# Brightness Temperature Comparison of Enhanced Resolution SSMIS $T_B$ Images Created from CSU ICDR V1 and GPM L1C V5 Files

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October 12, 2021

#### Abstract

The Calibrated Enhanced Resolution Passive Microwave Daily Equal-Area Scalable Earth (EASE) Grid 2.0 Brightness Temperature (CETB) Earth System Data Record (ESDR) project team has developed algorithms for creating Earth-based enhanced resolution brightness temperature  $(T_B)$  images from swath-based CSU FCDR files. In this report, these algorithms are applied to CSU ICDR and GPM L1C files and the relative  $T_B$  values. It is found that there are noisy differences that appear correlated with the surface type. The channel dependent mean difference for either land or ocean varied from -0.60 K to 2.72 K while the standard deviations varied anywhere from 0.21 K to 7.11 K for EASE2\_T. Looking at an average mean and average std for assessing passes for horizontally polarized 37 GHz of EASE2\_T, the overall mean difference is 1.09 K (land), and 1.39 K (ocean) with a std of 1.23 K (land), and 1.04 K (ocean). Similar statistics exist for EASE2\_N and EASE2\_S.

### 1 Introduction

The NASA MEaSUREs Calibrated Enhanced Resolution Passive Microwave Daily EASE-Grid 2.0 Brightness Temperature ESDR (CETB) Earth System Data Record (ESDR)[1] is produced from the Colorado State University (CSU) Fundamental Climate Data Record (CSU FCDR V1) [2]. The data producers used the same software system to produce an interim version of the data, produced and distributed in near real-time as the Interim Climate Data Record (CSU ICDR V1). Both FCDR and ICDR use the DMSP F13 SSM/I as the crosscalibration sensor. The GPM Level 1C (L1C V5) brightness temperatures ( $T_B$ ) are produced by the NASA Precipitation Precipitation System (PPS) [3] using the Global Precipitation Mission (GPM) microwave imager (GMI) as the cross-calibration sensor.

The purpose of this report is to compare gridded  $T_B$  differences between the two different data sources (CSU ICDR V1 and GPM L1C V5). The method used is to compute daily gridded CETB images from both sensors separately for each channel and local time of day (ltod). The difference of the images created from each data source are computed and analyzed. Figures 2-57 present the EASE2\_T difference images for the selected days (Days 01, 101, 201, and 301 for 2019). Figures 58-113 present the EASE2\_N difference images for the same selected days. Figures 114-169 present the EASE2\_S difference images for the same selected days as EASE2\_T and EASE2\_N. The probability distribution of the difference values for EASE2\_T, EASE2\_N, and EASE2\_S are also computed over a 10 day period (01-10, 101-110, 201-210, 301-310, 2019) and plotted in the same figures.

The mean differences appear to be consistent through the year within their channels. As the figures show, the mean difference varies with channel and local time of day(ltod), as does the standard deviation. Interestingly, the differences vary based on land or ocean surface. The largest differences lie around land ocean boundaries, which may be an artifact of resolution enhancements or possibly differences in geolocation. This is not an unexpected result when comparing land and ocean data together. The process of overlaying figures creates an imperfect overlap along the coastal edges, which can affect the data. However, there is a difference in when we compare land and ocean data separately, which we explore. Figure 1 shows the data results if we did not separate land and ocean.

To obtain more accurate results, we separated the land and ocean data using a sea/land mask[5]. The mask was made at Brigham Young University by plotting the 1987 CIA coastline database[6] into a map array image of 0.01° x 0.01°. Land areas of the map were then filled, creating a high resolution land mask. To create the land mask for any particular region, compute the latitude/longitude for each CETB pixel and compare it to the high resolution land mask, noting if the pixel center is land or ocean. Using this process, we compared land and ocean data individually. The separated results are then displayed together in the histograms. Data overlap is visible.

When comparing the data from EASE2\_T, EASE2\_N, and EASE2\_S together, the results were relatively similar. The  $T_B$  differences in comparing L1C to I/FCDR over a global area and the Northern and Southern poles was fairly consistent. Land difference means for channels 37 V, 19 V, and 19 H are always negative for EASE2\_T, EASE2\_N, and EASE2\_S. However, for the same channels the ocean difference means vary between positive and negative among the three sensors. Furthermore, EASE2\_T, EASE2\_N, and EASE2\_S have multiple extreme standard deviations for channel 22 V. We conclude that the data derived from the two input sources differ significantly relative to one another. CETB images from the two sources should not be mixed in time series analysis.

### 2 Conclusion

This white paper considers the differences in gridded CETB images between two different data sources. A mean difference between data sets that depends on the channel (H or V) is noted, with differences somewhat dependent on surface type and location. Standard deviation also is dependent on the channel. However, the standard deviation appears to not be dependent on the direction or the season of year.

We conclude that CETB images derived from I/FCDR V1 and L1C V5 are significantly different. This is not surprising, given the differences in calibration cross-sensor (F13 vs. GPM)

and other details described in [2]. We recommend that data from the two different calibration methods should not be used interchangeably or for time series analysis. The differences between the two data sets are dependent on surface type, which is intriguing. The magnitude and sign of the differences are not consistent across all channels/pass directions.

# **3** References

## References

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- [6] CIA World DataBank II. https://www.evl.uic.edu/pape/data/WDB/. [September 2021].

channel	$\mathbf{pass}$	land mean	ocean mean	land std	ocean std
19 H	A	1.41	1.65	0.88	1.63
19 H	D	1.44	1.74	0.57	0.57
$19 \mathrm{V}$	A	1.28	1.90	5.78	3.08
$19 \mathrm{V}$	D	1.53	1.89	0.64	2.59
22 V	А	2.37	2.54	5.94	0.29
22  V	D	2.47	2.53	0.24	0.21
37 H	А	1.09	1.40	0.73	0.61
$37 \mathrm{H}$	D	1.13	1.39	0.59	0.54
$37 \mathrm{V}$	A	-0.34	-0.37	0.44	0.32
$37 \mathrm{V}$	D	-0.33	-0.37	0.31	0.28
91 H	А	-0.14	0.00	1.39	1.08
91 H	D	-0.11	-0.00	1.00	1.05
$91 \mathrm{V}$	A	-0.45	-0.40	1.10	0.67
$91 \mathrm{V}$	D	-0.42	-0.44	0.81	0.68

Table 1: Statistics of land and ocean differences(K) for EASE2\_T over days 1-10, 2019. channel | pass | land mean | ocean mean | land std | ocean std

Table 2: Statistics of land and ocean differences(K) for EASE2\_T over days 101-110, 2019. channel | pass | land mean | ocean mean | land std | ocean std

channer	pass	land mean	occan mean	land Stu	occan stu
19 H	А	1.43	1.75	1.05	0.86
$19 \mathrm{~H}$	D	1.44	1.75	0.59	0.49
$19 \mathrm{V}$	A	1.45	2.06	0.66	0.51
19 V	D	1.48	2.06	0.37	0.32
22 V	А	2.41	2.53	0.50	0.41
22  V	D	2.43	2.53	0.26	0.24
37 H	А	1.04	1.40	0.85	0.78
$37 \mathrm{~H}$	D	1.09	1.38	0.63	0.59
$37 \mathrm{V}$	A	-0.35	-0.36	0.49	0.41
$37 \mathrm{V}$	D	-0.34	-0.37	0.35	0.30
91 H	А	-0.27	-0.00	1.26	1.10
$91~\mathrm{H}$	D	-0.19	-0.01	1.05	1.02
$91 \mathrm{V}$	A	-0.58	-0.43	1.03	0.64
$91 \mathrm{V}$	D	-0.50	-0.43	0.83	0.65

channel	$\mathbf{pass}$	land mean	ocean mean	land std	ocean std
19 H	А	1.43	1.92	3.39	7.11
$19 \mathrm{~H}$	D	1.36	1.66	1.39	1.30
$19 \mathrm{V}$	А	1.37	1.72	1.08	2.73
$19 \mathrm{V}$	D	1.37	1.81	0.97	2.52
22 V	А	2.31	2.72	3.62	2.66
22  V	D	2.39	2.55	3.65	0.51
37 H	А	1.00	1.39	1.00	0.80
$37 \mathrm{~H}$	D	1.05	1.38	0.63	0.48
$37 \mathrm{V}$	А	-0.35	-0.37	0.59	0.41
$37 \mathrm{V}$	D	-0.35	-0.36	0.32	0.28
91 H	А	-0.38	-0.01	1.35	1.04
$91 \mathrm{~H}$	D	-0.33	-0.02	0.90	1.01
$91 \mathrm{V}$	A	-0.54	-0.13	2.51	3.10
$91 \mathrm{V}$	D	-0.60	-0.10	1.07	2.86

Table 3: Statistics of land and ocean differences(K) for EASE2\_T over days 201-210, 2019. channel | pass | land mean | ocean mean | land std | ocean std

Table 4: Statistics of land and ocean differences(K) for EASE2\_T over days 301-310, 2019. channel | pass | land mean | ocean mean | land std | ocean std

channer	pass	land mean	occan mean	land Stu	occan stu
19 H	А	1.45	1.74	0.87	0.40
$19 \mathrm{~H}$	D	1.43	1.75	0.54	0.35
$19 \mathrm{V}$	A	1.47	2.05	0.48	0.30
19 V	D	1.49	2.05	0.34	0.26
22 V	А	2.37	2.53	4.25	0.19
22  V	D	2.44	2.54	0.27	0.74
37 H	А	1.04	1.39	0.69	0.45
$37 \mathrm{~H}$	D	1.09	1.39	0.60	0.46
$37 \mathrm{V}$	A	-0.35	-0.37	0.38	0.25
$37 \mathrm{V}$	D	-0.33	-0.36	0.31	0.24
91 H	А	-0.24	-0.00	1.20	0.90
$91 \mathrm{~H}$	D	-0.19	-0.00	0.94	1.01
$91 \mathrm{V}$	A	-0.55	-0.43	0.96	0.57
$91 \mathrm{V}$	D	-0.51	-0.42	0.68	0.65

Table 5: Average Probablility distribution of differences for land and ocean over the four periods recorded for EASE2\_T.

channel	pass	land mean	ocean mean	land std	ocean std
19 H	A	1.43	1.77	3.76	7.36
$19 \mathrm{~H}$	D	1.42	1.73	1.70	1.54
19 V	A	1.39	1.93	5.94	4.16
$19 \mathrm{V}$	D	1.47	1.95	1.27	3.64
22 V	A	2.36	2.58	8.17	2.71
22 V	D	2.43	2.54	3.68	0.95
37 H	A	1.04	1.40	1.65	1.35
$37 \mathrm{~H}$	D	1.09	1.39	1.23	1.04
$37 \mathrm{V}$	A	-0.35	-0.36	0.96	0.71
$37 \mathrm{V}$	D	-0.34	-0.37	0.64	0.55
91 H	A	-0.26	-0.00	2.60	2.07
$91 \mathrm{~H}$	D	-0.21	-0.01	1.95	2.05
$91 \mathrm{V}$	A	-0.53	-0.35	3.08	3.29
91 V	D	-0.51	-0.35	1.72	3.08

channel	$\mathbf{pass}$	land mean	ocean mean	land std	ocean std
19 H	М	1.44	1.71	0.65	0.60
$19 \mathrm{~H}$	E	1.43	1.68	0.91	1.04
$19 \mathrm{V}$	M	1.58	1.85	0.74	2.79
$19 \mathrm{V}$	E	1.29	1.90	6.35	3.91
$22 \mathrm{V}$	М	2.50	2.53	0.25	0.23
22  V	E	2.49	2.53	0.38	0.37
$37 \mathrm{~H}$	М	1.17	1.37	0.57	0.56
$37 \mathrm{~H}$	E	1.13	1.38	0.70	0.65
$37 \mathrm{V}$	М	-0.33	-0.37	0.31	0.29
$37 \mathrm{V}$	E	-0.35	-0.36	0.40	0.34
91 H	М	-0.01	0.02	1.13	1.12
$91~\mathrm{H}$	E	-0.05	-0.08	1.52	3.14
$91 \mathrm{V}$	M	-0.30	-0.38	0.88	0.66
$91 \mathrm{V}$	E	-0.34	-0.38	0.96	0.67

Table 6: Statistics of land and ocean differences(K) for EASE2\_N over days 1-10, 2019. channel | pass | land mean | ocean mean | land std | ocean std

Table 7: Statistics of land and ocean differences(K) for EASE2\_N over days 101-110, 2019. channel | pass | land mean | ocean mean | land std | ocean std

channer	Pubb	land mean	occan mean	land Sta	occan sta
19 H	М	1.45	1.72	0.63	0.48
19 H	E	1.43	1.72	1.16	1.14
$19 \mathrm{V}$	M	1.53	2.01	0.40	0.35
$19 \mathrm{V}$	E	1.49	2.01	0.71	0.66
22 V	М	2.46	2.54	0.29	0.21
22  V	E	2.44	2.54	0.55	0.49
37 H	М	1.13	1.37	0.63	0.53
$37 \mathrm{~H}$	E	1.07	1.39	0.88	0.95
$37 \mathrm{V}$	М	-0.34	-0.36	0.36	0.28
$37 \mathrm{V}$	E	-0.35	-0.36	0.50	0.51
91 H	М	-0.11	0.00	1.17	1.01
91 H	E	-0.20	0.01	1.29	1.13
$91 \mathrm{V}$	M	-0.41	-0.41	0.94	0.64
$91 \mathrm{V}$	E	-0.50	-0.41	1.02	0.68

pass	land mean	ocean mean	land std	ocean std
М	1.31	1.60	2.11	1.62
E	1.39	1.19	3.67	7.50
М	1.40	1.71	0.71	2.23
E	1.35	1.82	1.15	1.57
М	2.40	2.59	4.00	0.80
E	2.30	2.64	4.14	1.77
М	1.05	1.37	0.62	0.57
E	1.01	1.39	1.03	0.94
M	-0.35	-0.32	0.33	0.30
E	-0.35	-0.32	0.61	0.49
М	-0.32	-0.09	0.99	1.07
E	-0.36	-0.07	1.50	1.10
M	-0.61	-0.16	1.05	2.77
E	-0.48	-0.35	2.91	2.13
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Table 8: Statistics of land and ocean differences(K) for EASE2\_N over days 201-210, 2019. channel | pass | land mean | ocean mean | land std | ocean std

Table 9: Statistics of land and ocean differences(K) for EASE2\_N over days 301-310, 2019. channel | pass | land mean | ocean mean | land std | ocean std

channer	Pubb	land mean	occan mean	land Sta	occan sta
19 H	М	1.45	1.74	0.87	0.40
19 H	E	1.43	1.75	0.54	0.35
$19 \mathrm{V}$	M	1.47	2.05	0.48	0.30
$19 \mathrm{V}$	E	1.49	2.05	0.34	0.26
22 V	М	2.37	2.53	4.25	0.19
22  V	E	2.44	2.54	0.27	0.74
37 H	М	1.04	1.39	0.69	0.45
$37 \mathrm{~H}$	E	1.09	1.39	0.60	0.46
$37 \mathrm{V}$	М	-0.35	-0.37	0.38	0.25
$37 \mathrm{V}$	E	-0.33	-0.36	0.31	0.24
91 H	М	-0.24	-0.00	1.20	0.90
91 H	E	-0.19	-0.00	0.94	1.01
$91 \mathrm{V}$	М	-0.55	-0.43	0.96	0.57
$91 \mathrm{V}$	E	-0.51	-0.42	0.68	0.65

Table 10: Average Probability distribution of differences for land and ocean over the four periods recorded for EASE2\_N.

channel	pass	land mean	ocean mean	land std	ocean std
19 H	M	1.41	1.69	2.46	1.84
$19 \mathrm{~H}$	E	1.42	1.59	3.99	3.04
19 V	M	1.50	1.91	1.20	3.60
$19 \mathrm{V}$	E	1.41	1.95	6.50	4.27
22 V	М	2.43	2.55	5.85	0.89
22 V	E	2.42	2.56	4.20	2.01
37 H	М	1.10	1.40	1.26	1.06
$37 \mathrm{~H}$	E	1.10	1.40	1.64	1.56
$37 \mathrm{V}$	M	-0.34	-0.36	0.69	0.56
$37 \mathrm{V}$	E	-0.35	-0.35	0.94	0.82
91 H	М	-0.17	-0.02	2.25	2.06
$91~\mathrm{H}$	E	-0.20	-0.04	2.67	3.66
$91 \mathrm{V}$	M	-0.47	-0.35	1.92	2.97
91 V	E	-0.46	-0.39	3.30	2.42

channel	pass	land mean	ocean mean	land std	ocean std
19 H	М	1.39	1.73	0.90	0.89
19 H	E	1.31	1.62	1.16	1.92
19 V	M	1.53	1.91	0.73	2.35
$19 \mathrm{V}$	E	1.51	1.88	0.94	2.13
22 V	М	2.42	2.53	0.25	0.22
22  V	E	2.20	2.54	9.35	0.23
37 H	М	1.12	1.39	0.65	0.59
$37 \mathrm{~H}$	E	1.09	1.40	0.70	0.56
$37 \mathrm{V}$	M	-0.36	-0.37	0.34	0.30
$37 \mathrm{V}$	E	-0.37	-0.37	0.44	0.30
91 H	М	-0.20	-0.00	0.99	1.15
91 H	E	-0.22	0.01	1.41	1.03
$91 \mathrm{V}$	M	-0.50	-0.45	0.88	0.78
$91 \mathrm{V}$	E	-0.50	-0.38	1.31	0.73

Table 11: Statistics of land and ocean differences(K) for EASE2\_S over days 1-10, 2019. channel | pass | land mean | ocean mean | land std | ocean std

Table 12: Statistics of land and ocean differences(K) for EASE2\_S over days 101-110, 2019. channel | pass | land mean | ocean mean | land std | ocean std

emanner	Pubb	land moan	occan mean	iana sta	occan bud
19 H	М	1.47	1.75	0.66	0.40
$19 \mathrm{~H}$	E	1.46	1.76	0.68	0.40
$19 \mathrm{V}$	M	1.61	2.07	0.48	0.28
$19 \mathrm{V}$	E	1.60	2.07	0.52	0.29
22 V	М	2.42	2.53	0.24	0.17
22  V	E	2.41	2.53	0.27	0.19
37 H	М	1.15	1.38	0.66	0.48
$37 \mathrm{~H}$	E	1.12	1.39	0.67	0.48
$37 \mathrm{V}$	М	-0.37	-0.37	0.33	0.25
$37 \mathrm{V}$	E	-0.38	-0.37	0.35	0.25
91 H	М	-0.14	-0.00	0.95	1.11
$91~\mathrm{H}$	E	-0.16	-0.00	1.26	1.06
$91 \mathrm{V}$	M	-0.46	-0.41	0.73	0.68
$91 \mathrm{V}$	E	-0.49	-0.41	1.08	0.63

channel	$\mathbf{pass}$	land mean	ocean mean	land std	ocean std
19 H	М	1.32	1.65	1.75	1.48
19 H	E	1.51	2.35	2.92	6.60
$19 \mathrm{V}$	M	1.34	1.86	2.15	2.61
$19 \mathrm{V}$	E	1.37	1.65	2.12	3.17
22 V	М	2.63	2.54	2.05	0.56
22  V	E	2.60	2.79	1.78	3.03
37 H	М	1.18	1.38	0.69	0.46
$37 \mathrm{~H}$	E	1.13	1.38	0.74	0.53
$37 \mathrm{V}$	Μ	-0.37	-0.38	0.34	0.25
$37 \mathrm{V}$	E	-0.39	-0.39	0.39	0.28
91 H	М	-0.08	0.05	0.97	1.11
91 H	E	-0.14	0.04	1.05	1.04
$91 \mathrm{V}$	M	-0.05	-0.03	3.01	2.86
$91 \mathrm{V}$	E	-0.14	0.04	2.69	3.50

Table 13: Statistics of land and ocean differences(K) for EASE2\_S over days 201-210, 2019. channel | pass | land mean | ocean mean | land std | ocean std

Table 14: Statistics of land and ocean differences(K) for EASE2\_S over days 301-310, 2019. channel | pass | land mean | ocean mean | land std | ocean std

emanner	Pubb	lana mean	occan mean	iana sta	occan sta
19 H	М	1.47	1.76	0.65	0.37
$19 \mathrm{~H}$	E	1.49	1.76	0.93	0.36
$19 \mathrm{V}$	M	1.62	2.07	0.50	0.28
19 V	E	1.62	2.06	0.63	0.30
22 V	М	2.43	2.54	0.25	0.88
22  V	E	2.25	2.53	6.03	0.17
37 H	М	1.16	1.39	0.67	0.43
$37 \mathrm{~H}$	E	1.11	1.38	0.70	0.41
$37 \mathrm{V}$	М	-0.36	-0.37	0.33	0.22
$37 \mathrm{V}$	E	-0.38	-0.38	0.39	0.24
91 H	М	-0.15	0.04	0.96	1.02
$91~\mathrm{H}$	E	-0.19	-0.03	1.27	0.94
91 V	M	-0.46	-0.37	0.71	0.59
$91 \mathrm{V}$	E	-0.49	-0.37	1.08	0.54

Table 15: Average Probability distribution of differences for land and ocean over the four periods recorded for EASE2\_S.

channel	pass	land mean	ocean mean	land std	ocean std
19 H	М	1.41	1.72	2.17	1.81
$19 \mathrm{~H}$	E	1.44	1.87	3.35	6.89
19 V	M	1.52	1.98	2.37	3.53
$19 \mathrm{V}$	E	1.53	1.92	2.46	3.84
22 V	М	2.48	2.54	2.09	1.08
22 V	E	2.37	2.60	11.27	3.05
37 H	М	1.15	1.39	1.34	0.99
$37 \mathrm{~H}$	E	1.11	1.39	1.41	1.00
$37 \mathrm{V}$	M	-0.37	-0.37	0.67	0.51
$37 \mathrm{V}$	E	-0.38	-0.38	0.79	0.54
91 H	М	-0.14	-0.02	1.94	2.20
$91 \mathrm{~H}$	E	-0.18	0.01	2.51	2.04
$91 \mathrm{V}$	M	-0.38	-0.32	3.30	3.10
91 V	E	-0.41	-0.28	3.36	3.67





Figure 1: SSMIS difference analaysis for year 2019, channel 19H ascending pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Overlapping land and ocean difference statistics (I/FCDR-L1C) for days 1-10.





Figure 2: SSMIS difference analaysis for year 2019, channel 19H ascending pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.





Figure 3: SSMIS difference analaysis for year 2019, channel 19H ltod descending pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics for land and ocean separately (I/FCDR-L1C) for days 1-10.





Figure 4: SSMIS difference analaysis for year 2019, channel 19V ascending pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.





Figure 5: SSMIS difference analaysis for year 2019, channel 19V descending pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.





Figure 6: SSMIS difference analaysis for year 2019, channel 22V ltod A. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.





Figure 7: SSMIS difference analaysis for year 2019, channel 22V ltod D. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.





Figure 8: SSMIS difference analaysis for year 2019, channel 37H ltod A. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.





Figure 9: SSMIS difference analaysis for year 2019, channel 37H ltod D. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.





Figure 10: SSMIS difference analaysis for year 2019, channel 37V ltod A. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.





Figure 11: SSMIS difference analaysis for year 2019, channel 37V ltod D. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.





Figure 12: SSMIS difference analaysis for year 2019, channel 91H ltod A. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.





Figure 13: SSMIS difference analaysis for year 2019, channel 91H ltod D. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.





Figure 14: SSMIS difference analaysis for year 2019, channel 91V ltod A. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.





Figure 15: SSMIS difference analaysis for year 2019, channel 91V ltod D. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.





Figure 16: SSMIS difference analaysis for year 2019, channel 19H ltod A. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.





Figure 17: SSMIS difference analaysis for year 2019, channel 19H ltod D. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.





Figure 18: SSMIS difference analaysis for year 2019, channel 19V ltod A. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.





Figure 19: SSMIS difference analaysis for year 2019, channel 19V ltod D. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 20: SSMIS difference analaysis for year 2019, channel 22V ltod A. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.

0.5 I/FCDR-L1C (K)

1.5

1

2.5

з

2

Q

-2

-1.5

-1

-0.5

0





Figure 21: SSMIS difference analaysis for year 2019, channel 22V ltod D. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.





Figure 22: SSMIS difference analaysis for year 2019, channel 37H ltod A. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.





Figure 23: SSMIS difference analaysis for year 2019, channel 37H ltod D. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.




Figure 24: SSMIS difference analaysis for year 2019, channel 37V ltod A. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.





Figure 25: SSMIS difference analaysis for year 2019, channel 37V ltod D. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.





Figure 26: SSMIS difference analaysis for year 2019, channel 91H ltod A. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.





Figure 27: SSMIS difference analaysis for year 2019, channel 91H ltod D. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.





Figure 28: SSMIS difference analaysis for year 2019, channel 91V ltod A. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.





Figure 29: SSMIS difference analaysis for year 2019, channel 91V ltod D. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.





Figure 30: SSMIS difference analaysis for year 2019, channel 19H ltod A. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 31: SSMIS difference analaysis for year 2019, channel 19H ltod D. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.

1.5

2

1

2.5

3

0.6

0.4

0.2

0

-2

-1.5

-1

-0.5





Figure 32: SSMIS difference analaysis for year 2019, channel 19V ltod A. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.





Figure 33: SSMIS difference analaysis for year 2019, channel 19V ltod D. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.





Figure 34: SSMIS difference analaysis for year 2019, channel 22V ltod A. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 35: SSMIS difference analaysis for year 2019, channel 22V ltod D. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.





Figure 36: SSMIS difference analaysis for year 2019, channel 37H ltod A. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.





Figure 37: SSMIS difference analaysis for year 2019, channel 37H ltod D. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 38: SSMIS difference analaysis for year 2019, channel 37V ltod A. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.

2.5

3

1.5

2

1

0.4

0.2

Q

-2

-1.5

-1

-0,5



Figure 39: SSMIS difference analaysis for year 2019, channel 37V ltod D. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.





Figure 40: SSMIS difference analaysis for year 2019, channel 91H ltod A. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 41: SSMIS difference analaysis for year 2019, channel 91H ltod D. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.





Figure 42: SSMIS difference analaysis for year 2019, channel 91V ltod A. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.





Figure 43: SSMIS difference analaysis for year 2019, channel 91V ltod D. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.





Figure 44: SSMIS difference analaysis for year 2019, channel 19H ltod A. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.





Figure 45: SSMIS difference analaysis for year 2019, channel 19H ltod D. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.





Figure 46: SSMIS difference analaysis for year 2019, channel 19V ltod A. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.





Figure 47: SSMIS difference analaysis for year 2019, channel 19V ltod D. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 48: SSMIS difference analaysis for year 2019, channel 22V ltod A. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 49: SSMIS difference analaysis for year 2019, channel 22V ltod D. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.

1.5

1

2

2.5

3

Q

-2

-1.5

-1

-0,5





Figure 50: SSMIS difference analaysis for year 2019, channel 37H ltod A. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.





Figure 51: SSMIS difference analaysis for year 2019, channel 37H ltod D. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 52: SSMIS difference analaysis for year 2019, channel 37V ltod A. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.

2.5

3

1.5

2

1

0.2

Q

-2

-1.5

-1

-0,5





Figure 53: SSMIS difference analaysis for year 2019, channel 37V ltod D. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 54: SSMIS difference analaysis for year 2019, channel 91H ltod A. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.

1.5

1

2

2.5

3

-0.5

0

-1

0.2

0.1

0

-2

-1.5





Figure 55: SSMIS difference analaysis for year 2019, channel 91H ltod D. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.





Figure 56: SSMIS difference analaysis for year 2019, channel 91V ltod A. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.





Figure 57: SSMIS difference analaysis for year 2019, channel 91V ltod D. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 58: SSMIS difference analaysis for year 2019, channel 19H morning pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 59: SSMIS difference analaysis for year 2019, channel 19H evening pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.


Figure 60: SSMIS difference analaysis for year 2019, channel 19V morning pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 61: SSMIS difference analaysis for year 2019, channel 19V evening pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 62: SSMIS difference analaysis for year 2019, channel 22V morning pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 63: SSMIS difference analaysis for year 2019, channel 22V evening pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 64: SSMIS difference analaysis for year 2019, channel 37H morning pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 65: SSMIS difference analaysis for year 2019, channel 37H evening pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 66: SSMIS difference analaysis for year 2019, channel 37V morning pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 67: SSMIS difference analaysis for year 2019, channel 37V evening pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 68: SSMIS difference analaysis for year 2019, channel 91H morning pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 69: SSMIS difference analaysis for year 2019, channel 91H evening pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 70: SSMIS difference analaysis for year 2019, channel 91V morning pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 71: SSMIS difference analaysis for year 2019, channel 91V evening pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 72: SSMIS difference analaysis for year 2019, channel 19H morning pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 73: SSMIS difference analaysis for year 2019, channel 19H evening pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 74: SSMIS difference analaysis for year 2019, channel 19V morning pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 75: SSMIS difference analaysis for year 2019, channel 19V evening pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 76: SSMIS difference analaysis for year 2019, channel 22V morning pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 77: SSMIS difference analaysis for year 2019, channel 22V evening pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 78: SSMIS difference analaysis for year 2019, channel 37H morning pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 79: SSMIS difference analaysis for year 2019, channel 37H evening pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 80: SSMIS difference analaysis for year 2019, channel 37V morning pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 81: SSMIS difference analaysis for year 2019, channel 37V evening pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 82: SSMIS difference analaysis for year 2019, channel 91H morning pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 83: SSMIS difference analaysis for year 2019, channel 91H evening pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 84: SSMIS difference analaysis for year 2019, channel 91V morning pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 85: SSMIS difference analaysis for year 2019, channel 91V evening pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 86: SSMIS difference analaysis for year 2019, channel 19H morning pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 87: SSMIS difference analaysis for year 2019, channel 19H evening pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 88: SSMIS difference analaysis for year 2019, channel 19V morning pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 89: SSMIS difference analaysis for year 2019, channel 19V evening pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 90: SSMIS difference analaysis for year 2019, channel 22V morning pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 91: SSMIS difference analaysis for year 2019, channel 22V evening pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 92: SSMIS difference analaysis for year 2019, channel 37H morning pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 93: SSMIS difference analaysis for year 2019, channel 37H evening pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 94: SSMIS difference analaysis for year 2019, channel 37V morning pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 95: SSMIS difference analaysis for year 2019, channel 37V evening pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.


Figure 96: SSMIS difference analaysis for year 2019, channel 91H morning pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 97: SSMIS difference analaysis for year 2019, channel 91H evening pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 98: SSMIS difference analaysis for year 2019, channel 91V morning pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 99: SSMIS difference analaysis for year 2019, channel 91V evening pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 100: SSMIS difference analaysis for year 2019, channel 19H morning pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 101: SSMIS difference analaysis for year 2019, channel 19H evening pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 102: SSMIS difference analaysis for year 2019, channel 19V morning pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 103: SSMIS difference analaysis for year 2019, channel 19V evening pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 104: SSMIS difference analaysis for year 2019, channel 22V morning pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 105: SSMIS difference analaysis for year 2019, channel 22V evening pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 106: SSMIS difference analaysis for year 2019, channel 37H morning pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 107: SSMIS difference analaysis for year 2019, channel 37H evening pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 108: SSMIS difference analaysis for year 2019, channel 37V morning pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 109: SSMIS difference analaysis for year 2019, channel 37V evening pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 110: SSMIS difference analaysis for year 2019, channel 91H morning pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 111: SSMIS difference analaysis for year 2019, channel 91H evening pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 112: SSMIS difference analaysis for year 2019, channel 91V morning pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 113: SSMIS difference analaysis for year 2019, channel 91V evening pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 114: SSMIS difference analaysis for year 2019, channel 19H morning pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 115: SSMIS difference analaysis for year 2019, channel 19H ltod evening pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10. 128



Figure 116: SSMIS difference analaysis for year 2019, channel 19V morning pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 117: SSMIS difference analaysis for year 2019, channel 19V evening pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 118: SSMIS difference analaysis for year 2019, channel 22V morning pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 119: SSMIS difference analaysis for year 2019, channel 22V evening pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 120: SSMIS difference analaysis for year 2019, channel 37H morning pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 121: SSMIS difference analaysis for year 2019, channel 37H evening pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 122: SSMIS difference analaysis for year 2019, channel 37V morning pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 123: SSMIS difference analaysis for year 2019, channel 37V evening pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 124: SSMIS difference analaysis for year 2019, channel 91H morning pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 125: SSMIS difference analaysis for year 2019, channel 91H evening pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 126: SSMIS difference analaysis for year 2019, channel 91V morning pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 127: SSMIS difference analaysis for year 2019, channel 91V evening pass. (a) Difference image (I/FCDR-L1C) for day 1. (b) Difference statistics (I/FCDR-L1C) for days 1-10.



Figure 128: SSMIS difference analaysis for year 2019, channel 19H morning pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 129: SSMIS difference analaysis for year 2019, channel 19H evening pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 130: SSMIS difference analaysis for year 2019, channel 19V morning pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 131: SSMIS difference analaysis for year 2019, channel 19V evening pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.


Figure 132: SSMIS difference analaysis for year 2019, channel 22V morning pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 133: SSMIS difference analaysis for year 2019, channel 22V evening pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 134: SSMIS difference analaysis for year 2019, channel 37H morning pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 135: SSMIS difference analaysis for year 2019, channel 37H evening pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 136: SSMIS difference analaysis for year 2019, channel 37V morning pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 137: SSMIS difference analaysis for year 2019, channel 37V evening pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 138: SSMIS difference analaysis for year 2019, channel 91H morning pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 139: SSMIS difference analaysis for year 2019, channel 91H evening pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 140: SSMIS difference analaysis for year 2019, channel 91V morning pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 141: SSMIS difference analaysis for year 2019, channel 91V evening pass. (a) Difference image (I/FCDR-L1C) for day 101. (b) Difference statistics (I/FCDR-L1C) for days 101-110.



Figure 142: SSMIS difference analaysis for year 2019, channel 19H morning pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 143: SSMIS difference analaysis for year 2019, channel 19H evening pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 144: SSMIS difference analaysis for year 2019, channel 19V morning pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 145: SSMIS difference analaysis for year 2019, channel 19V evening pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 146: SSMIS difference analaysis for year 2019, channel 22V morning pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 147: SSMIS difference analaysis for year 2019, channel 22V evening pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 148: SSMIS difference analaysis for year 2019, channel 37H morning pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 149: SSMIS difference analaysis for year 2019, channel 37H evening pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 150: SSMIS difference analaysis for year 2019, channel 37V morning pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 151: SSMIS difference analaysis for year 2019, channel 37V evening pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 152: SSMIS difference analaysis for year 2019, channel 91H morning pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 153: SSMIS difference analaysis for year 2019, channel 91H evening pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 154: SSMIS difference analaysis for year 2019, channel 91V morning pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 155: SSMIS difference analaysis for year 2019, channel 91V evening pass. (a) Difference image (I/FCDR-L1C) for day 201. (b) Difference statistics (I/FCDR-L1C) for days 201-210.



Figure 156: SSMIS difference analaysis for year 2019, channel 19H morning pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 157: SSMIS difference analaysis for year 2019, channel 19H evening pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 158: SSMIS difference analaysis for year 2019, channel 19V morning pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 159: SSMIS difference analaysis for year 2019, channel 19V evening pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 160: SSMIS difference analaysis for year 2019, channel 22V morning pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 161: SSMIS difference analaysis for year 2019, channel 22V evening pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 162: SSMIS difference analaysis for year 2019, channel 37H morning pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 163: SSMIS difference analaysis for year 2019, channel 37H evening pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 164: SSMIS difference analaysis for year 2019, channel 37V morning pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 165: SSMIS difference analaysis for year 2019, channel 37V evening pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 166: SSMIS difference analaysis for year 2019, channel 91H morning pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 167: SSMIS difference analaysis for year 2019, channel 91H evening pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.


Figure 168: SSMIS difference analaysis for year 2019, channel 91V morning pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.



Figure 169: SSMIS difference analaysis for year 2019, channel 91V evening pass. (a) Difference image (I/FCDR-L1C) for day 301. (b) Difference statistics (I/FCDR-L1C) for days 301-310.