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

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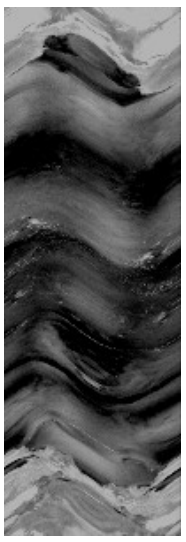
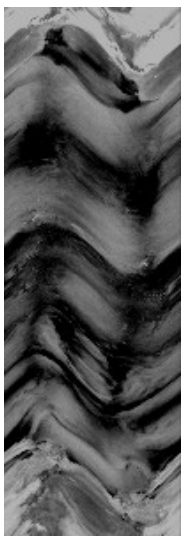
L1B Parameter as a function of Latitude

Half Orbit OAT Behaviour


## Image Snapshot for Inner & Outer Beam

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

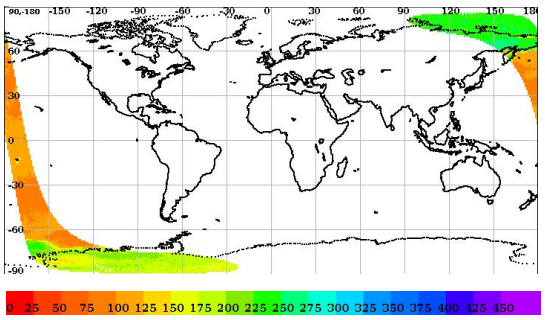




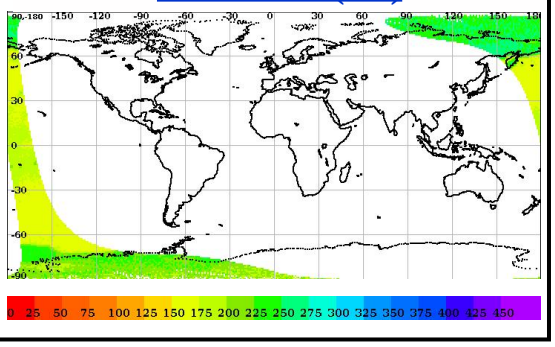
| | | | | | |
|---|---|---|---|---|---|
| **Satellite Id** | ScatSat-1 | **Start Orbit** | 3293 | **Total Scans** | 982 |
| **Sensor Name** | Scatterometer | **End Orbit** | 3294 | **No of Inner FootPrints** | 281 |
| **Processor Version** | v1.1.2 | **Rev. Number** | 03293_03294 | **No Of Outer FootPrints** | 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** | 08:20:56.000 | **No Of Outer Slices** | 14 |

## Brightness Temprature(k) Footprint trace

**Inner Beam (HH)**

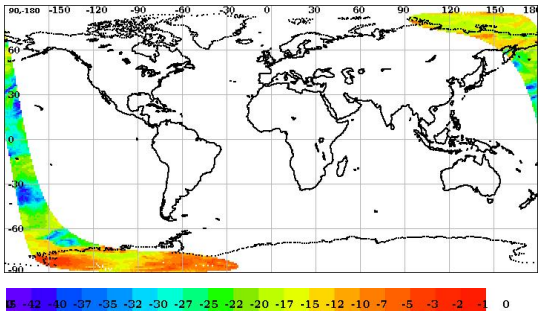



**Outer Beam (VV)**

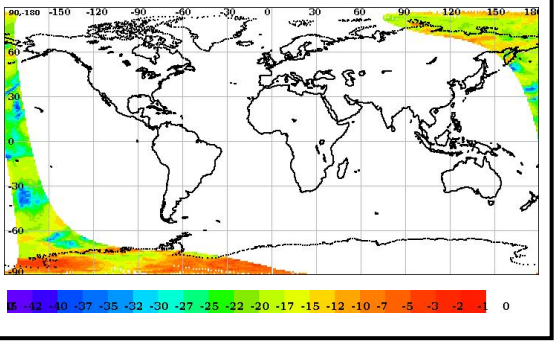



## Sigma0(dB) Footprint trace

**Inner Beam (HH)**




**Outer Beam (VV)**



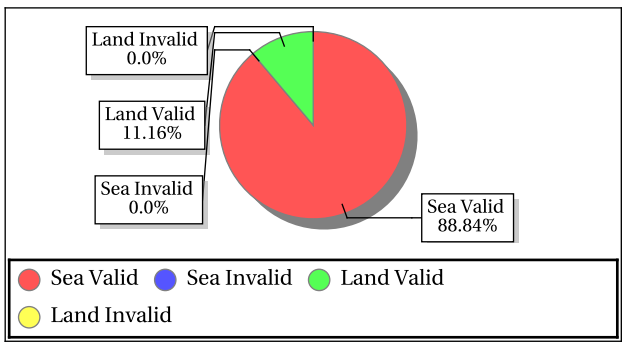

## Invalid and Poor Sigma-0 Quality Flag Statistics for Inner/Outer Slices*

| Sigma-0 Flags | Inner Beam | Outer Beam |
|---|---|---|
| **Invalid Sigma0(%)** | 0.00 | 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(%)** | 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 |

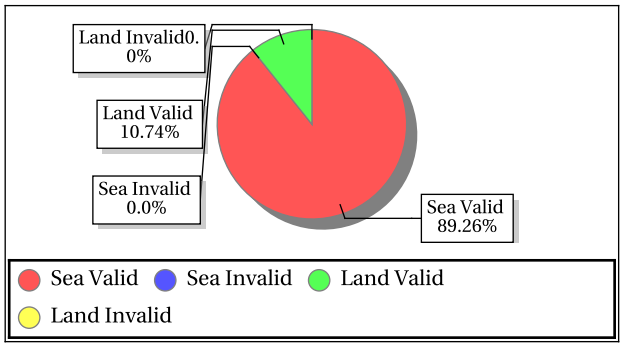
***DP Format Document**

## 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 | 264.32 | 0.31 | 2.805 | 0.10 | 260.49 | 0.27 | 2.149 | 0.10 | 0.14 | 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 | -34.95 | 25.98 | 4.25 | 0.211 | -34.89 | 26.81 | 5.92 | 0.235 | 2.89 | 27.72 | 16.95 | 15.811 | 5.17 | 29.10 | 17.92 | 19.655 |

## 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 | 211.65 | 0.24 | 1.851 | 0.08 | 189.75 | 0.20 | 1.464 | 0.08 | 0.19 | 0.09 | 0.000 | 0.08 | 0.17 | 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 | -34.87 | 20.71 | 3.03 | 0.000 | -34.39 | 20.89 | 3.88 | 0.000 | -2.52 | 22.92 | 12.49 | 0.043 | -1.48 | 23.40 | 12.76 | 0.861 |

| 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)

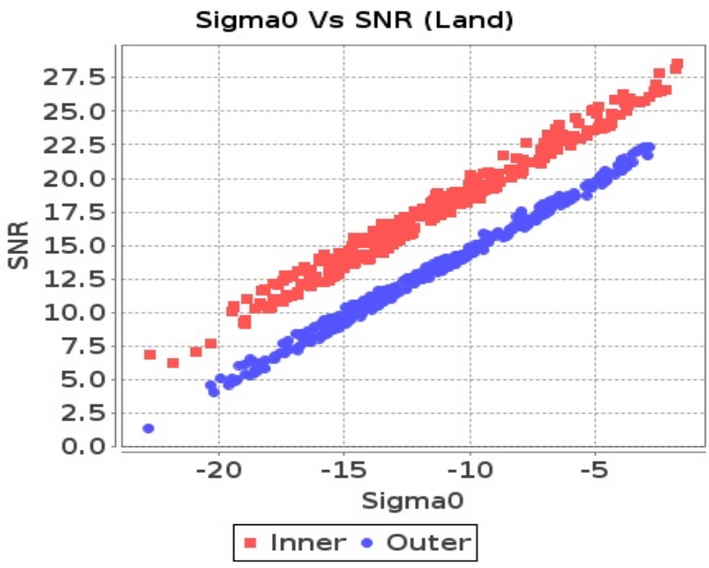
| | Inner Beam (HH) | | | | Outer Beam (VV) | | | |
|---|---|---|---|---|---|---|---|---|
| | Min | Max | Mean | Bad Occ. (%) | Min | Max | Mean | Bad Occ. (%) |
| Incidence Angle (deg) | 48.73 | 49.36 | 49.05 | 0.000 | 57.50 | 58.23 | 57.99 | 0.000 |
| Azimuth Diff. (deg) | 0.0026 | 1.80 | 1.12 | 0.142 | 0.0026 | 1.97 | 1.11 | 0.207 |
| Range(Km) | 1043.46 | 1073.03 | 1056.60 | 0.000 | 1222.18 | 1261.78 | 1242.04 | 0.000 |
| X Factor(dbm) | -92.11 | -89.35 | -90.51 | 0.000 | -93.45 | -91.85 | -92.40 | 0.000 |
| Across Distance (Km) | 15.62 | 16.27 | 15.96 | 0.000 | 20.78 | 21.36 | 21.03 | 0.000 |
| Along Distance (Km) | 18.98 | 20.59 | 19.72 | 0.000 | 18.70 | 20.55 | 19.62 | 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 |

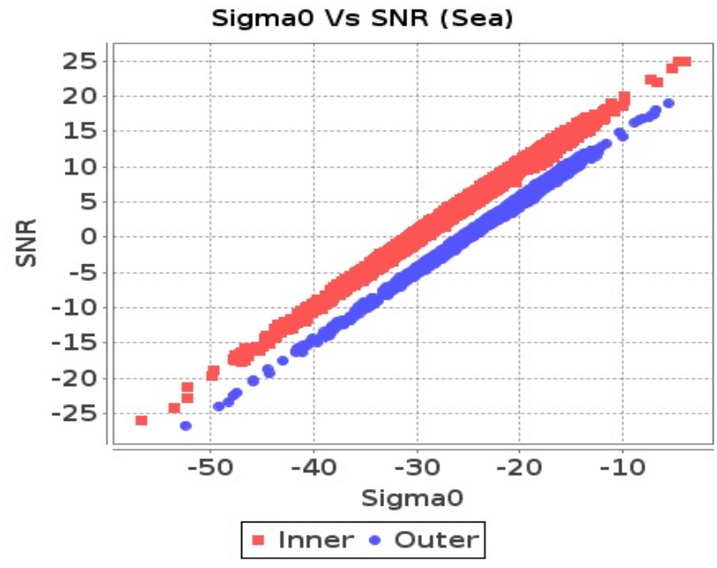
Normal
Deviations
Alarming
High Errors

# Sigma0 Behaviour (Sigma0 Vs SNR)

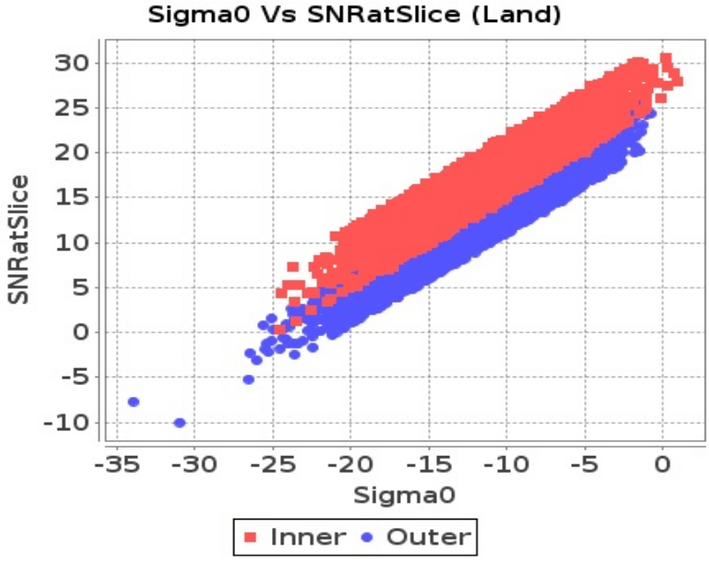
## Footprint-Land



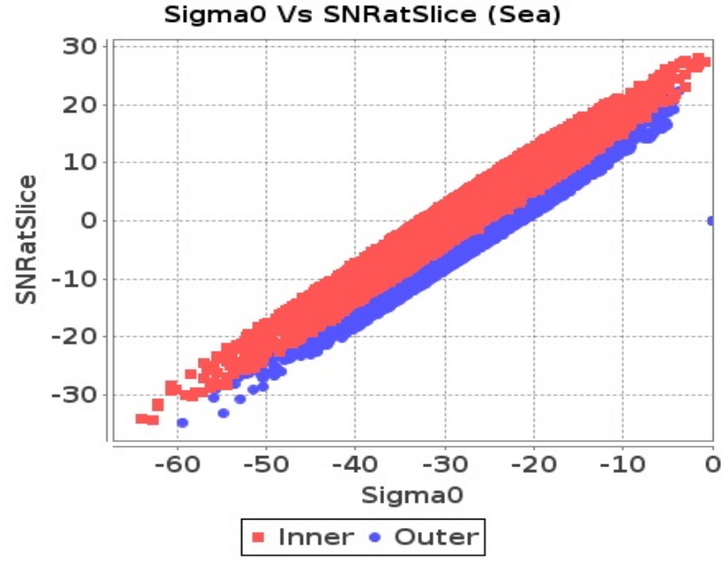

## Footprint-Sea




## Slice-Land

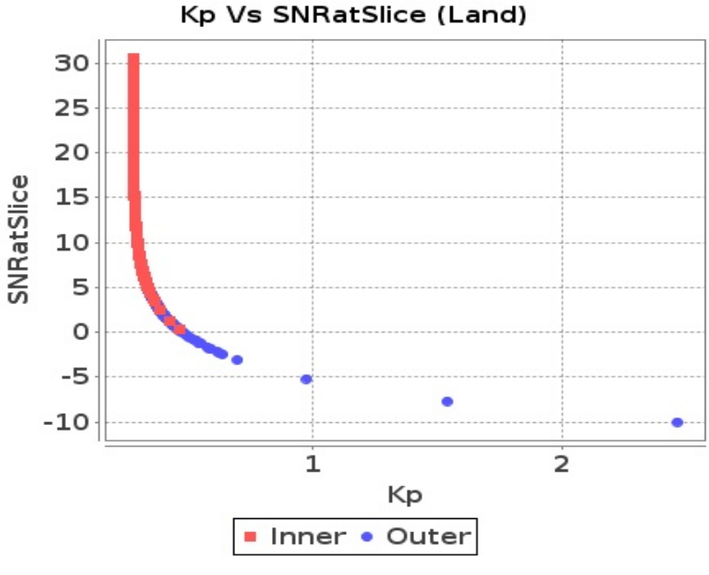



## Slice-Sea

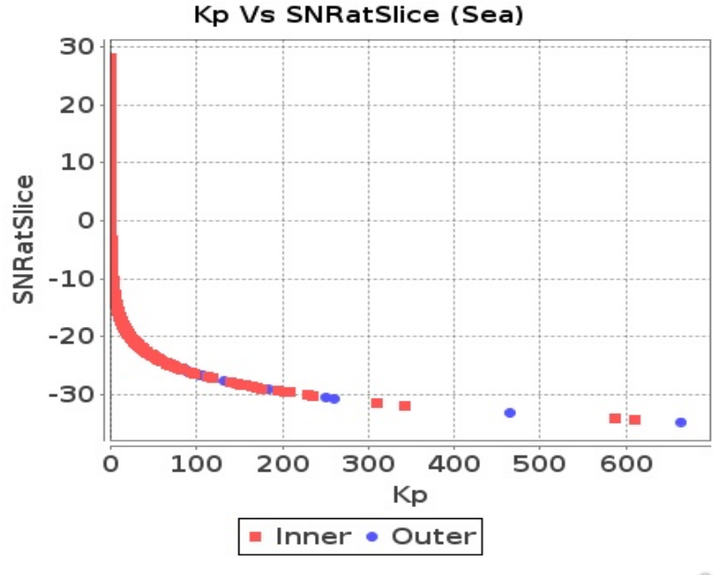



# Sigma0 Behaviour (Kp Vs SNR)

## Slice

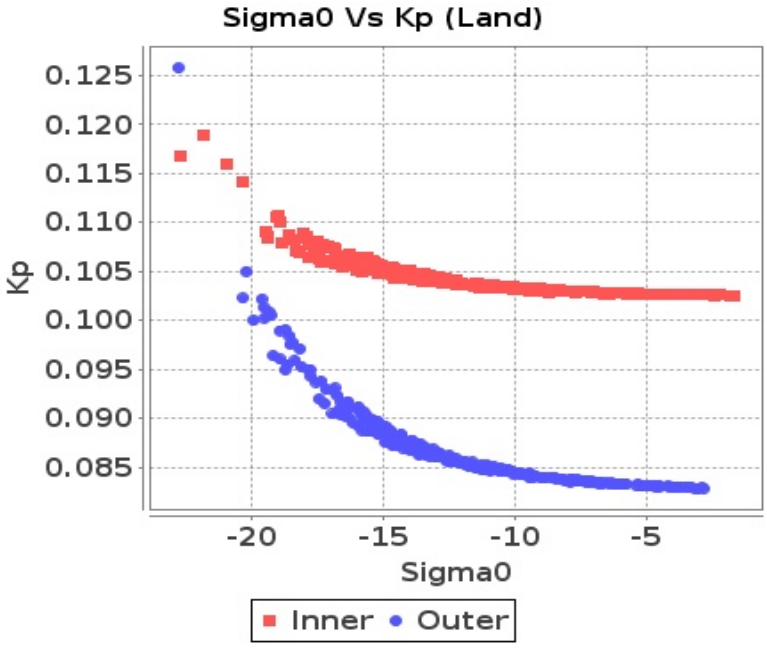



## Slice

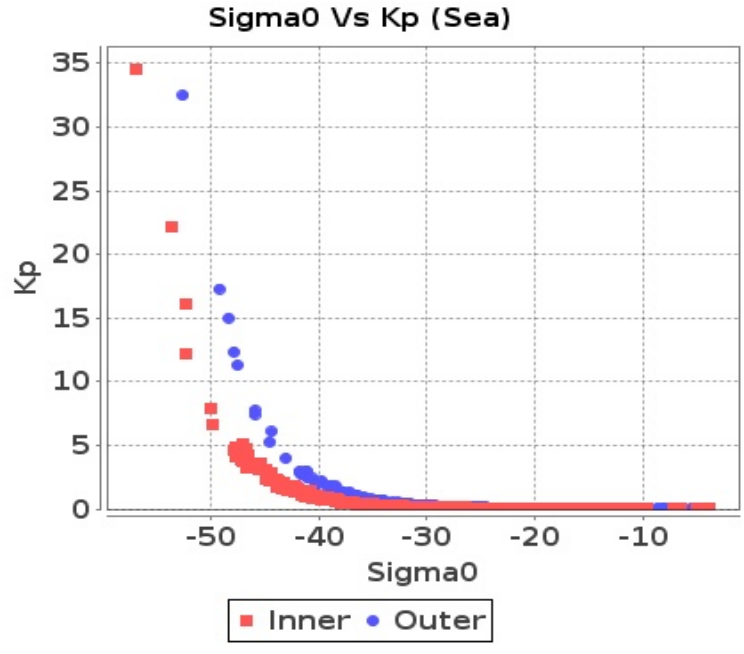


# Sigma0 Behaviour(Sigma0 Vs Kp)

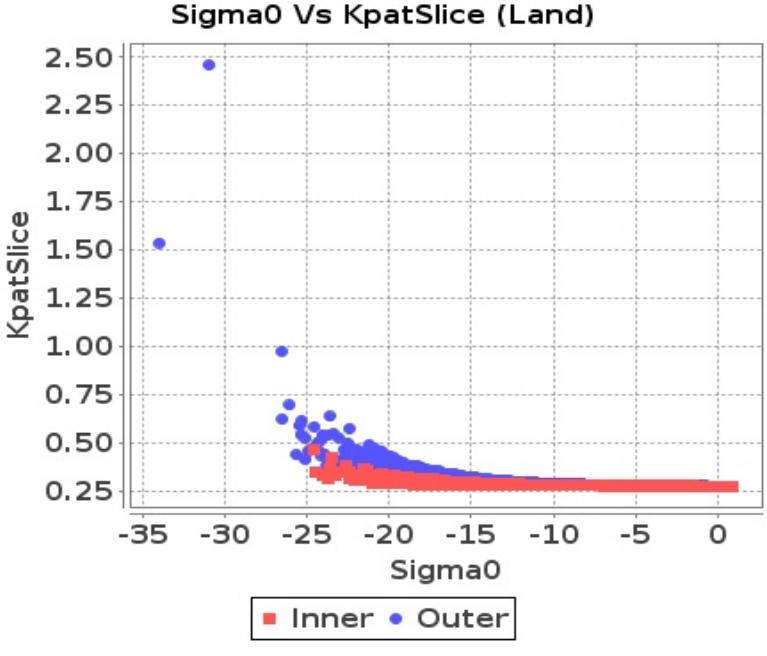
## Footprint-Land



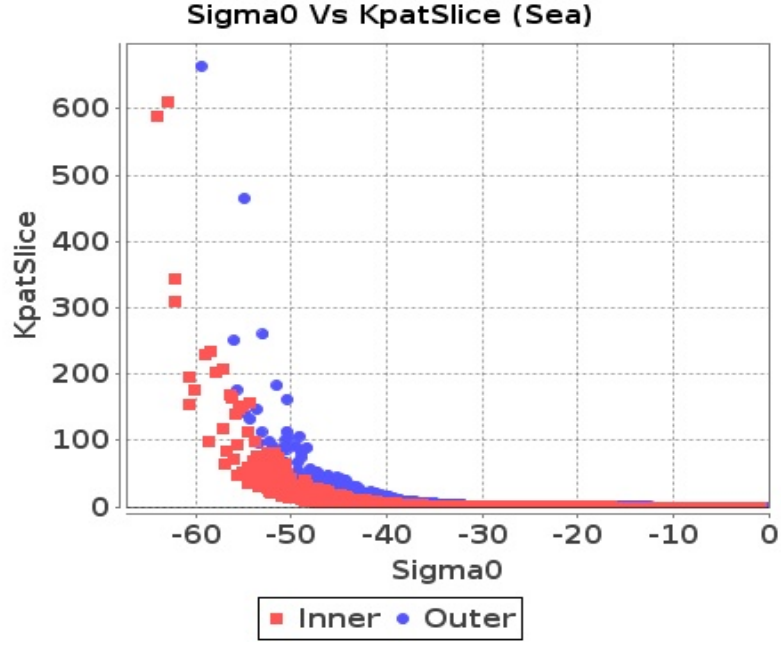

## Footprint-Sea




## Slice-Land




## Slice-Sea

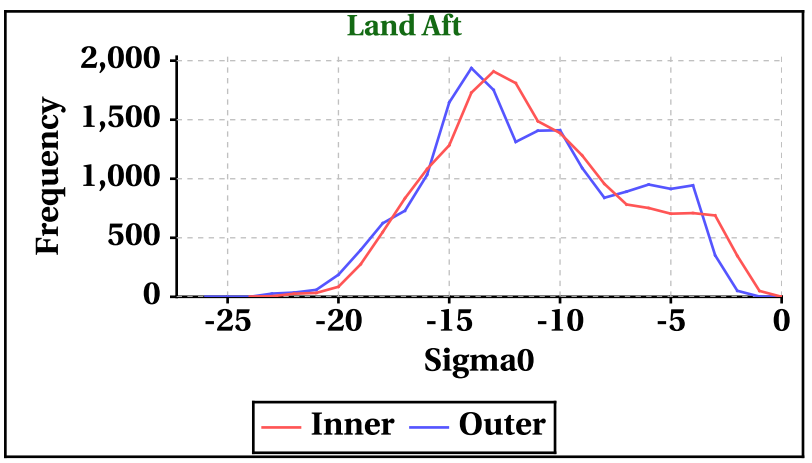


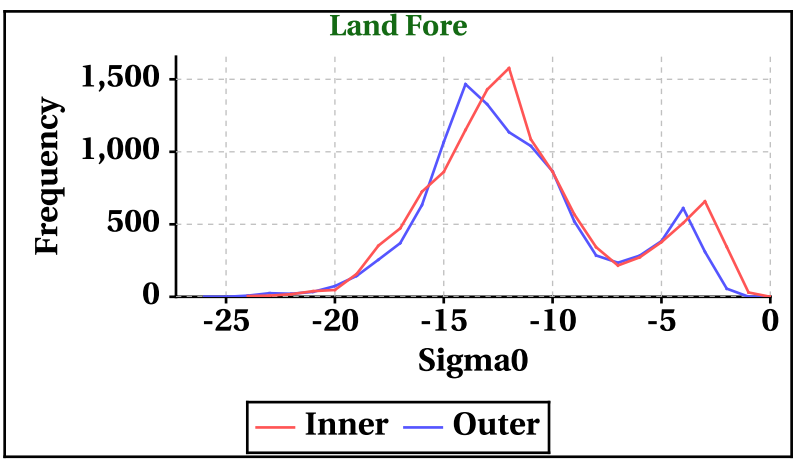
# Dynamic Range (Data Histograms)

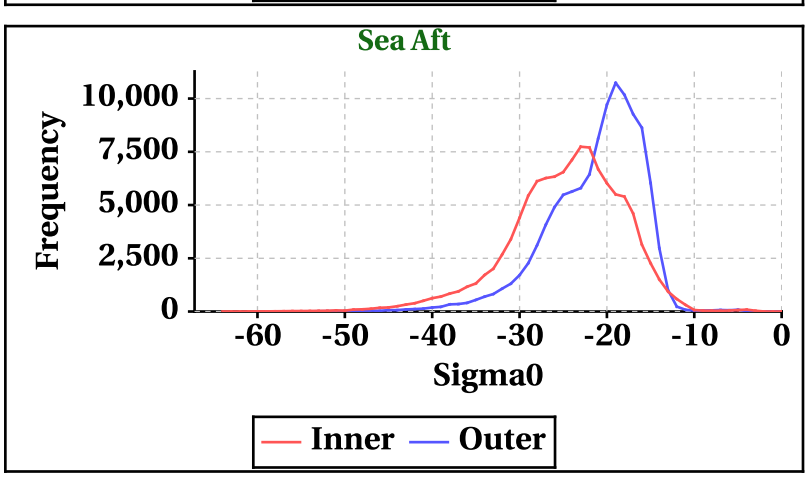
## Sigma0(db)

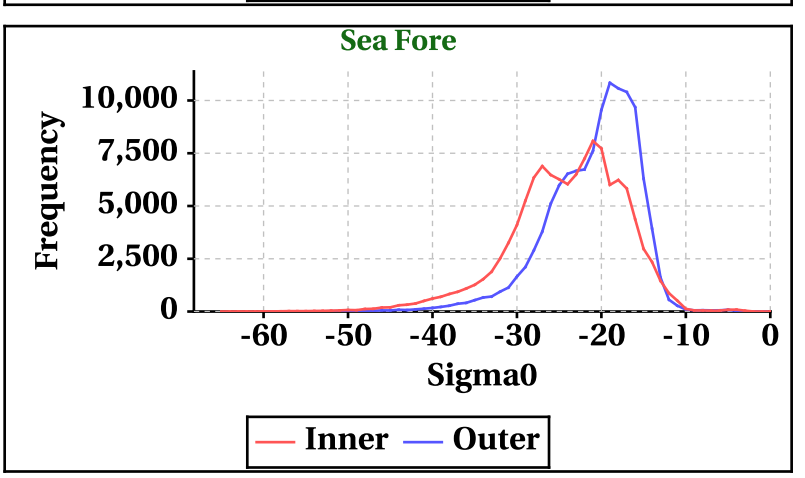
| Inner Beam (HH) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | -24 | -24 | -64 | -65 |
| Max | 0 | 0 | 0 | 0 |

| Outer Beam (VV) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | -26 | -26 | -59 | -60 |
| Max | 0 | 0 | 0 | 0 |



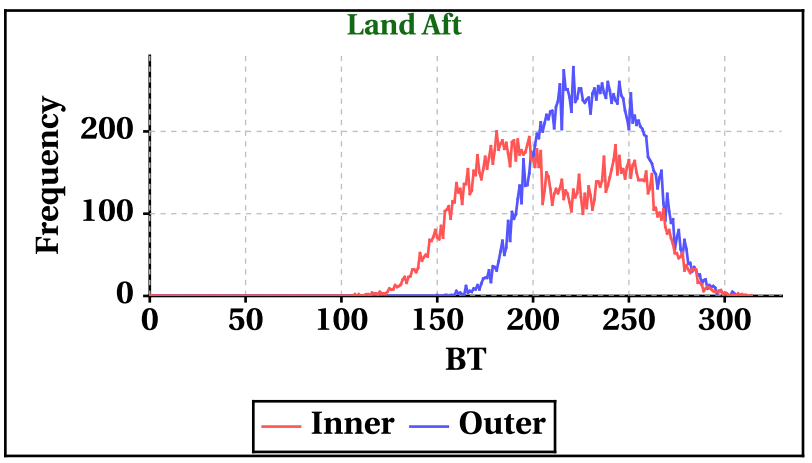



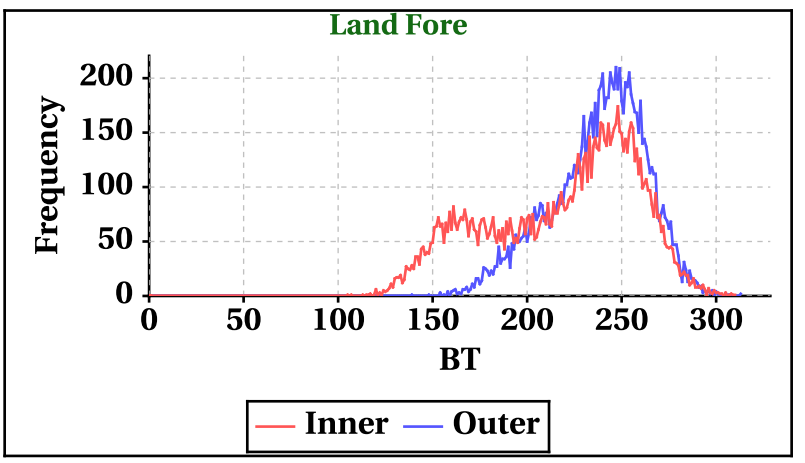



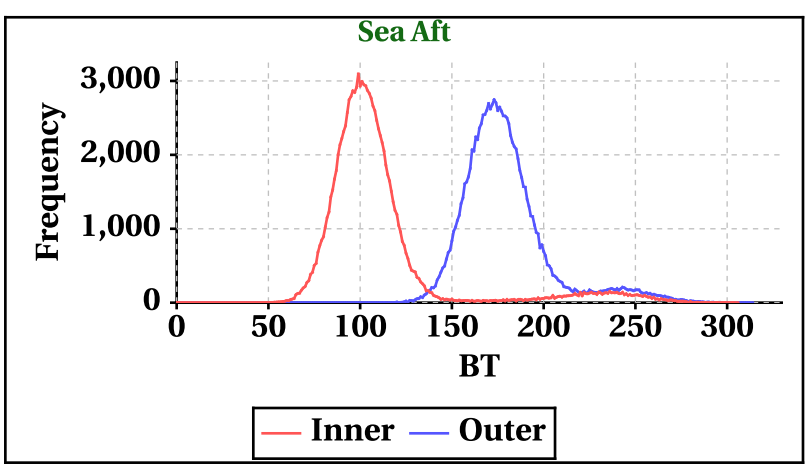

## Brightness Temperature(K)

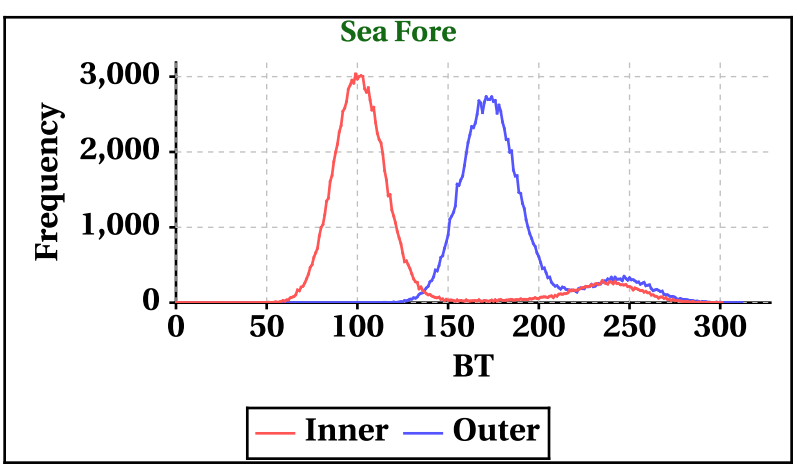
| Inner Beam(HH) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | 0 | 0 | 0 | 0 |
| Max | 314 | 310 | 306 | 301 |

| Outer Beam(VV) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | 0 | 0 | 0 | 0 |
| Max | 311 | 313 | 314 | 312 |



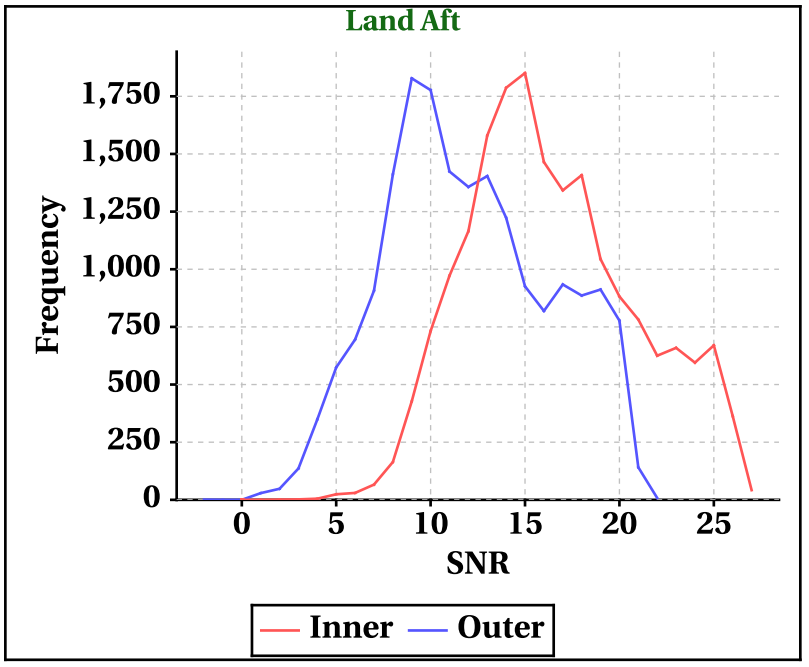



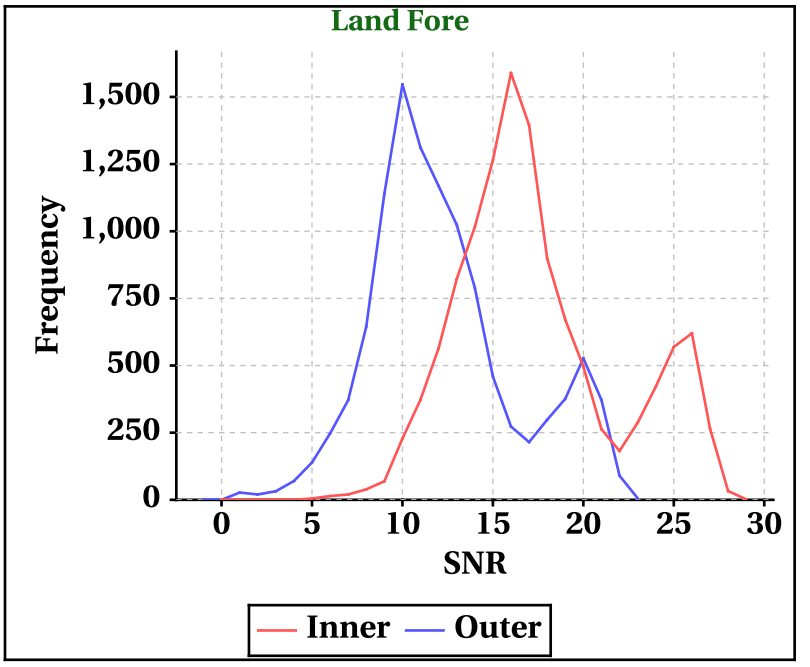
# Dynamic Range (Data Histograms)

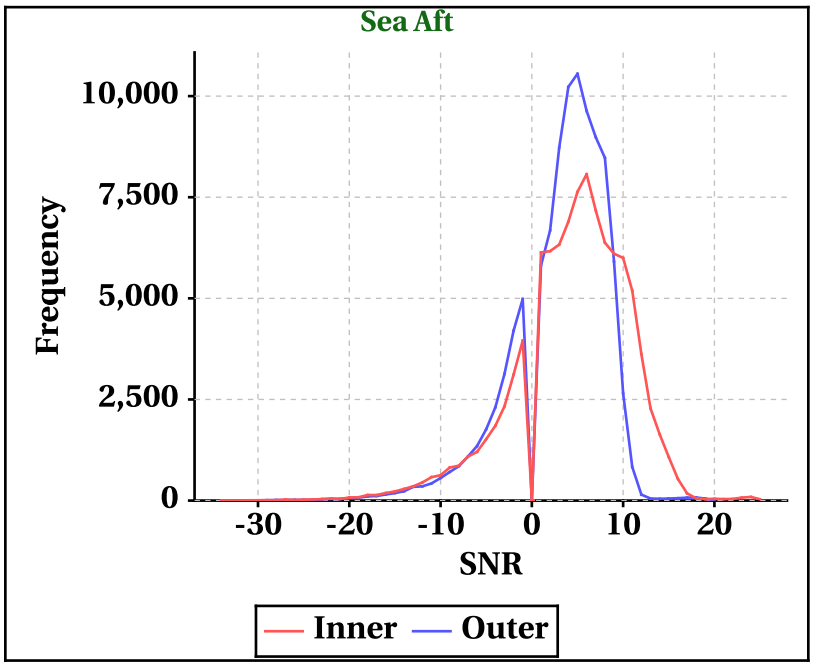
## SNR(dBm)

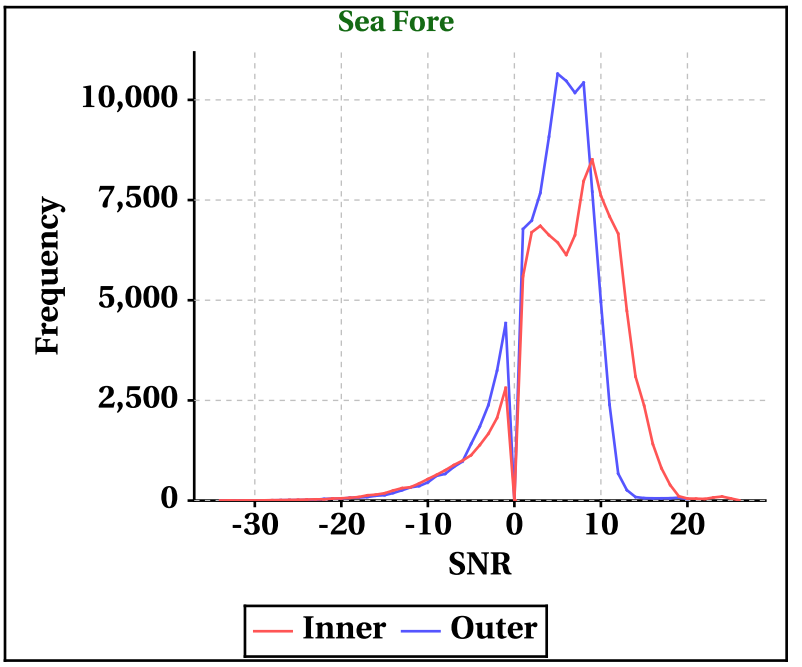
| Inner Beam (HH) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | 0 | 0 | -34 | -34 |
| Max | 27 | 29 | 25 | 26 |

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



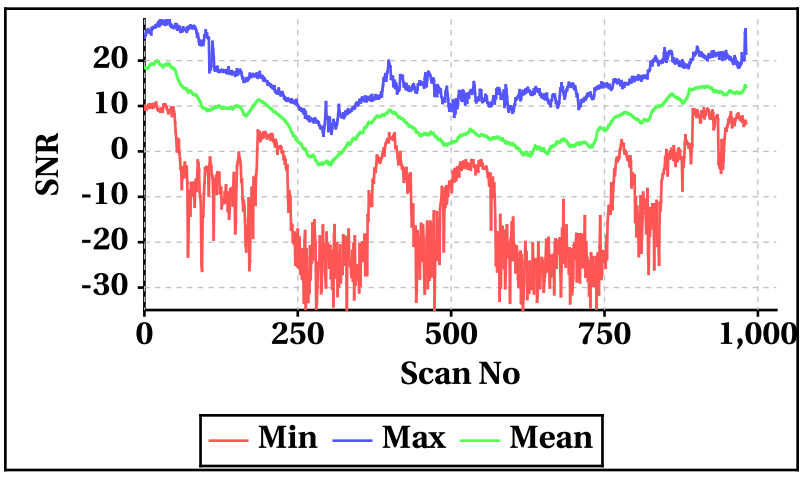



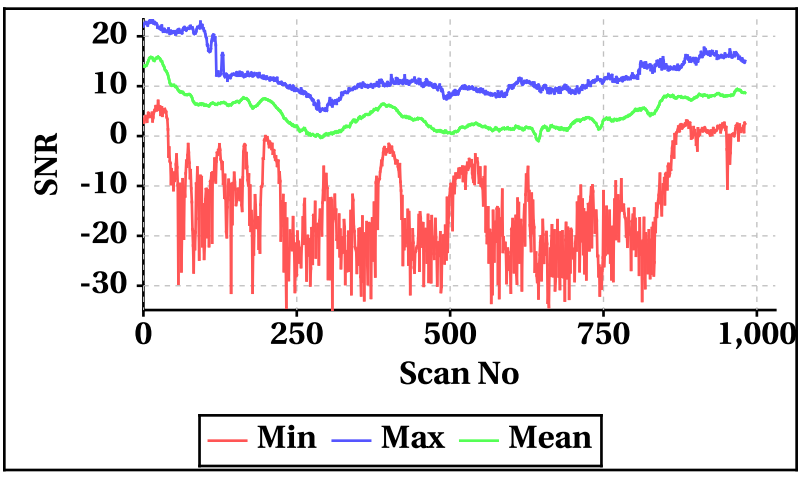



## Orbit-wise behaviour of SNR

Inner Beam (HH)

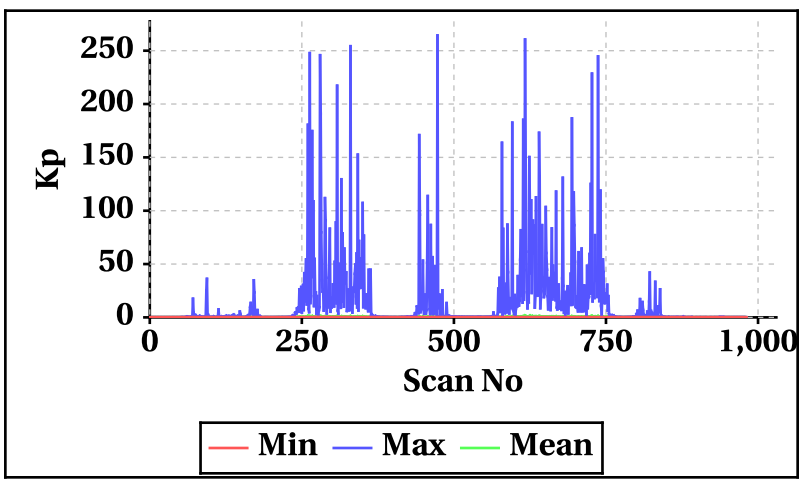



Outer Beam(VV)

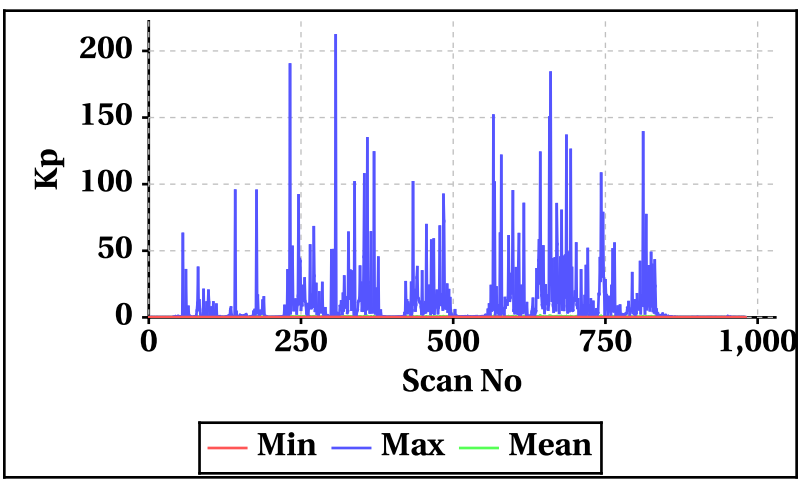



## Orbit-wise behaviour of Kp,Kpa,Kpb,Kpc

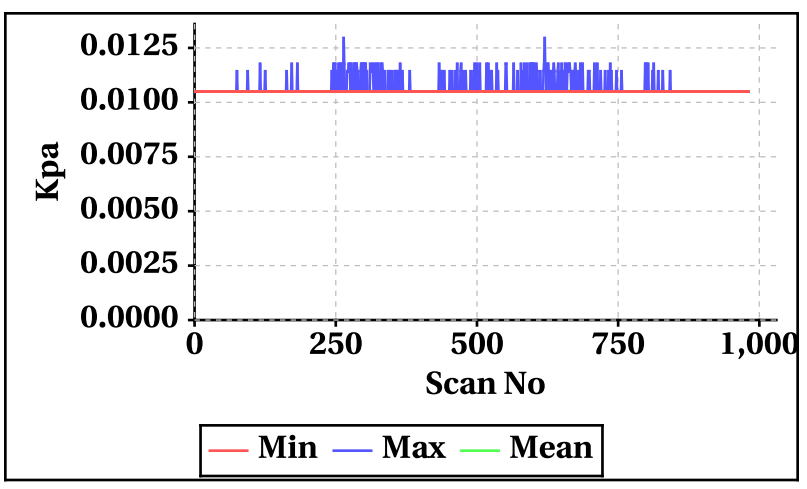
Inner Beam(HH)



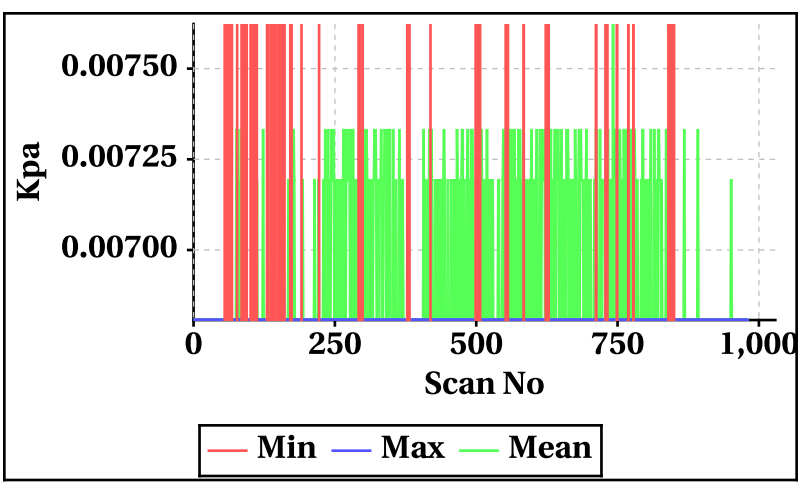

Outer Beam(VV)



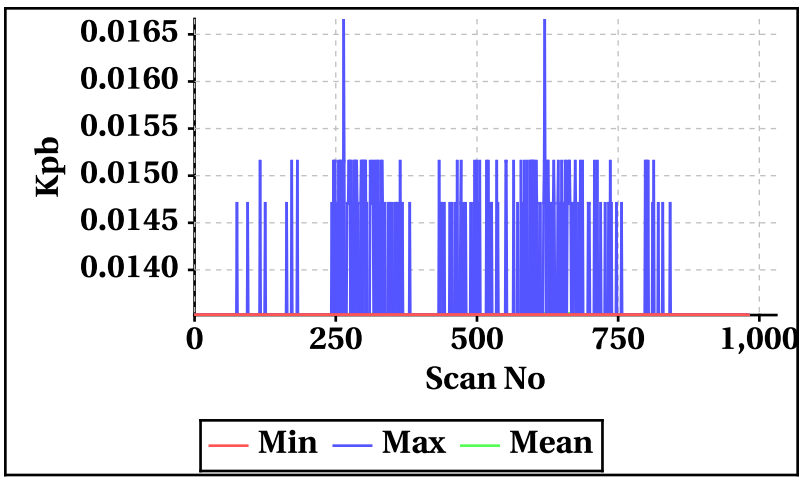

Inner Beam(HH)



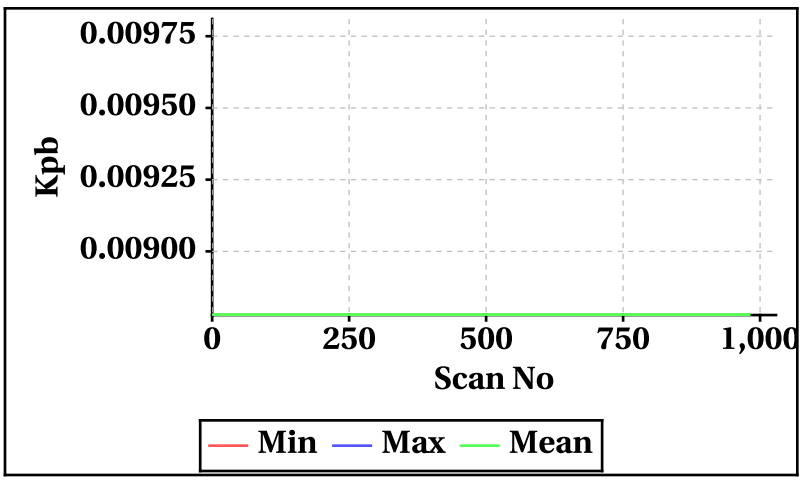

Outer Beam(VV)



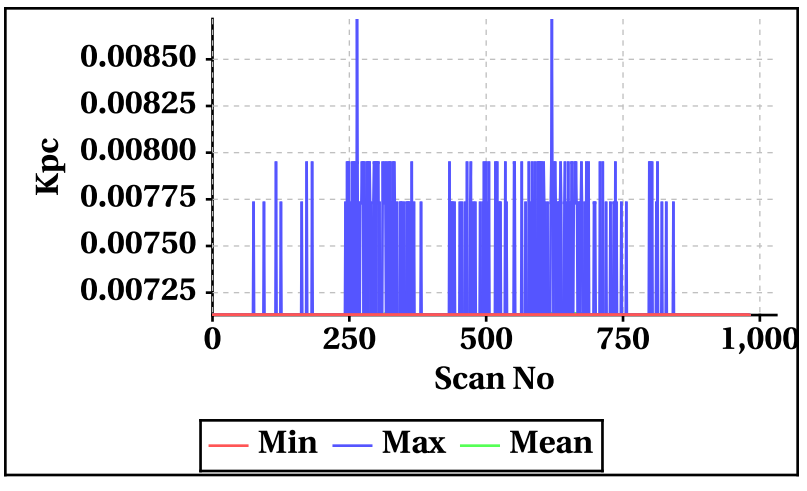

Inner Beam(HH)



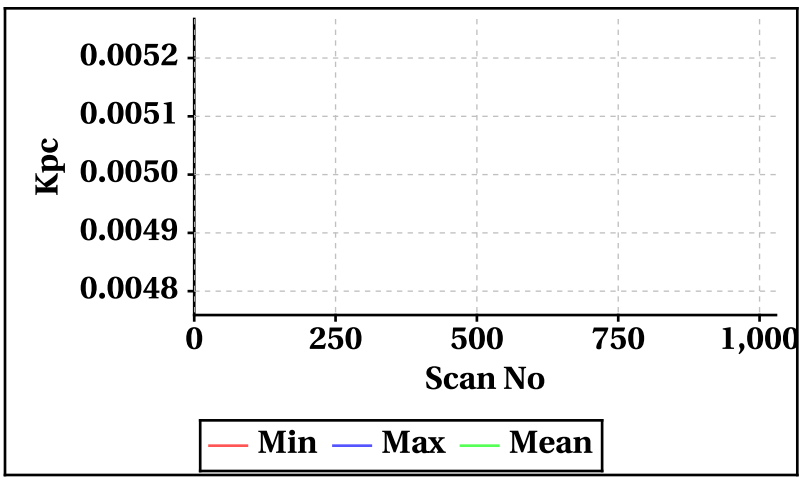

Outer Beam(VV)




Inner Beam(HH)

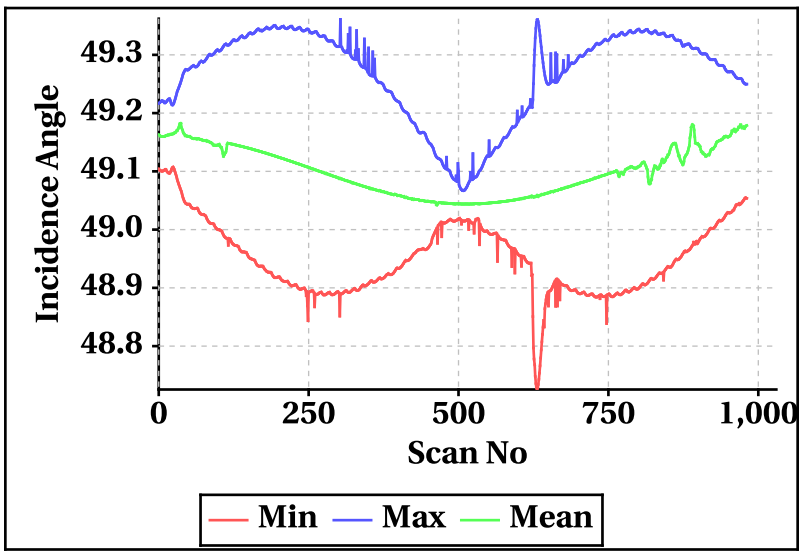



Outer Beam(VV)

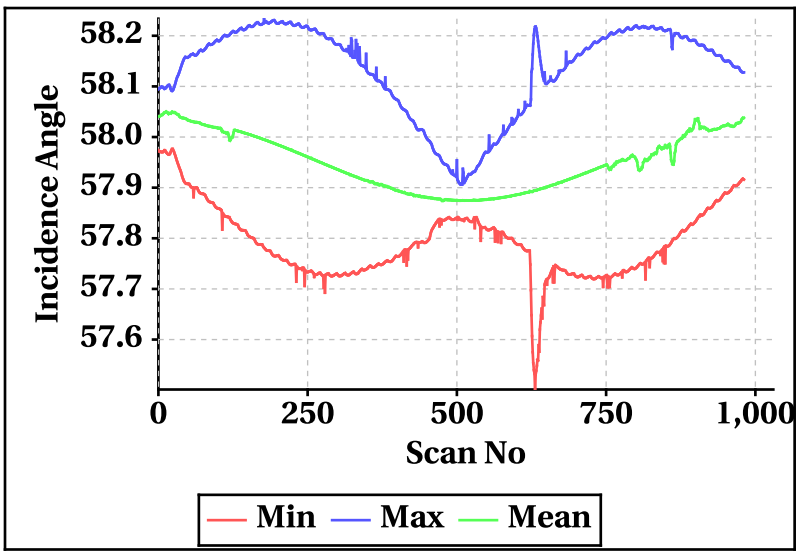


## Orbt-wise behaviour of Incidence,Azimuth,Range,X-Factor

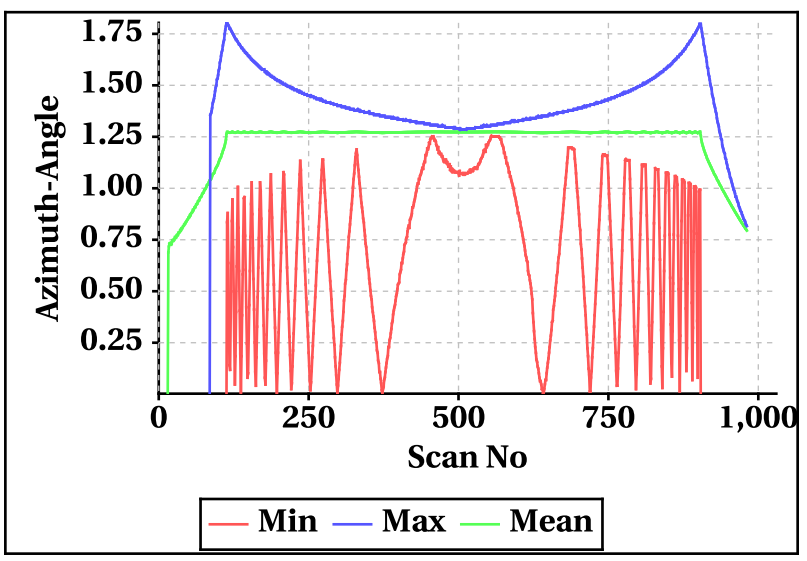
### Inner Beam (HH)



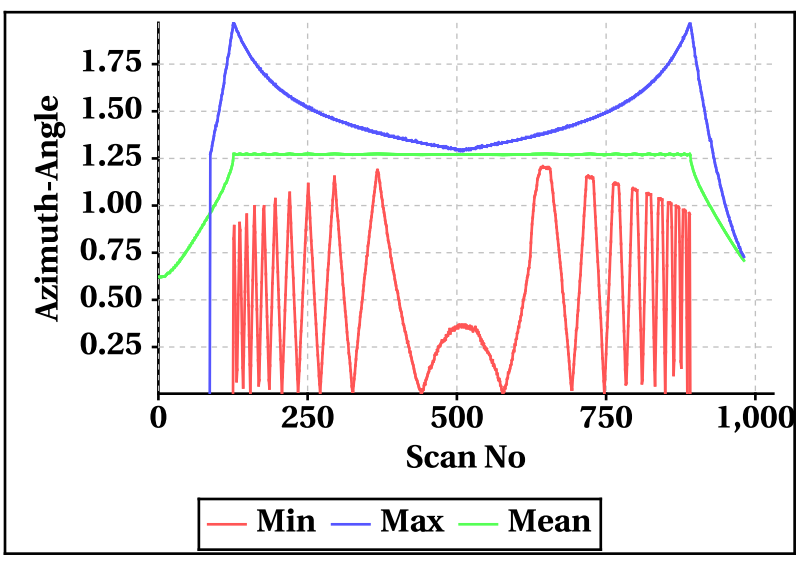

### Outer Beam(VV)



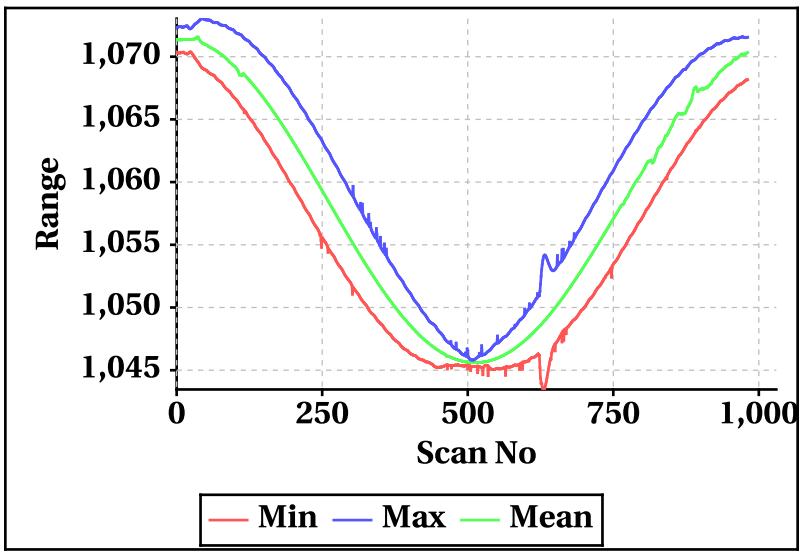

### Inner Beam (HH)



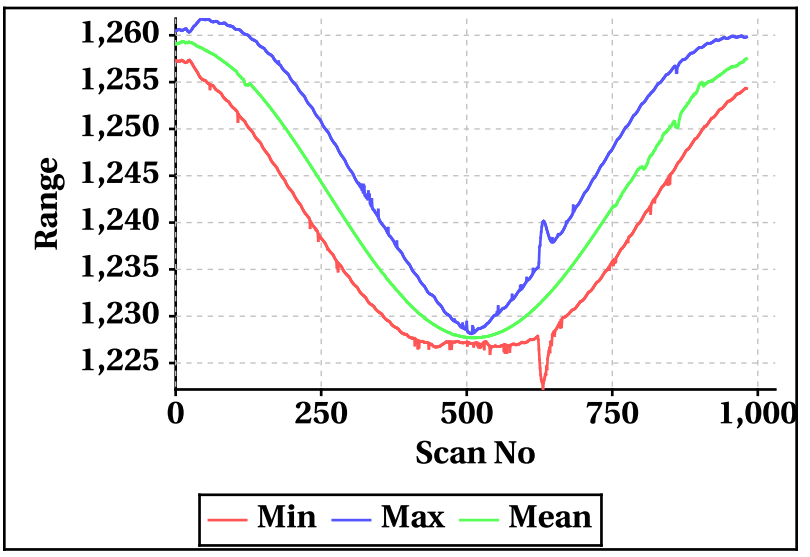

### Outer Beam(VV)



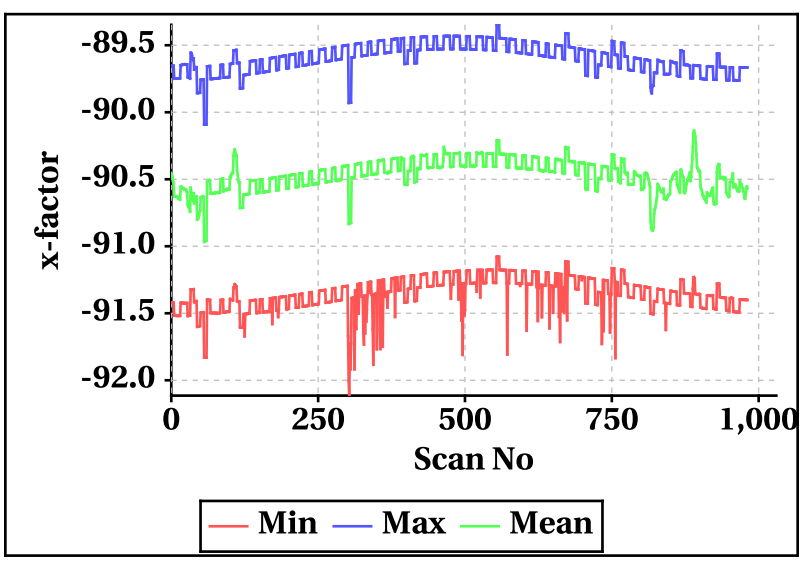

### Inner Beam (HH)



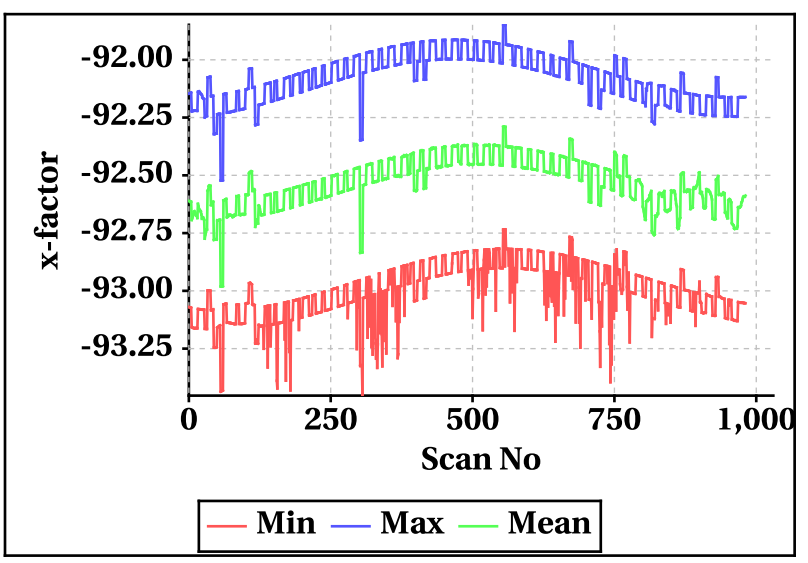

### Outer Beam(VV)




### Inner Beam (HH)




### Outer Beam(VV)



# Doppler Frequency Variation

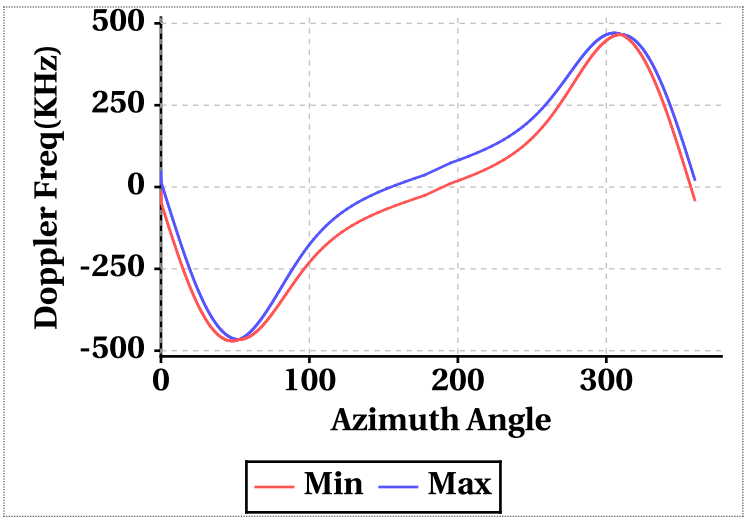
### Doppler Frequency(KHz) variation statistics Over the half Orbit

| | Inner Beam (HH) | Outer Beam (VV) |
|---|---|---|
| Min | -470.32 | -527.06 |
| Max | 470.40 | 527.16 |

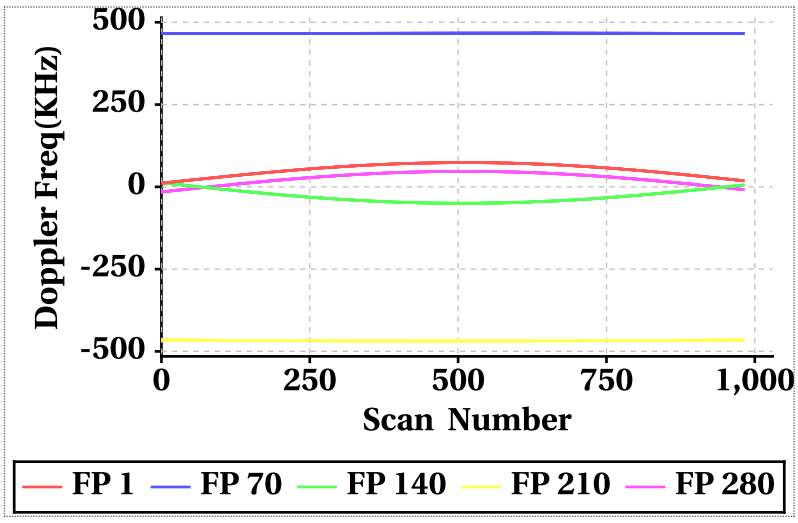
### Doppler Frequency(KHz) variation

| | Inner Beam (HH) | | | Outer Beam (VV) | | |
|---|---|---|---|---|---|---|
| Doppler_FP | Min | Max | Mean | Min | Max | Mean |
| Doppler_1 | 11.12 | 73.76 | 52.35 | 7.32 | 77.48 | 53.53 |
| Doppler_70 | 465.66 | 467.32 | 466.47 | 521.80 | 524.16 | 523.13 |
| Doppler_140 | -50.00 | 12.44 | -28.57 | -62.50 | 7.46 | -38.52 |
| Doppler_210 | -468.34 | -465.46 | -467.25 | -524.22 | -521.86 | -523.30 |
| Doppler_280 | -15.42 | 47.14 | 25.69 | -10.78 | 59.30 | 35.28 |

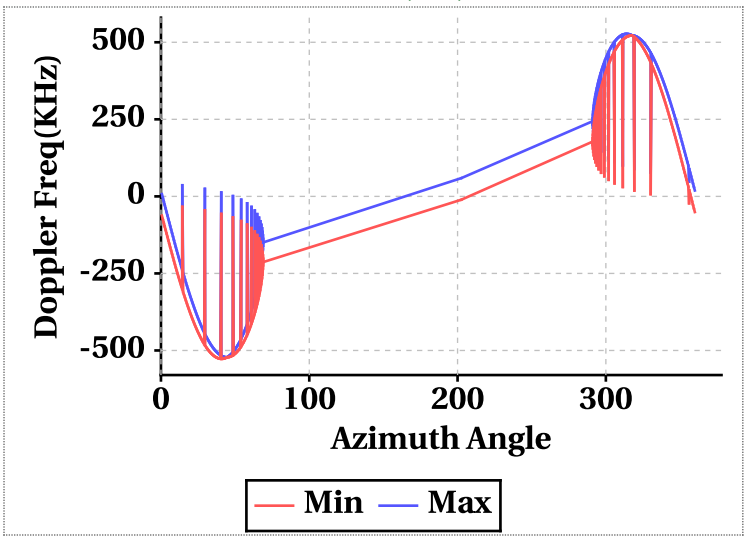
### Footprint wise Doopler frequency variation Inner Beam (HH)



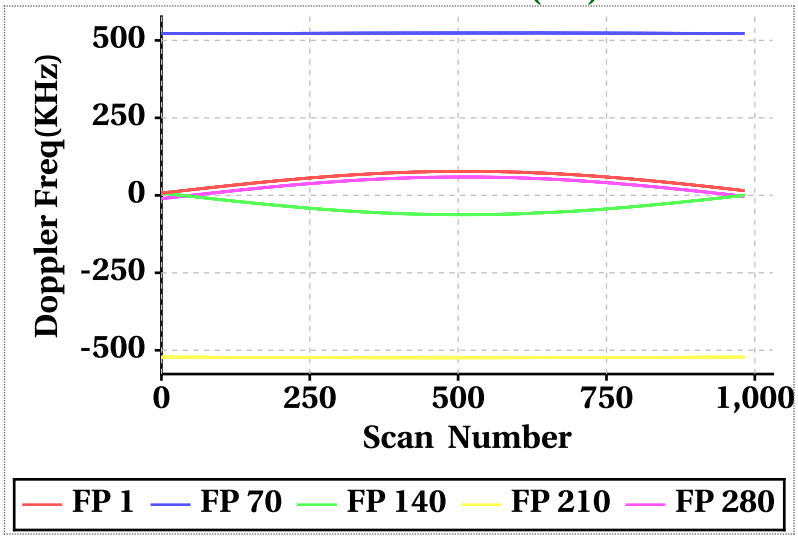

### Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Inner Beam (HH)




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

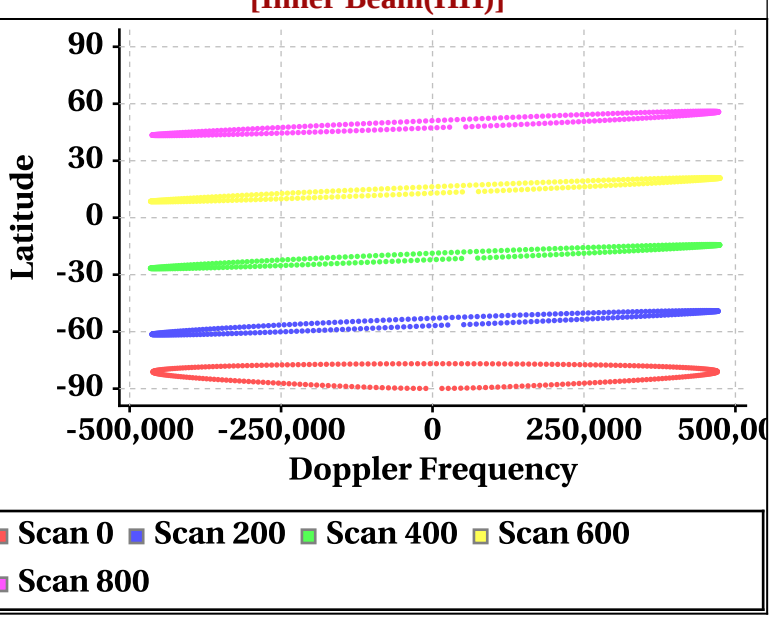



### Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Outer Beam (VV)

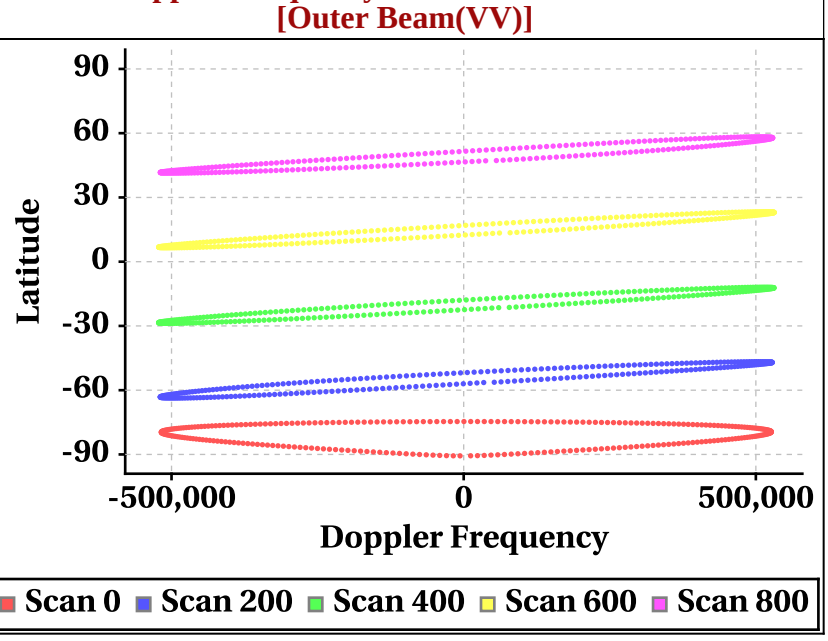



## Latitude Vs Doppler Frequency

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



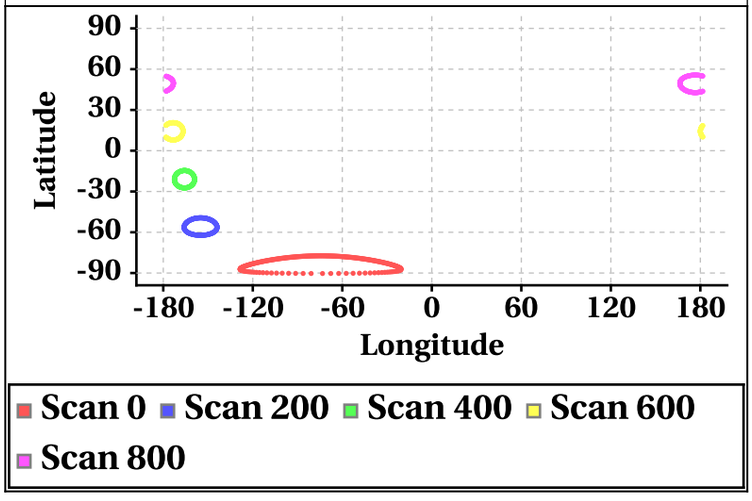

### Doppler Frequency at Scan Interval of 200 [Outer Beam(VV)]



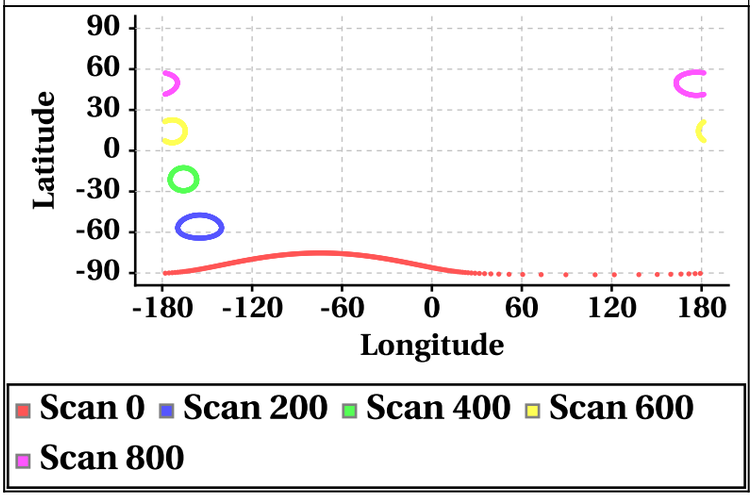
# Parameter as a function of Latitude

## Latitude Vs Longitude

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

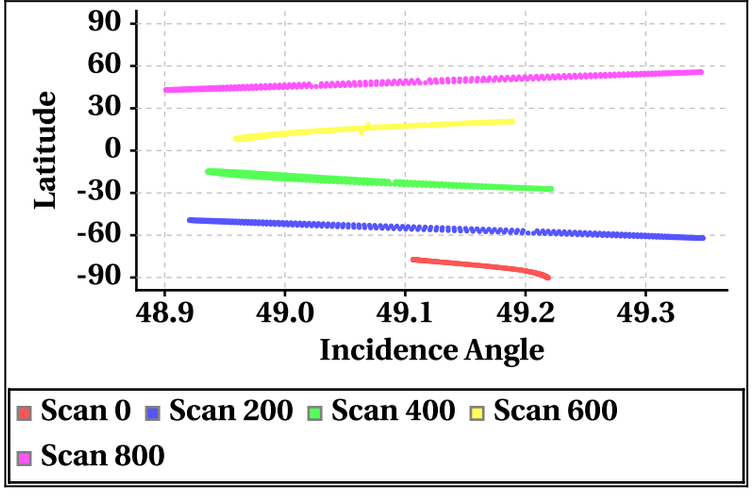



### Scan Trace [Outer Beam (VV)]

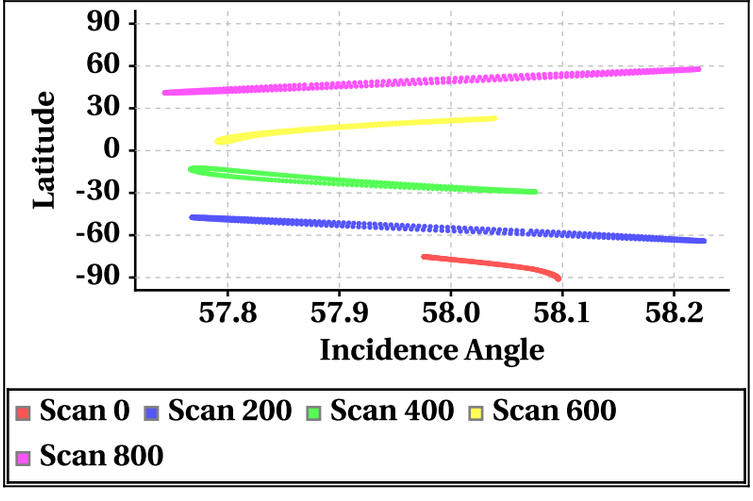



## Latitude Vs Incidence Angle

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

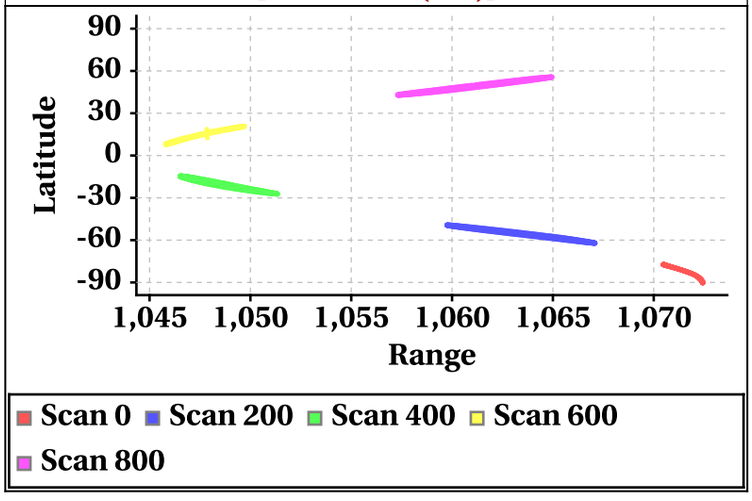



### Incidence Angle at Scan Interval of 200 [Outer Beam (VV)]

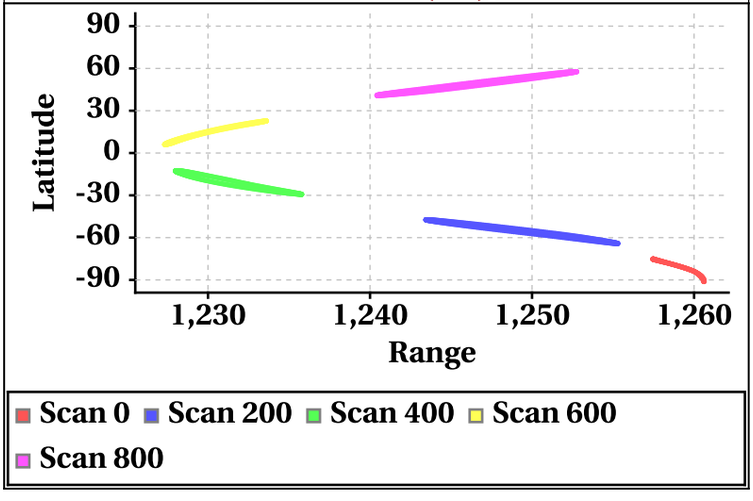



## Latitude Vs Range

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



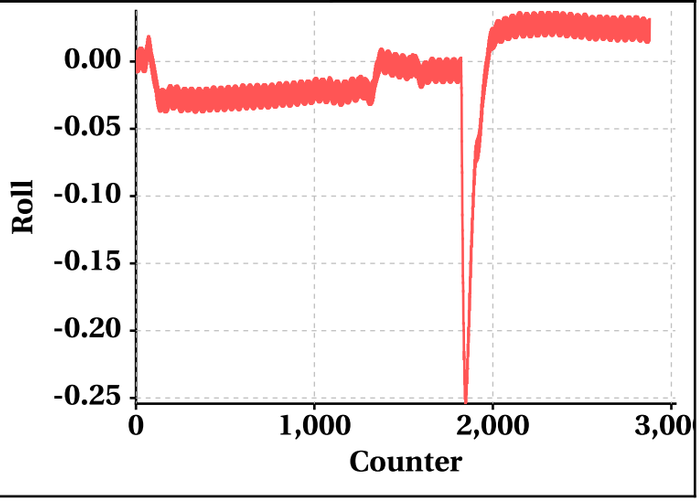

### Range at Scan Interval of 200 [Outer Beam(VV)]



# Variation in Orbit and Attitude Parameters

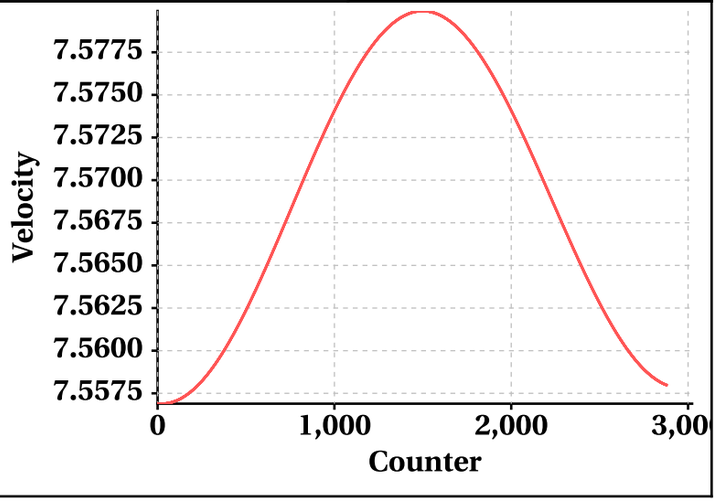
## Roll

| Min Roll(deg) | -0.254249 |
|---|---|
| Max Roll(deg) | 0.037549 |



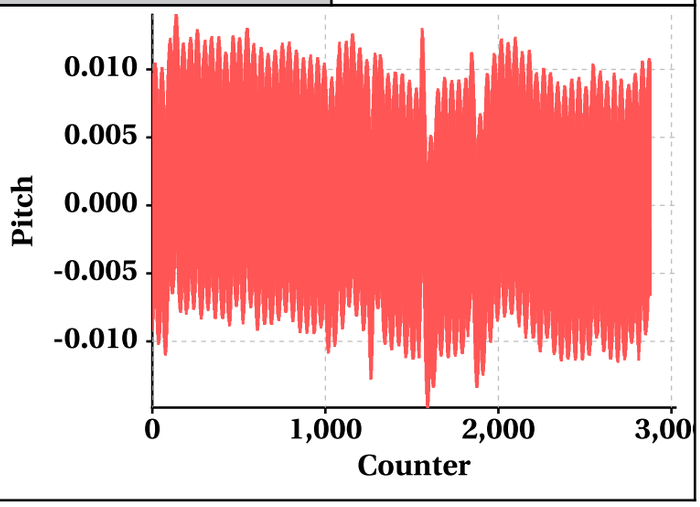

## Velocity

| Min Velocity(km/s) | 7.556891 |
|---|---|
| Max Velocity(km/s) | 7.579921 |



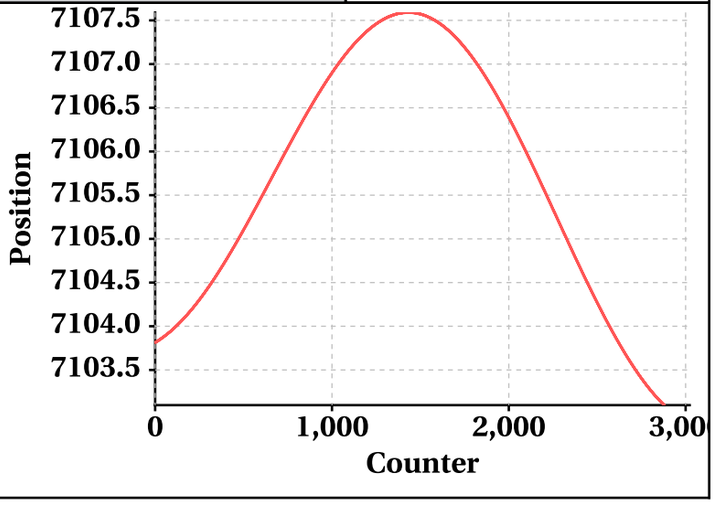

## Pitch

| Min Pitch(deg) | -0.01487 |
|---|---|
| Max Pitch(deg) | 0.014009 |



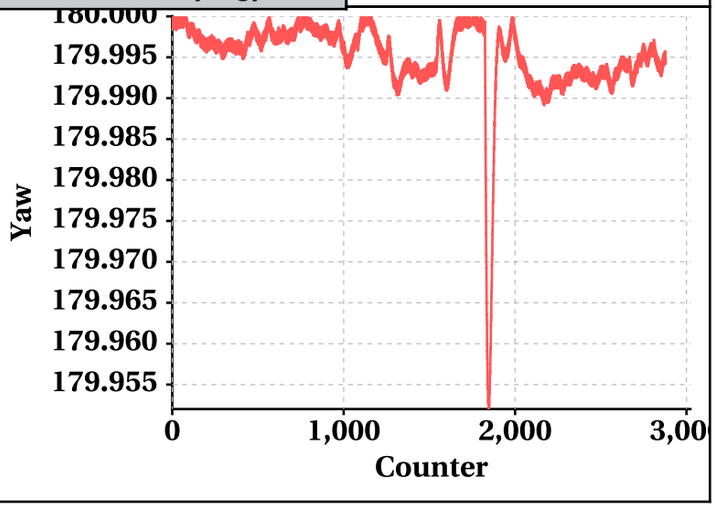

## Position

| Min Position(km) | 7103.097168 |
|---|---|
| Max Position(km) | 7107.59082 |




## Yaw

| Min Yaw(deg) | 179.952011 |
|---|---|
| Max Yaw(deg) | 180.0 |




## TimeDifference

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

