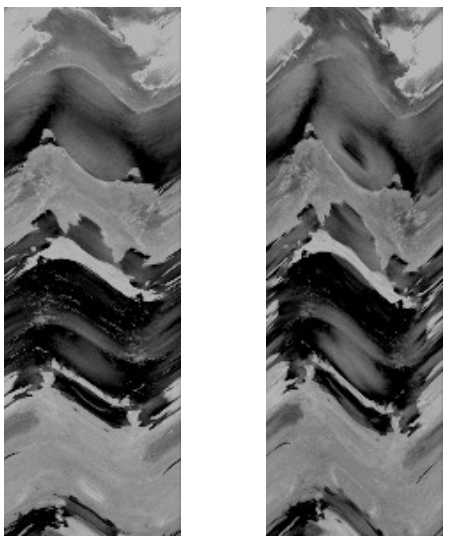
# SCATSAT-1 Scatterometer Level-1B Data Quality Evaluation Report

## Table of Contents



## Image Snapshot for Inner & Outer Beam

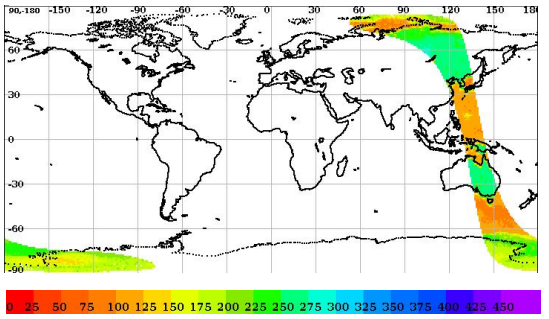
**Inner (HH)** **Outer (VV)**



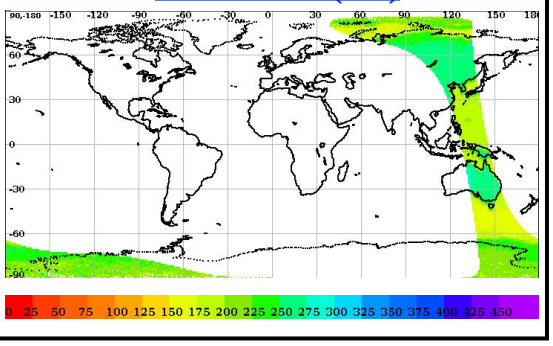
| | | | | | |
|---|---|---|---|---|---|
| **Satellite Id** | ScatSat-1 | **Start Orbit** | 4904 | **Total Scans** | 970 |
| **Sensor Name** | Scatterometer | **End Orbit** | 4905 | **No of Inner FootPrints** | 281 |
| **Processor Version** | v1.1.2 | **Rev. Number** | 04904_04905 | **No Of Outer FootPrints** | 282 |
| **Half Orbit Direction** | SN | **Data Production Date** | 30-08-2017 | **No. Of Inner Slices** | 9 |
| **Equator Crossing Date** | 30-08-2017 | **Equator Crossing Time** | 11:40:21.000 | **No Of Outer Slices** | 14 |

## Brightness Temprature(k) Footprint trace

**Inner Beam (HH)**

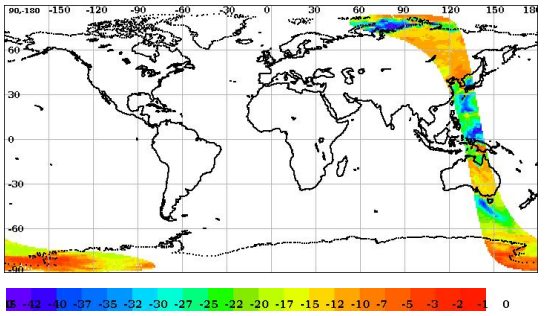


**Outer Beam (VV)**

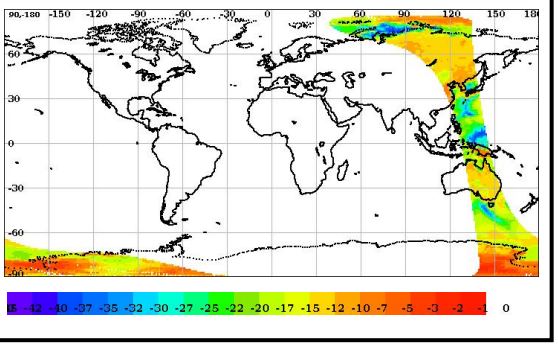


## Sigma0(dB) Footprint trace

**Inner Beam (HH)**



**Outer Beam (VV)**



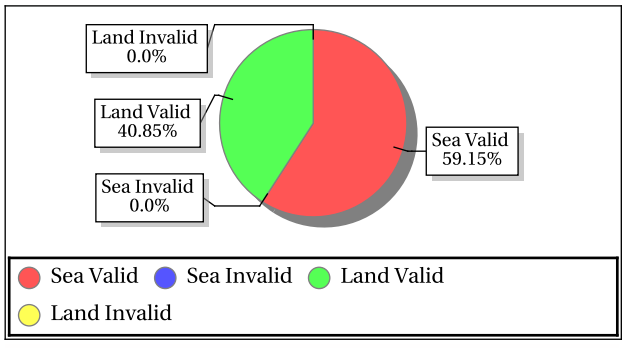
## Invalid and Poor Sigma-0 Quality Flag Statistics for Inner/Outer Slices*

| 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 |

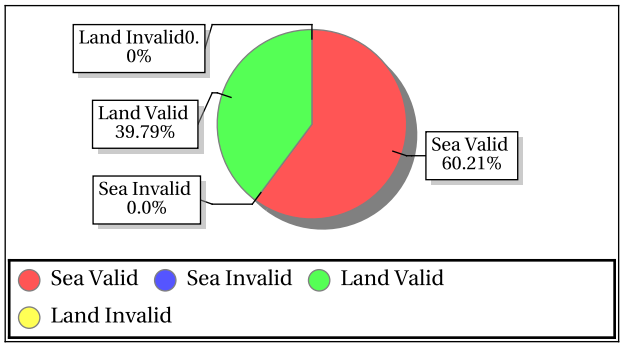
*DP Format Document

## 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 | 263.32 | 0.34 | 3.370 | 0.10 | 251.19 | 0.31 | 2.901 | 0.10 | 118.42 | 0.11 | 0.019 | 0.10 | 5.60 | 0.10 | 0.008 |
| 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 | -34.94 | 23.28 | 4.77 | 0.012 | -34.73 | 24.47 | 6.02 | 0.085 | -31.47 | 29.58 | 17.16 | 9.020 | -18.15 | 32.53 | 18.40 | 11.660 |

## 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 | 212.28 | 0.28 | 2.679 | 0.08 | 191.48 | 0.28 | 2.608 | 0.08 | 6.61 | 0.09 | 0.003 | 0.08 | 0.30 | 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 | 0.00 | 0.00 | 0.000 |
| SNR | -34.88 | 18.04 | 3.71 | 0.000 | -34.43 | 17.63 | 4.29 | 0.000 | -19.77 | 23.82 | 12.31 | 0.663 | -5.20 | 24.63 | 12.85 | 1.462 |

| 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)

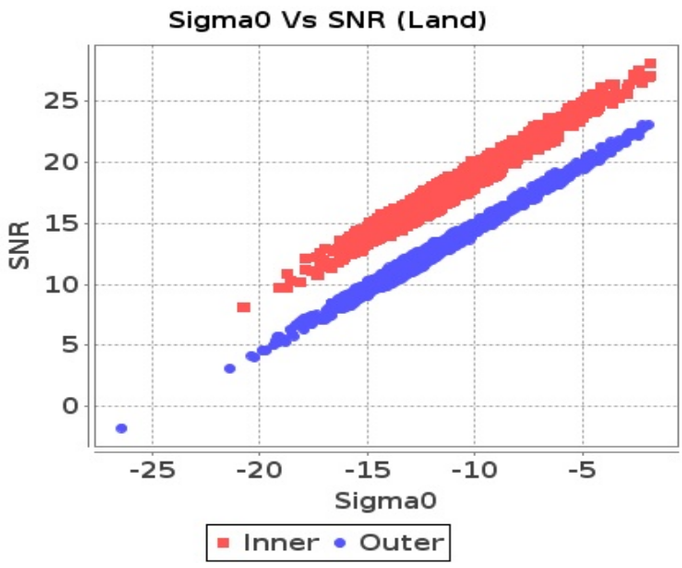
| | Inner Beam (HH) | | | | Outer Beam (VV) | | | |
|---|---|---|---|---|---|---|---|---|
| | Min | Max | Mean | Bad Occ. (%) | Min | Max | Mean | Bad Occ. (%) |
| Incidence Angle (deg) | 48.83 | 49.36 | 49.02 | 0.000 | 57.65 | 58.24 | 57.95 | 0.000 |
| Azimuth Diff. (deg) | 0.0026 | 1.80 | 1.13 | 0.167 | 0.0026 | 1.97 | 1.12 | 0.200 |
| Range(Km) | 1040.49 | 1075.34 | 1053.55 | 0.000 | 1220.31 | 1264.59 | 1237.19 | 0.000 |
| X Factor(dbm) | -92.00 | -89.36 | -90.49 | 0.000 | -93.37 | -91.88 | -92.44 | 0.000 |
| Across Distance (Km) | 15.67 | 16.29 | 16.01 | 0.000 | 20.89 | 21.48 | 21.10 | 0.000 |
| Along Distance (Km) | 18.95 | 20.54 | 19.73 | 0.000 | 18.51 | 34.33 | 19.68 | 2.000 |

| 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 |

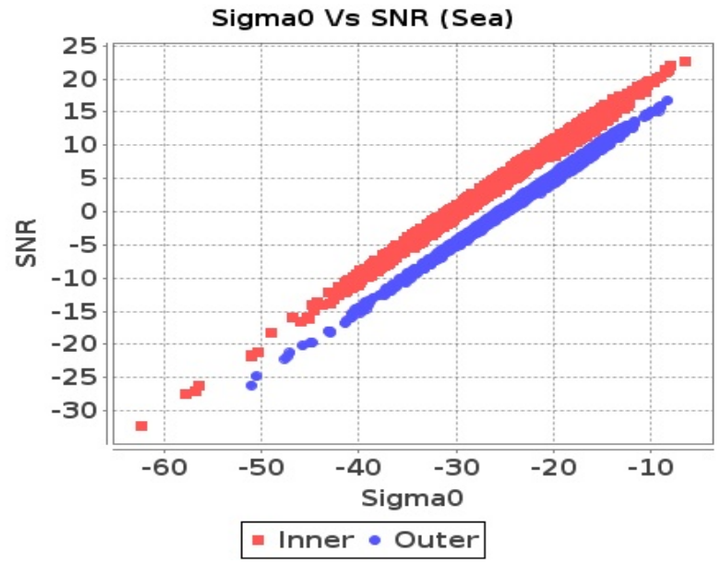
Normal
Deviations
Alarming
High Errors

# Sigma0 Behaviour (Sigma0 Vs SNR)

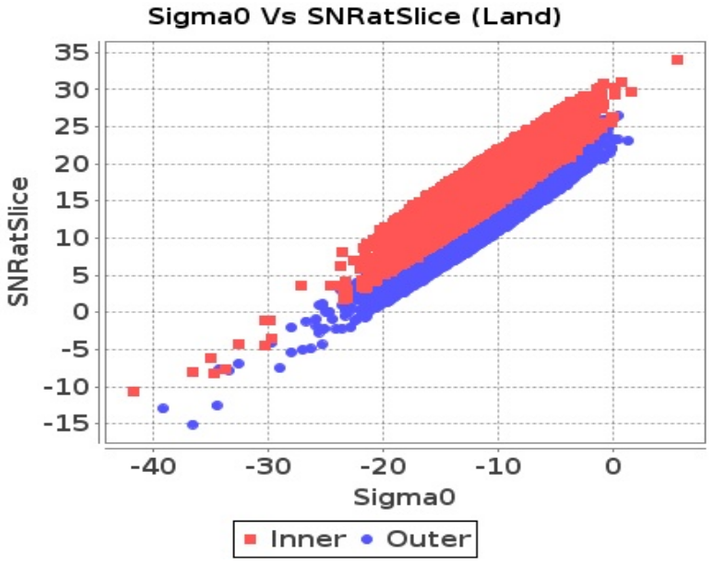
**Footprint-Land**



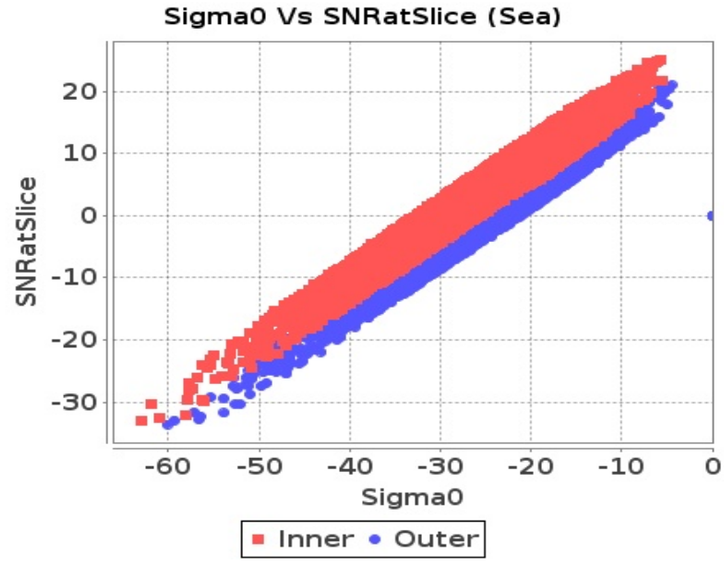

**Footprint-Sea**




**Slice-Land**

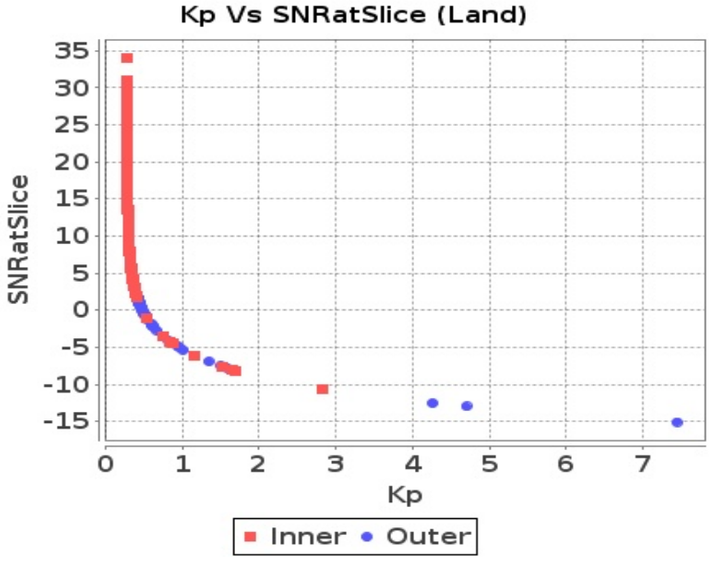



**Slice-Sea**

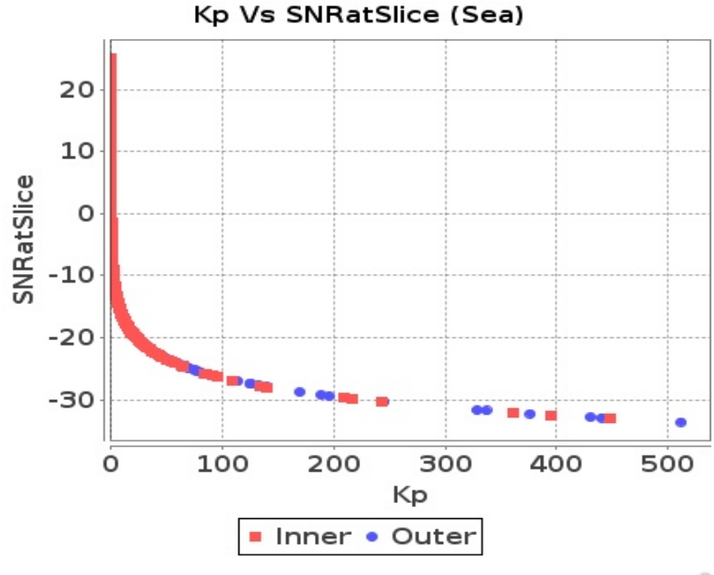



# Sigma0 Behaviour (Kp Vs SNR)

**Slice**

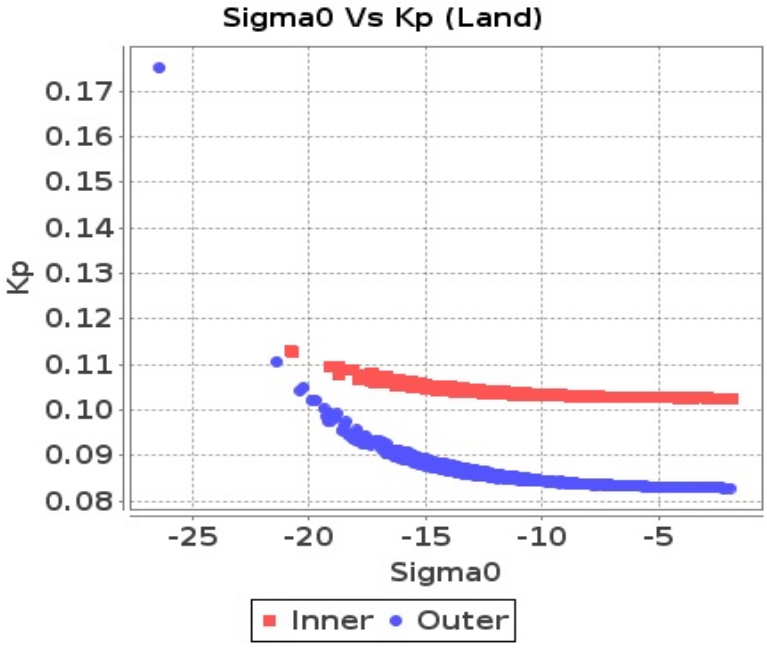



**Slice**

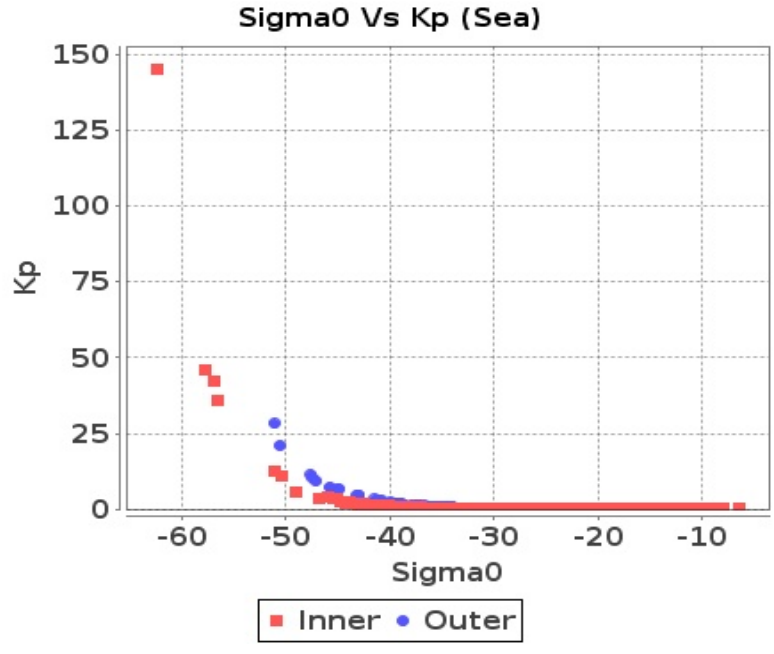


# Sigma0 Behaviour(Sigma0 Vs Kp)

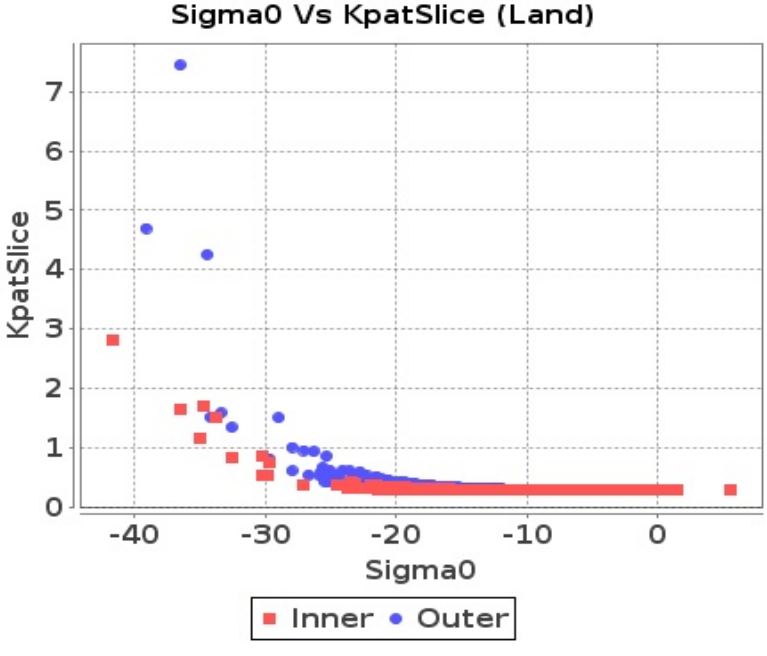
## Footprint-Land



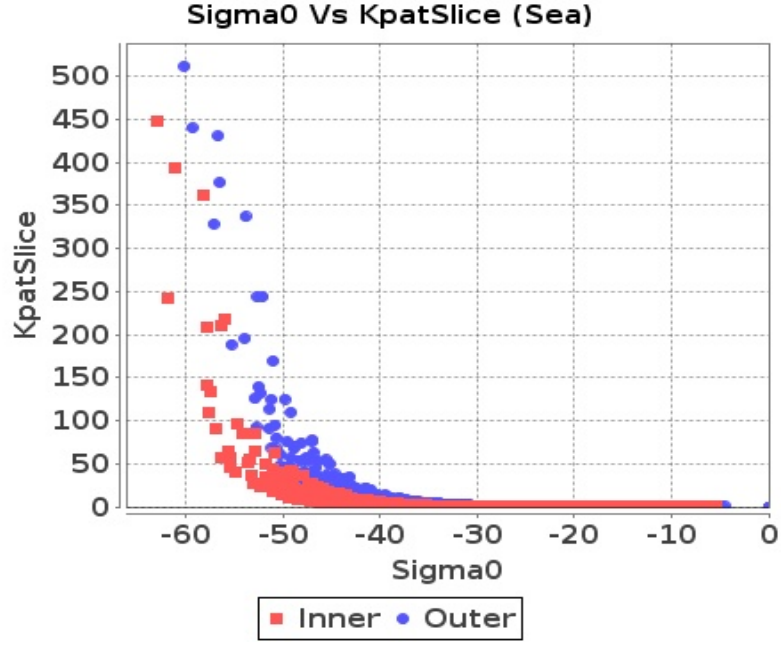

## Footprint-Sea




## Slice-Land




## Slice-Sea

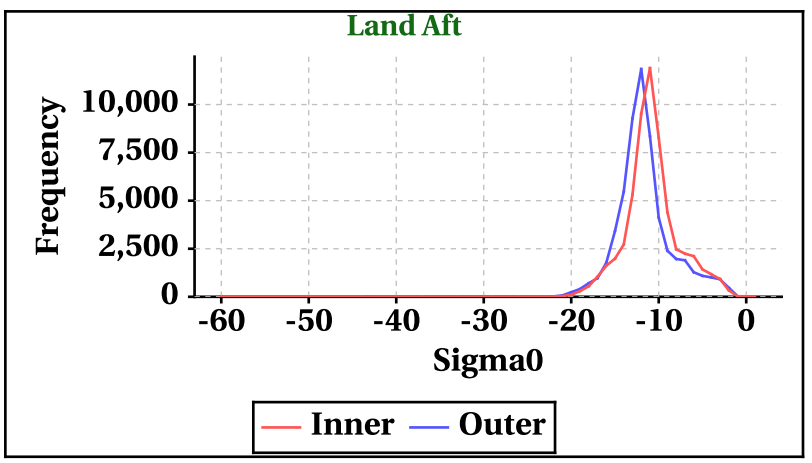


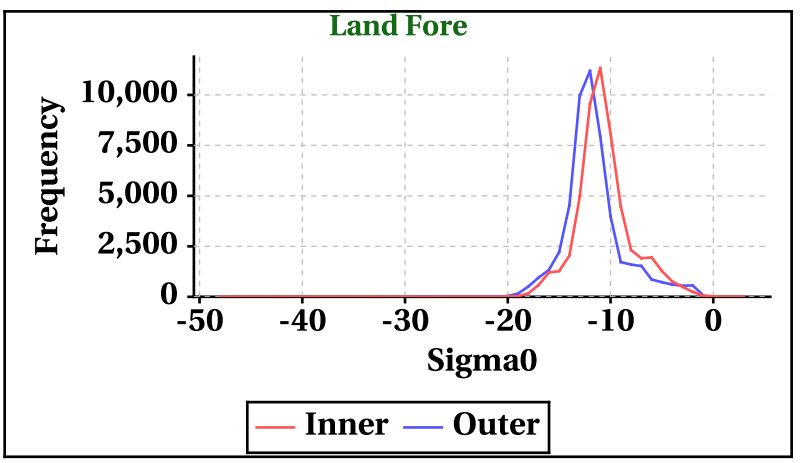
# Dynamic Range (Data Histograms)

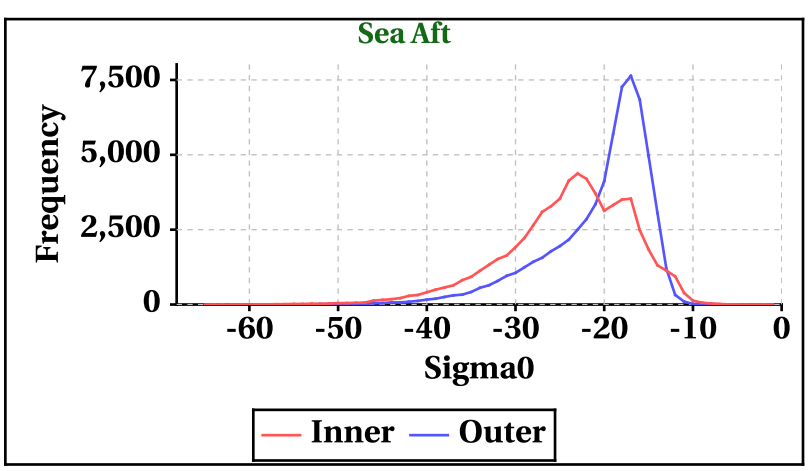
## Sigma0(db)

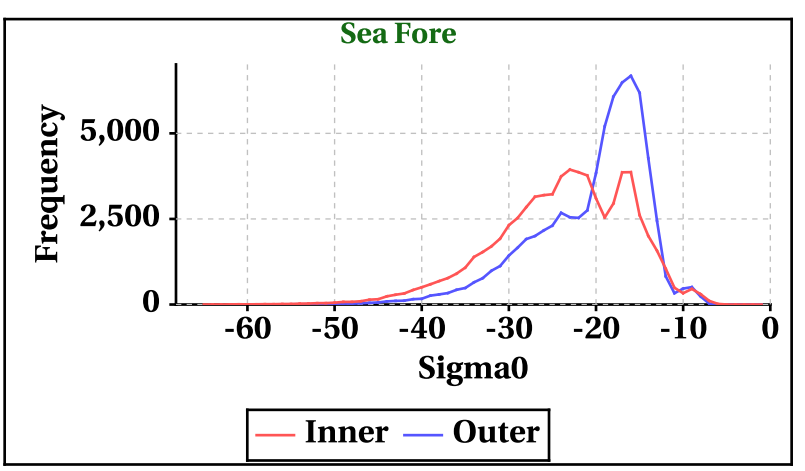
| Inner Beam (HH) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | -60 | -48 | -65 | -65 |
| Max | 1 | 3 | 0 | 0 |

| Outer Beam (VV) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | -44 | -30 | -59 | -59 |
| Max | 0 | 0 | 0 | 0 |



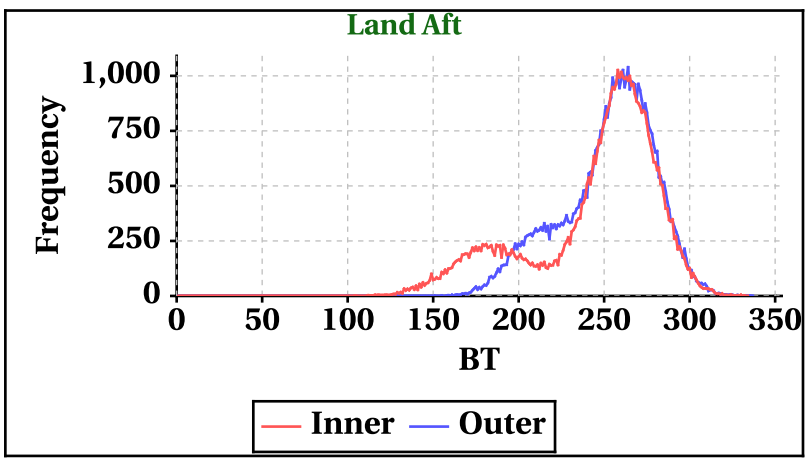



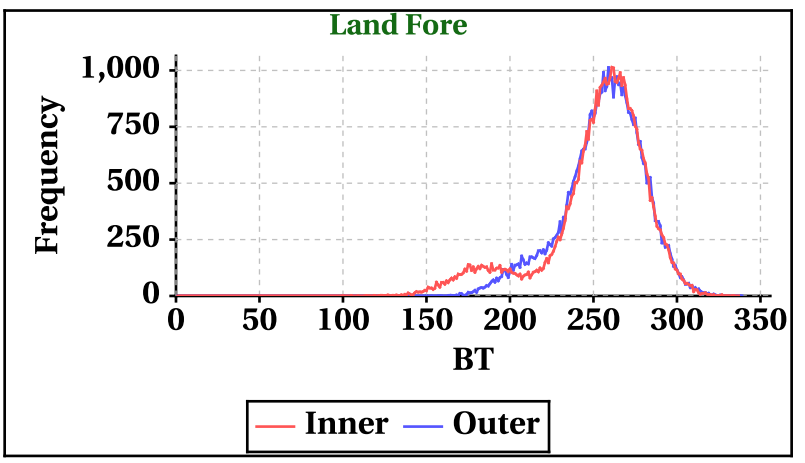



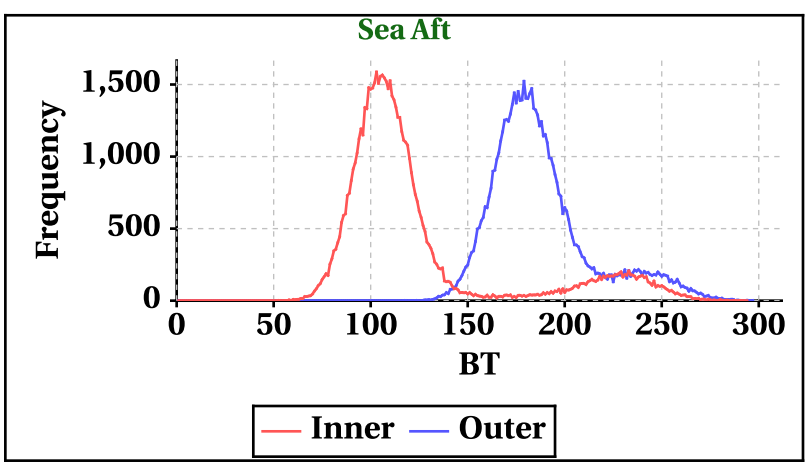

## Brightness Temperature(K)

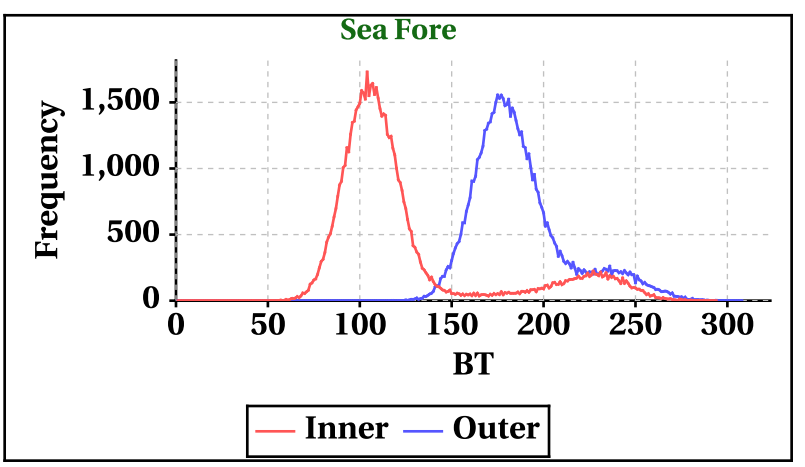
| Inner Beam(HH) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | 0 | 0 | 0 | 0 |
| Max | 334 | 337 | 294 | 294 |

| Outer Beam(VV) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | 0 | 0 | 0 | 0 |
| Max | 337 | 339 | 297 | 308 |



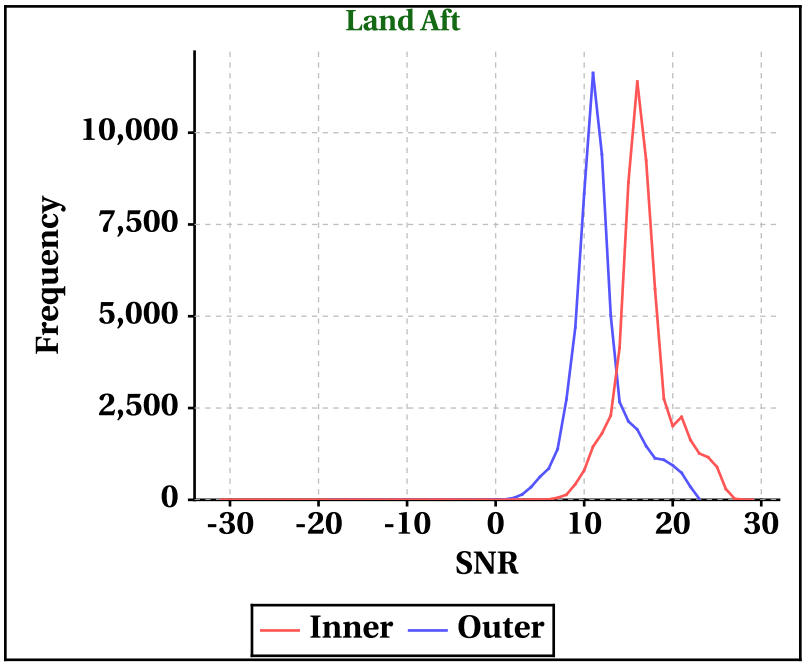



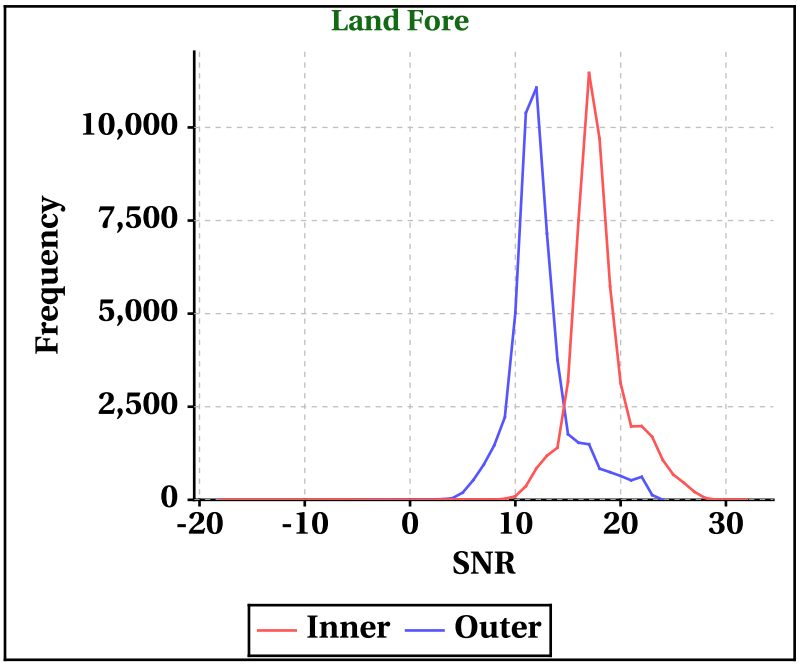
# Dynamic Range (Data Histograms)

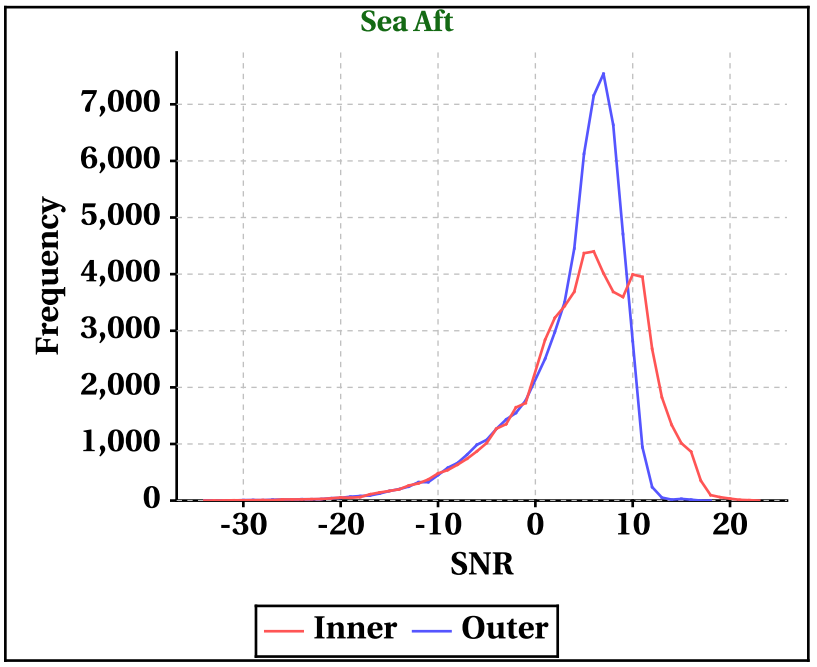
## SNR(dBm)

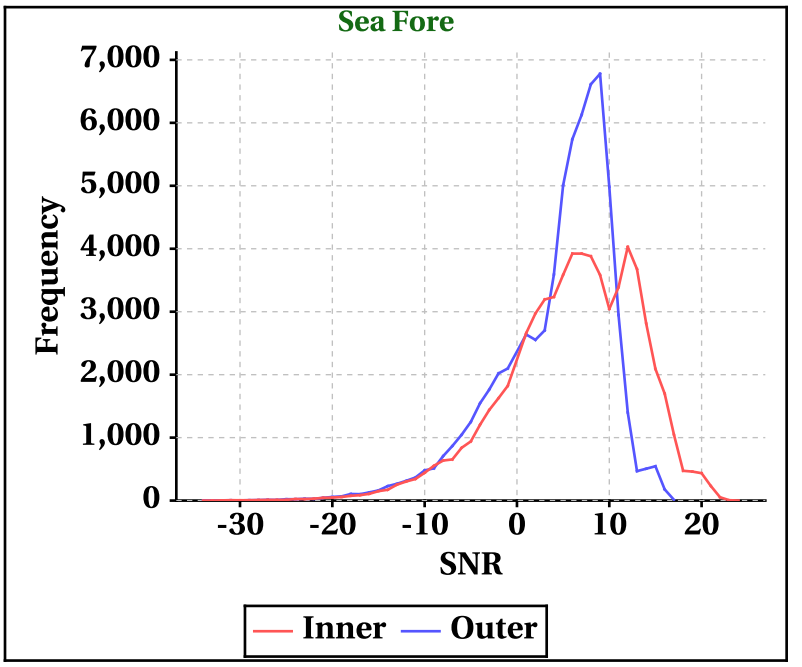
| Inner Beam (HH) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | -31 | -18 | -34 | -34 |
| Max | 29 | 32 | 23 | 24 |

| Outer Beam (VV) | | | | |
|---|---|---|---|---|
| | Land Aft | Land Fore | Sea Aft | Sea Fore |
| Min | -19 | -5 | -34 | -34 |
| Max | 23 | 24 | 18 | 17 |



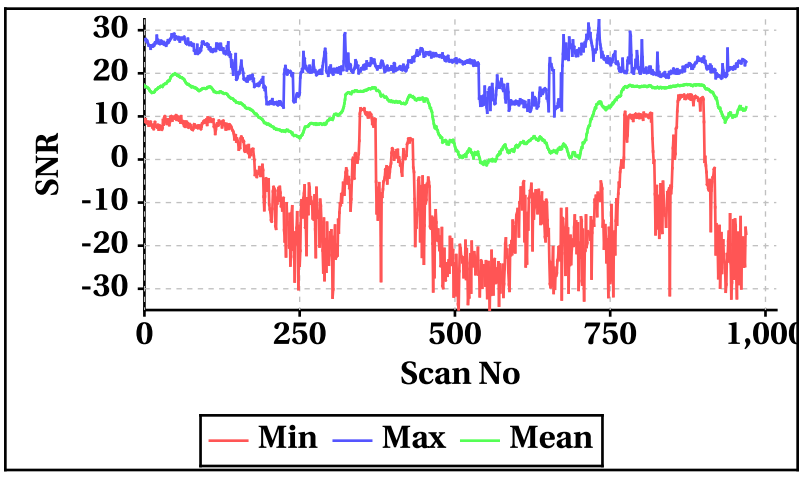



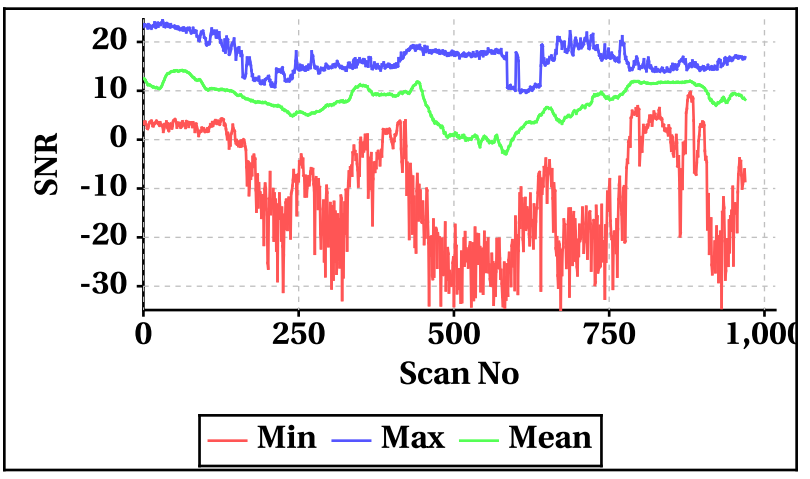



## Orbit-wise behaviour of SNR

Inner Beam (HH)

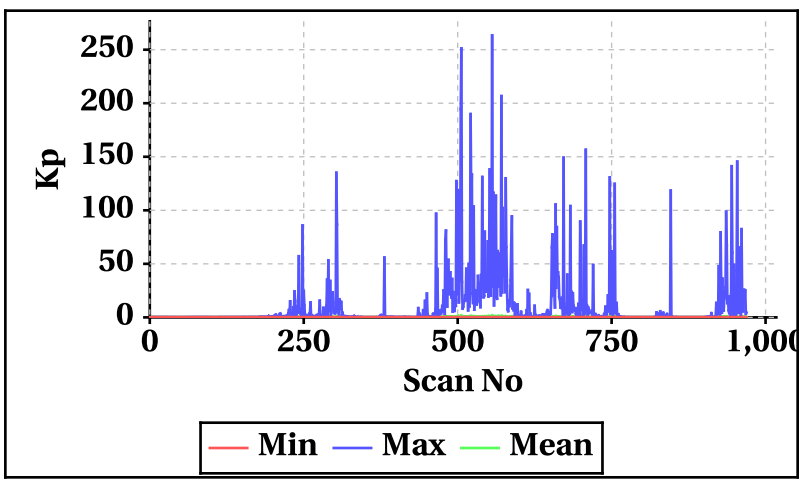



Outer Beam(VV)

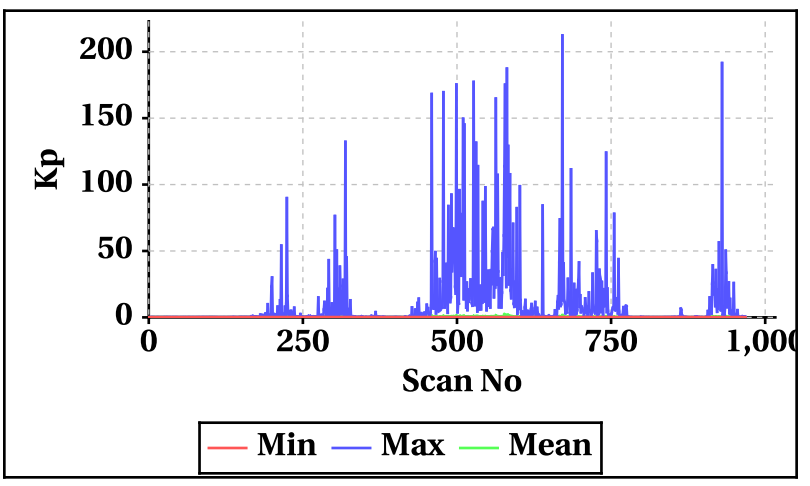



## Orbit-wise behaviour of Kp,Kpa,Kpb,Kpc

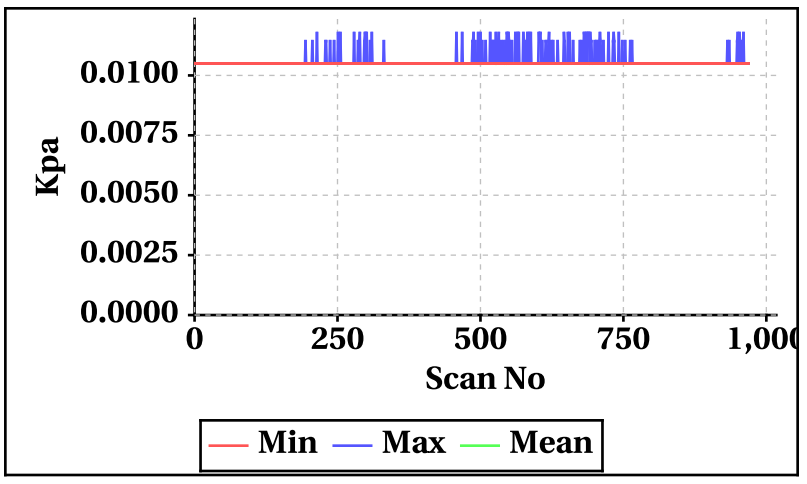
Inner Beam(HH)



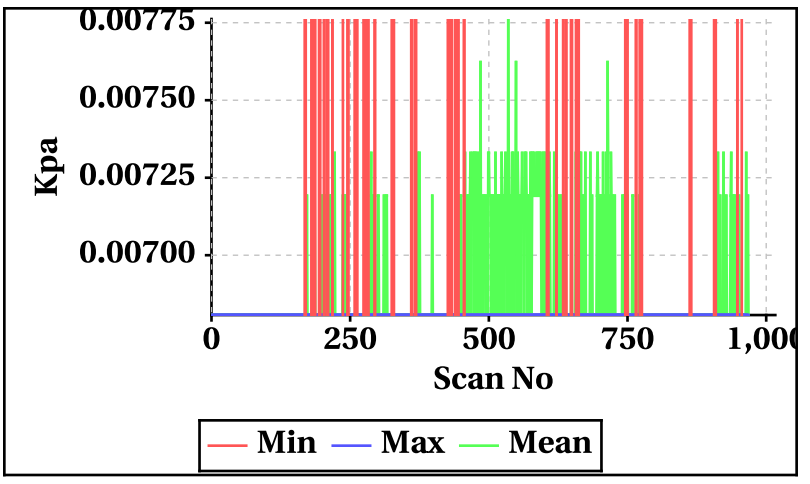

Outer Beam(VV)



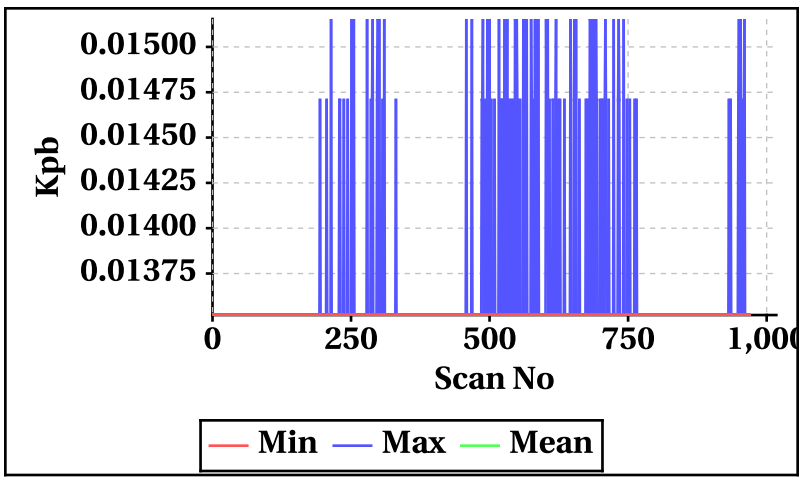

Inner Beam(HH)



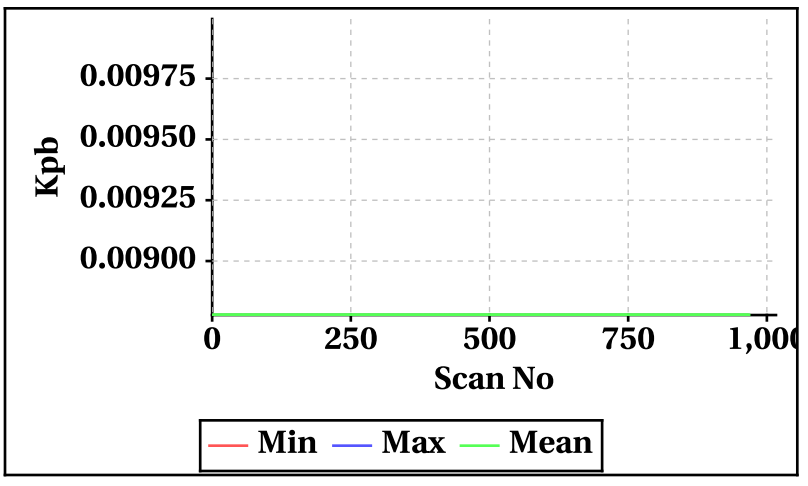

Outer Beam(VV)



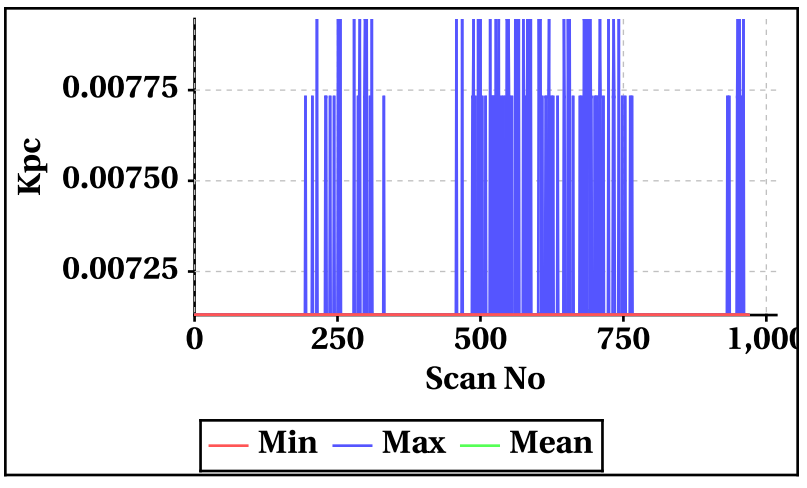

Inner Beam(HH)



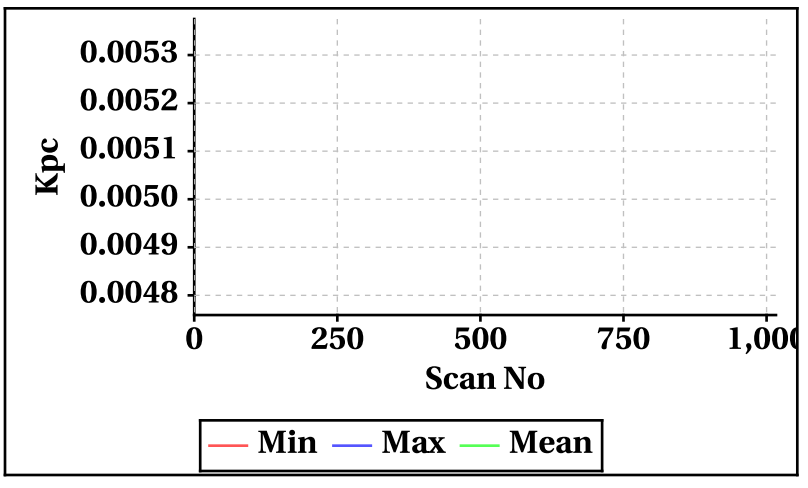

Outer Beam(VV)




Inner Beam(HH)

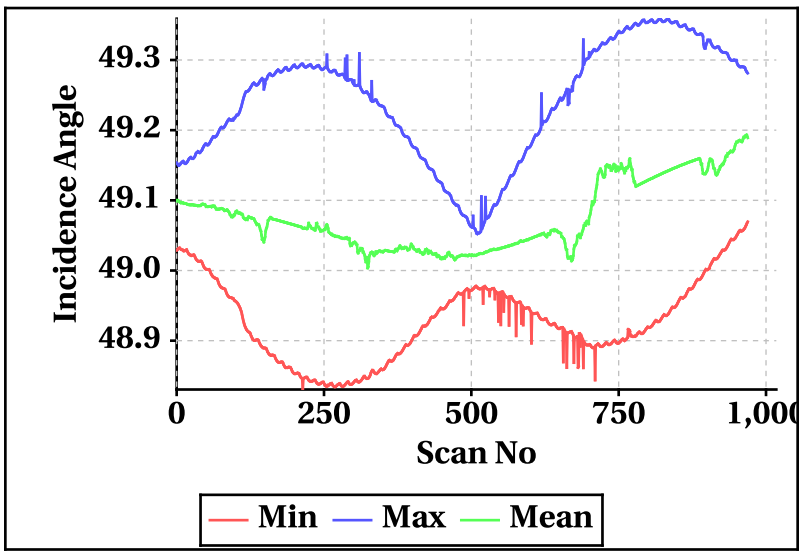



Outer Beam(VV)

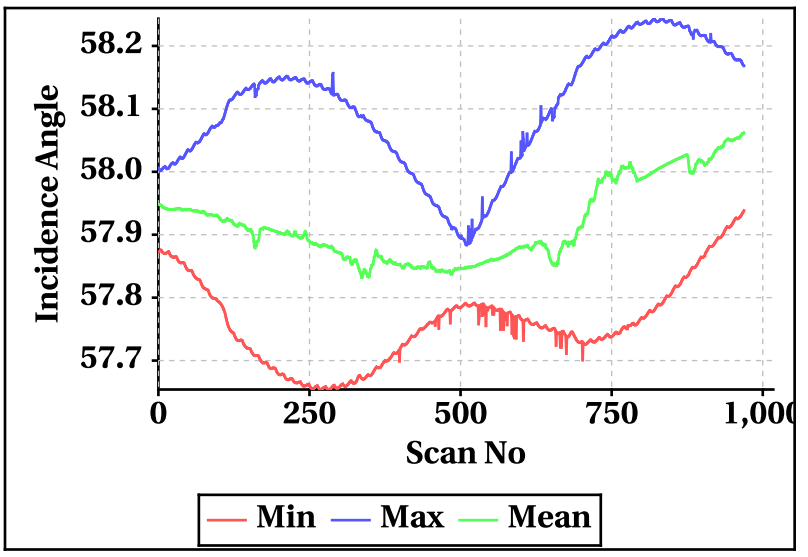


## Orbt-wise behaviour of Incidence,Azimuth,Range,X-Factor

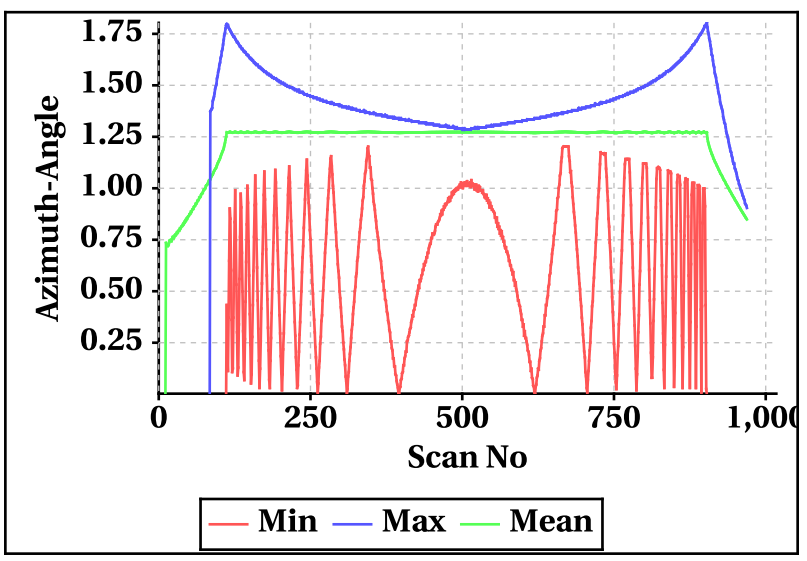
### Inner Beam (HH)



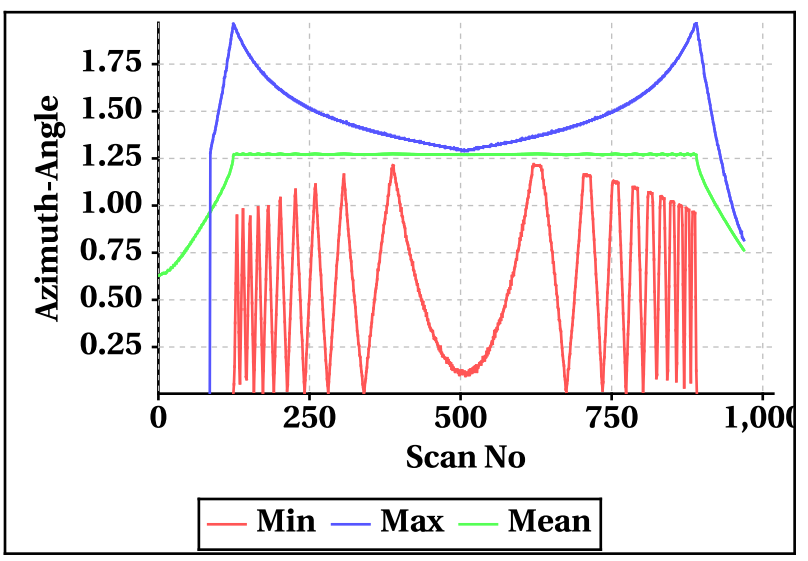

### Outer Beam(VV)



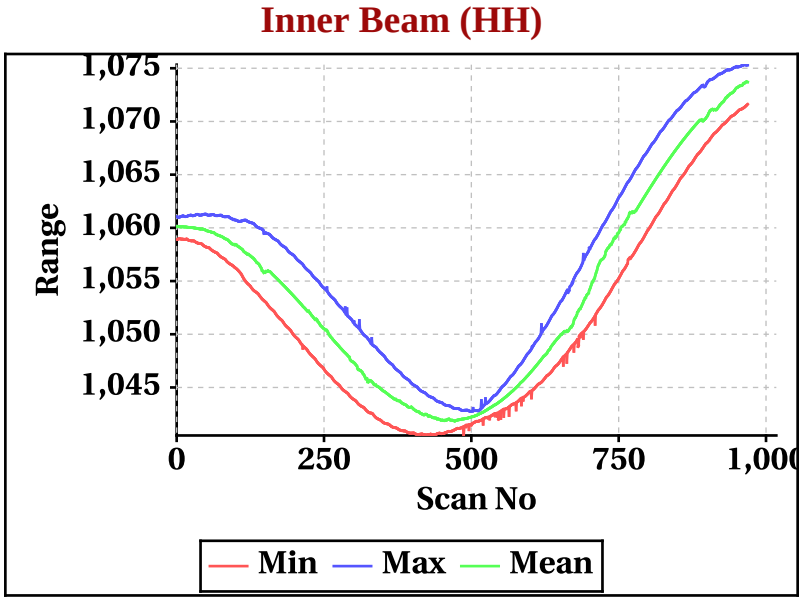

### Inner Beam (HH)



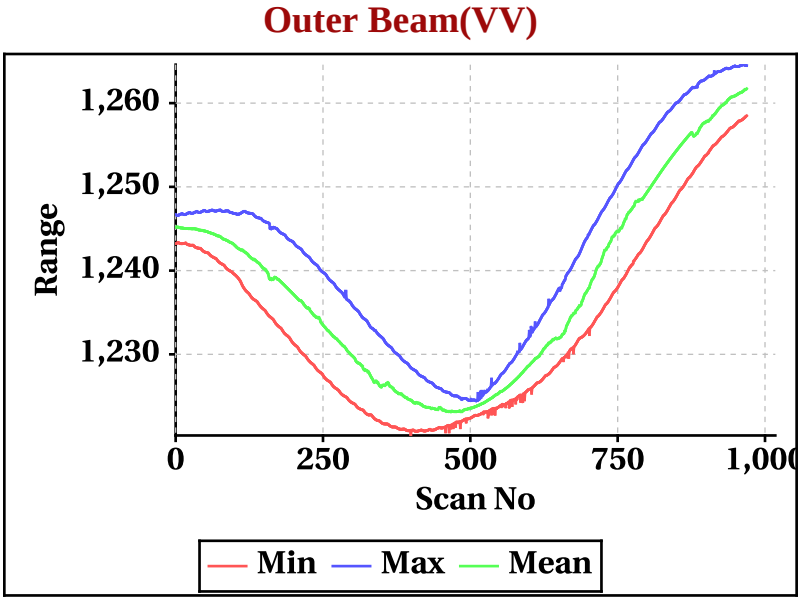

### Outer Beam(VV)



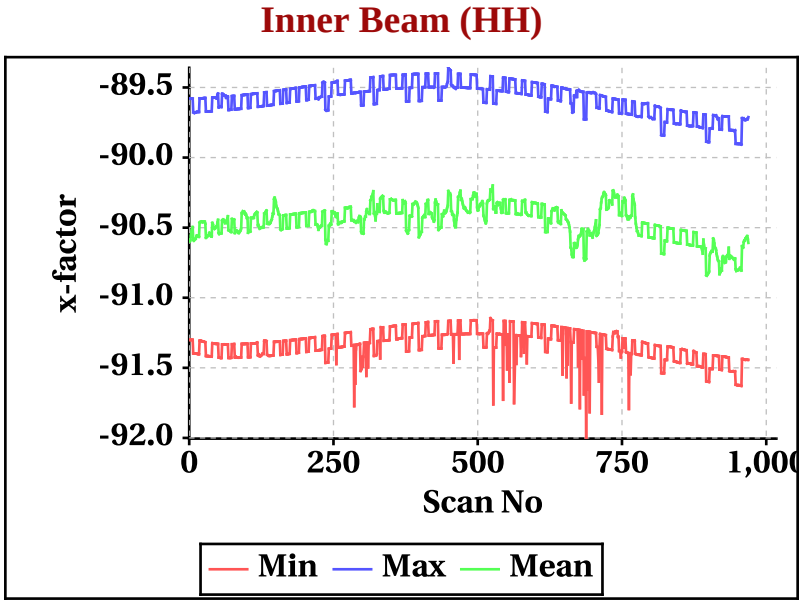

### Inner Beam (HH)



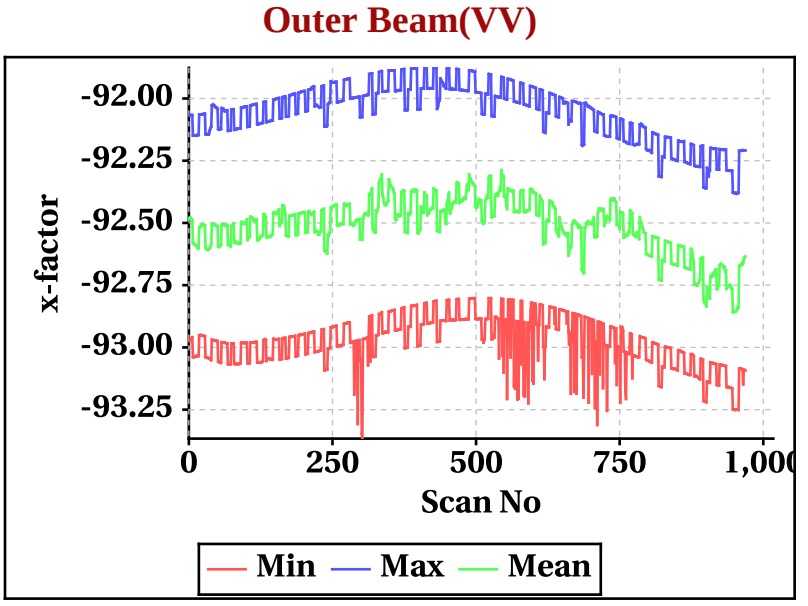

### Outer Beam(VV)




### Inner Beam (HH)




### Outer Beam(VV)



# Doppler Frequency Variation

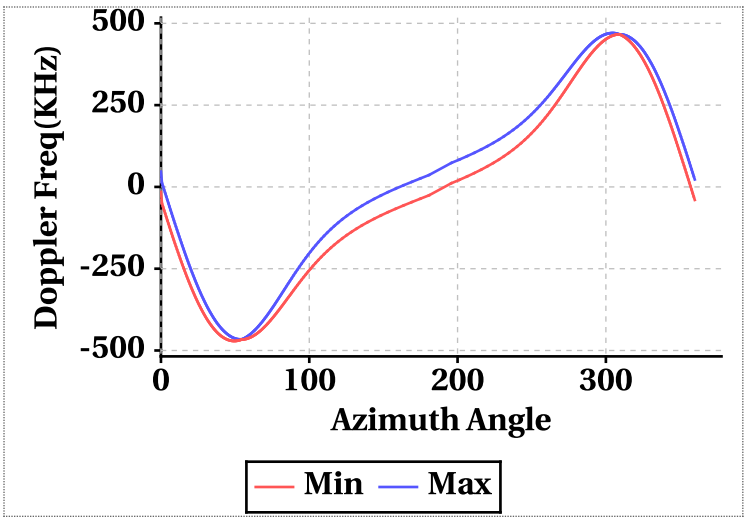
### Doppler Frequency(KHz) variation statistics Over the half Orbit

| | Inner Beam (HH) | Outer Beam (VV) |
|---|---|---|
| Min | -470.98 | -527.72 |
| Max | 470.32 | 527.18 |

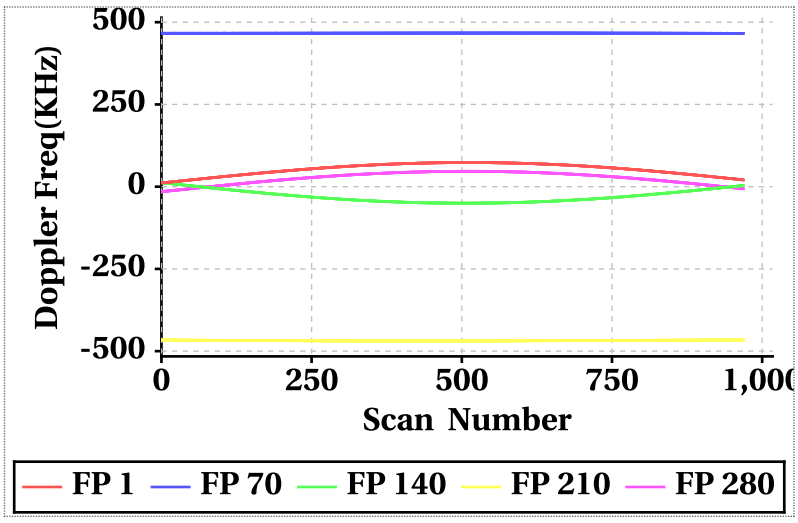
### Doppler Frequency(KHz) variation

| | Inner Beam (HH) | | | Outer Beam (VV) | | |
|---|---|---|---|---|---|---|
| Doppler_FP | Min | Max | Mean | Min | Max | Mean |
| Doppler_1 | 11.26 | 73.34 | 52.50 | 7.50 | 77.14 | 53.77 |
| Doppler_70 | 466.06 | 466.96 | 466.58 | 522.30 | 523.96 | 523.31 |
| Doppler_140 | -50.32 | 12.28 | -29.18 | -62.84 | 7.28 | -39.15 |
| Doppler_210 | -469.06 | -465.72 | -467.84 | -524.94 | -522.04 | -523.90 |
| Doppler_280 | -15.30 | 46.76 | 25.83 | -10.62 | 59.00 | 35.50 |

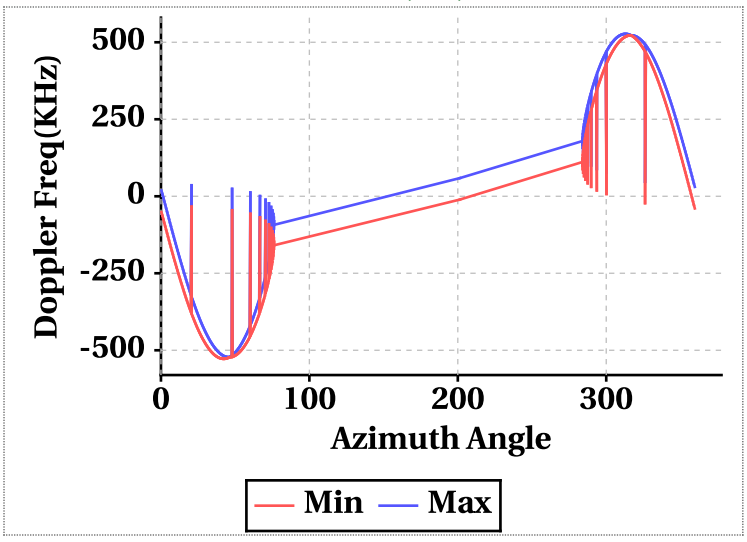
### Footprint wise Doopler frequency variation Inner Beam (HH)



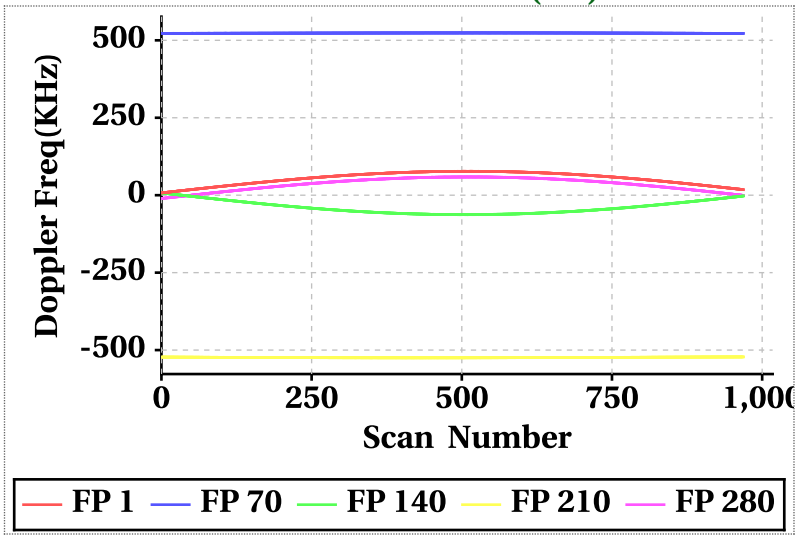

### Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Inner Beam (HH)




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

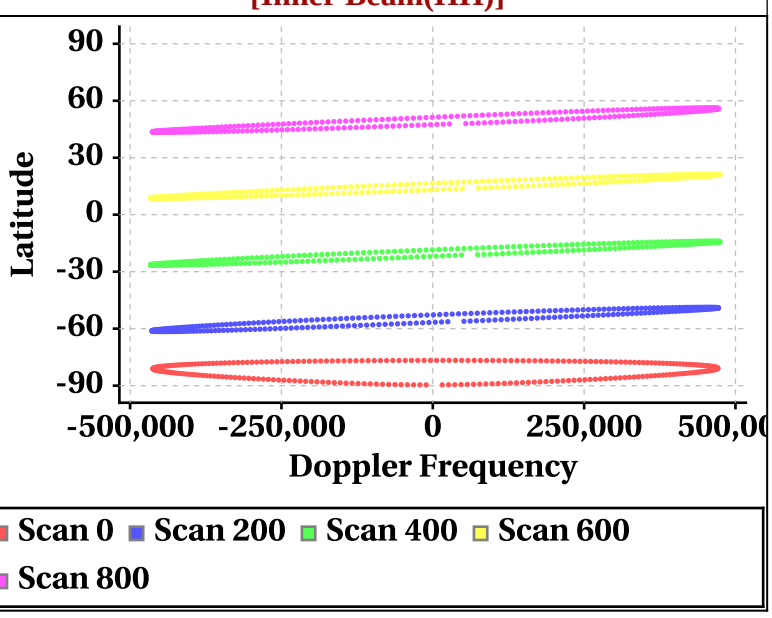



### Doppler frequency variation at footprints: 1, 70, 140, 210 & 280 Outer Beam (VV)

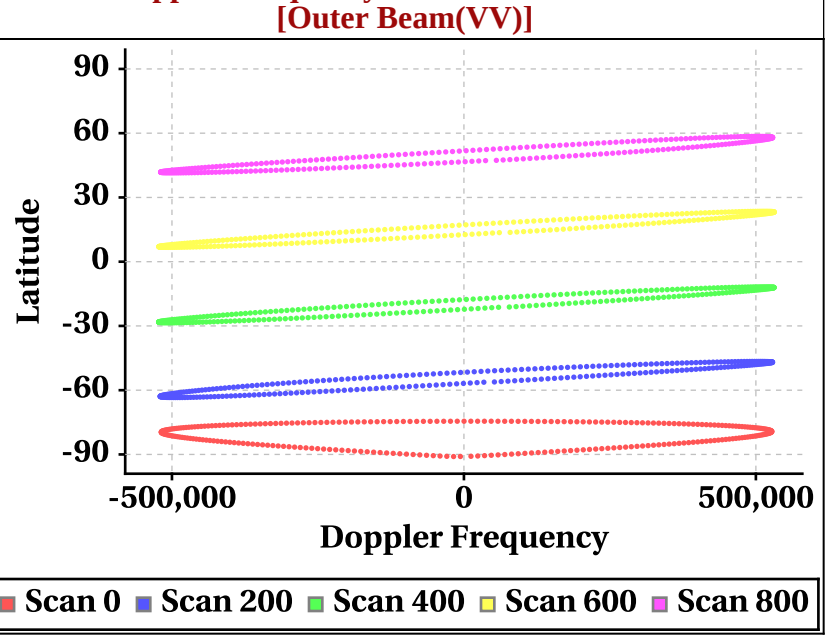



## Latitude Vs Doppler Frequency

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



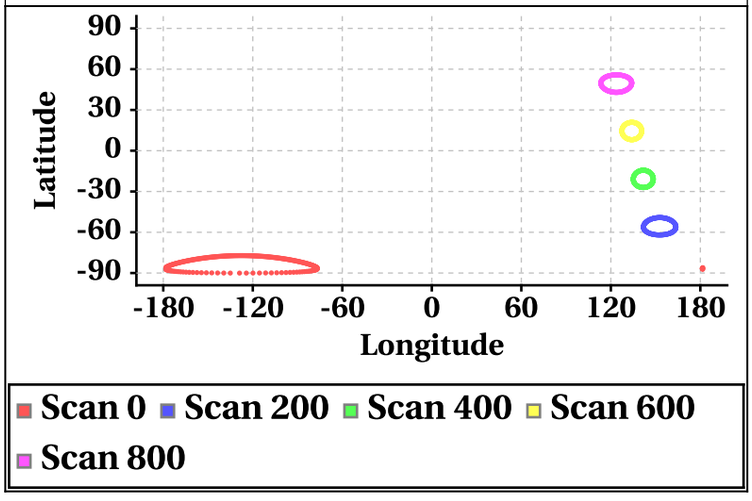

### Doppler Frequency at Scan Interval of 200 [Outer Beam(VV)]



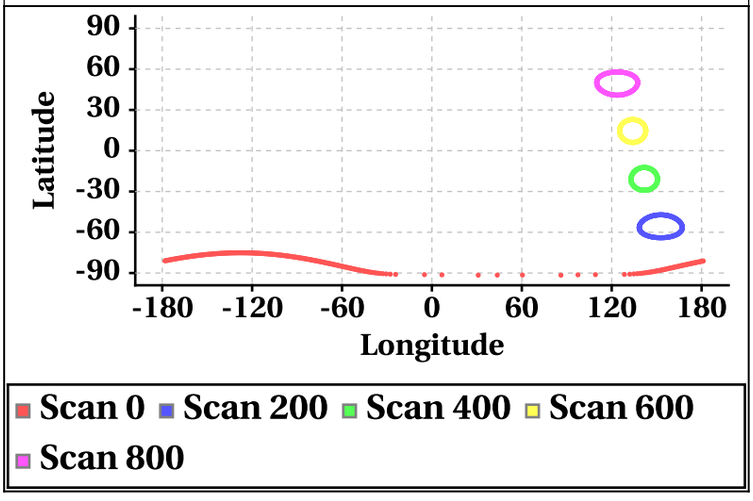
# Parameter as a function of Latitude

## Latitude Vs Longitude

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

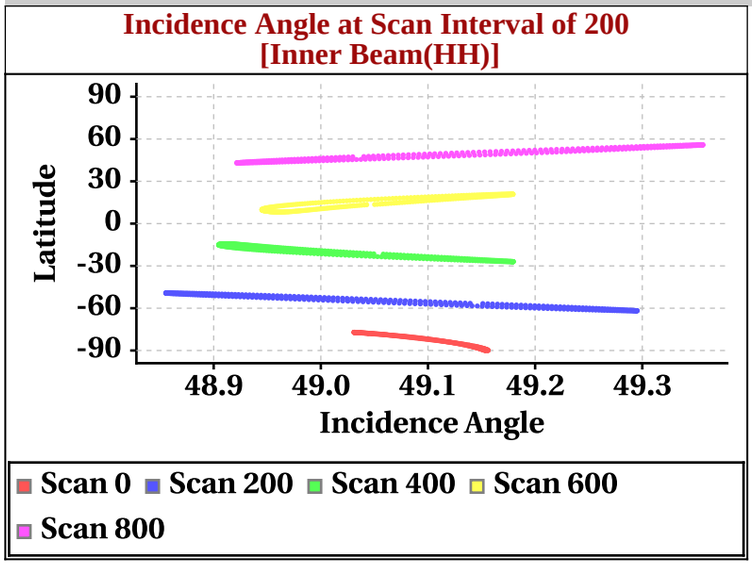



### Scan Trace [Outer Beam (VV)]

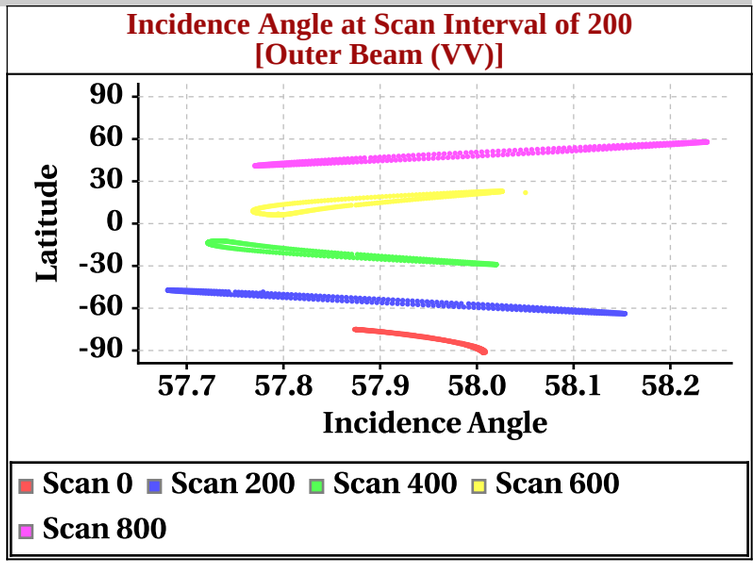



## Latitude Vs Incidence Angle

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

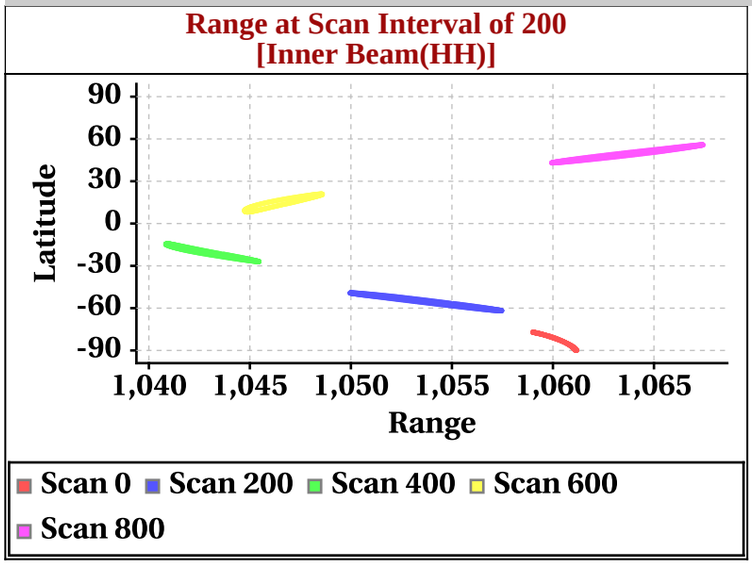



### Incidence Angle at Scan Interval of 200 [Outer Beam (VV)]

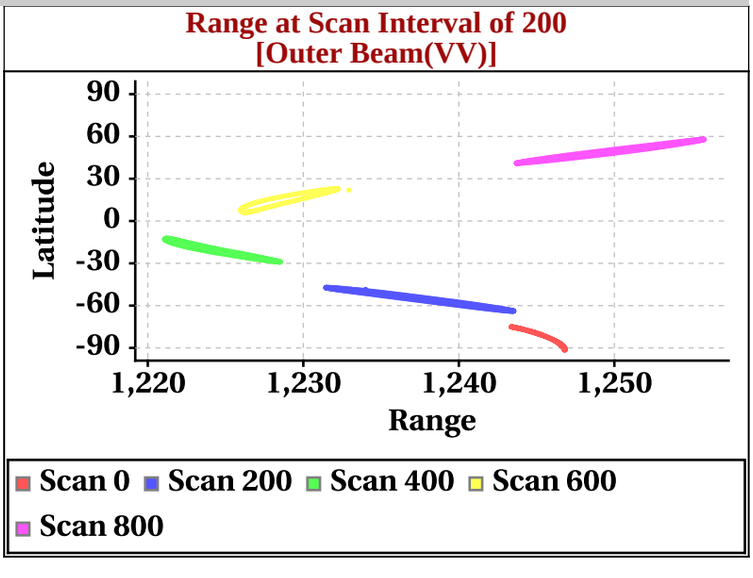



## Latitude Vs Range

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



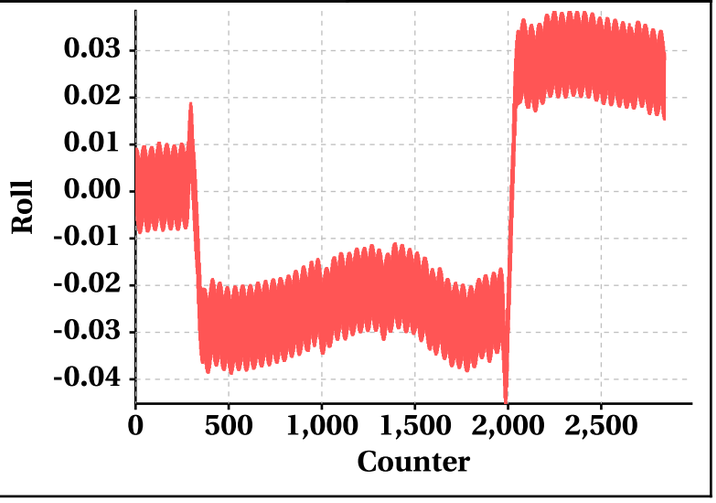

### Range at Scan Interval of 200 [Outer Beam(VV)]



# Variation in Orbit and Attitude Parameters

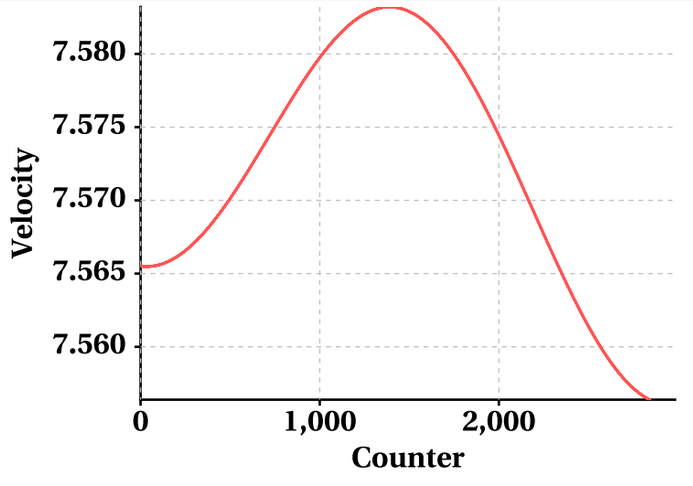
## Roll

| | |
|---|---|
| Min Roll(deg) | -0.045194 |
| Max Roll(deg) | 0.038444 |



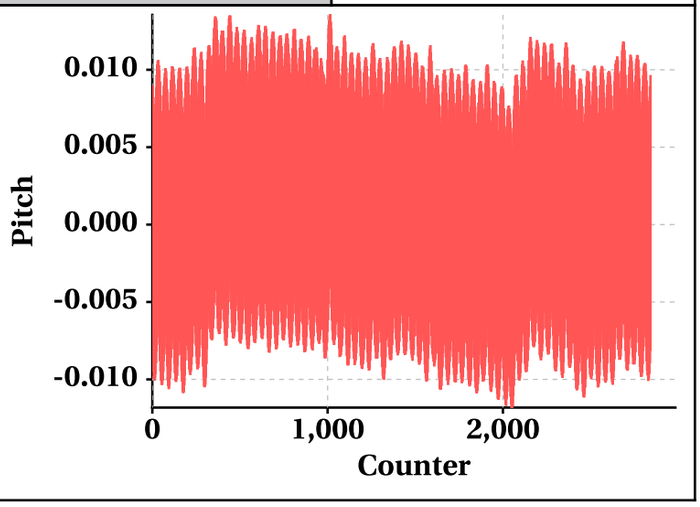

## Velocity

| | |
|---|---|
| Min Velocity(km/s) | 7.55639 |
| Max Velocity(km/s) | 7.583205 |



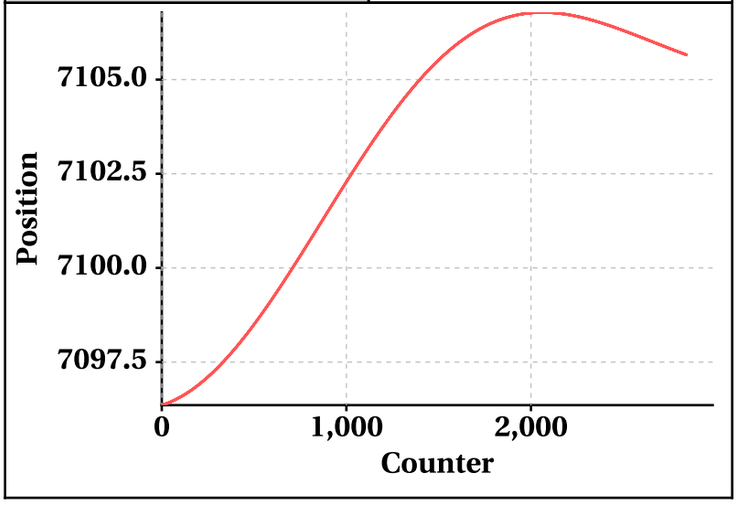

## Pitch

| | |
|---|---|
| Min Pitch(deg) | -0.011821 |
| Max Pitch(deg) | 0.013544 |



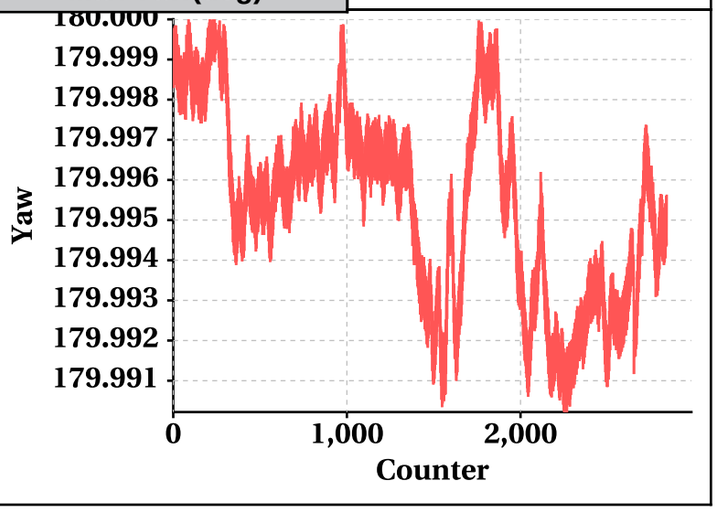

## Position

| | |
|---|---|
| Min Position(km) | 7096.356934 |
| Max Position(km) | 7106.782227 |




## Yaw

| | |
|---|---|
| Min Yaw(deg) | 179.990219 |
| Max Yaw(deg) | 180.0 |




## TimeDifference

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