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

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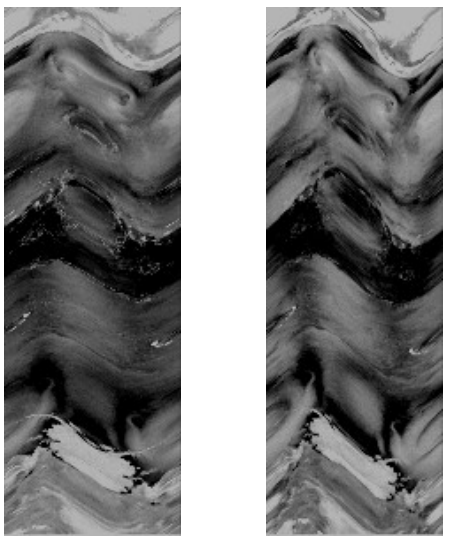
L1B Parameter as a function of Latitude

Half Orbit OAT Behaviour


| | | | | | |
|---|---|---|---|---|---|
| **Satellite Id** | ScatSat-1 | **Start Orbit** | 3292 | **Total Scans** | 1008 |
| **Sensor Name** | Scatterometer | **End Orbit** | 3293 | **No of Inner FootPrints** | 281 |
| **Processor Version** | v1.1.2 | **Rev. Number** | 03292_03293 | **No Of Outer FootPrints** | 282 |
| **Half Orbit Direction** | SN | **Data Production Date** | 11-05-2017 | **No. Of Inner Slices** | 9 |
| **Equator Crossing Date** | 11-05-2017 | **Equator Crossing Time** | 06:41:35.000 | **No Of Outer Slices** | 14 |

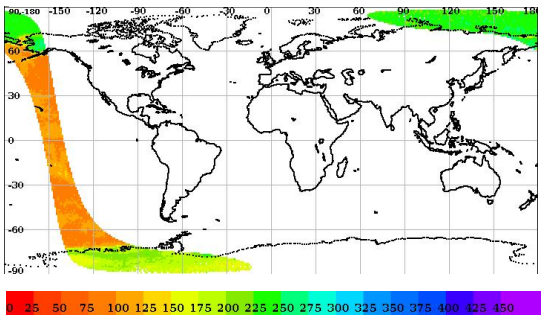
## Image Snapshot for Inner & Outer Beam

**Inner (HH)** **Outer (VV)**

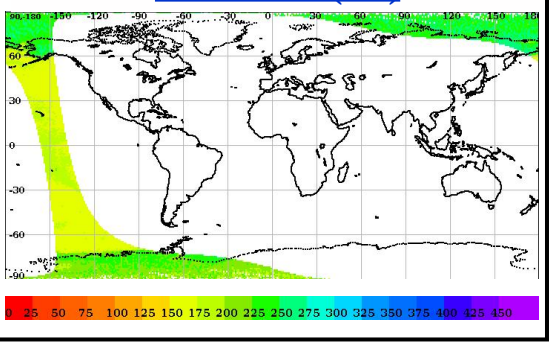


## Brightness Temprature(k) Footprint trace

**Inner Beam (HH)**

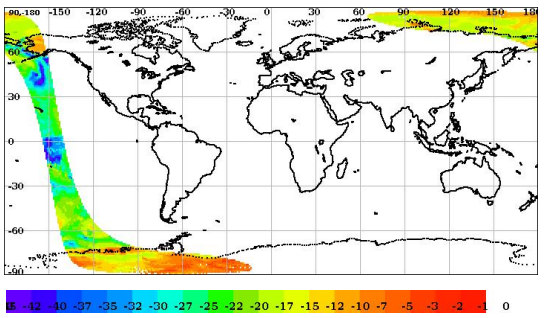


**Outer Beam (VV)**

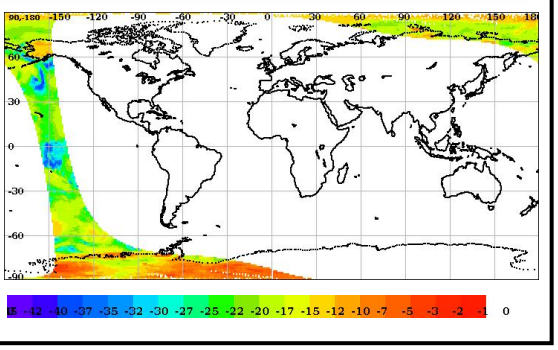


## Sigma0(dB) Footprint trace

**Inner Beam (HH)**



**Outer Beam (VV)**



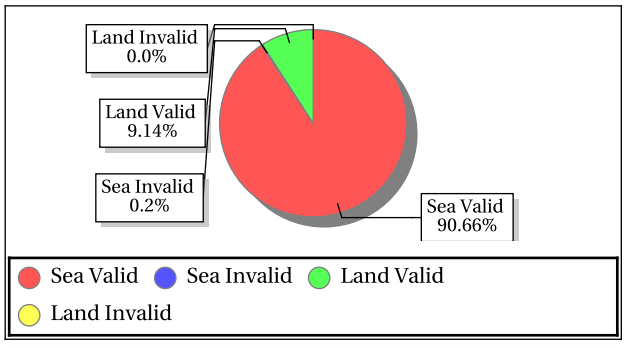
## Invalid and Poor Sigma-0 Quality Flag Statistics for Inner/Outer Slices*

| Sigma-0 Flags | Inner Beam | Outer Beam |
|---|---|---|
| **Invalid Sigma0(%)** | 0.20 | 0.20 |
| **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(%)** | 0.01 | 0.01 |
| **Noise samples for blending Saturated** | 0.0 | 0.0 |
| **Count samp. for interpol. saturated (%)** | 0.00 | 0.00 |
| **Sigma0<lower bound (-96bB) (%)** | 0.0 | 0.0 |
| **Sigma0>upper bound (0 dB) (%)** | 0.00 | 0.00 |
| **SNR <-65 dB (%)** | 100.0 | 100.0 |

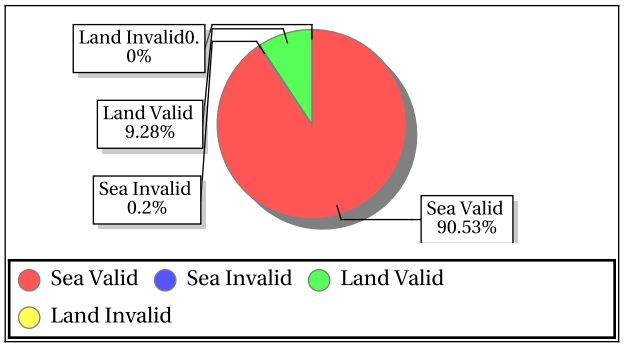
*DP Format Document

## 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. (%) |
| Kp | 0.10 | 218.28 | 0.33 | 3.108 | 0.10 | 213.19 | 0.28 | 2.493 | 0.10 | 0.13 | 0.10 | 0.000 | 0.10 | 0.12 | 0.10 | 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 | 0.02 | 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 |
| 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 | -34.12 | 25.01 | 4.64 | 0.111 | -34.02 | 27.17 | 6.21 | 0.170 | 4.58 | 27.11 | 16.69 | 9.885 | 5.40 | 29.09 | 16.93 | 7.783 |

## 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 | 0.08 | 168.70 | 0.24 | 2.101 | 0.08 | 212.27 | 0.24 | 1.864 | 0.08 | 0.18 | 0.09 | 0.000 | 0.08 | 0.19 | 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 | 0.00 | 0.01 | 0.00 | 0.000 | 0.00 | 0.01 | 0.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.000 | 0.00 | 0.01 | 0.00 | 0.000 |
| SNR | -33.88 | 20.17 | 2.92 | 0.000 | -34.88 | 21.29 | 3.89 | 0.000 | -1.84 | 22.81 | 12.38 | 0.259 | -2.32 | 23.16 | 12.25 | 0.688 |

| 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)

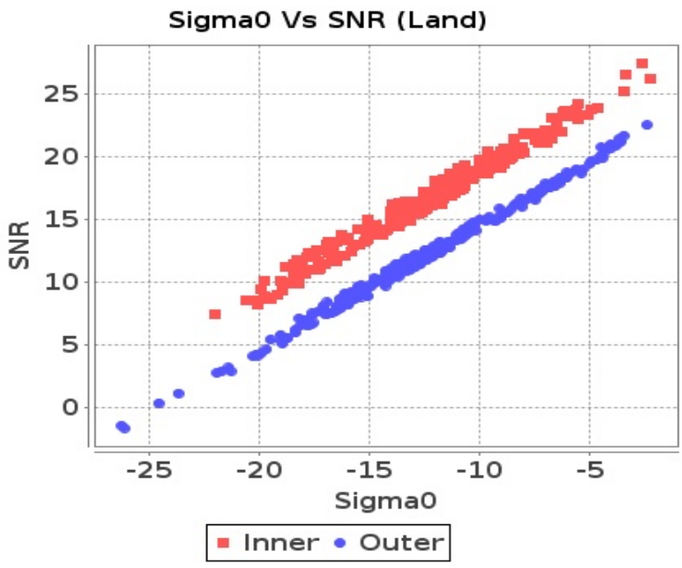
| | Inner Beam (HH) | | | | Outer Beam (VV) | | | |
|---|---|---|---|---|---|---|---|---|
| | Min | Max | Mean | Bad Occ. (%) | Min | Max | Mean | Bad Occ. (%) |
| Incidence Angle (deg) | 48.71 | 49.39 | 49.05 | 0.000 | 57.51 | 58.26 | 57.99 | 0.000 |
| Azimuth Diff. (deg) | 0.0026 | 207.75 | 1.09 | 0.140 | 0.0029 | 1.97 | 1.09 | 0.200 |
| Range(Km) | 1043.50 | 1073.13 | 1056.75 | 0.000 | 1222.74 | 1261.91 | 1242.04 | 0.000 |
| X Factor(dbm) | -91.97 | -89.33 | -90.50 | 0.000 | -93.40 | -91.83 | -92.41 | 0.000 |
| Across Distance (Km) | 99999.99 | -99999.99 | 0.00 | 0.000 | 99999.99 | -99999.99 | 0.00 | 0.000 |
| Along Distance (Km) | 19.05 | 20.52 | 19.72 | 0.000 | 18.66 | 20.41 | 19.63 | 0.000 |

| Parameter Specifications | | |
|---|---|---|
| Parameter | Min | Max |
| Inci.(Inner) | 47.10 | 49.90 |
| Inci.(Outer) | 57.30 | 58.90 |
| Azimuth Diff. | 0.60 | 2.00 |
| Range(Inner) | 1025.00 | 1095.70 |
| Range(Outer) | 1210.00 | 1280.00 |
| X-Factor | -100.00 | -80.00 |
| Ac.Dist(Inner) | 15.00 | 20.00 |
| Ac.Dist(Outer) | 15.00 | 22.00 |
| Al.Dist(Inner) | 15.00 | 30.00 |
| Al.Dist(Outer) | 10.00 | 30.00 |

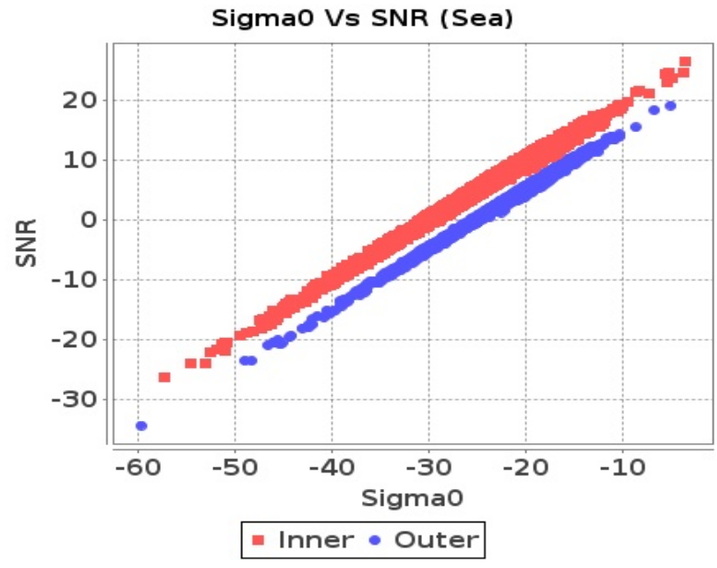
Normal
Deviations
Alarming
High Errors

# Sigma0 Behaviour (Sigma0 Vs SNR)

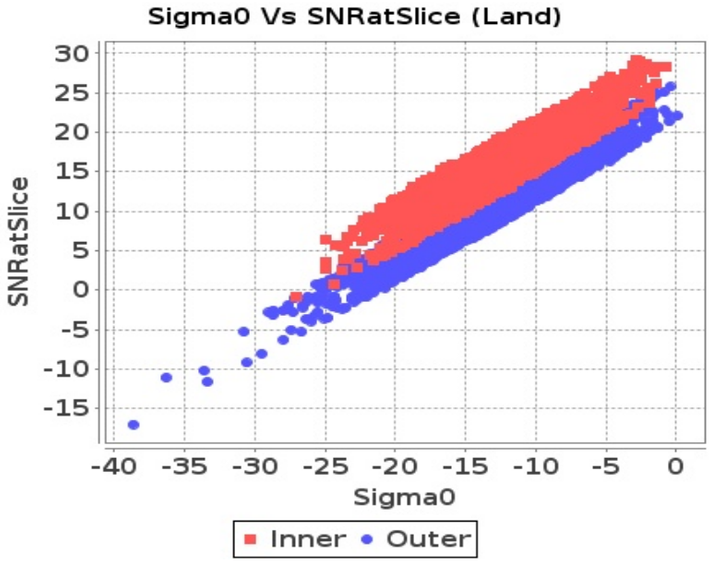
**Footprint-Land**



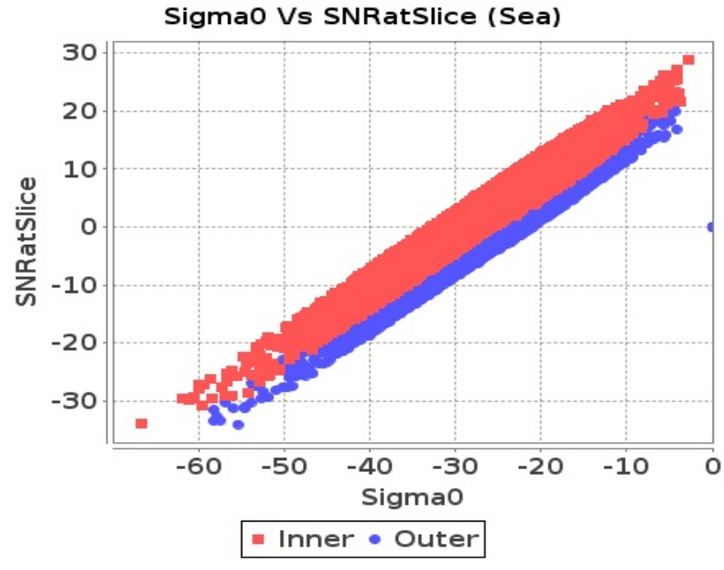

**Footprint-Sea**




**Slice-Land**

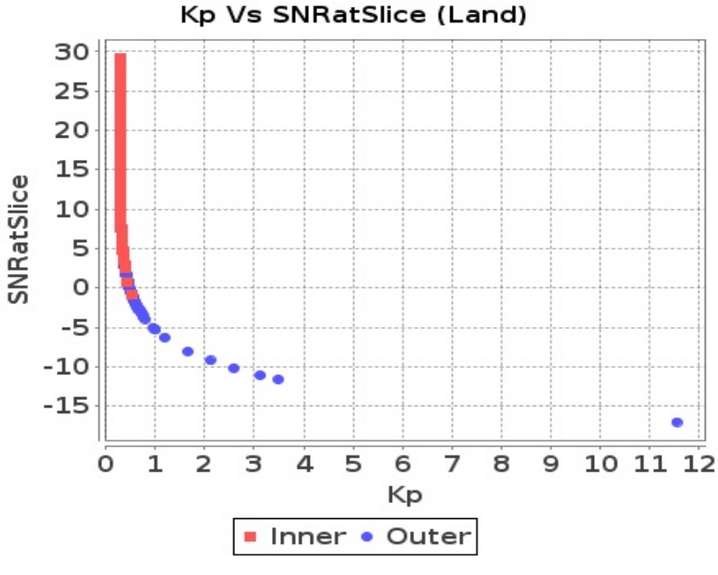



**Slice-Sea**

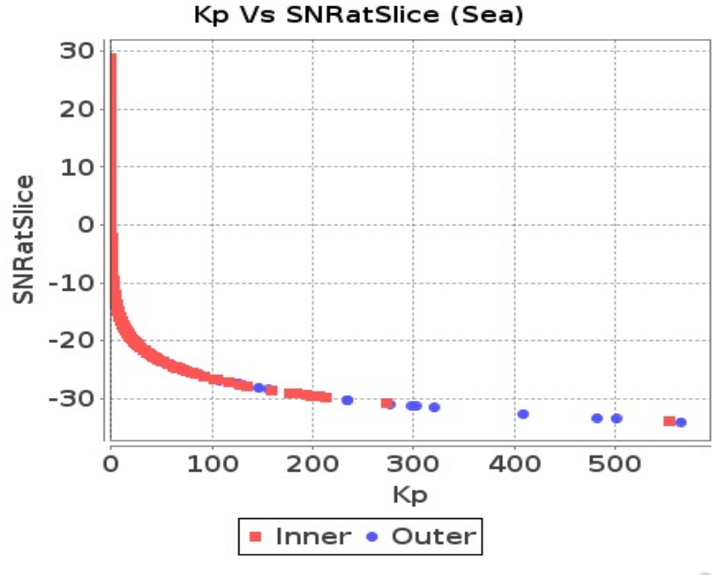



# Sigma0 Behaviour (Kp Vs SNR)

**Slice**

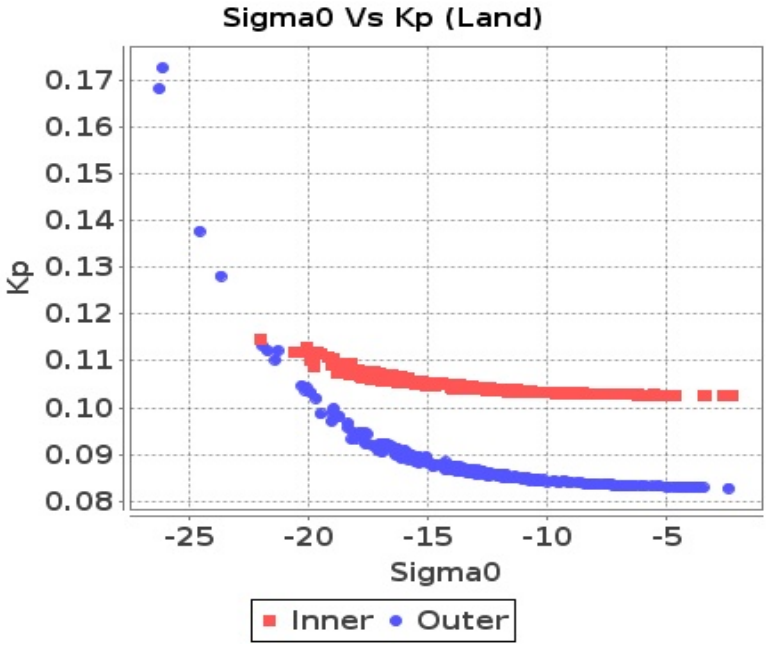



**Slice**

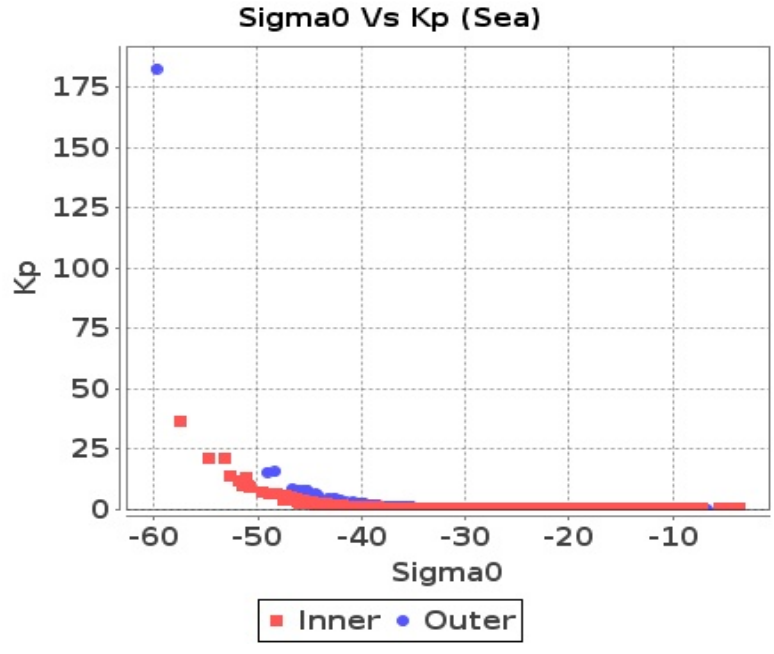


# Sigma0 Behaviour(Sigma0 Vs Kp)

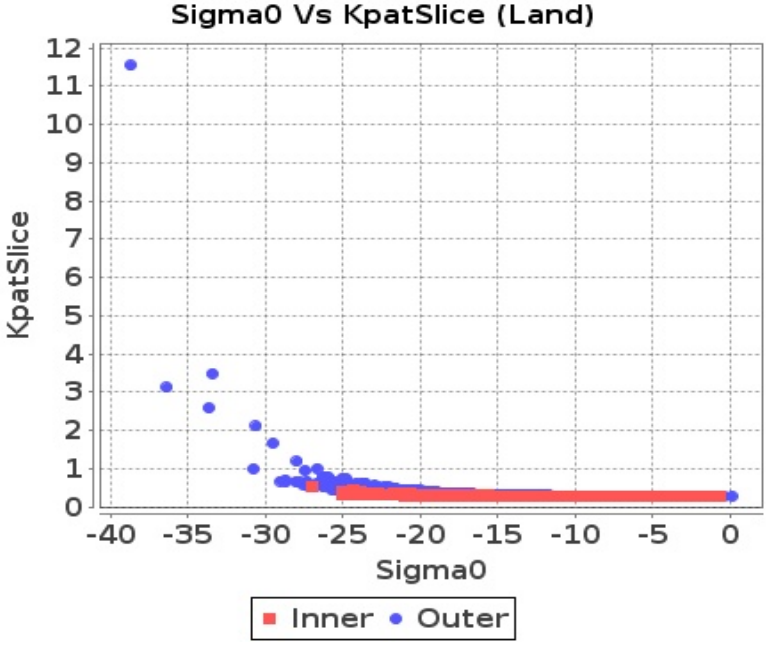
## Footprint-Land



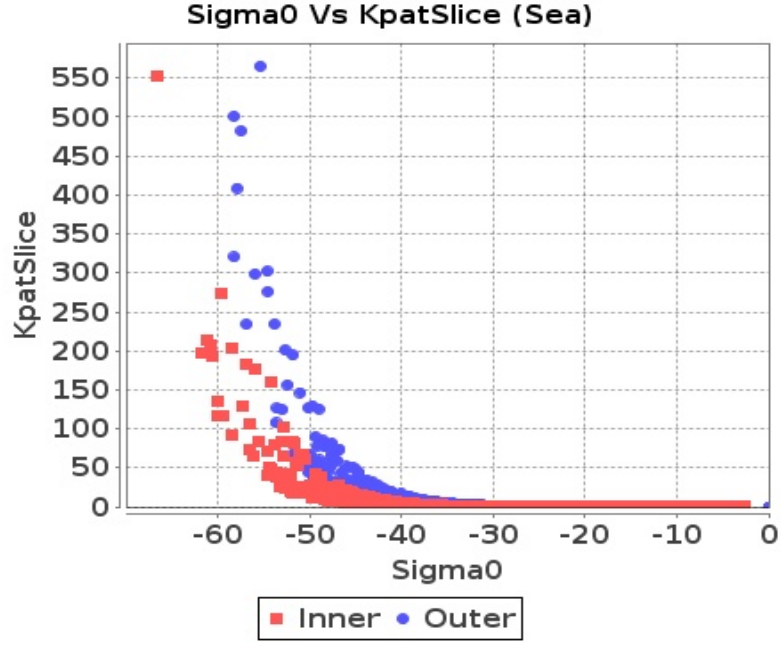

## Footprint-Sea




## Slice-Land




## Slice-Sea

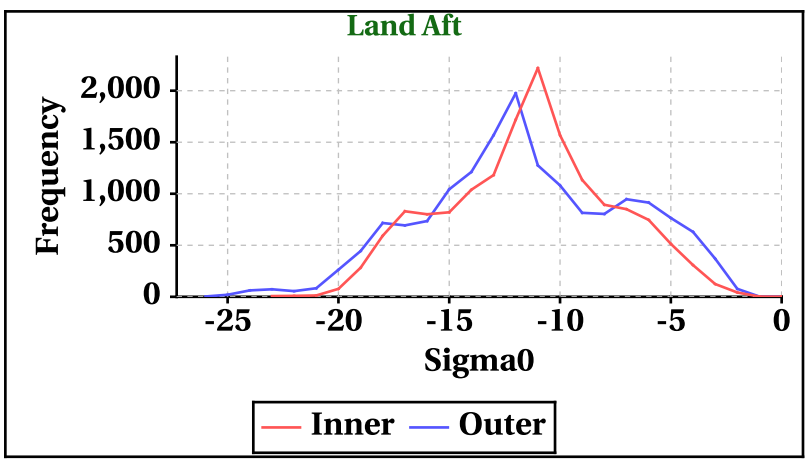


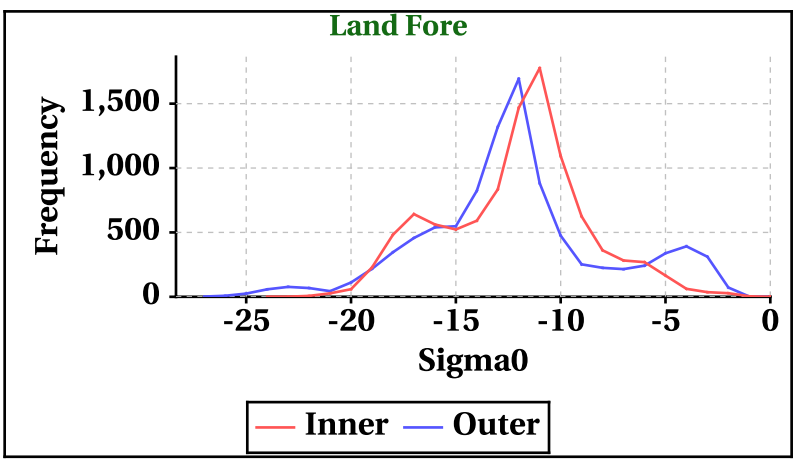
# Dynamic Range (Data Histograms)

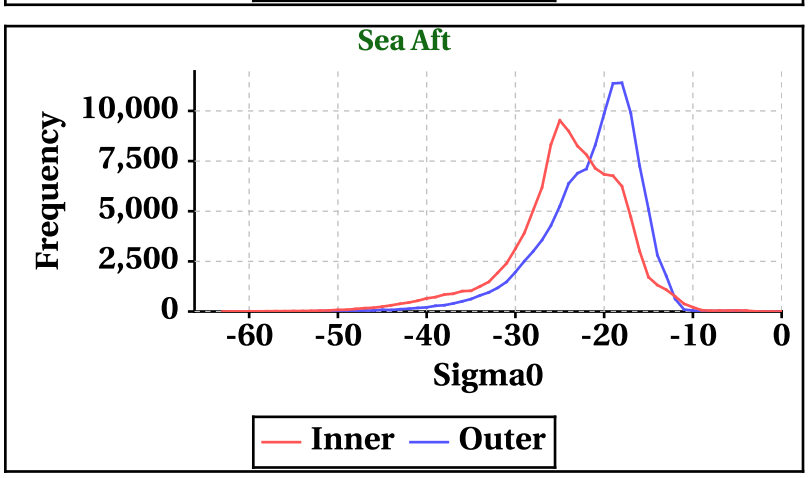
## Sigma0(db)

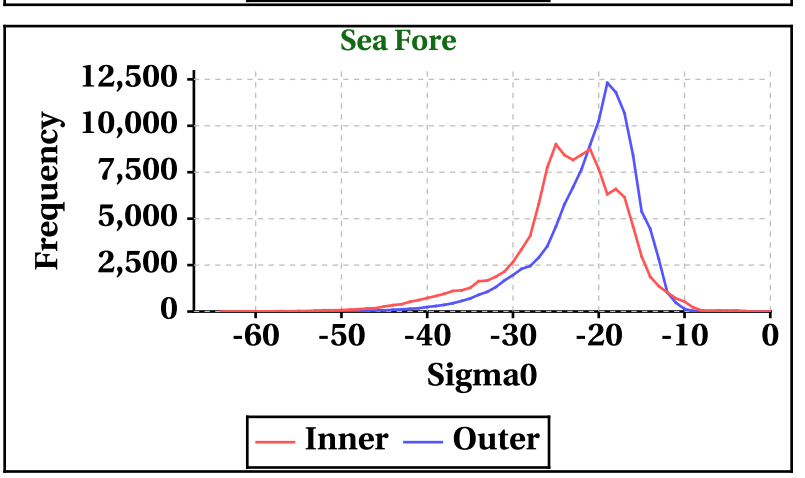
| Inner Beam (HH) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | -23 | -24 | -63 | -64 |
| Max | 0 | 0 | 0 | 0 |

| Outer Beam (VV) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | -26 | -27 | -58 | -60 |
| Max | 0 | 0 | 0 | 0 |



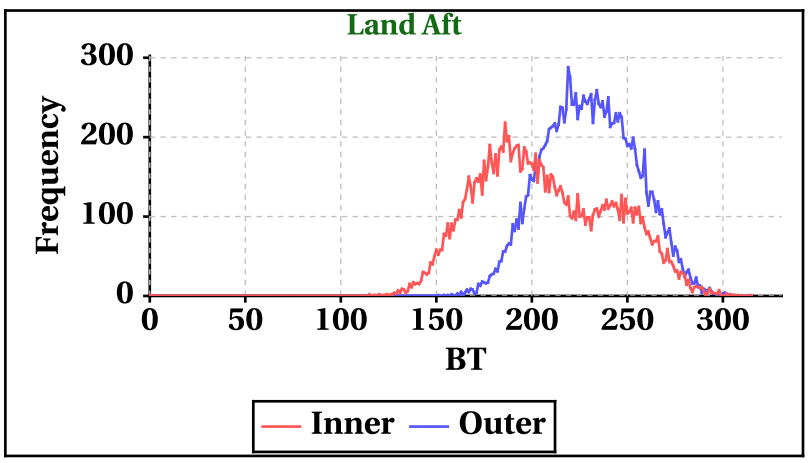



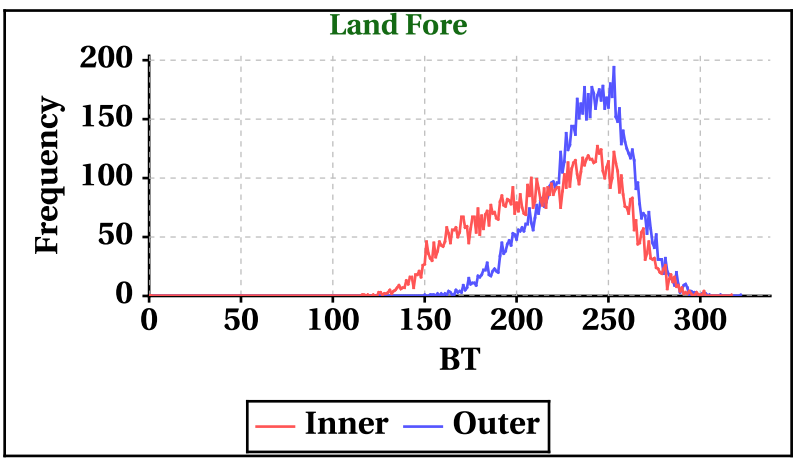



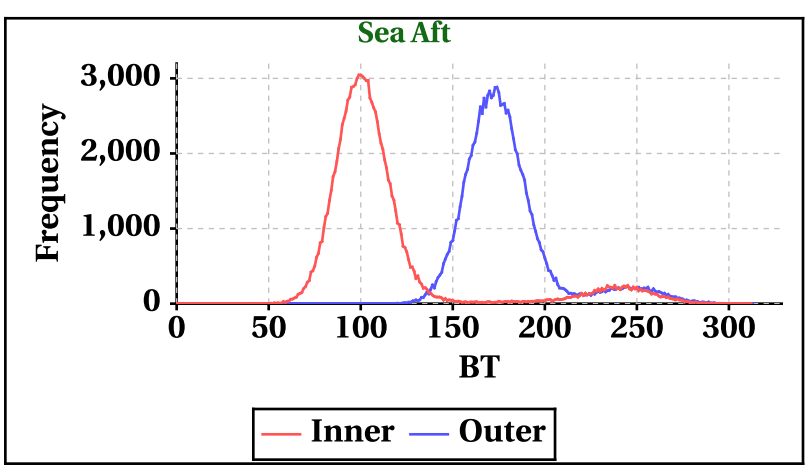

## Brightness Temperature(K)

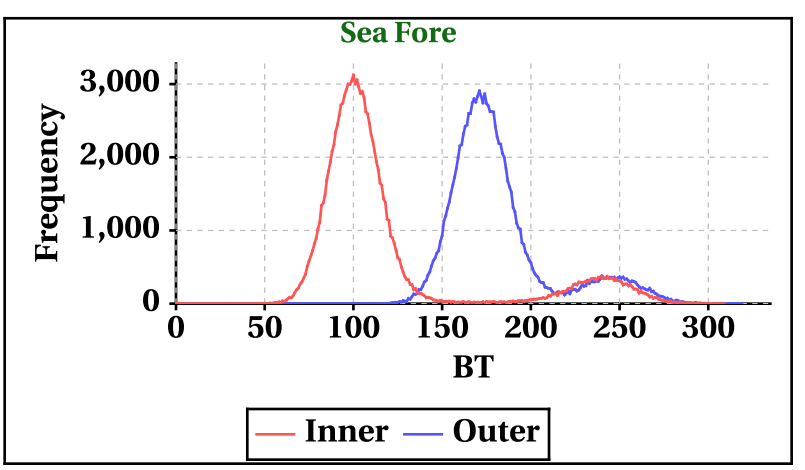
| Inner Beam(HH) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | 0 | 0 | 0 | 0 |
| Max | 315 | 317 | 312 | 309 |

| Outer Beam(VV) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | 0 | 0 | 0 | 0 |
| Max | 314 | 322 | 313 | 319 |



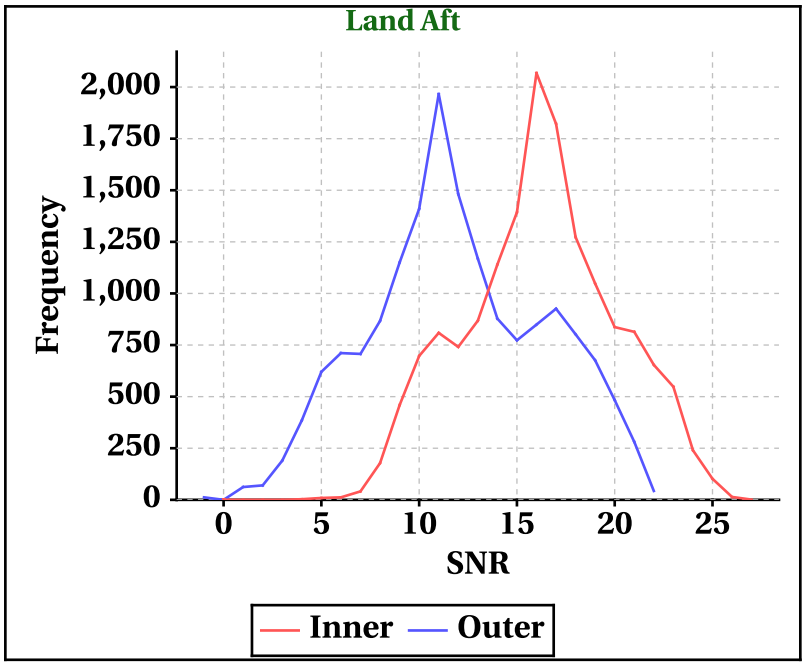



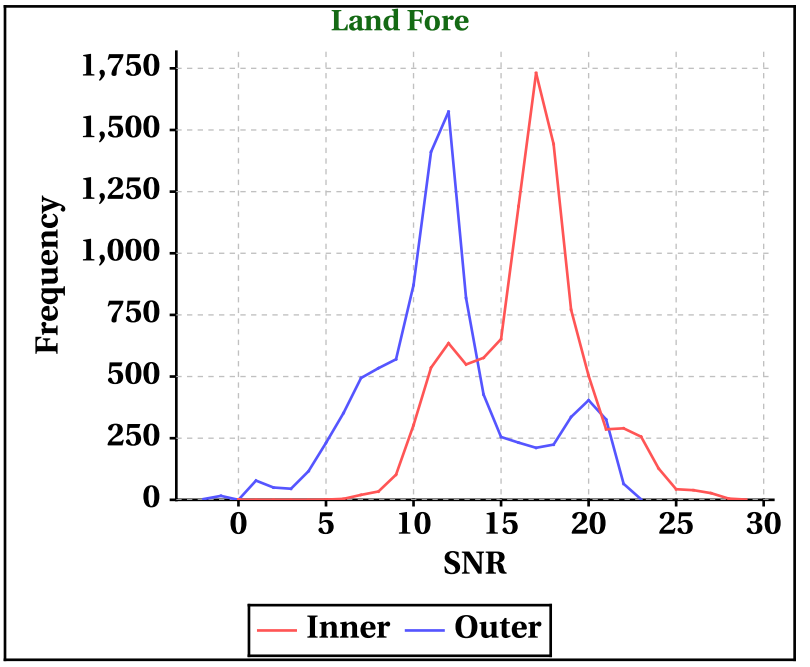
# Dynamic Range (Data Histograms)

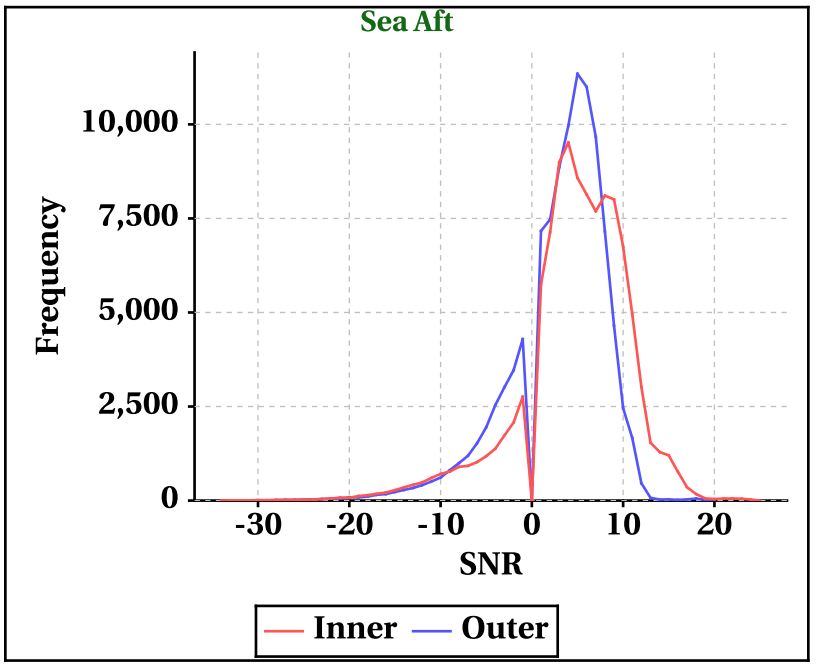
## SNR(dBm)

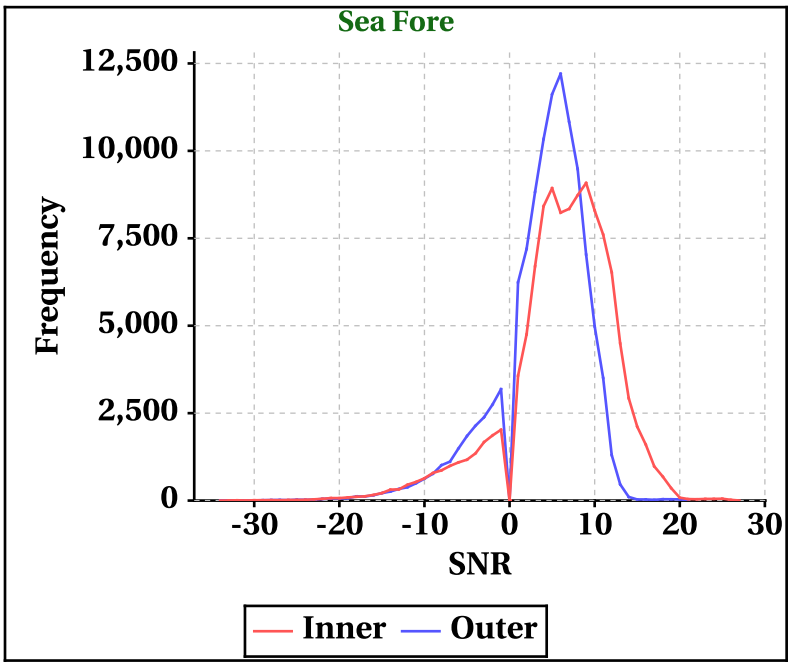
| Inner Beam (HH) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | 0 | 0 | -34 | -34 |
| Max | 27 | 29 | 25 | 27 |

| Outer Beam (VV) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | -1 | -2 | -33 | -34 |
| Max | 22 | 23 | 20 | 21 |



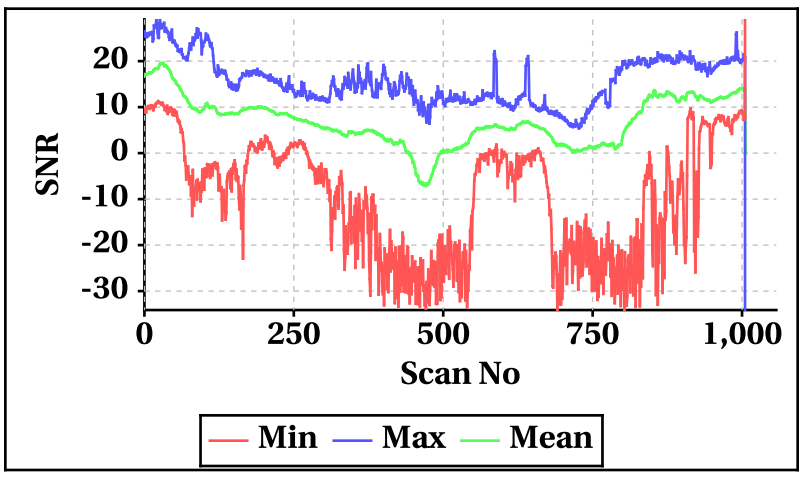



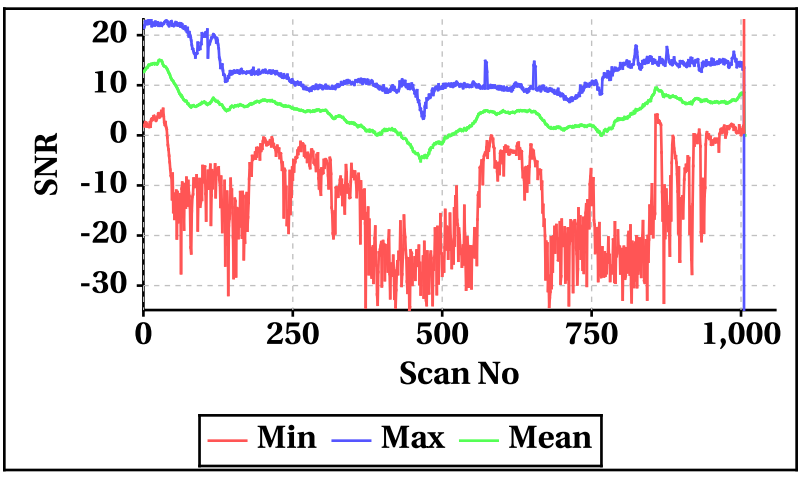



## Orbit-wise behaviour of SNR

Inner Beam (HH)

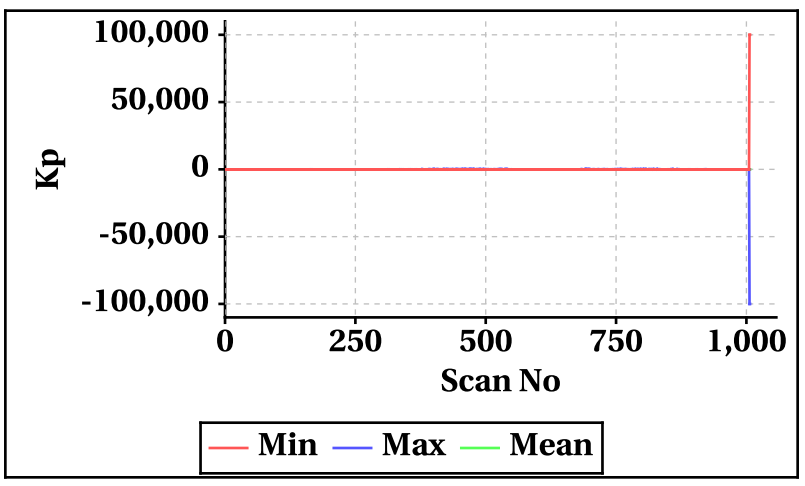



Outer Beam(VV)

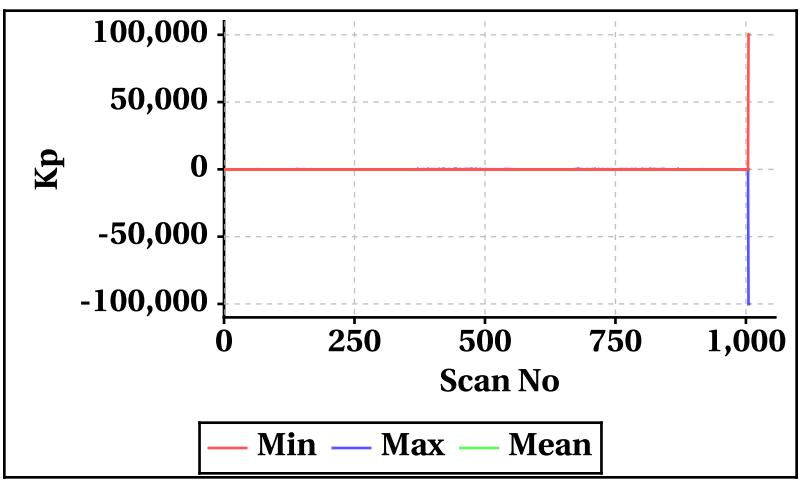



## Orbit-wise behaviour of Kp,Kpa,Kpb,Kpc

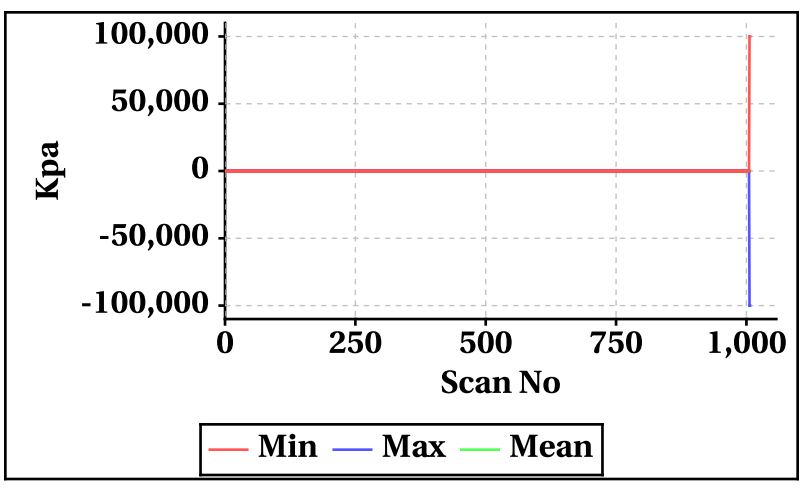
Inner Beam(HH)



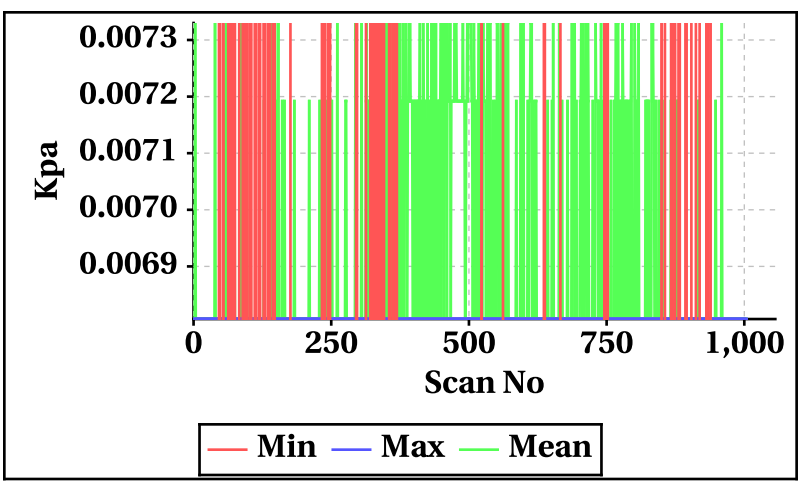

Outer Beam(VV)



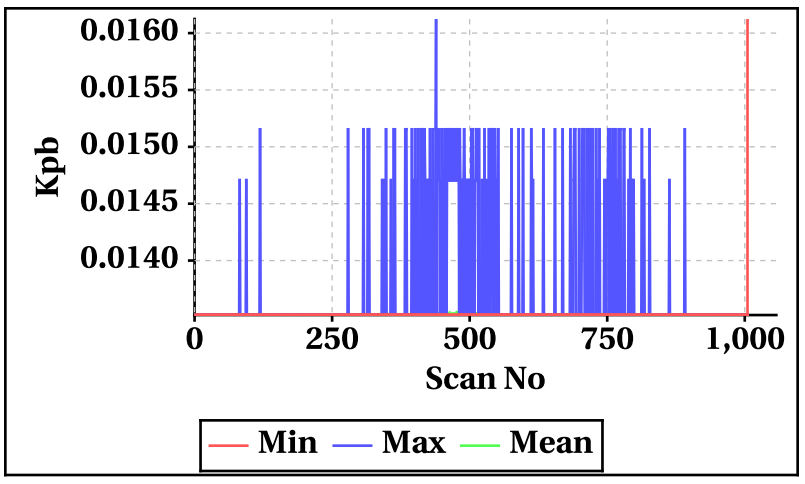

Inner Beam(HH)



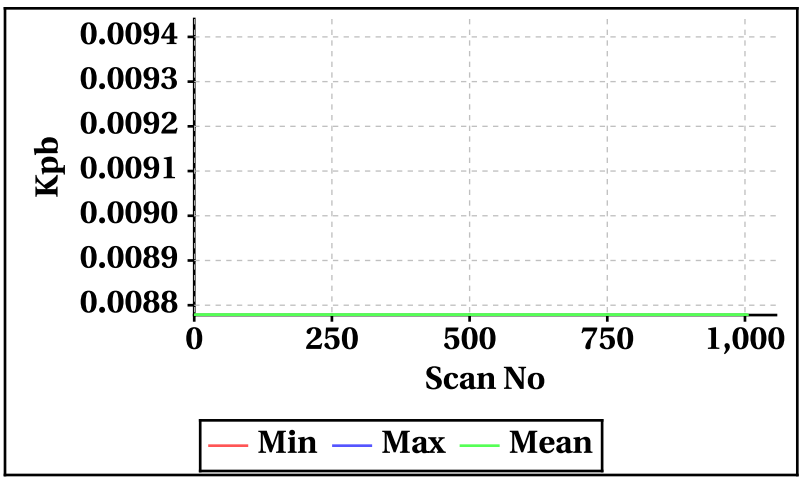

Outer Beam(VV)



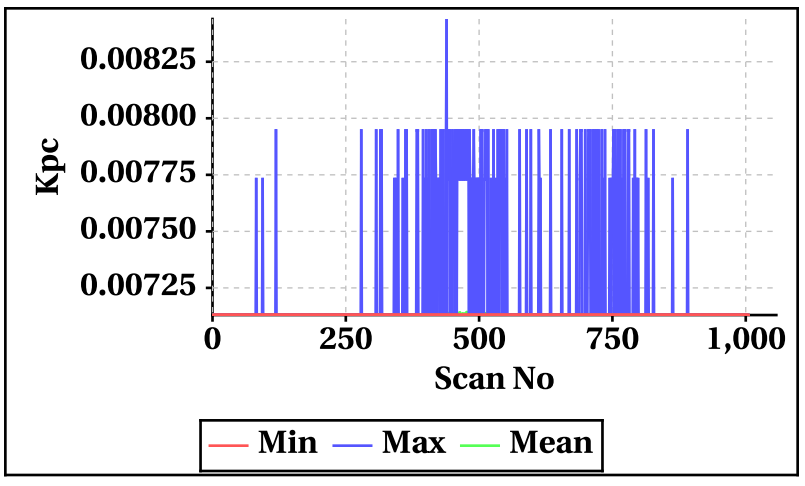

Inner Beam(HH)



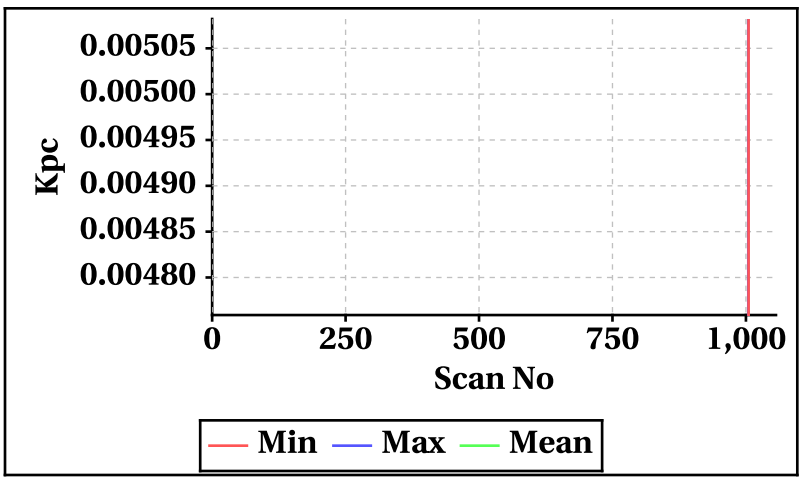

Outer Beam(VV)




Inner Beam(HH)

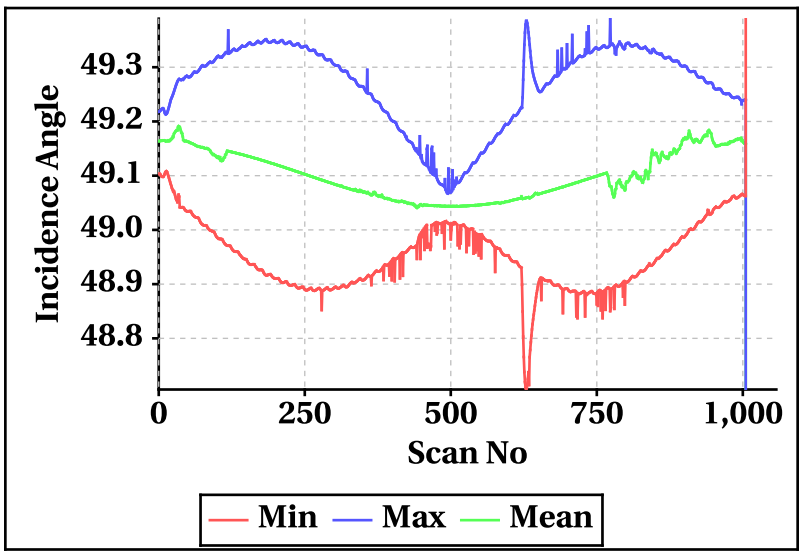



Outer Beam(VV)

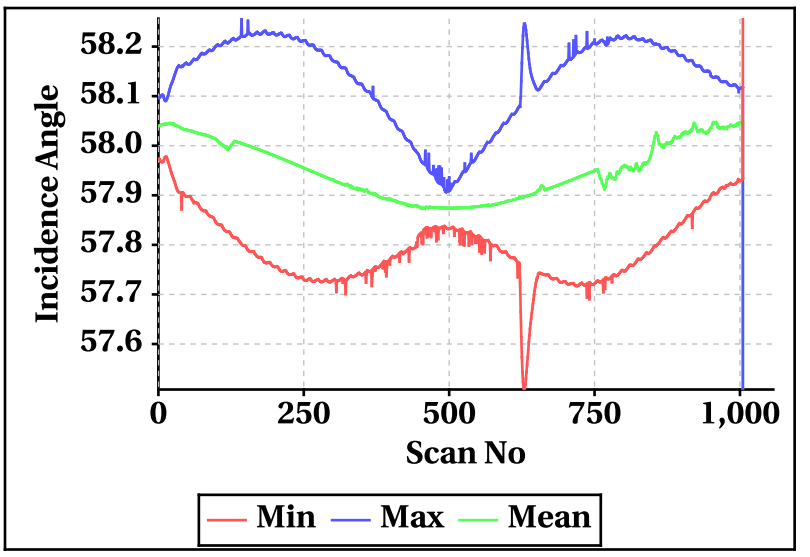


## Orbt-wise behaviour of Incidence,Azimuth,Range,X-Factor

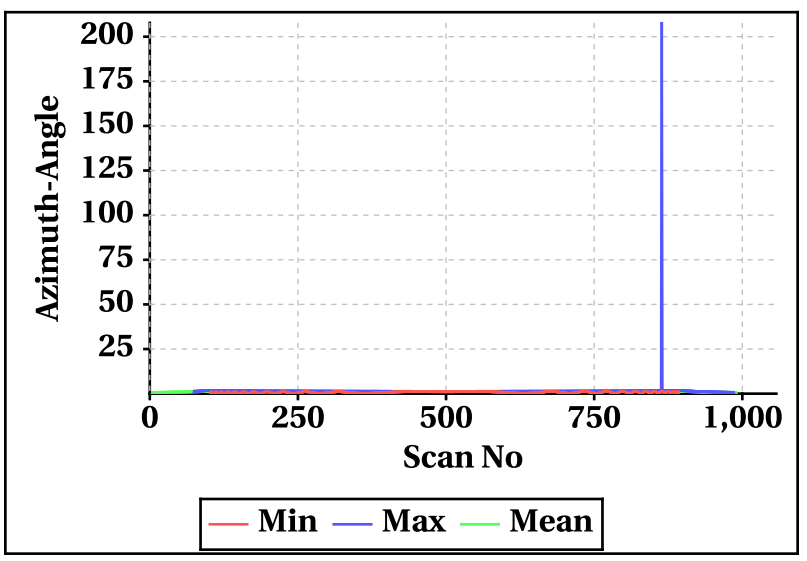
### Inner Beam (HH)



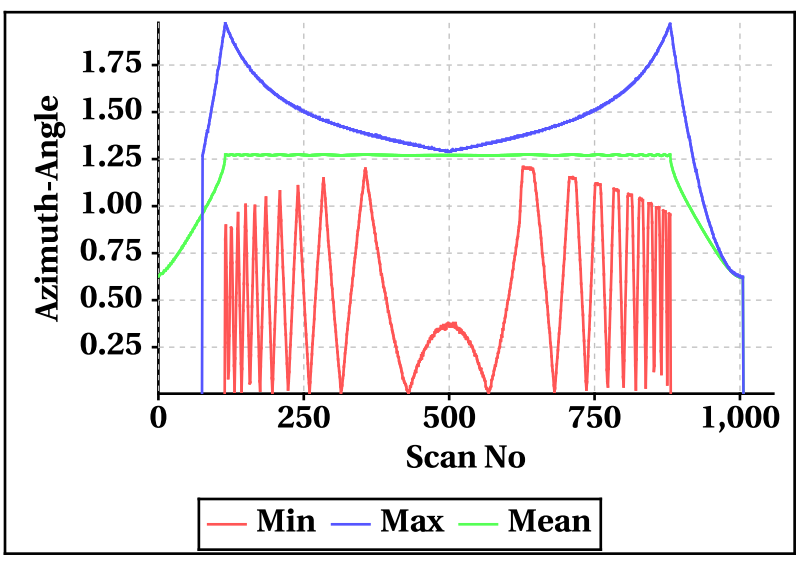

### Outer Beam(VV)



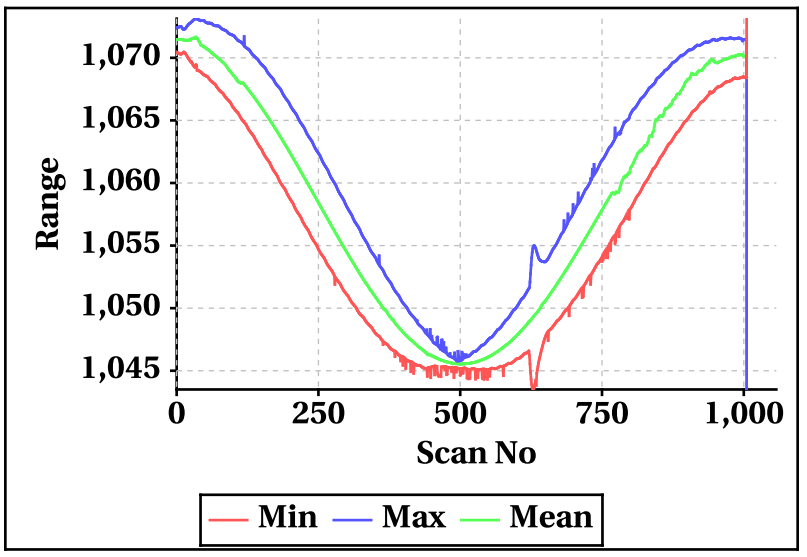

### Inner Beam (HH)



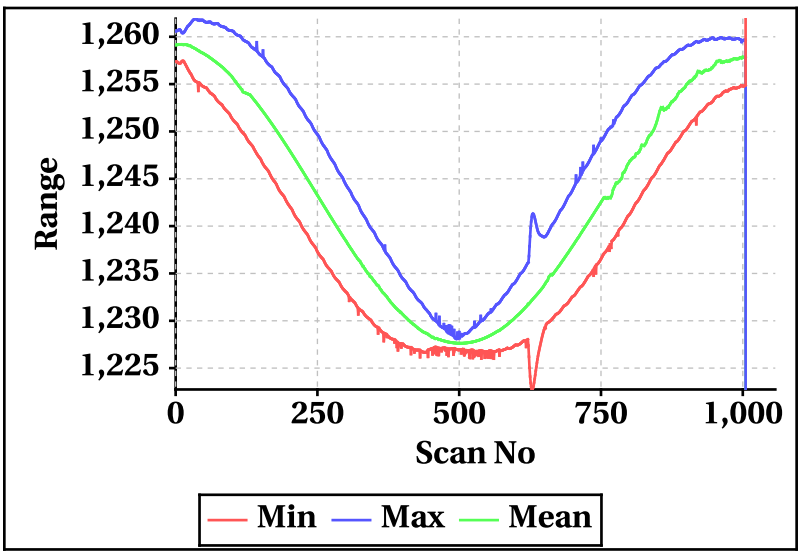

### Outer Beam(VV)



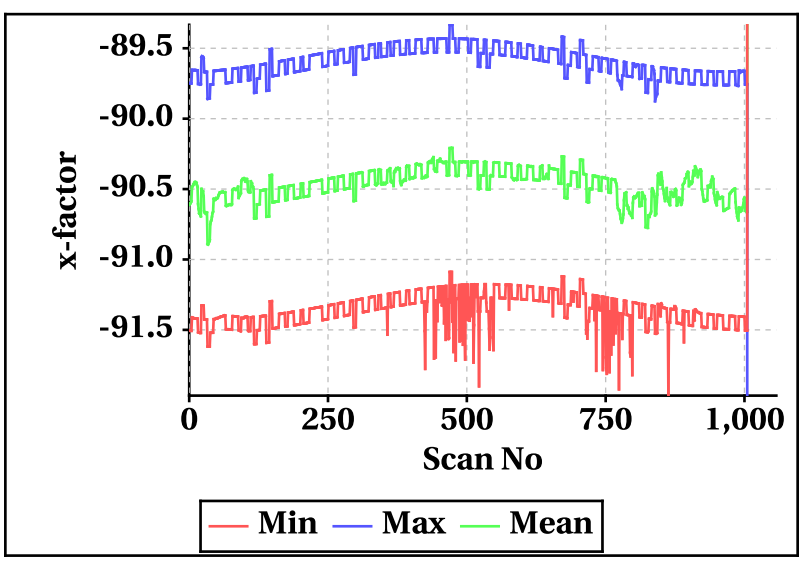

### Inner Beam (HH)



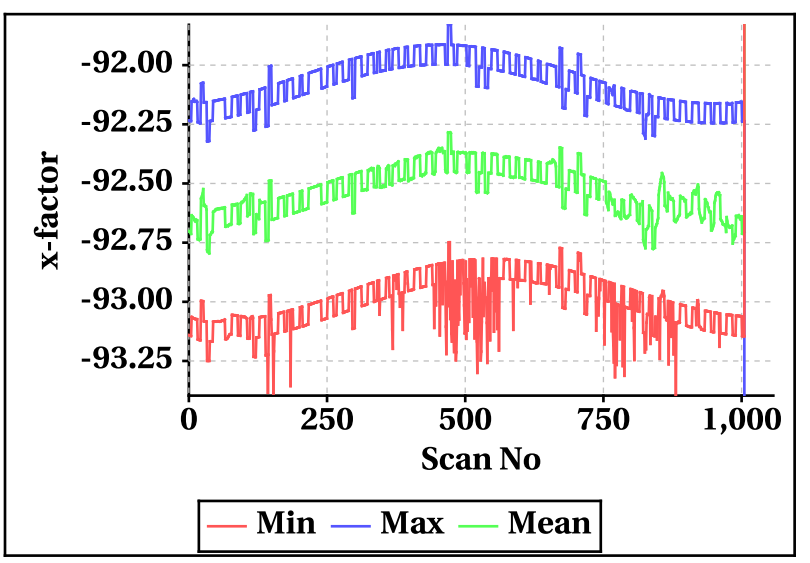

### Outer Beam(VV)




### Inner Beam (HH)




### Outer Beam(VV)



# Doppler Frequency Variation

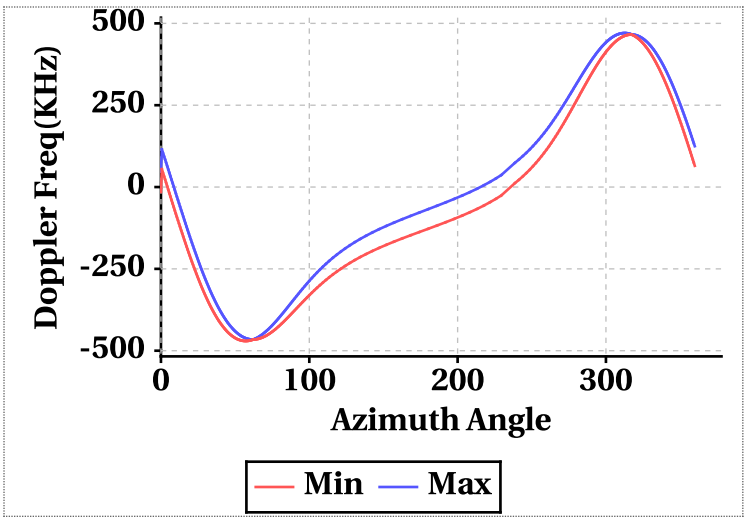
### Doppler Frequency(KHz) variation statistics Over the half Orbit

| | Inner Beam (HH) | Outer Beam (VV) |
|---|---|---|
| Min | -470.30 | -527.06 |
| Max | 470.40 | 527.16 |

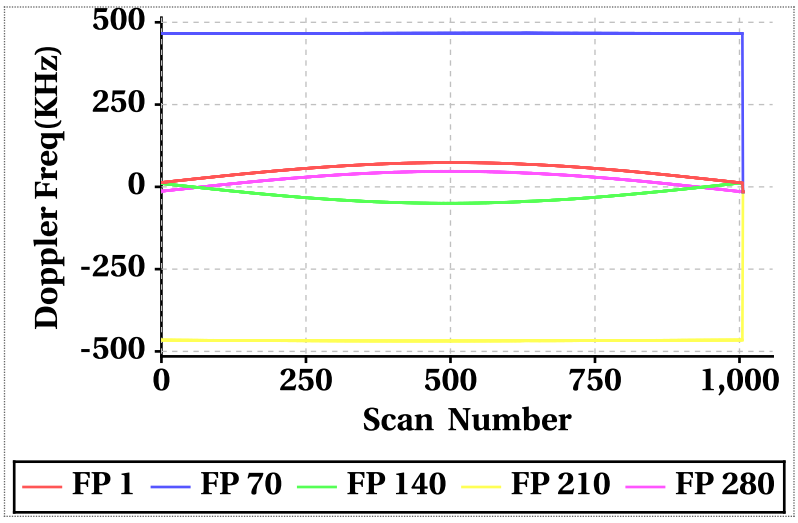
### Doppler Frequency(KHz) variation

| | Inner Beam (HH) | | | Outer Beam (VV) | | |
|---|---|---|---|---|---|---|
| Doppler_FP | Min | Max | Mean | Min | Max | Mean |
| Doppler_1 | -15.24 | 73.78 | 51.36 | -10.60 | 77.50 | 52.45 |
| Doppler_70 | -15.24 | 467.32 | 465.51 | -10.60 | 524.14 | 522.06 |
| Doppler_140 | -50.00 | 12.36 | -27.67 | -62.56 | 7.40 | -37.49 |
| Doppler_210 | -468.34 | -15.24 | -466.30 | -524.22 | -10.60 | -522.24 |
| Doppler_280 | -15.24 | 47.18 | 24.76 | -10.60 | 59.36 | 34.23 |

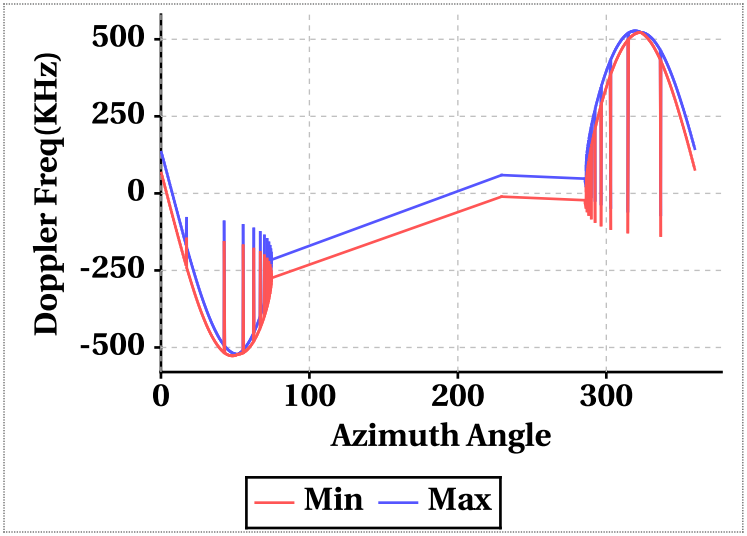
### Footprint wise Doopler frequency variation Inner Beam (HH)



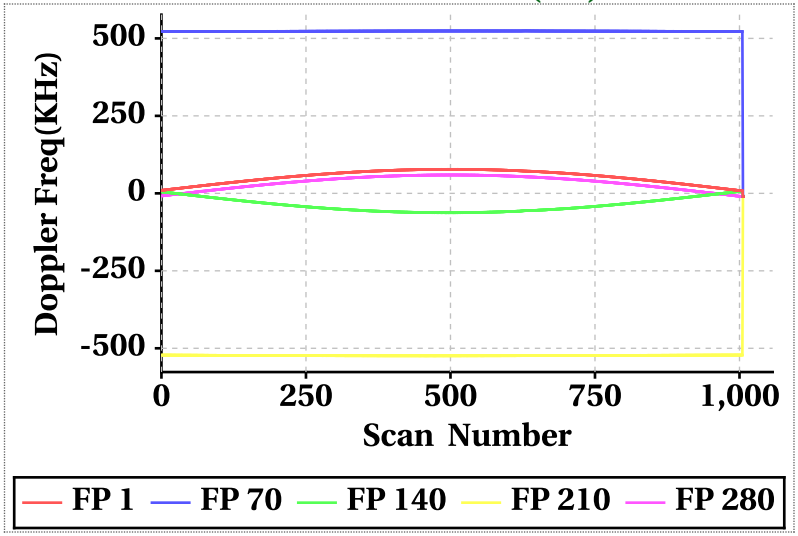

### Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Inner Beam (HH)




### Footprint wise Doopler frequency variation Outer Beam (VV)

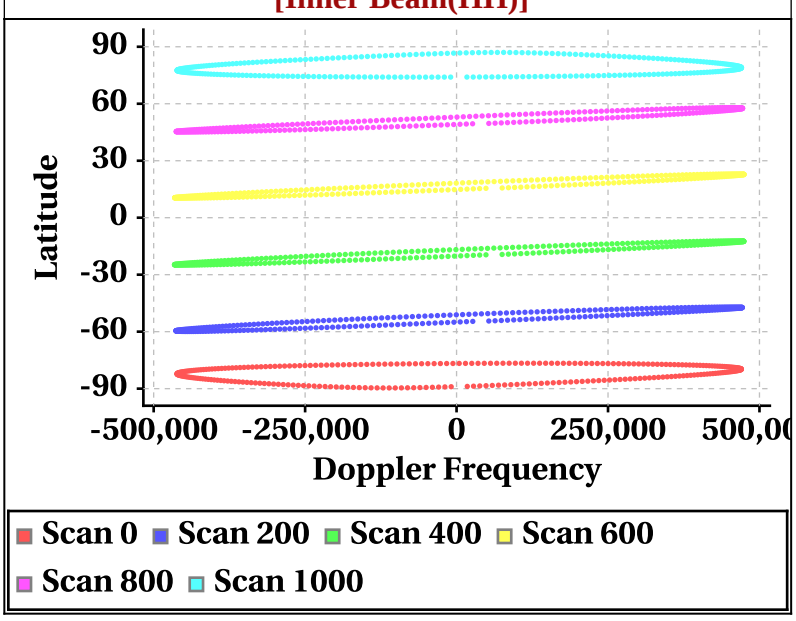



### Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Outer Beam (VV)

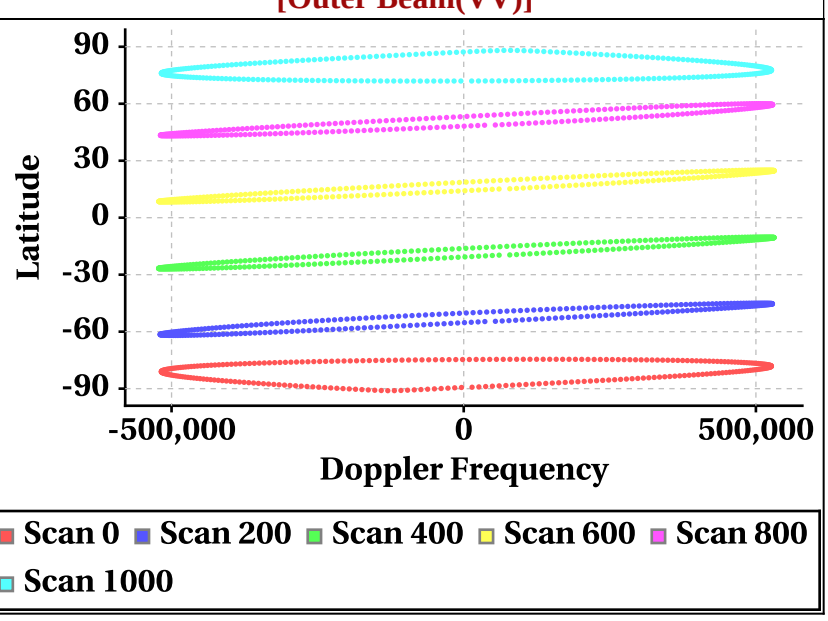



## Latitude Vs Doppler Frequency

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



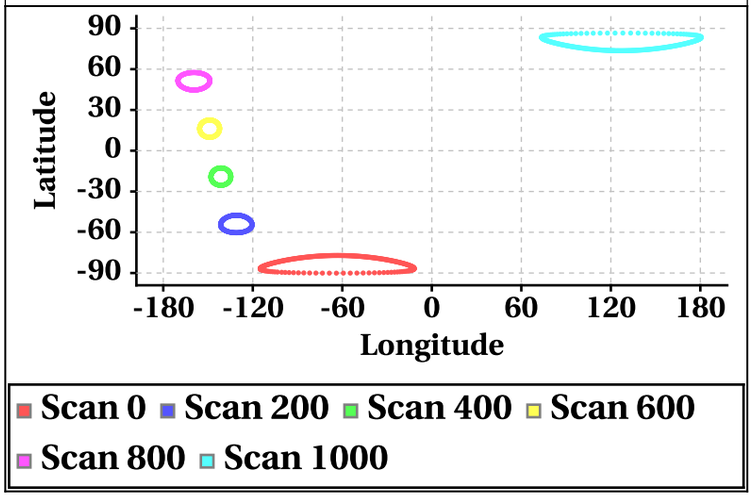

### Doppler Frequency at Scan Interval of 200 [Outer Beam(VV)]



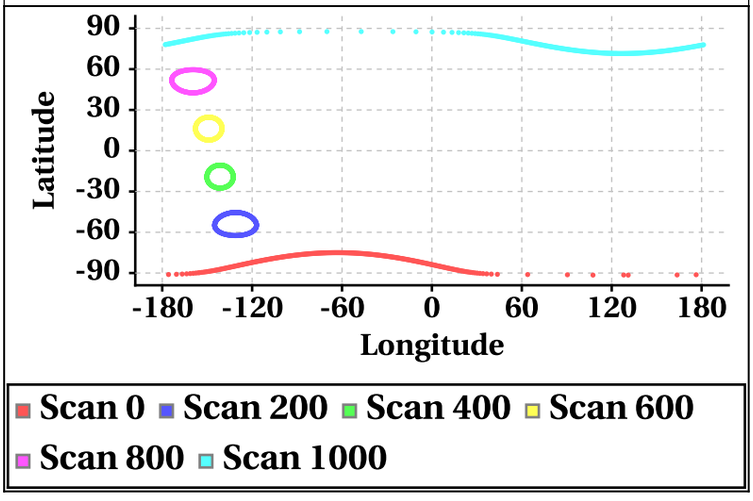
# Parameter as a function of Latitude

## Latitude Vs Longitude

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

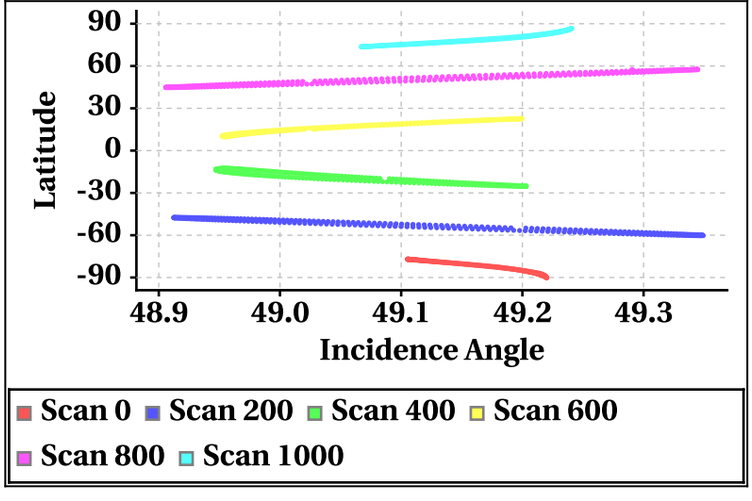



### Scan Trace [Outer Beam (VV)]

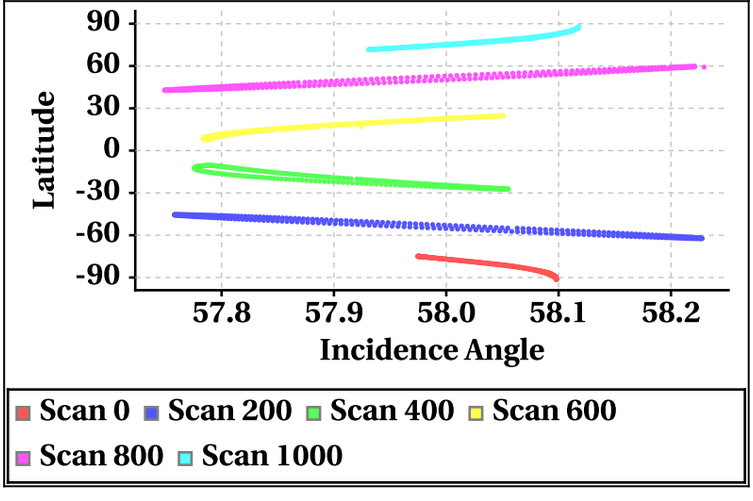



## Latitude Vs Incidence Angle

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

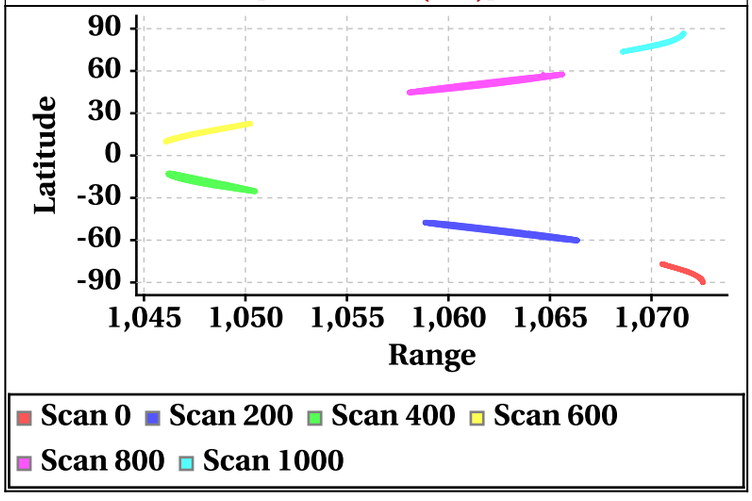



### Incidence Angle at Scan Interval of 200 [Outer Beam (VV)]

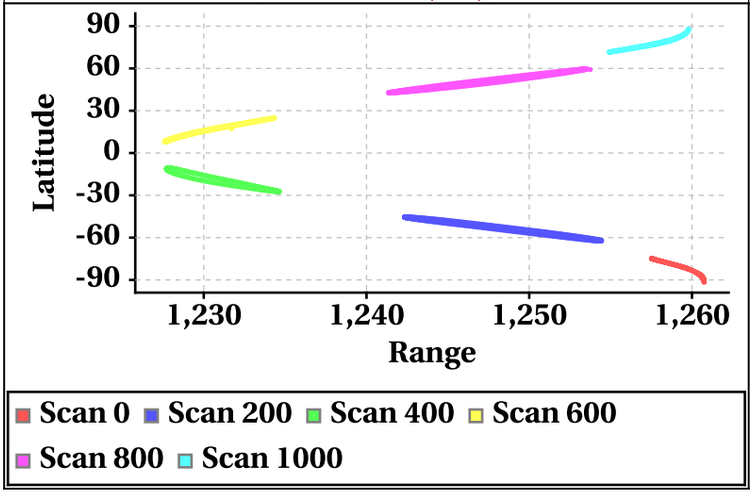



## Latitude Vs Range

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



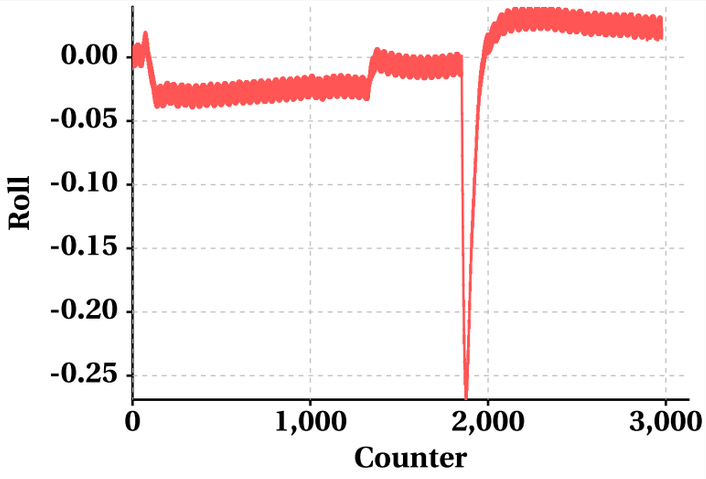

### Range at Scan Interval of 200 [Outer Beam(VV)]



# Variation in Orbit and Attitude Parameters

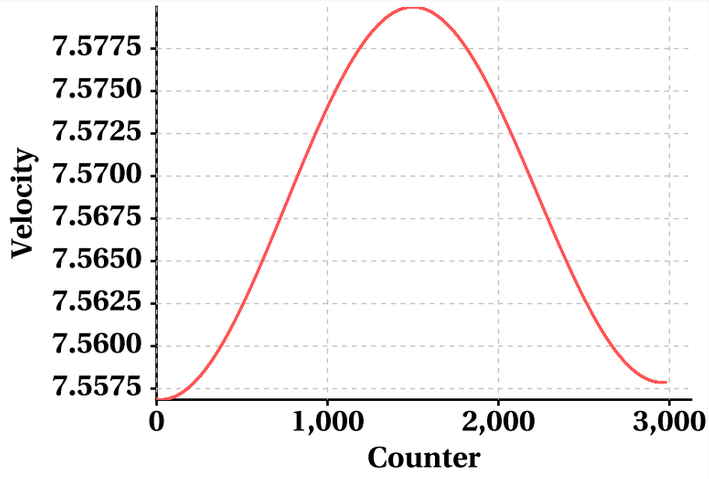
## Roll

| | |
|---|---|
| Min Roll(deg) | -0.268865 |
| Max Roll(deg) | 0.039551 |



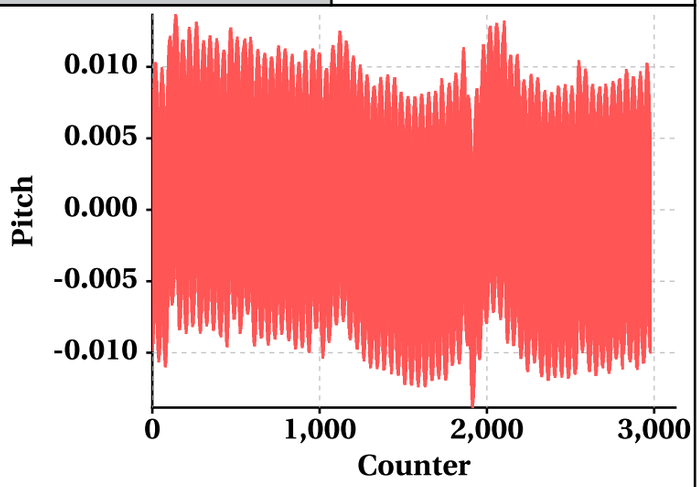

## Velocity

| | |
|---|---|
| Min Velocity(km/s) | 7.556849 |
| Max Velocity(km/s) | 7.579945 |



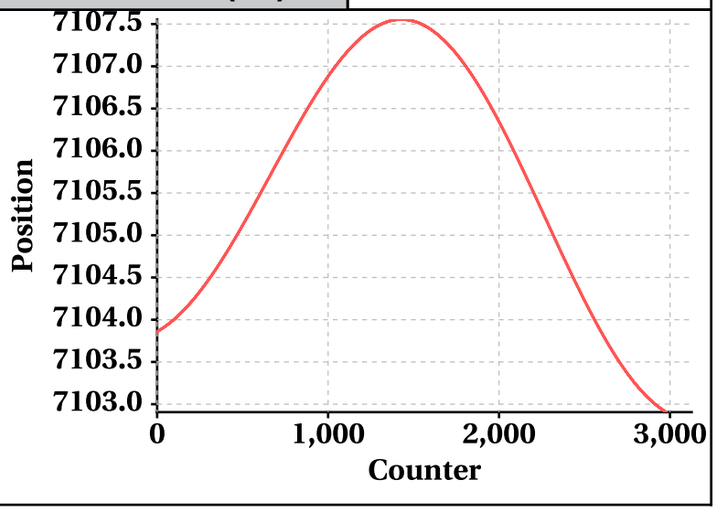

## Pitch

| | |
|---|---|
| Min Pitch(deg) | -0.013841 |
| Max Pitch(deg) | 0.013637 |



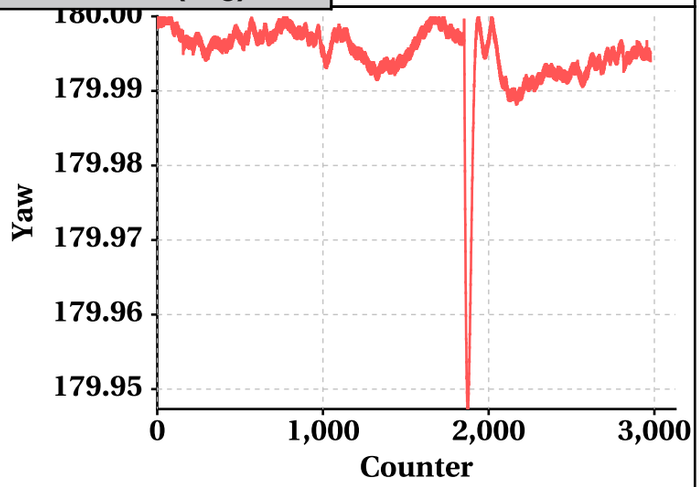

## Position

| | |
|---|---|
| Min Position(km) | 7102.905762 |
| Max Position(km) | 7107.554688 |




## Yaw

| | |
|---|---|
| Min Yaw(deg) | 179.947327 |
| Max Yaw(deg) | 180.0 |




## TimeDifference

| | |
|---|---|
| Min TimeDifference | 1.0 |
| Max TimeDifference | 1.0 |

