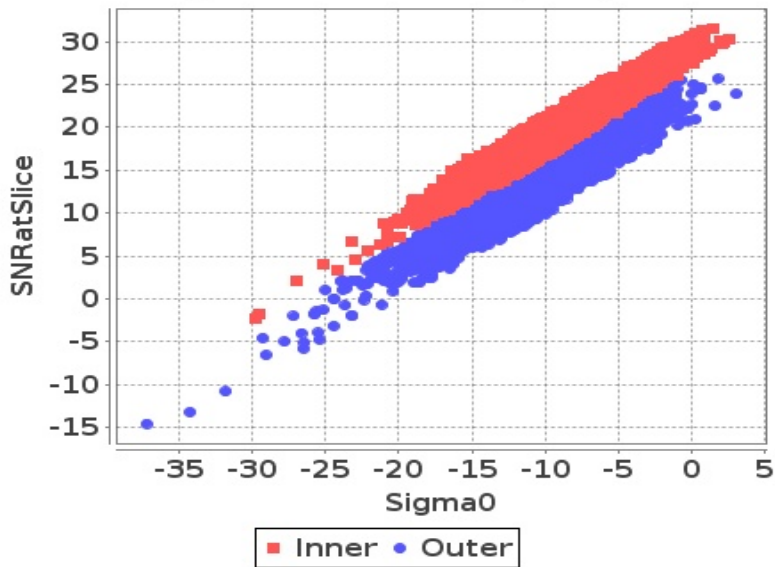
Footprint-Sea

Sigma0 Vs SNR (Sea)



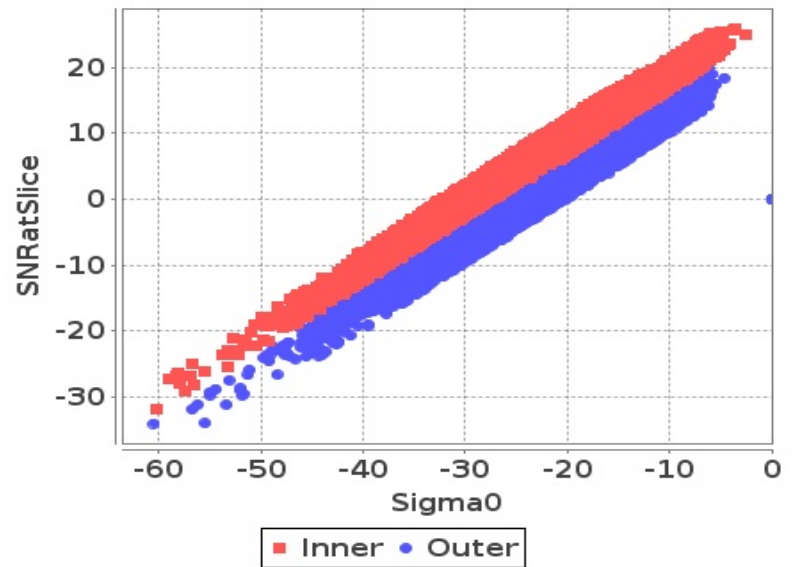
Slice-Land

Sigma0 Vs SNRatSlice (Land)



Slice-Sea

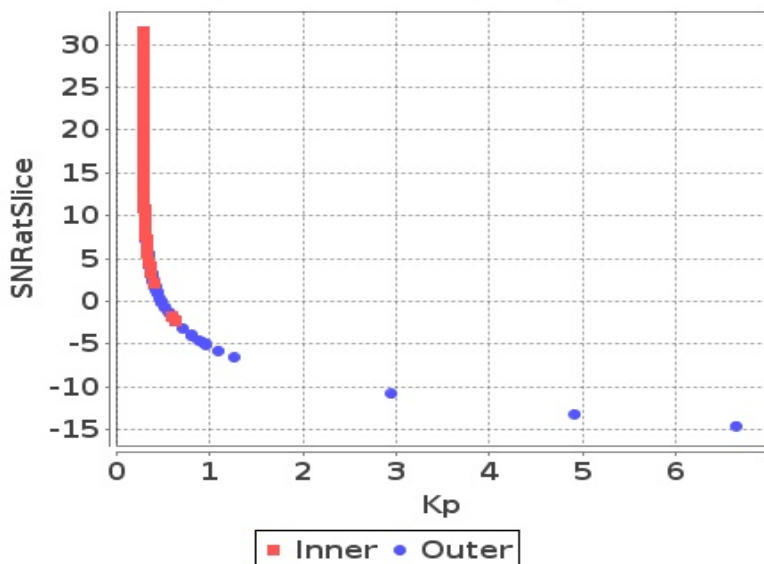
Sigma0 Vs SNRatSlice (Sea)



Sigma0 Behaviour (Kp Vs SNR)

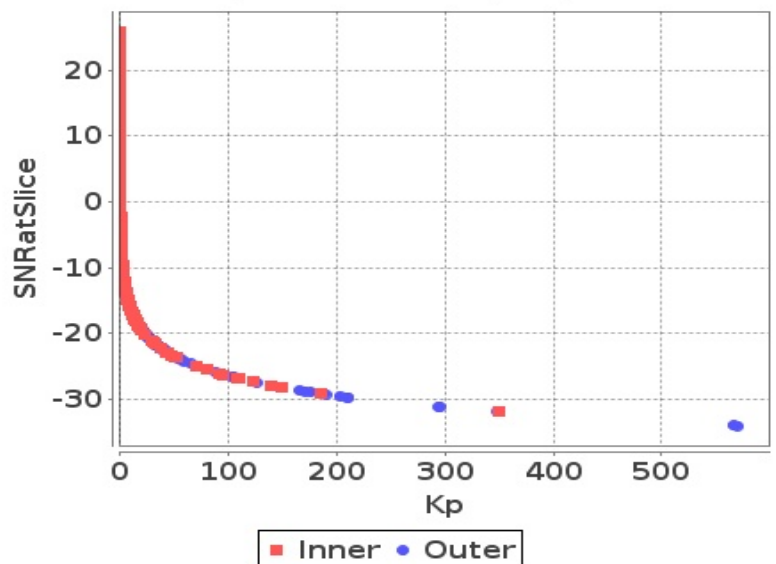
Slice

Kp Vs SNRatSlice (Land)



Slice

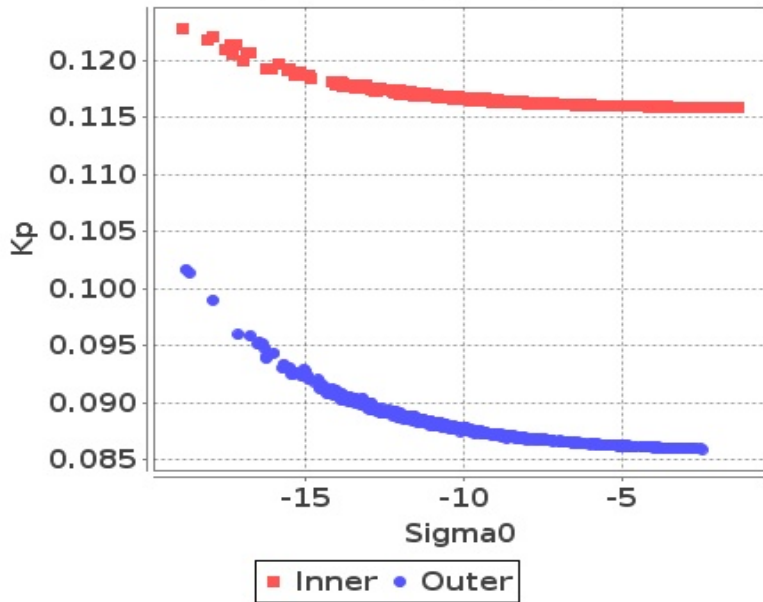
Kp Vs SNRatSlice (Sea)



Sigma0 Behaviour(Sigma0 Vs Kp)

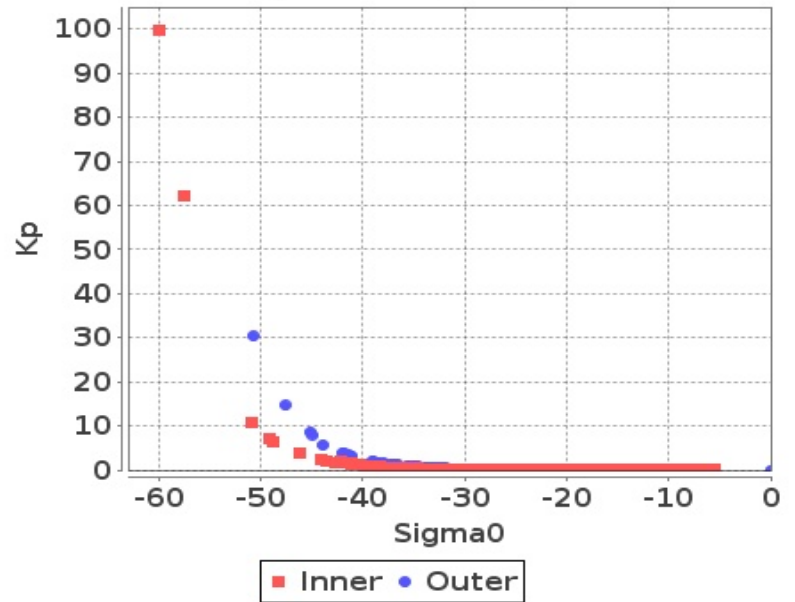
Footprint-Land

Sigma0 Vs Kp (Land)



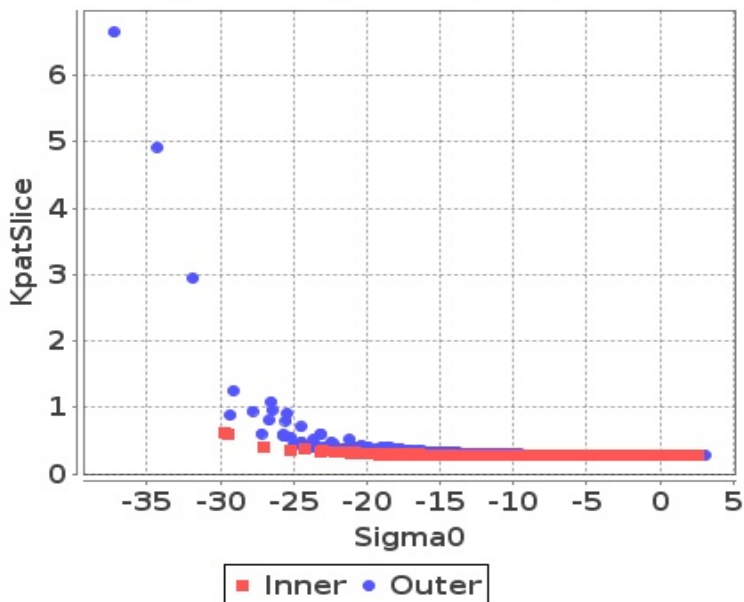
Footprint-Sea

Sigma0 Vs Kp (Sea)



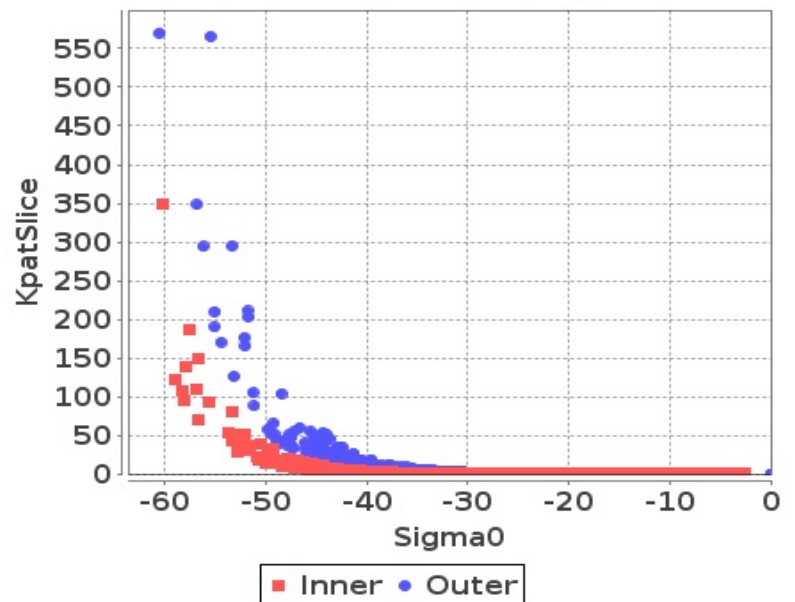
Slice-Land

Sigma0 Vs KpatSlice (Land)



Slice-Sea

Sigma0 Vs KpatSlice (Sea)

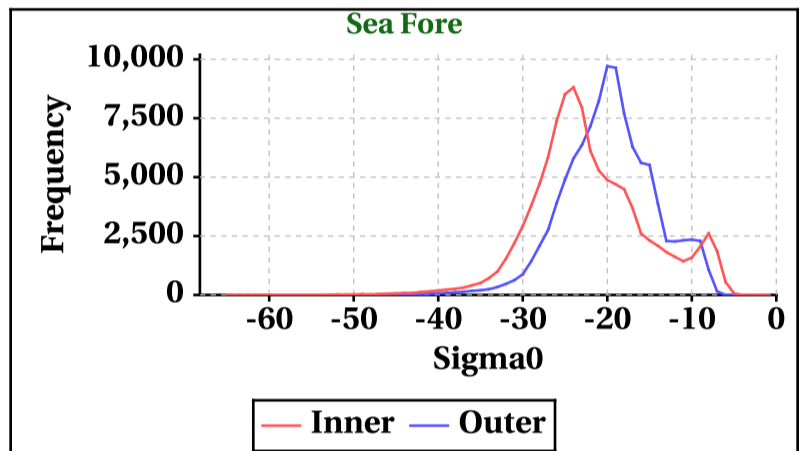
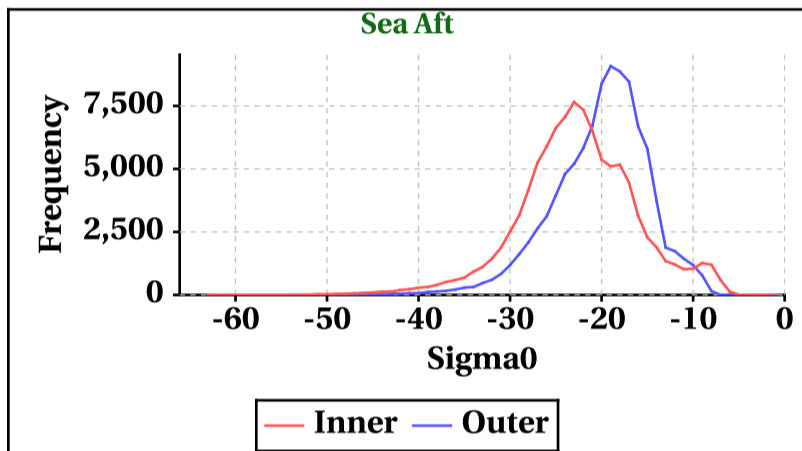
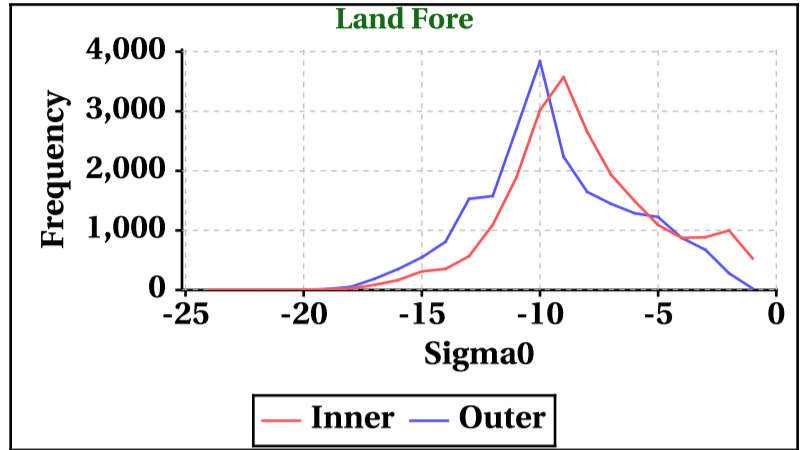
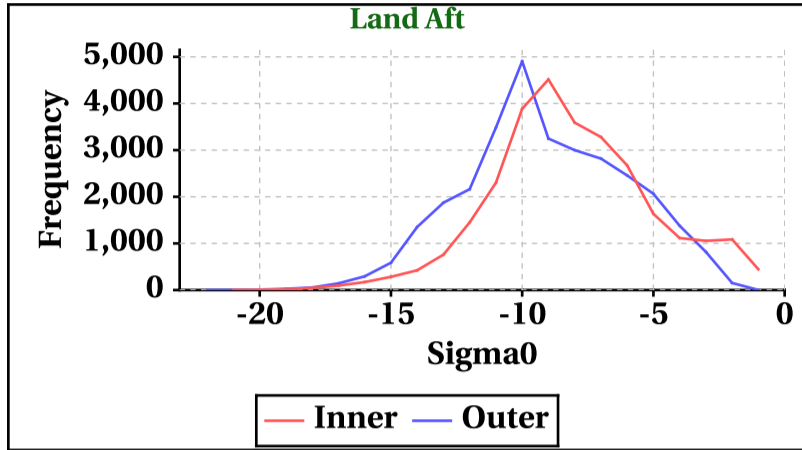


Dynamic Range (Data Histograms)

Sigma0(db)

| Inner Beam (HH) | | | | |
|-----------------|----------|-----------|---------|----------|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | -21 | -24 | -63 | -65 |
| Max | 0 | 0 | 0 | 0 |

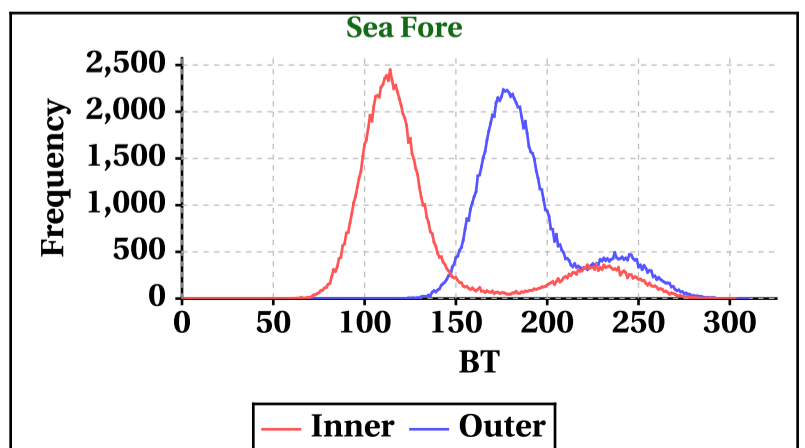
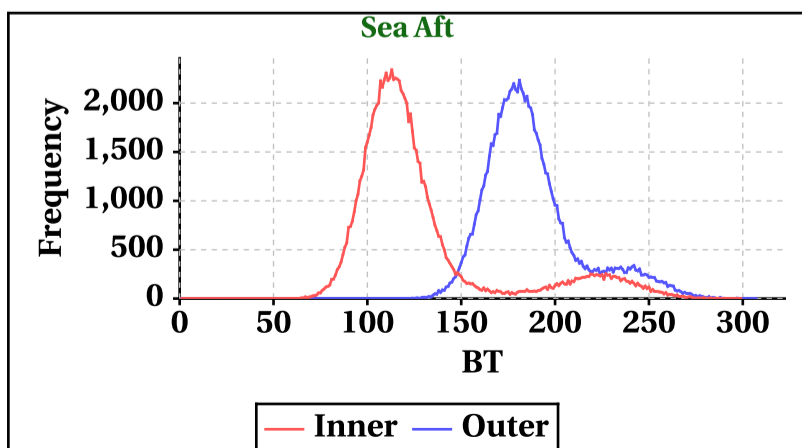
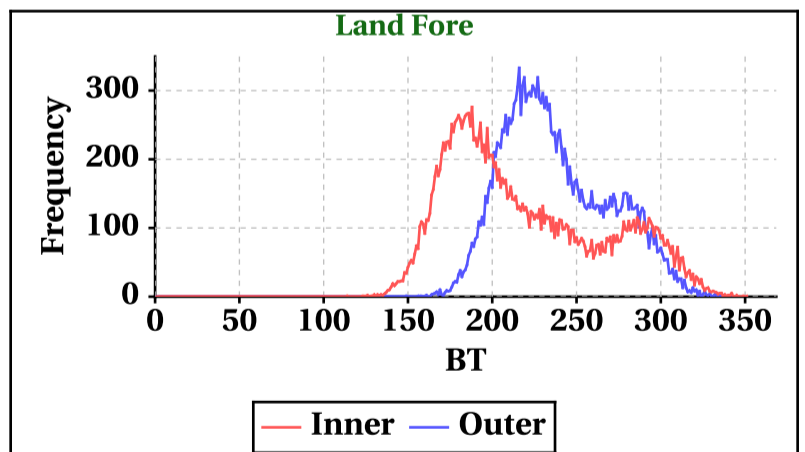
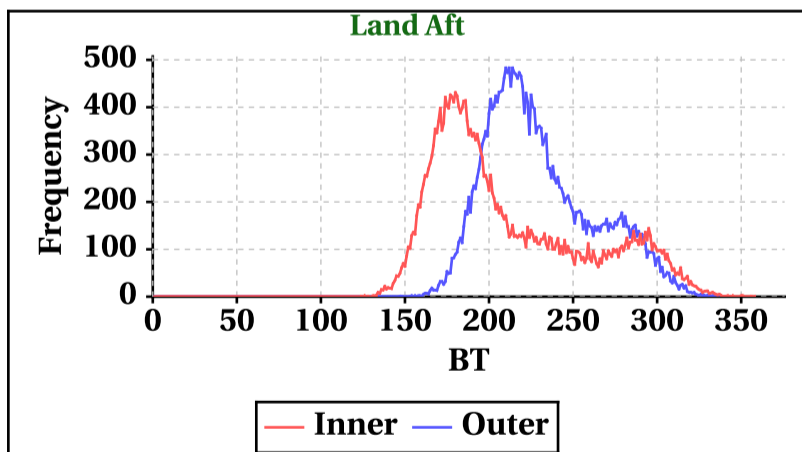
| Outer Beam (VV) | | | | |
|-----------------|----------|-----------|---------|----------|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | -22 | -20 | -59 | -59 |
| Max | 0 | 0 | 0 | 0 |



Brightness Temperature(K)

| Inner Beam(HH) | | | | |
|----------------|----------|-----------|---------|----------|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | 0 | 0 | 0 | 0 |
| Max | 358 | 351 | 299 | 303 |

| Outer Beam(VV) | | | | |
|----------------|----------|-----------|---------|----------|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | 0 | 0 | 0 | 0 |
| Max | 343 | 342 | 307 | 310 |

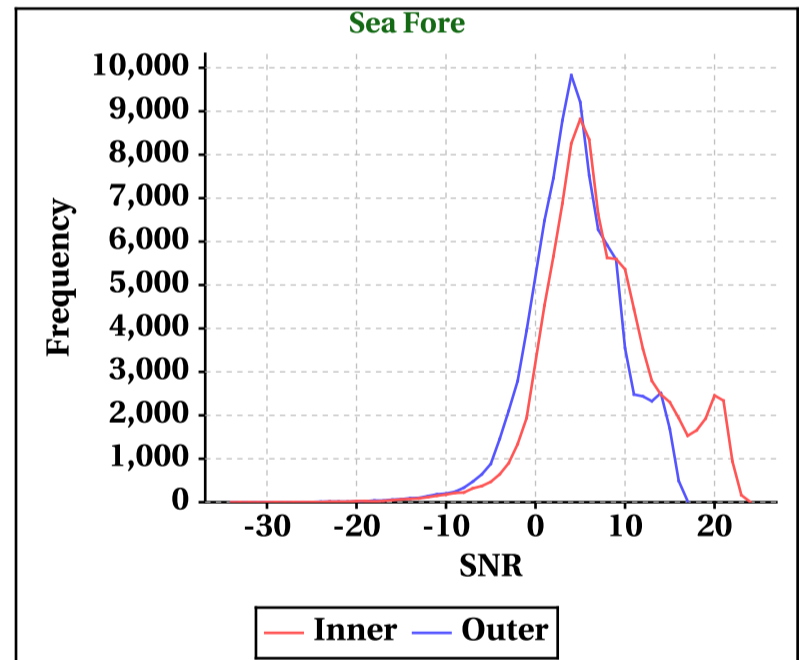
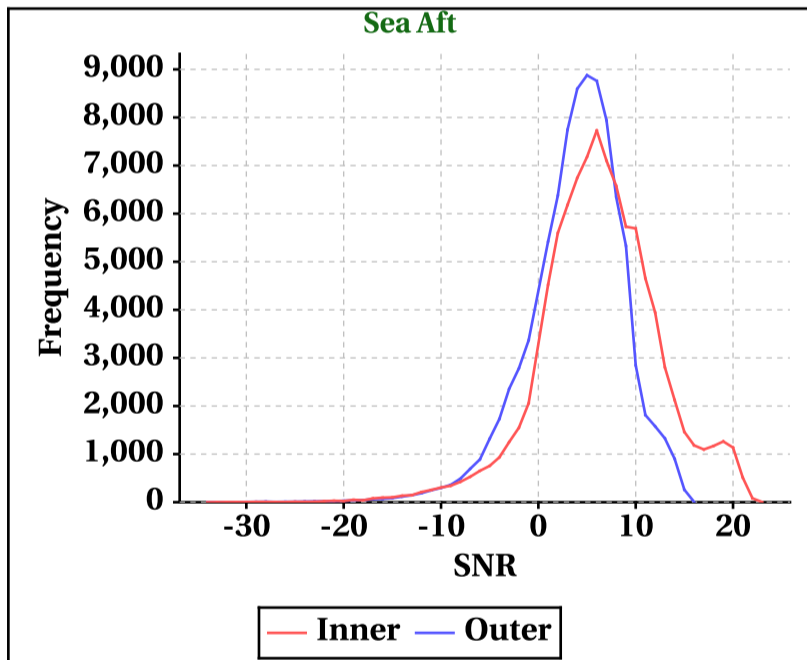
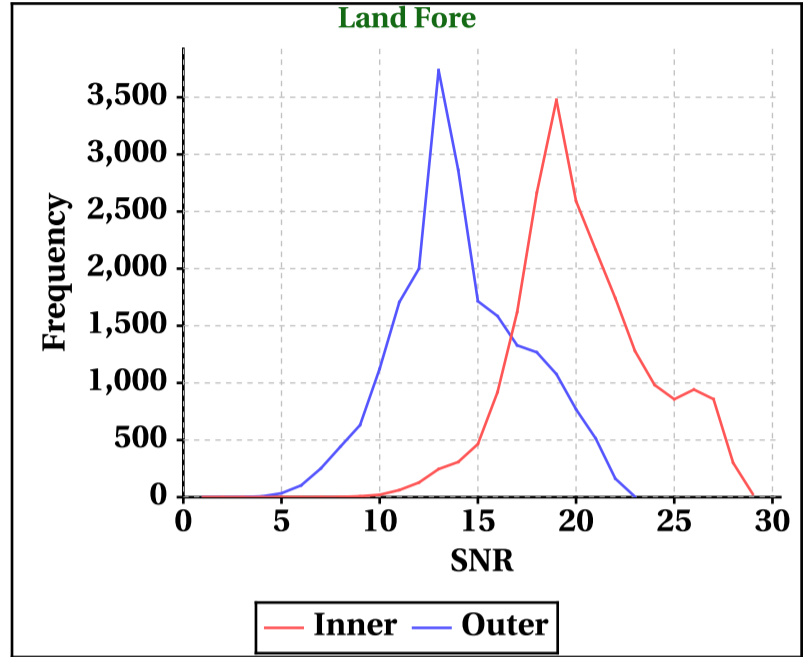
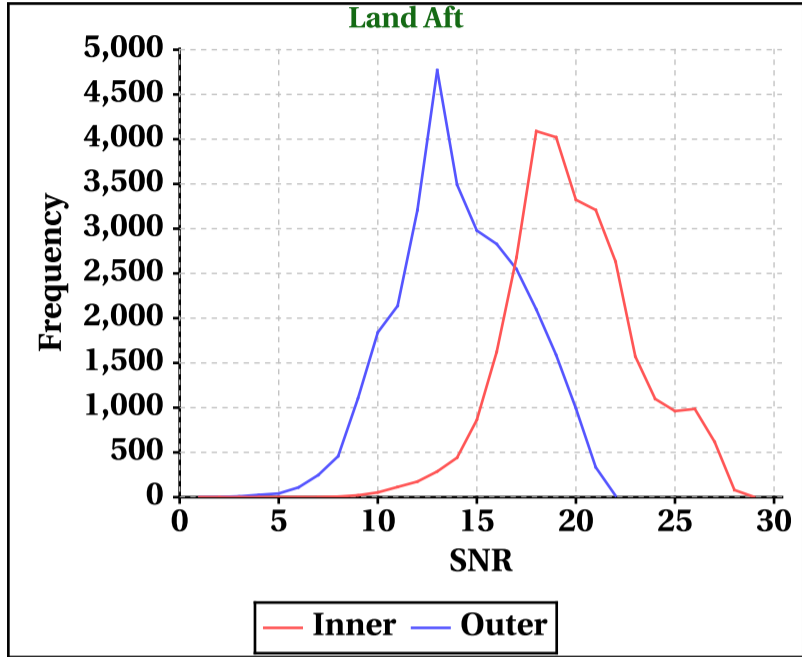


Dynamic Range (Data Histograms)

SNR(dBm)

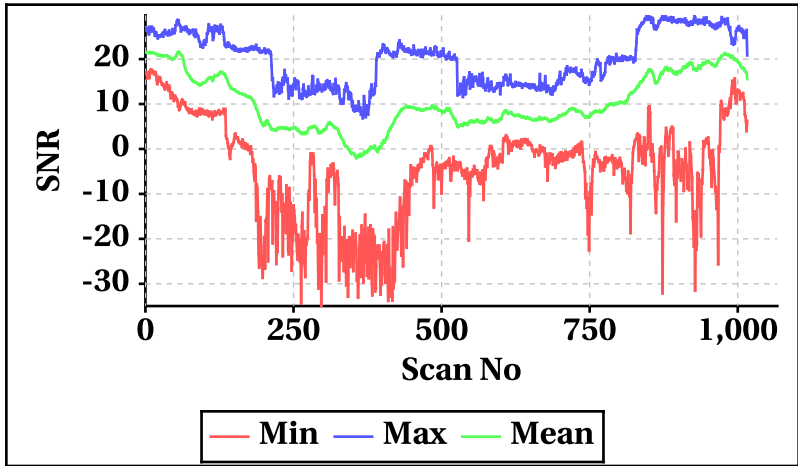
| Inner Beam (HH) | | | | |
|-----------------|----------|-----------|---------|----------|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | 0 | 0 | -34 | -34 |
| Max | 29 | 29 | 23 | 24 |

| Outer Beam (VV) | | | | |
|-----------------|----------|-----------|---------|----------|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | 0 | 0 | -34 | -34 |
| Max | 22 | 23 | 16 | 17 |

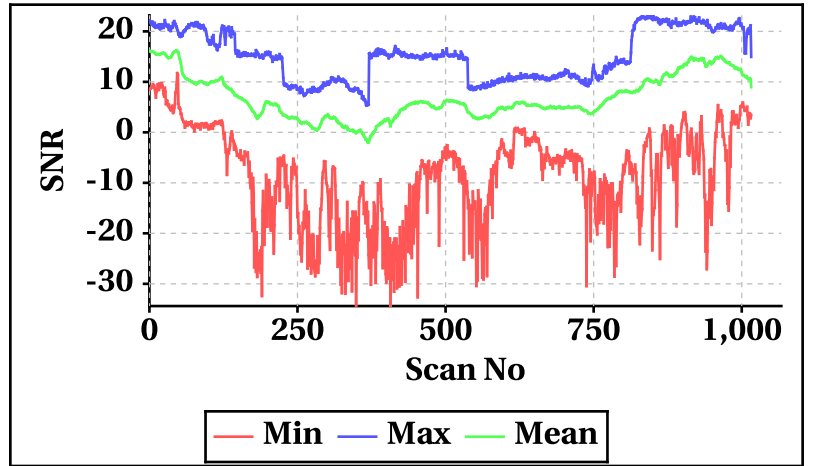


Orbit-wise behaviour of SNR

Inner Beam (HH)

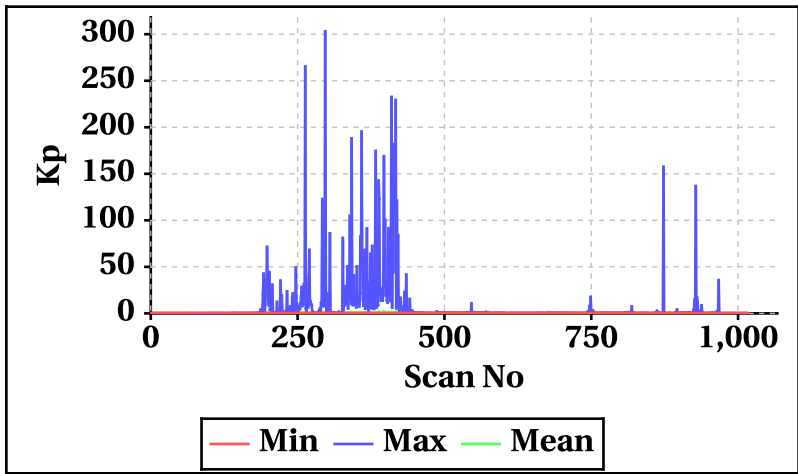


Outer Beam(VV)

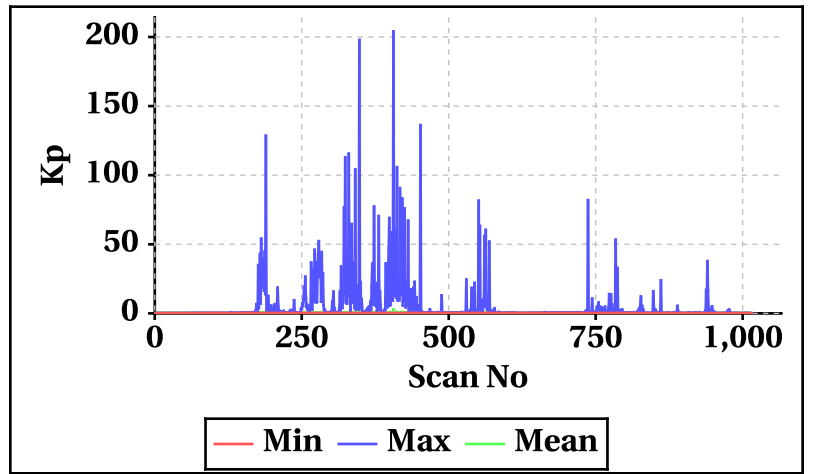


Orbit-wise behaviour of Kp,Kpa,Kpb,Kpc

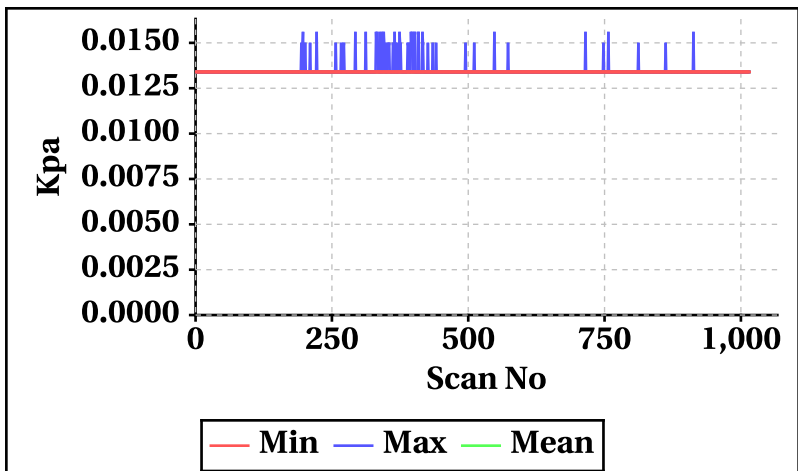
Inner Beam(HH)



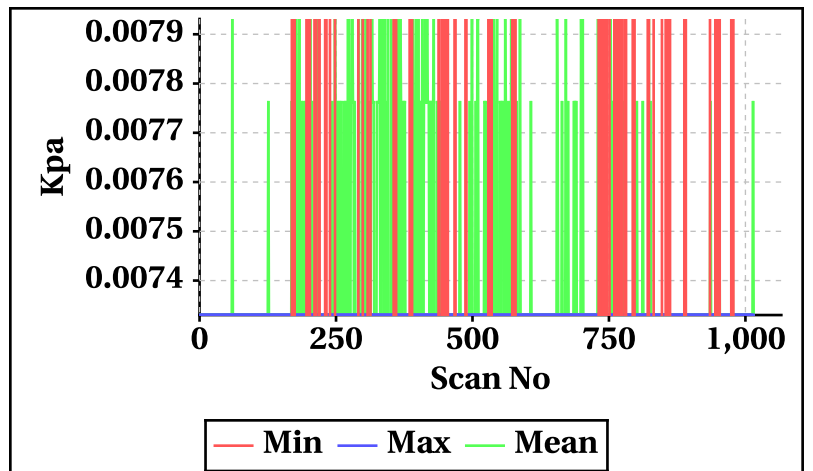
Outer Beam(VV)



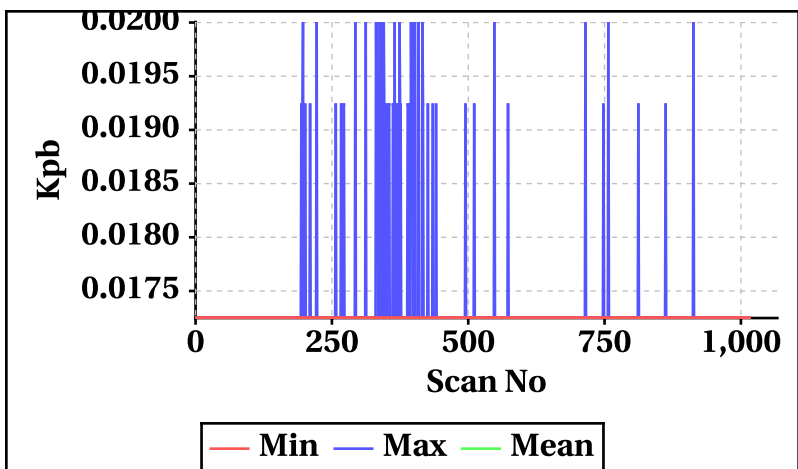
Inner Beam(HH)



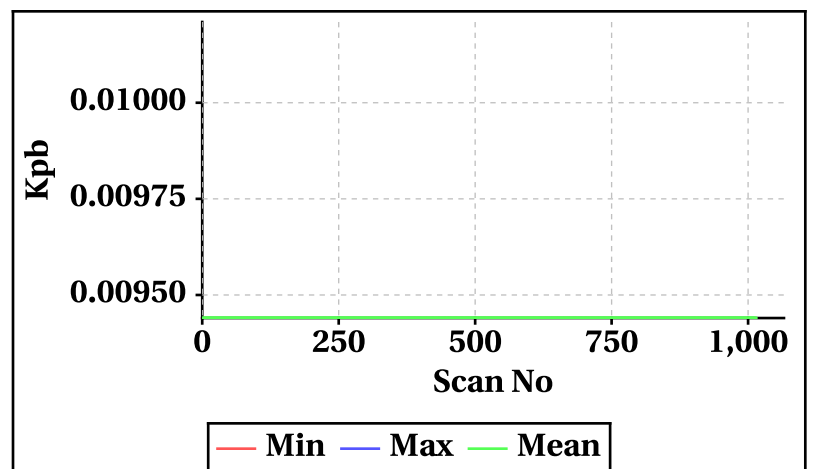
Outer Beam(VV)



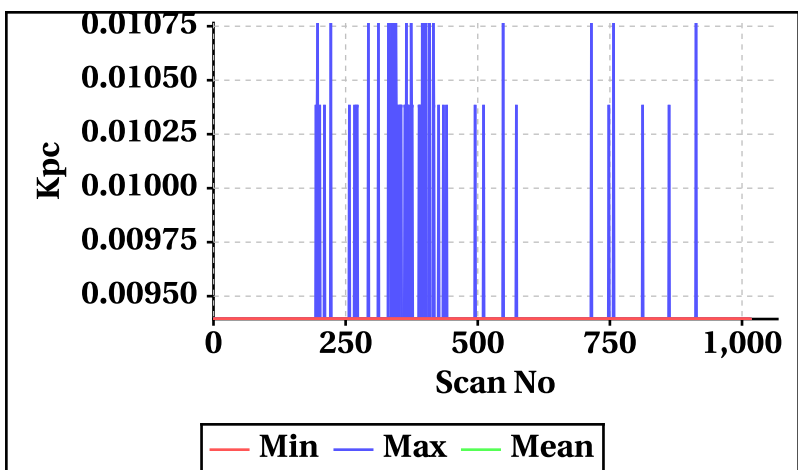
Inner Beam(HH)



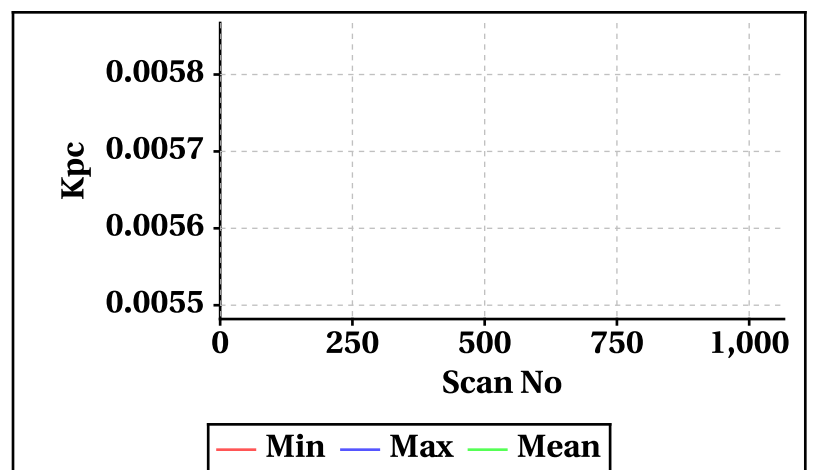
Outer Beam(VV)



Inner Beam(HH)

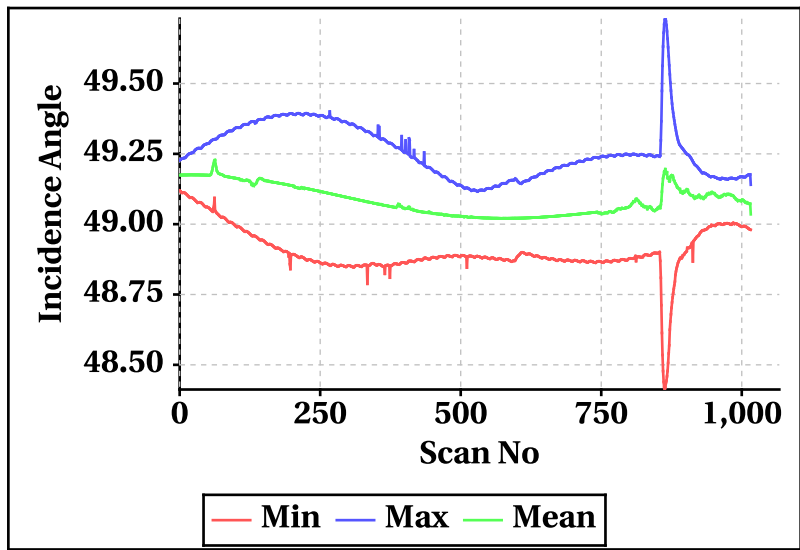


Outer Beam(VV)

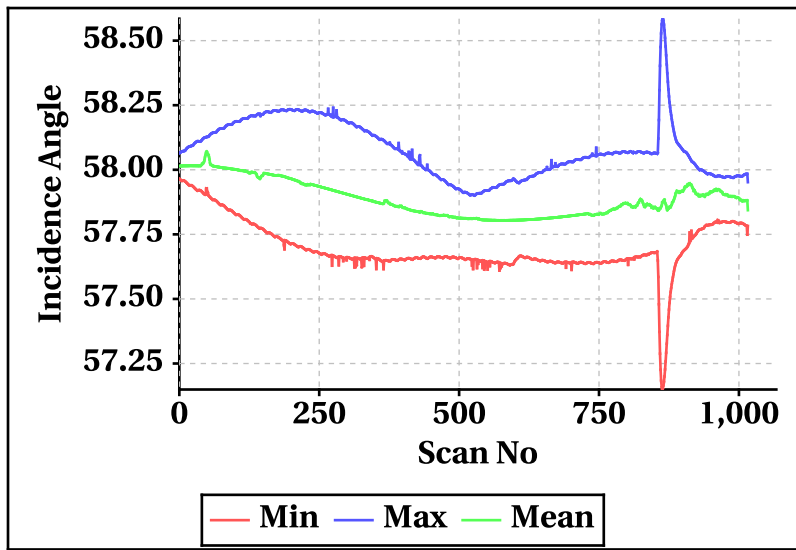


Orbit-wise behaviour of Incidence, Azimuth, Range, X-Factor

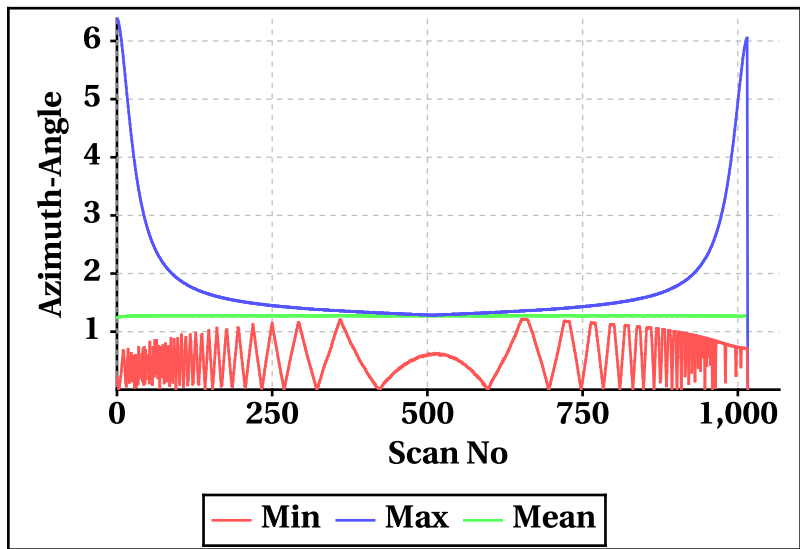
Inner Beam (HH)



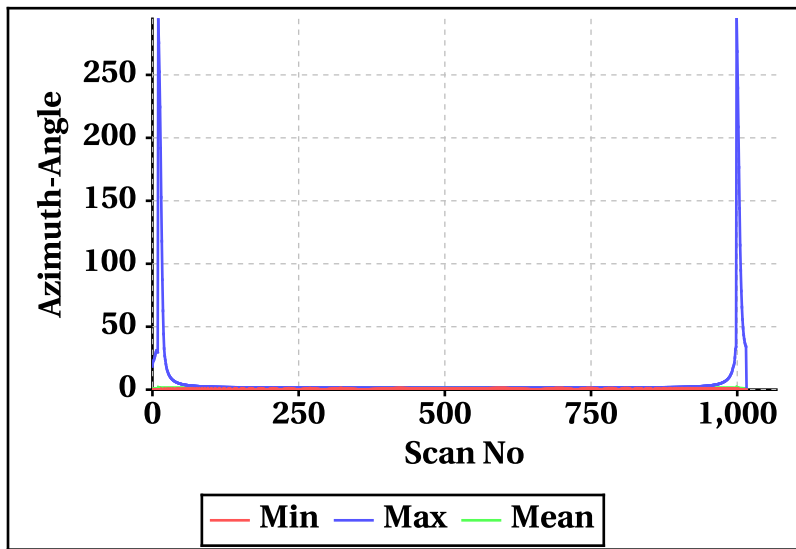
Outer Beam(VV)



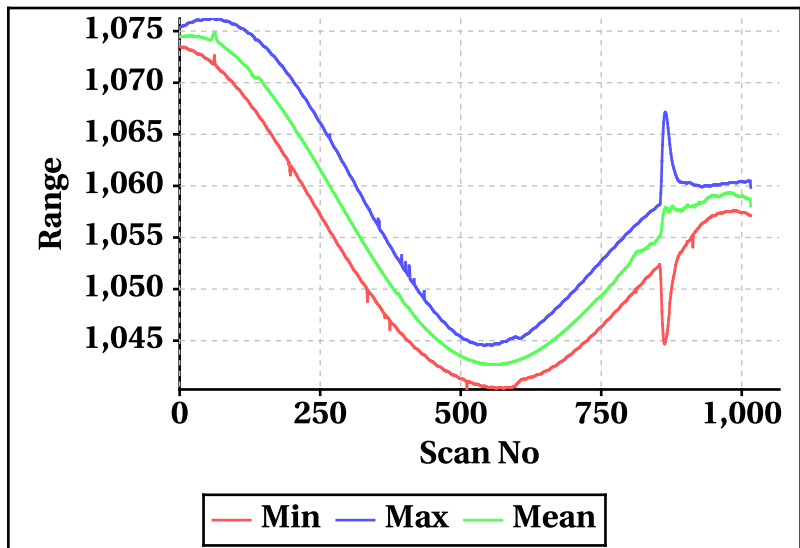
Inner Beam (HH)



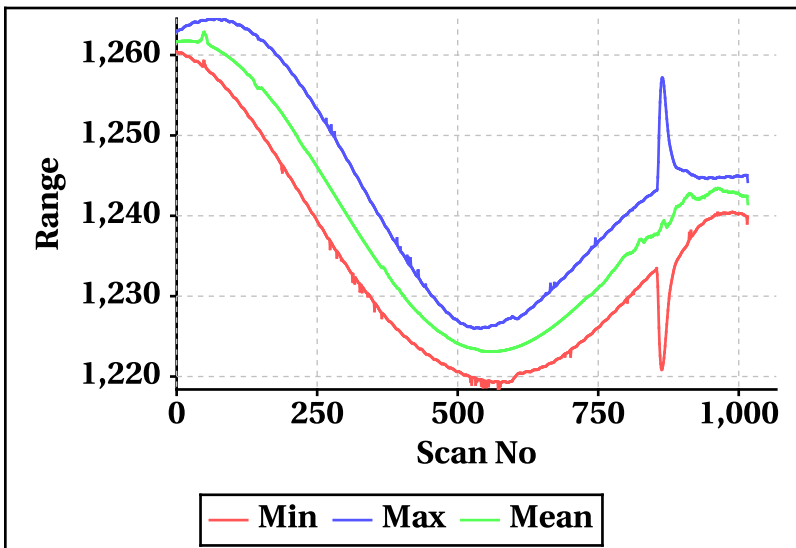
Outer Beam(VV)



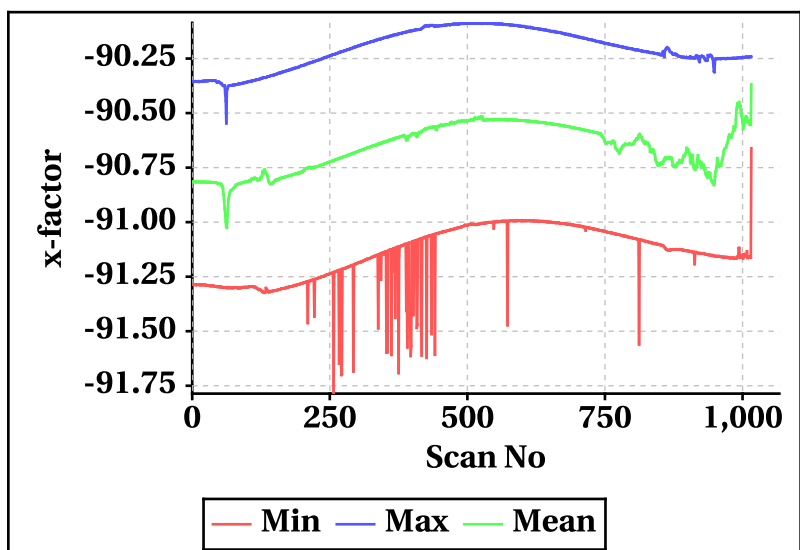
Inner Beam (HH)



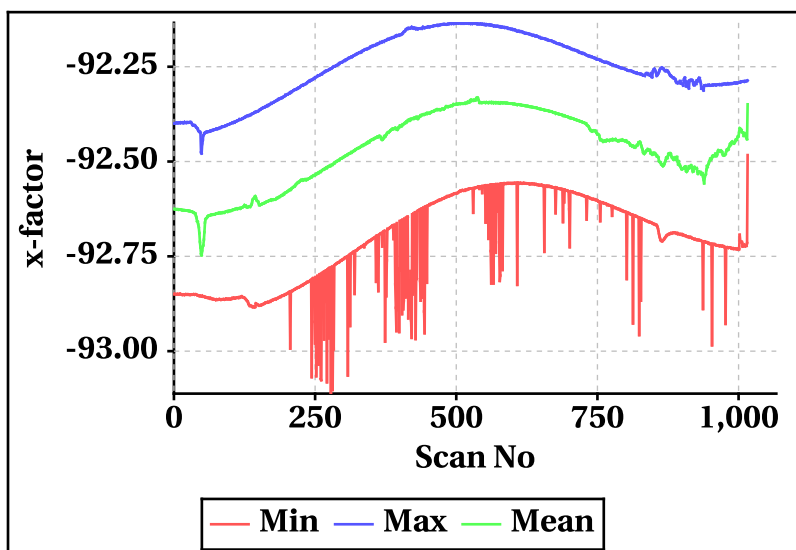
Outer Beam(VV)



Inner Beam (HH)



Outer Beam(VV)

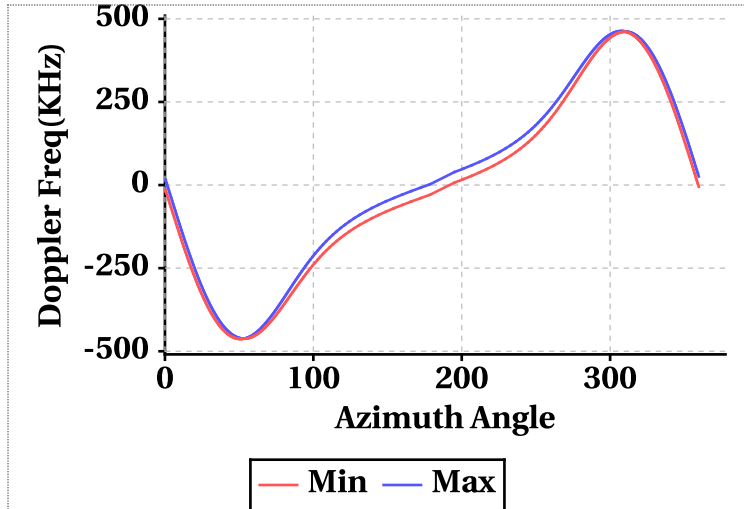


Doppler Frequency Variation

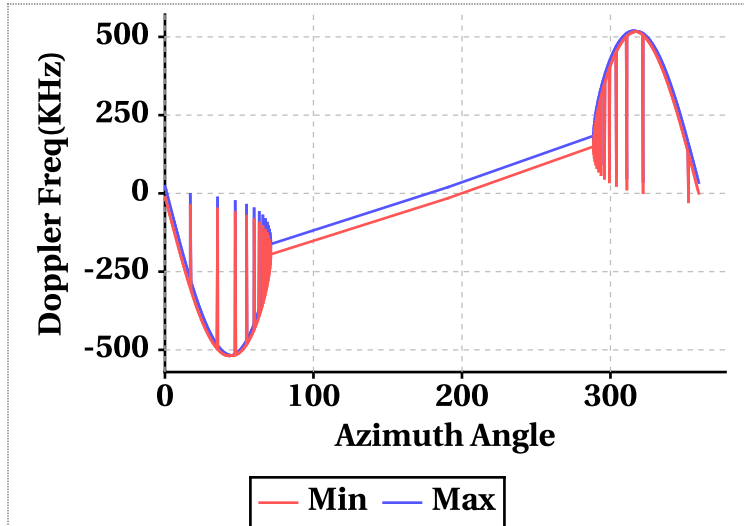
Doppler Frequency(KHz) variation statistics Over the half Orbit

| | Inner Beam (HH) | Outer Beam (VV) |
|------------|-----------------|-----------------|
| Min | -463.10 | -518.98 |
| Max | 463.24 | 519.10 |

Footprint wise Doppler frequency variation Inner Beam (HH)



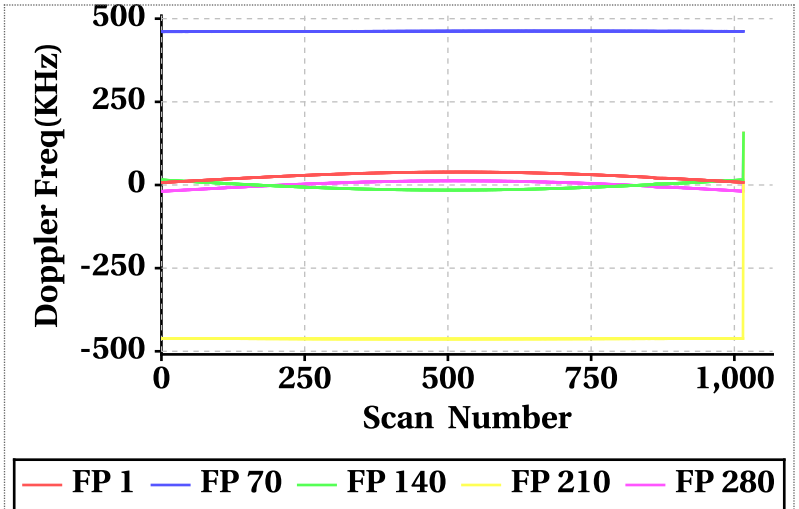
Footprint wise Doppler frequency variation Outer Beam (VV)



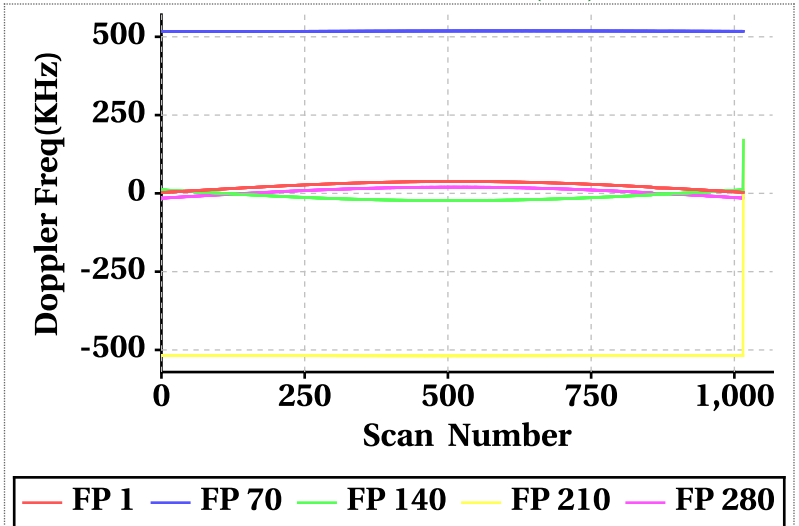
Doppler Frequency(KHz) variation

| Doppler_FP | Inner Beam (HH) | | | Outer Beam (VV) | | |
|-------------|-----------------|--------|---------|-----------------|--------|---------|
| | Min | Max | Mean | Min | Max | Mean |
| Doppler_1 | 7.18 | 38.94 | 27.44 | 2.52 | 37.98 | 25.14 |
| Doppler_70 | 460.86 | 462.80 | 462.07 | 516.48 | 518.84 | 517.98 |
| Doppler_140 | -15.42 | 156.22 | -4.06 | -23.16 | 169.58 | -10.38 |
| Doppler_210 | -463.02 | 156.22 | -461.81 | -518.76 | 169.58 | -517.53 |
| Doppler_280 | -19.00 | 156.22 | 1.20 | -15.34 | 169.58 | 7.23 |

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

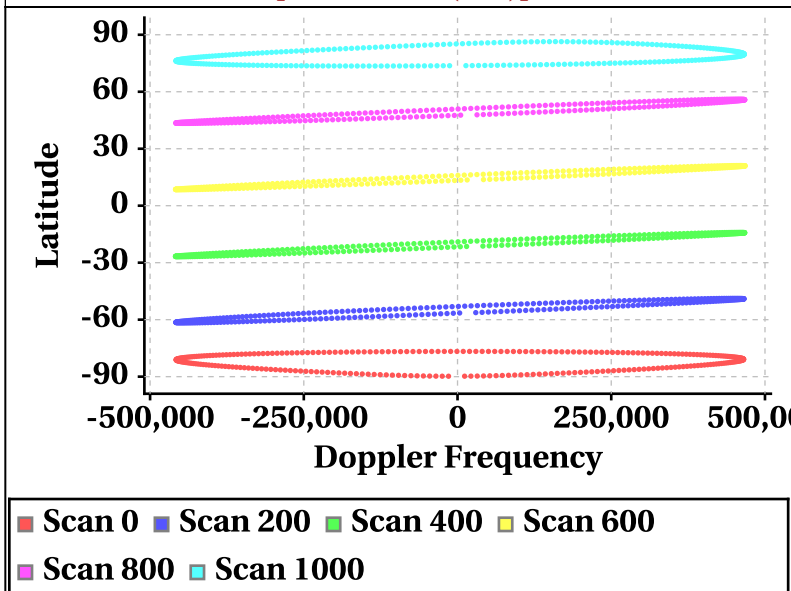


Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Outer Beam (VV)

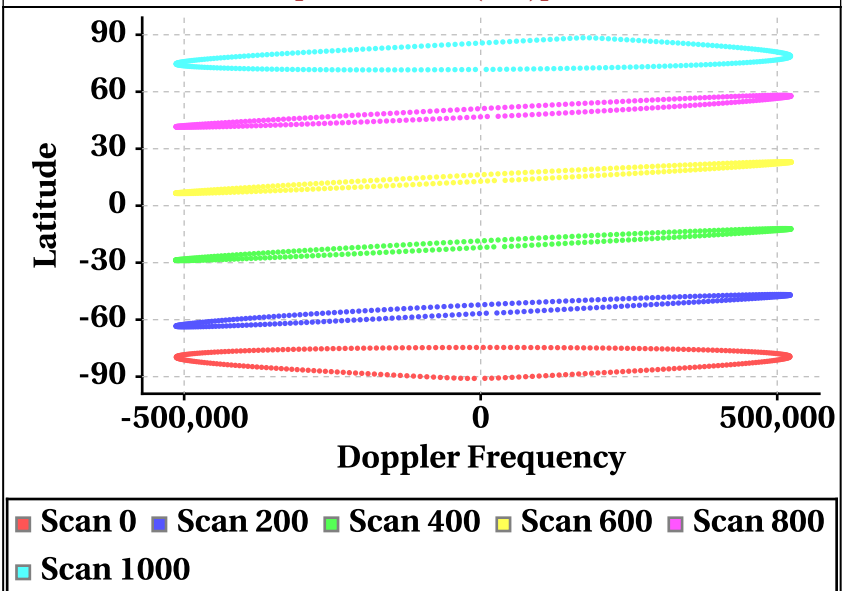


Latitude Vs Doppler Frequency

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



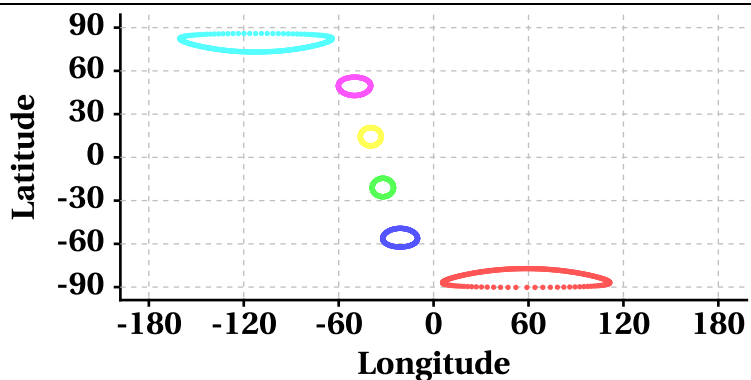
Doppler Frequency at Scan Interval of 200 [Outer Beam(VV)]



Parameter as a function of Latitude

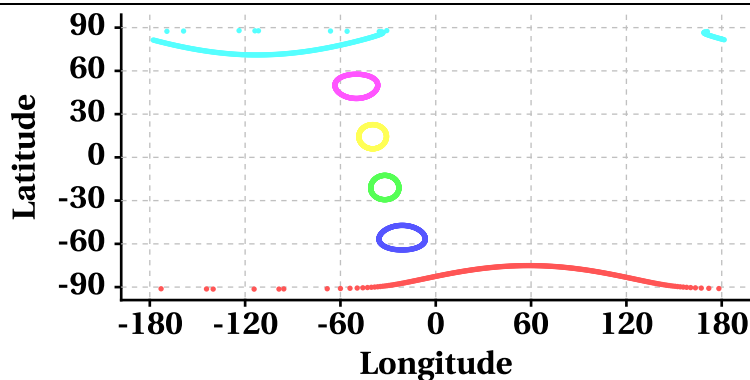
Latitude Vs Longitude

Scan Trace [Inner Beam(HH)]



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

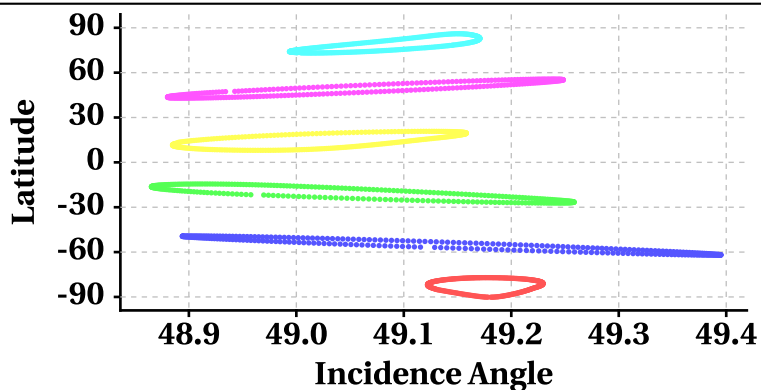
Scan Trace [Outer Beam (VV)]



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

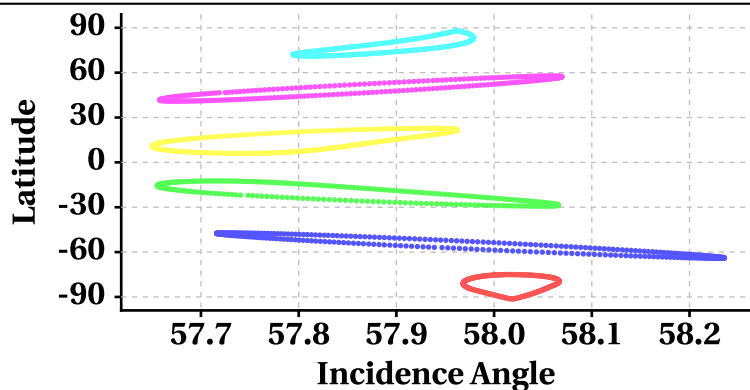
Latitude Vs Incidence Angle

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



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

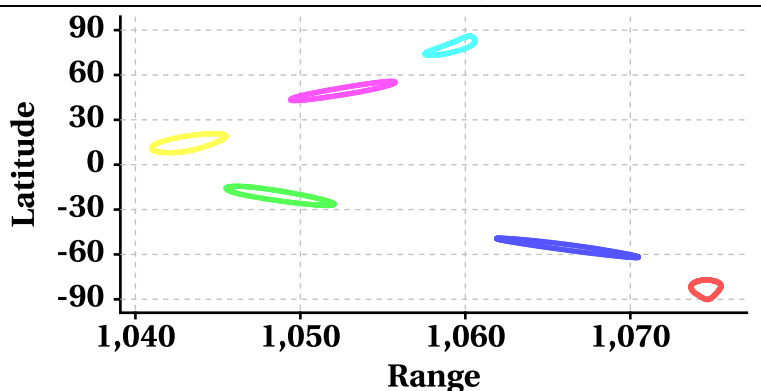
Incidence Angle at Scan Interval of 200 [Outer Beam (VV)]



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

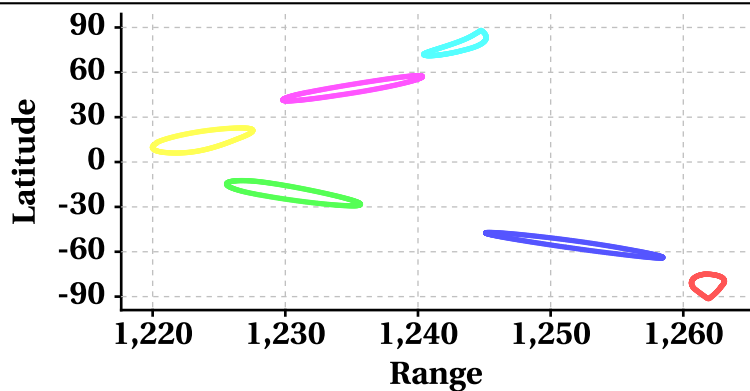
Latitude Vs Range

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

