

SAFARI 2000 MAS Flight 00156

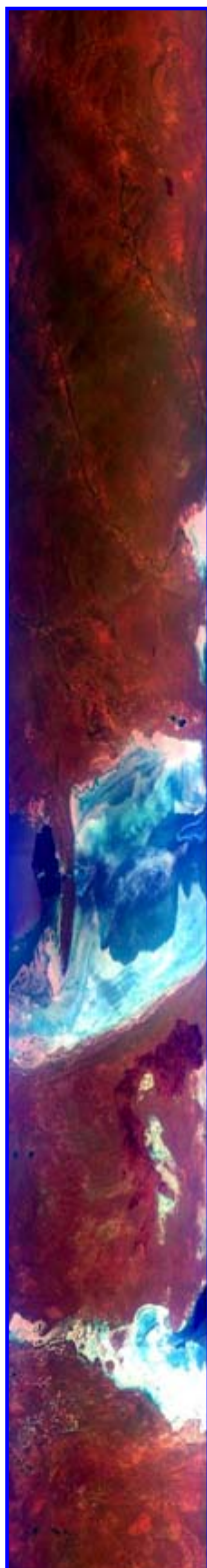
The SAFARI 2000 MAS contains 146 GB of data. Individual HDF files may exceed the size of a CD, and are best written to DVD. You may use this automated interface to order data from selected tracks (flight segments). If you require large portions of this data, we recommend that you contact us by email or phone and make special arrangements.

Flight #00-156

RBG Images

[Click Image](#)

Track #04



Summary Information

Date: **September 04, 2000**
 ER-2 Flight Number: **00-156**
 Location: **Northern South Africa and Mozambique**
 Principal Investigator: **Dr. Michael King (NASA GSFC)**
 Flight Scientist: **Chris Moeller (UW CIMSS)**
 Additional Sensors: **AirMISR, CLS, LAS, MAS, MOPITT-A, S-HIS, SSFR** (see [Instrument Status](#) below)

Flight Track Map



[Click to enlarge](#)

Processing Information

Level-1B Data processed by: **Ames Research Center**
 Level-1B Data Version: **#2**
 Level-1B Configuration: ([sample file](#))
 Calibration Type: **Final**
 Calibration Version: **1.0**

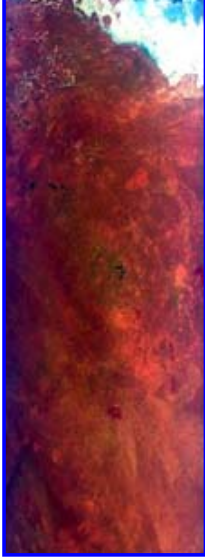
Level-1B Browse Imagery

Straight Line Flight Tracks: **10 processed**
 Scanlines Processed: **71166**
[Solar Azimuth and Zenith Angles](#)

Browse Images							
Click on the Flight Track number to see track images. Click on the Check Box to list HDF files prior to adding to shopping cart. Lat/Lon ranges are for the BEG-END scanline nadir pixels.							
List	Flight Track	Time_Span (GMT)	Heading (Deg)	Lat_Range (Deg_S)	Lon_Range (Deg_E)	Length (Scanlines)	Altitude (msl)
<input type="checkbox"/>	01	08:29-08:43	307	22.16-21.25	28.46-27.11	5330	18955
<input type="checkbox"/>	02	08:43-09:02	307	21.25-20.03	27.10-25.25	6990	19784
<input type="checkbox"/>	03	09:08-09:25	124	19.88-20.98	25.03-26.70	6431	19966
<input type="checkbox"/>	04	09:32-09:50	303	21.08-19.94	26.85-25.08	6749	20092
<input type="checkbox"/>	05	09:51-10:12	274	19.92-19.91	25.01-22.45	7935	20294
<input type="checkbox"/>	06	10:14-10:40	170	20.01-22.96	22.34-23.05	9999	20149
<input type="checkbox"/>	07	10:40-10:49	168	22.96-23.96	23.05-23.30	3379	19999
<input type="checkbox"/>	08	10:51-11:11	109	24.06-24.71	23.38-25.80	7621	19994
<input type="checkbox"/>	09	11:11-11:38	84	24.71-24.17	25.86-29.05	9999	20137
<input type="checkbox"/>	10	11:38-11:56	80	24.17-23.77	29.05-31.18	6733	20096
All images in sequence							

ER-2 Flight Log

Author: **Chris Moeller**
 Mission Scientist: **Dr. Michael King**
 ER-2 Pilot: **Ken Broda**
 Takeoff: **04Sep2000 0000 UTC**
 Landing: **04Sep2000 0000 UTC**



R: 2.15 microns
G: 0.91 microns
B: 0.55 microns

Duration: 04:40:00

Objective:

Over fly Sua Pan PARABOLA instrument site (20°S; 34.53'S, 26°04.91'E) on a NW-SE oriented 12 minute line for AirMISR. Run the line 3 times, on the third run offsetting by 3km to the SW. Then over fly Maun (19°55'S, 23°36'E) on 12 minute AirMISR leg, then get on TOMS orbital track (0957 UTC overpass) for 30 minute leg. Then run 12 minute AirMISR lines over Tshane (24°09.84'S, 21°53.58'E) and Okwa River (22°24.55'S, 21°42.78'E), finishing by over flying the Murchisan Lineament (23°45'S, 31°18'E to 25°23'S, 31°40'E) for surface emissivity studies with SHIS and MAS.

Key Flight Legs:

The ER-2 launch was delayed by about 10 minutes for local winds and commercial aircraft activity. It flew northwest from Pietersburg to line up on Sua Pan AirMISR line. Three lines were run (~0854, 0919, 0940 UTC). Skies were clear for all runs. Pilot noted very poor visibility on these runs. Anomalous performance of AirMISR indicated in the cockpit. Maun line was partly cloudy (alto cu) as was the TOMS line, which the ER-2 arrived at about 12 minutes after overpass due to delay in launch. Because of cloud cover, Tshane and Okwa River runs were skipped and ER-2 finished with Murchisan Lineament run which was partly cloudy in the western half and clear in the eastern half. Highlights: TOMS under flight (partly cloudy), AirMISR over Sua Pan.

No AERONET sites were overflown during this mission.

Pilot Report:

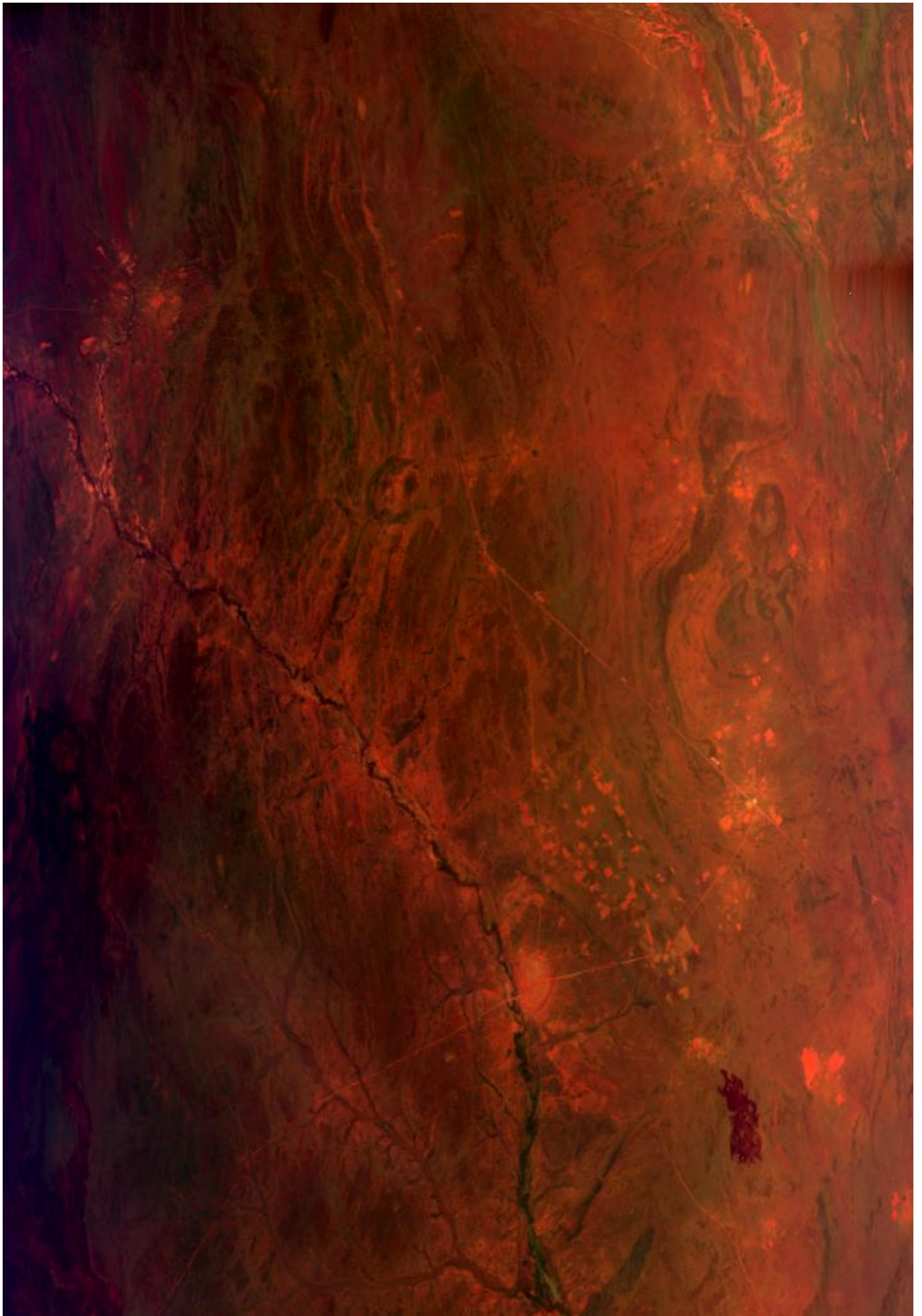
The ER-2 launch was delayed by about 10 minutes for local winds and commercial aircraft activity. It flew northwest from Pietersburg to line up on Sua Pan AirMISR line. Three lines were run (~0854, 0919, 0940 UTC). Skies were clear for all runs. Pilot noted very poor visibility on these runs. Anomalous performance of AirMISR indicated in the cockpit. Maun line was partly cloudy (alto cu) as was the TOMS line, which the ER-2 arrived at about 12 minutes after overpass due to delay in launch. Because of cloud cover, Tshane and Okwa River runs were skipped and ER-2 finished with Murchisan Lineament run which was partly cloudy in the western half and clear in the eastern half. Anomalous performance of AirMISR indicated in the cockpit.

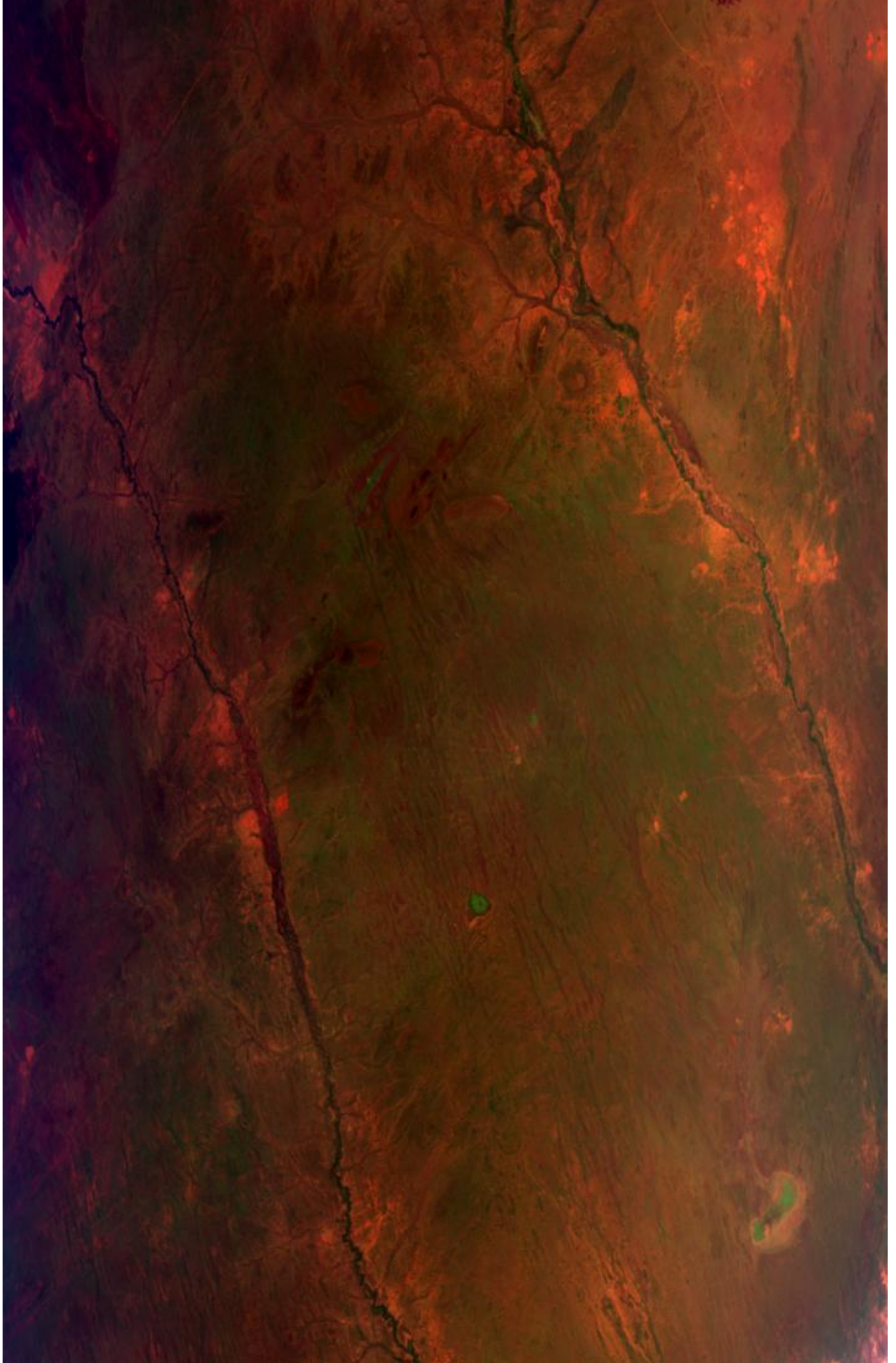
Meteorology:

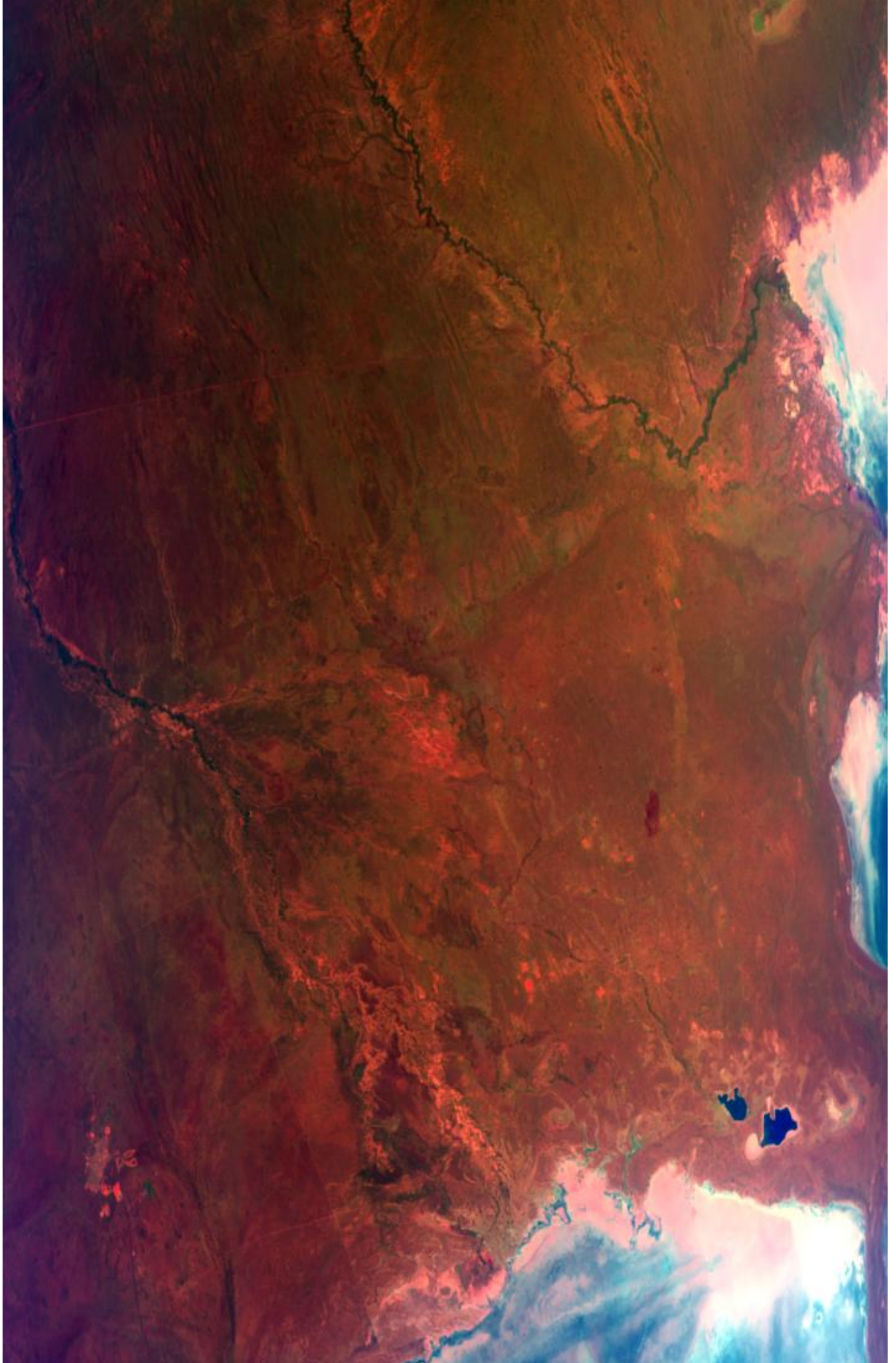
Cold front moving away to the east with Atlantic high ridging eastwards and starting to bulge out on the east coast. Cooler moist lower level air spreading northwards into the Mpumalanga and Northern province lowveld. A band of middle level cloud beneath an upper jet stream lies from central Namibia, through Botswana to the Gauteng and Mpumalanga highveld. Skies will be cloudy today along the eastern seaboard and adjacent interior and over the Mpumalanga lowveld. Low cloud will spread northwards into the lowveld of the Northern Province during the day. Partly cloudy over the central areas of Namibia, Botswana, Gauteng and the Mpumalanga highveld. Very isolated thundershowers are possible in these areas. Moist air from Zaire is spreading southwards and thundershowers are also expected over northwestern Zambia.

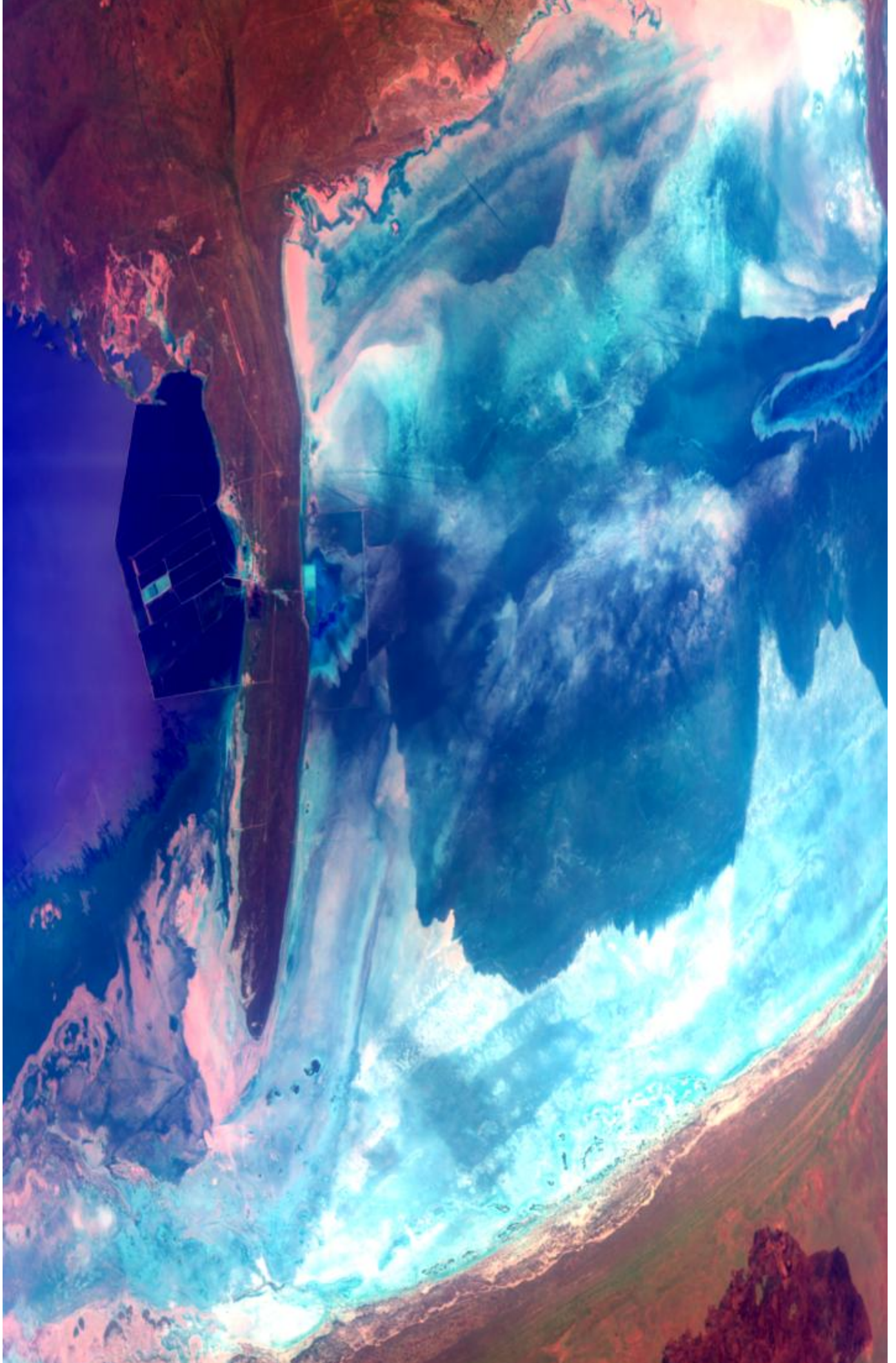
Instrument Status:

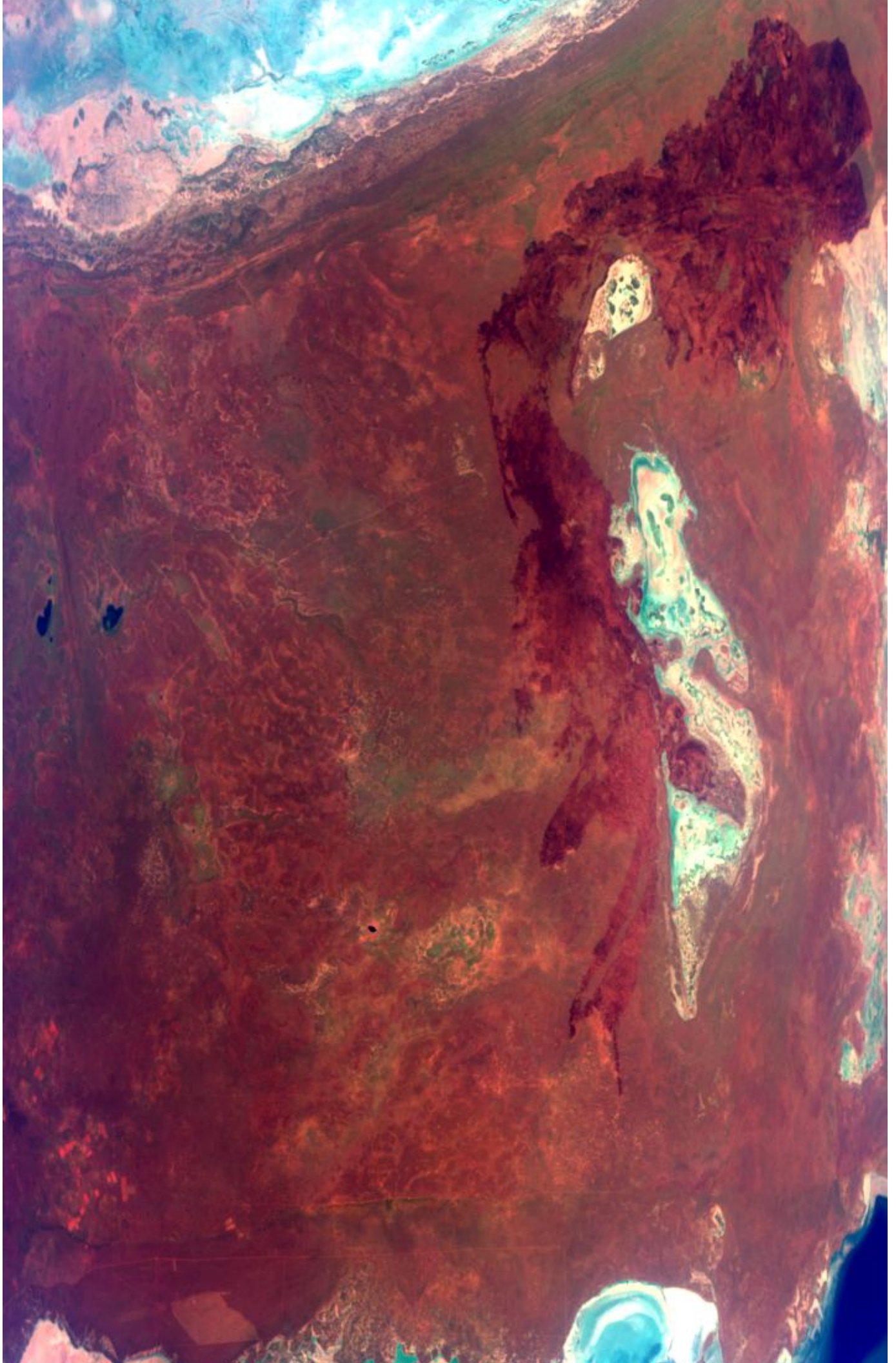
- AirMISR (Airborne Multi-angle Imaging Spectroradiometer): no data
- CLS (Cloud Lidar System): Lidar worked properly, but navigation data not recorded
- LAS (Leonardo Airborne Simulator): not operated (ballast)
- MAS (MODIS Airborne Simulator): worked well
- MOPITT-A (MOPITT Airborne Simulator): Worked well
- S-HIS (High-resolution Interferometer Sounder): operated in nadir mode; no data
- SSFR (Solar Spectral Flux Radiometer): Worked well

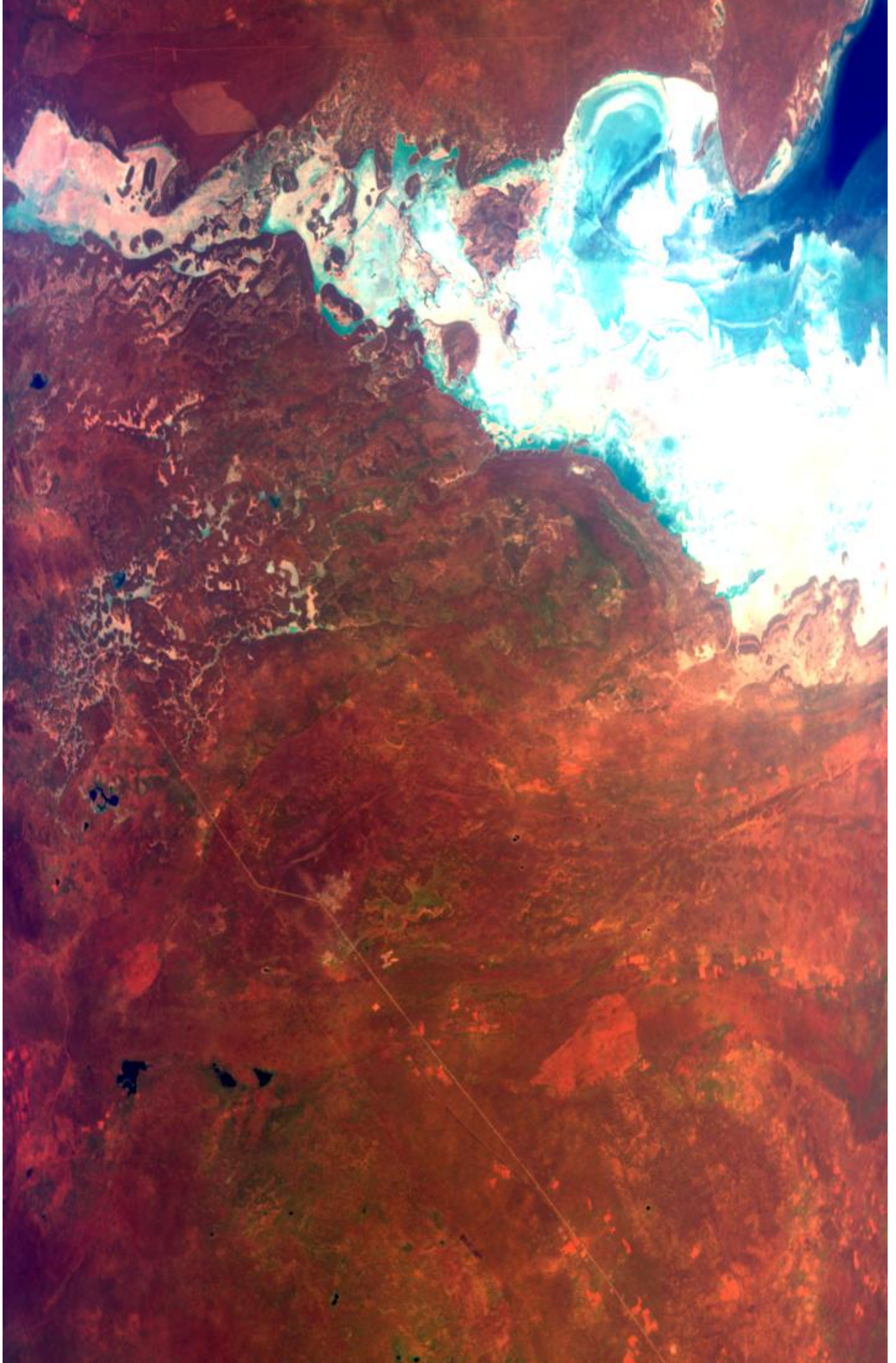


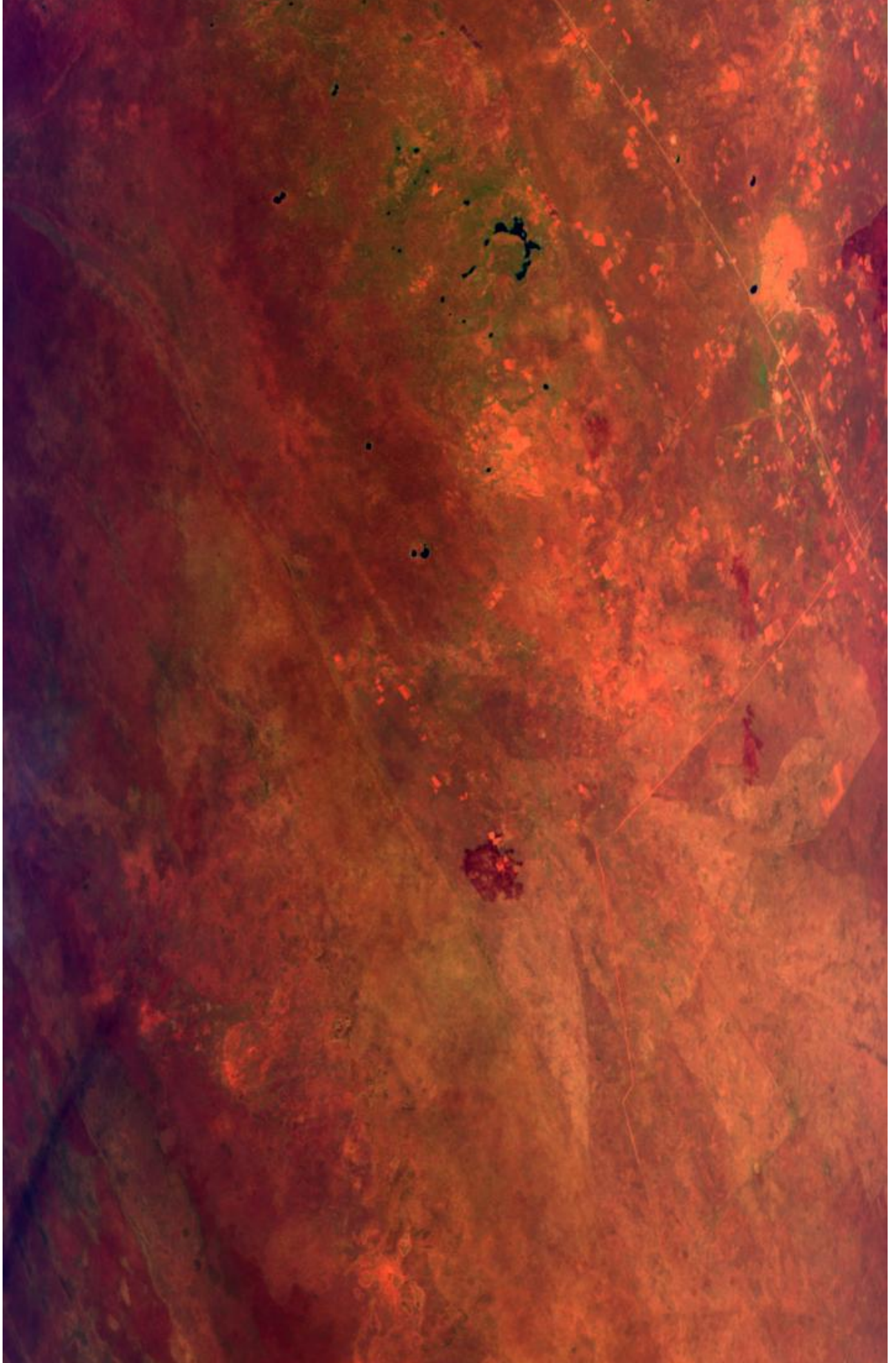


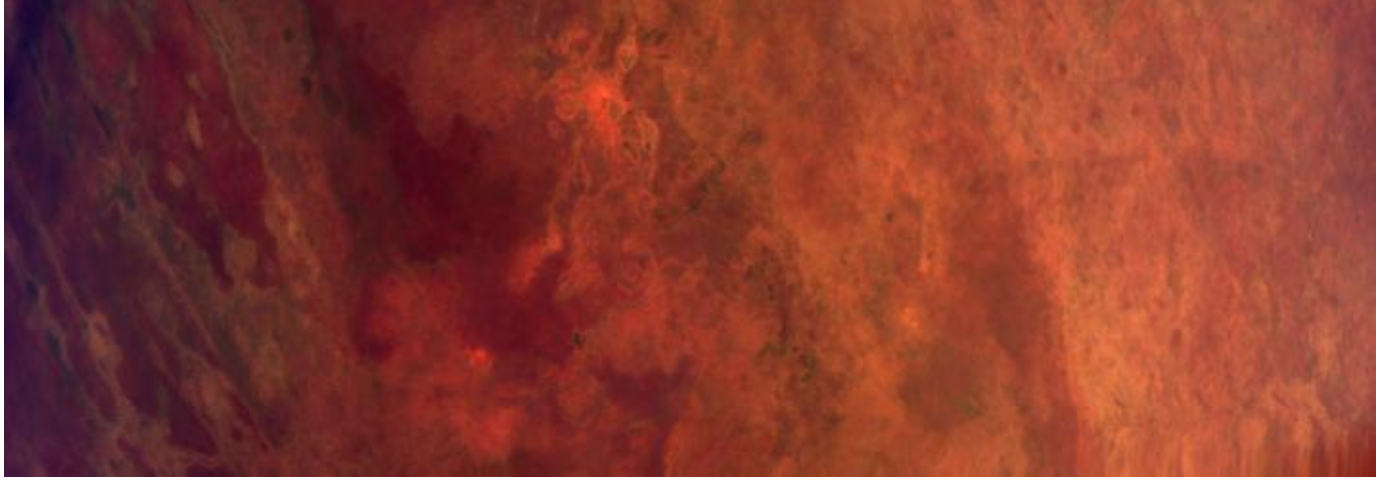


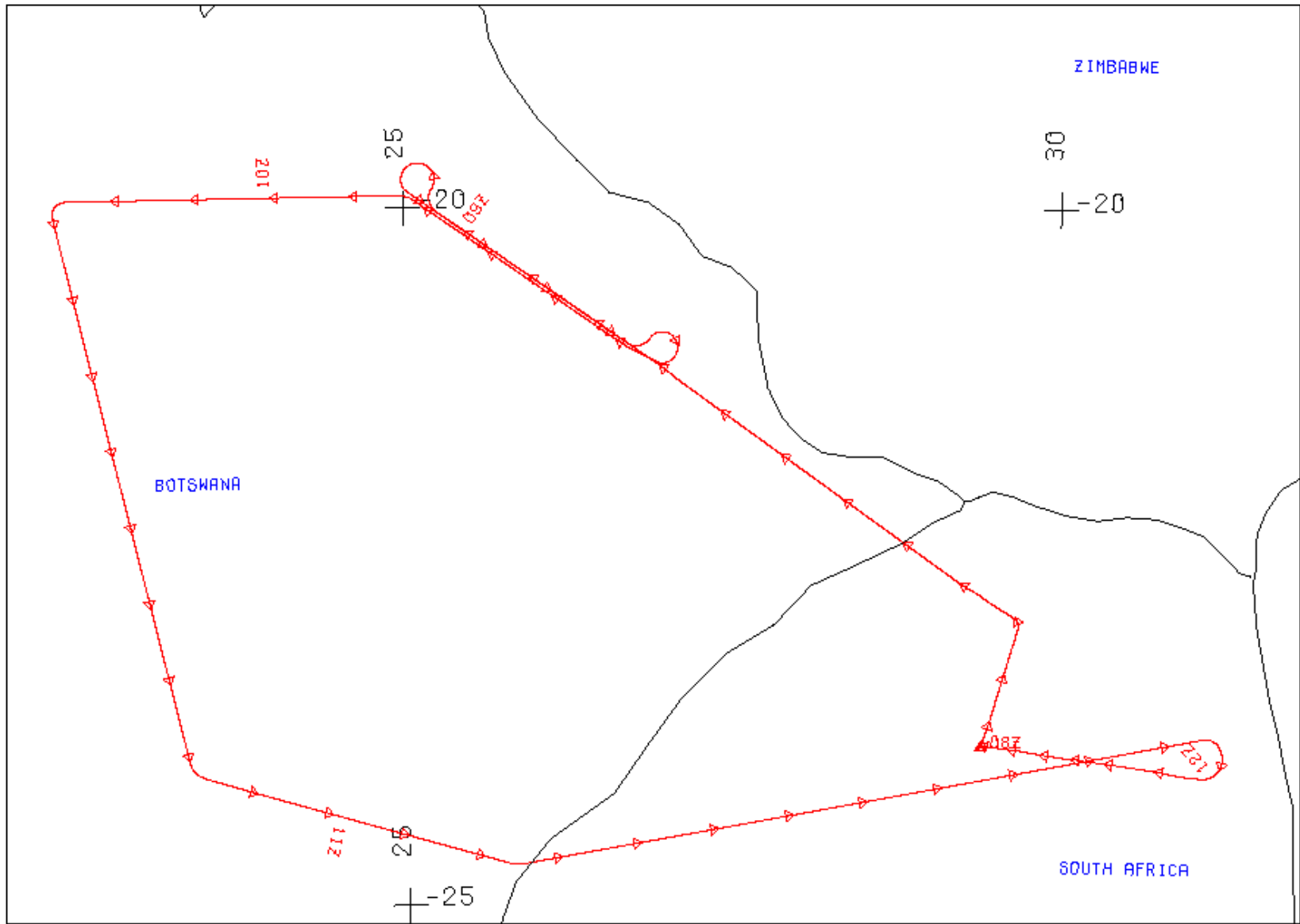












FLIGHT 00-156

4 SEPTEMBER 2000

A/C 809

SAFARI

FLIGHT 00-156

4 SEPTEMBER 2000

A/C 809

SAFARI

50 MAS Configuration for 00-156 04 Sep 2000 S. Africa and Botswana

01	01	16	0	0.037789	0.0000	0.452	0.472	0.493	0.100	1981.92
02	02	16	0	0.040547	0.0000	0.534	0.554	0.577	0.100	1857.88
03	03	16	0	0.027490	0.0000	0.635	0.658	0.689	0.100	1549.55
04	04	16	0	0.032186	0.0000	0.687	0.708	0.731	0.100	1386.41
05	05	16	0	0.024491	0.0000	0.729	0.750	0.773	0.100	1260.07
06	06	16	0	0.025248	0.0000	0.810	0.830	0.855	0.100	1053.65
07	07	16	0	0.025139	0.0000	0.853	0.874	0.895	0.100	962.82
08	08	16	0	0.020191	0.0000	0.893	0.912	0.934	0.100	869.28
09	09	16	0	0.021804	0.0000	0.933	0.954	0.974	0.100	784.92
10	10	16	0	0.003478	0.0000	1.586	1.612	1.640	0.100	244.16
11	11	16	0	0.006449	0.0000	1.642	1.668	1.695	0.010	227.32
12	12	16	0	0.003010	0.0000	1.698	1.722	1.749	0.010	201.29
13	13	16	0	0.002976	0.0000	1.751	1.776	1.801	0.010	176.56
14	14	16	0	0.003063	0.0000	1.805	1.830	1.855	0.010	156.28
15	15	16	0	0.002928	0.0000	1.855	1.880	1.906	0.010	139.66
16	16	16	0	0.002779	0.0000	1.906	1.932	1.956	0.100	131.21
17	17	16	0	0.002519	0.0000	1.956	1.982	2.006	0.010	122.76
18	18	16	0	0.002462	0.0000	2.006	2.032	2.057	0.010	109.78
19	19	16	0	0.002378	0.0000	2.058	2.082	2.107	0.010	98.67
20	20	16	0	0.002416	0.0000	2.107	2.132	2.157	0.010	86.28
21	21	16	0	0.005082	0.0000	2.156	2.180	2.205	0.010	76.85
22	22	16	0	0.002762	0.0000	2.205	2.230	2.255	0.010	73.57
23	23	16	0	0.002834	0.0000	2.255	2.280	2.305	0.010	68.38
24	24	16	0	0.002658	0.0000	2.306	2.330	2.354	0.010	58.53
25	25	16	0	0.002596	0.0000	2.355	2.380	2.404	0.010	57.88
26	26	16	1	0.956000	0.0000	3.105	3.180	3.261	0.001	20.15
27	27	16	1	0.960000	0.0000	3.250	3.325	3.401	0.001	17.66
28	28	16	1	0.961000	0.0000	3.405	3.475	3.559	0.001	15.05
29	29	16	1	0.949000	0.0000	3.556	3.640	3.718	0.001	13.06
30	30	16	1	0.945000	0.0000	3.702	3.770	3.847	0.001	11.39
31	31	16	1	0.942000	0.0000	3.857	3.940	4.023	0.001	9.98
32	32	16	1	0.940000	0.0000	4.014	4.095	4.183	0.001	8.69
33	33	16	1	0.939000	0.0000	4.138	4.210	4.291	0.001	7.73
34	34	16	1	0.938000	0.0000	4.288	4.360	4.441	0.001	6.71
35	35	16	1	0.935000	0.0000	4.471	4.550	4.632	0.001	5.63
36	36	16	1	0.934000	0.0000	4.622	4.700	4.784	0.001	4.87
37	37	16	1	0.933000	0.0000	4.773	4.860	4.937	0.001	4.28

38	38	16	1	0.932000	0.0000	4.917	4.990	5.084	0.001	3.80
39	39	16	1	0.931000	0.0000	5.055	5.165	5.235	0.001	3.39
40	40	16	1	0.930000	0.0000	5.215	5.315	5.371	0.001	3.03
41	41	16	1	0.932000	0.0000	5.342	5.380	5.421	0.001	2.80
42	42	16	1	0.966000	0.0000	8.330	8.564	8.759	0.010	0.45
43	43	16	1	0.963000	0.0000	9.436	9.665	9.928	0.010	0.28
44	44	16	1	0.960000	0.0000	10.218	10.474	10.711	0.010	0.20
45	45	16	1	0.957000	0.0000	10.694	10.943	11.209	0.010	0.17
46	46	16	1	0.947000	0.0000	11.684	11.953	12.208	0.010	0.12
47	47	16	1	0.943000	0.0000	12.583	12.803	13.035	0.010	0.09
48	48	16	1	0.948000	0.0000	12.939	13.193	13.446	0.010	0.08
49	49	16	1	0.939000	0.0000	13.425	13.712	14.035	0.010	0.07
50	50	16	1	0.944000	0.0000	13.953	14.193	14.403	0.010	0.06

										=(!)
										=-Scale Factor
										=- Right 50% spectral response
										=-Peak 100% spectral response (microns)
										=-Left 50% spectral response (microns)
										=-Calibration intercept (only used for visible bands)
										=-----Calibration slope (only used for visible bands 1-25)
										Blackbody emmissivity (only used for IR bands 26-50)
										=-----0 => visible band, 1 => thermal infrared band"
										=-----Number of bits in this channel (8 or 10)
										=-----Spectral band assigned to this channel
=	=	=	=	=	=	=	=	=	=	----- Channel number

(!) Sensor weighted solar spectral irradiance (Watts/meter²/micron) at mean Earth-Sun distance

NOTE: Factor in column 10 is used to scale radiances in calibrated data by the following method:
value_stored = int(radiance / factor) for each channel

Title	MODIS Airborne Simulator (MAS) Level-1B Data
Sensor_ID_Code	M5 105 MAS50
ExperimentName	SAFARI 2000
AircraftPlatform	NASA ER-2 (809)
NavFormatCode	Format (A-1)

LocationCode	Inertial (INU)
AltitudeCode	Inertial (INU)
CalibrationVersion	Version 1.0 Calibration
CalibrationName	SAFARI_Jul19-Oct19
SRF_Dataset	/rarray/calibrat/mas/srf/Oct_00/
SRF_FTP	ftp://asapdata/mas/srf/Oct_00/
NavDataSource	ER2 navigation recorder
NavDataPath	/nav/2000/er2/00-156
TbackBand	45, 47, 31, 273.0
GranuleVersion	1.0.0
MetadataVersion	1.0.0

 Conversion from counts to radiance in VIS and NIR channels is
 $rad = (count - (cbb_avg)) * slope$

"where,"

rad = radiance

cbb_avg = cold black body counts (running average)

slope = from column 7 in above table

count = count value

IR Emissivity Correction (for MAS-50)

From Chris Moeller (UWisc)

This is done in 2 steps:

1. Get the (TBACK Band) scan head count and convert it to a brightness temperature
2. Use the scan head temperature and the cold and warm black body counts/temperatures for computing the corrected slope and intercept for all IR bands.

(note: set to 1.0 for channels 1-25)

MAS BB Emissivity Coefficients

Hemispherical Reflectance (JPL) 11/00

convolved with MAS SRF (ARC) 10/00

Red spot Paint

Values in form Wavelength, Emissivity

For Bands 26 thru 50:

0.95600, 0.96000, 0.96100, 0.94900, 0.94500,
0.94200, 0.94000, 0.93900, 0.93800, 0.93500,
0.93400, 0.93300, 0.93200, 0.93100, 0.93000,
0.93200, 0.96600, 0.96300, 0.96000, 0.95700,
0.94700, 0.94300, 0.94800, 0.93900, 0.94400,

Config.asc creation date = 13-June-2001

Config.asc creation date = 13-June-2001

MODIS AIRBORNE SIMULATOR (MAS) FLIGHT LINE
 INFORMATION FOR 04 Sep 2000
 NASA FLIGHT NUMBER 00-156

START OF FLIGHT LINE					END OF FLIGHT				
LINE	FLIGHT DATA								
LINE	TIME	LAT	LON	SOLAR	TIME	LAT	LON		
SOLAR	SCAN	HEAD	ALT	ZEN	AZIM	HH:MM:SS	DEG	DEG	
ZEN	AZIM	LINES	DEG	M (GPS)					
1	08:29:14	-22.158	28.460	37.4	41.6	08:43:30	-21.253	27.106	35.4
39.4	5330	306.5	18955						
2	08:43:33	-21.250	27.102	35.4	39.4	09:02:16	-20.030	25.253	32.8
36.4	6990	306.9	19784						
3	09:08:44	-19.883	25.030	31.9	34.4	09:25:57	-20.976	26.696	30.2
23.3	6431	124.2	19966						
4	09:32:45	-21.078	26.854	29.6	19.7	09:50:49	-19.943	25.076	27.8
14.9	6749	302.5	20092						
5	09:51:24	-19.919	25.012	27.7	14.8	10:12:39	-19.913	22.450	27.2
9.0	7935	274.3	20294						
6	10:14:04	-20.011	22.344	27.2	8.4	10:40:50	-22.960	23.047	30.1
353.0	9999	169.9	20149						
7	10:40:50	-22.960	23.047	30.1	353.0	10:49:53	-23.960	23.296	31.5
348.4	3379	168.2	19999						
8	10:51:03	-24.059	23.384	31.6	347.8	11:11:27	-24.708	25.798	34.4
335.0	7621	109.4	19994						
9	11:11:56	-24.713	25.857	34.5	334.7	11:38:42	-24.173	29.047	38.9
320.0	9999	83.8	20137						
10	11:38:42	-24.173	29.047	38.9	320.0	11:56:44	-23.773	31.176	42.9
311.9	6733	80.4	20096						

NUMBER OF FILES FOR THIS FLIGHT = 10

TOTAL NUMBER OF SCAN LINES = 71166
DATE THESE FILES WERE PROCESSED = 16-Sep-2002
DATE THIS LIST WAS CREATED = Tue Sep 17

13:25:52 PDT 2002

GRANULE VERSION = 2

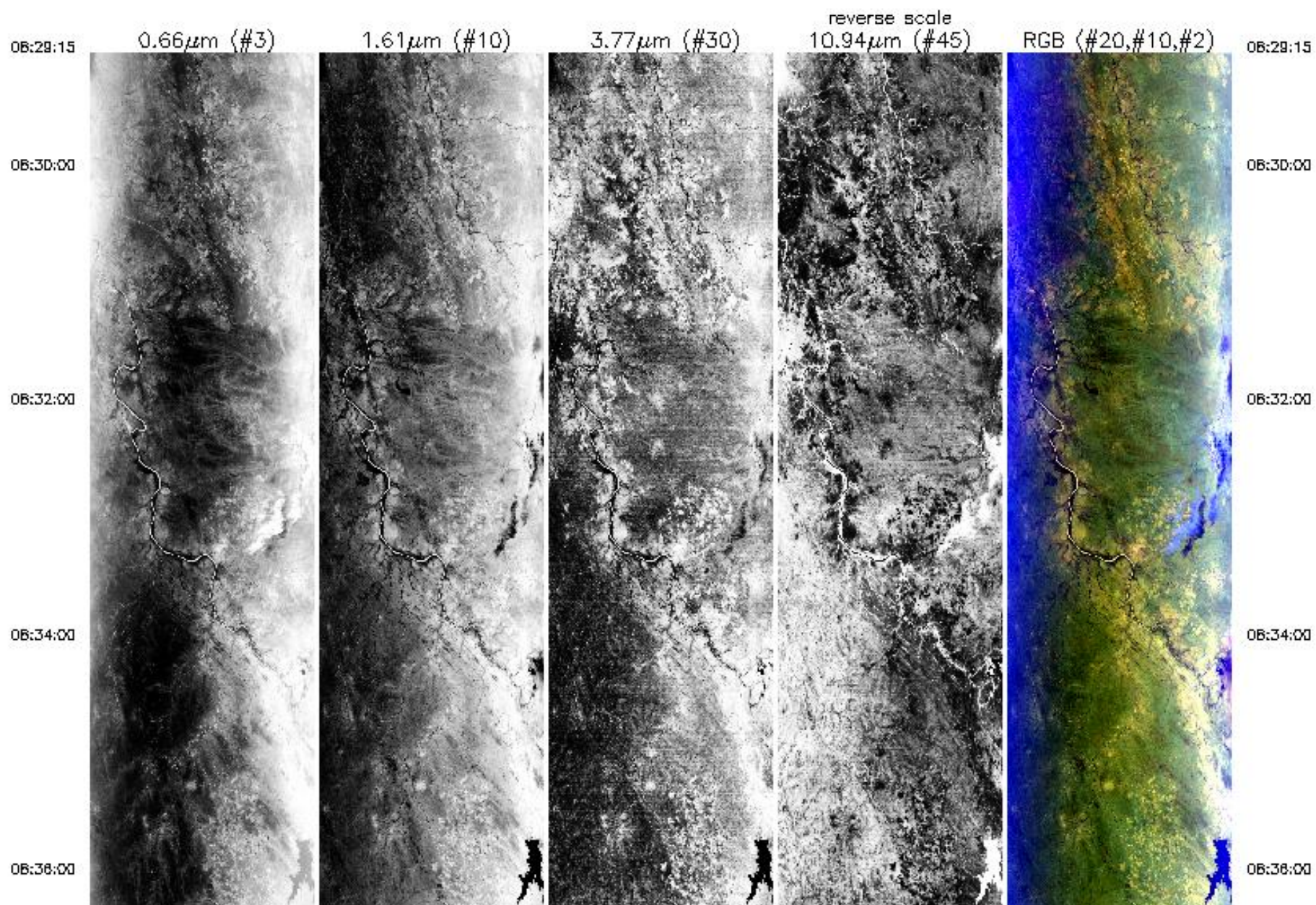
GLOBAL ATTRIBUTES

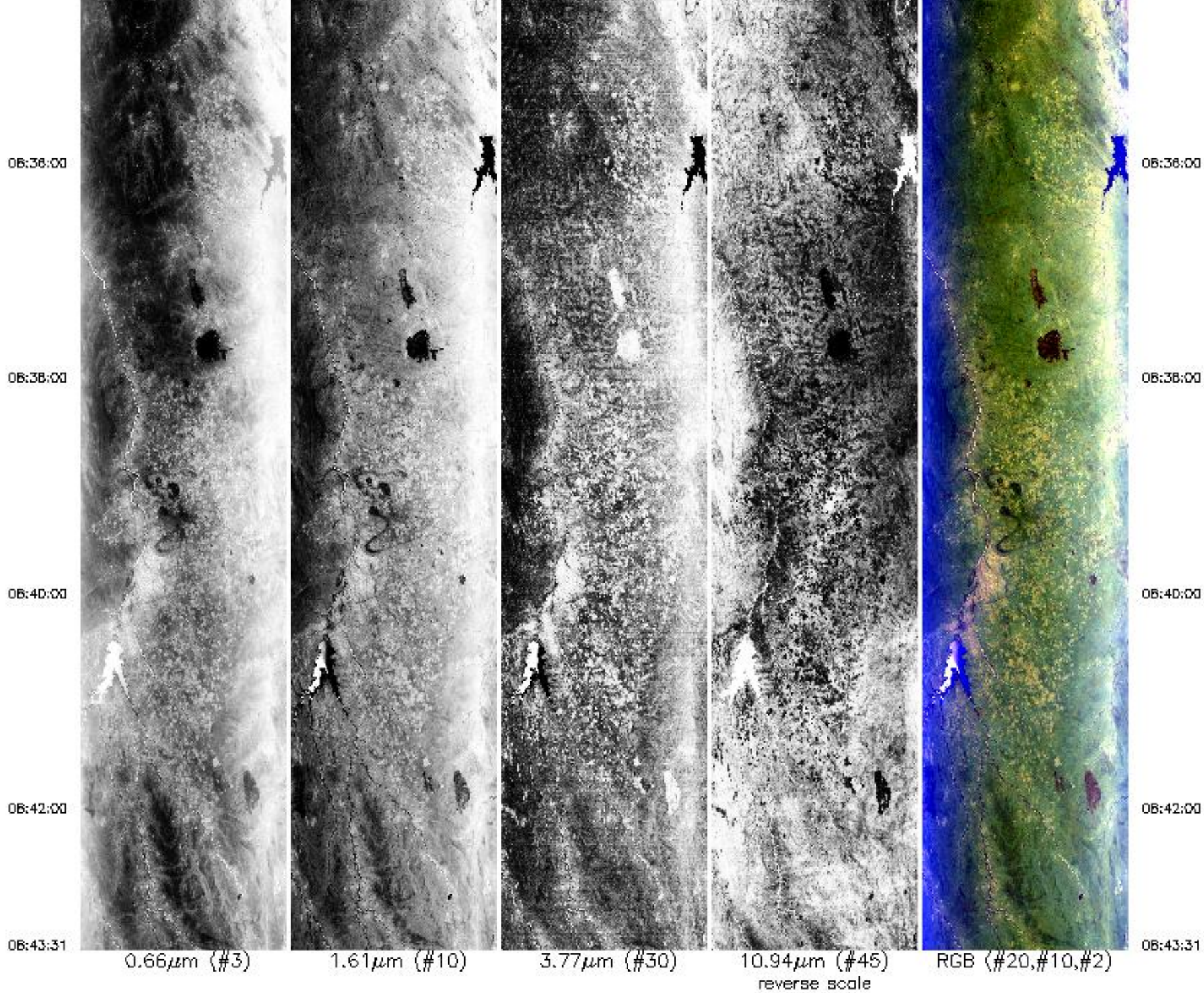
Attribute Name	Description
CreationDate	16-Sep-2002 20:00:03
AircraftPlatform	NASA ER-2 (809)
NavFormatCode	Format (A-1)
LocationCode	Inertial (INU)
AltitudeCode	Inertial (INU)
NavDataSource	ER2 navigation recorder
NavDataPath	/nav/2000/er2/00-156
CalibrationName	SAFARI_Jul19-Oct19
Reference	NCSA HDF Reference Manual, Version 4.1r4, 2000
title	MODIS Airborne Simulator (MAS) Level-1B Data
ExperimentName	SAFARI 2000
FlightNumber	00-156
FlightDate	04 Sep 2000
SiteLineRun	void
GeographicArea	Botswana
SRF_FTP	ftp://asapdata/mas/srf/Oct_00/
SRF_dataset	/rarray/calibrat/mas/srf/Oct_00/
FlightLineNumber	1
TotalFlightLines	10
DataUsersGuideSource	http://ltpww.gsfc.nasa.gov/MAS/
SoftwareVersion	Level-1b Version 10.1.1 UR
CalibrationVersion	Version 1.0 Calibration
data_set	MAS SAFARI 2000
day_night_flag	D
granule_version	2

metadata_version	2.0.0
data_quality	Good
Other_Aircraft_Sensors	AirMISR, CLS, MOPPIT-A, Leonardo, RC-10
Principal_Investigator	King
lat_UL	-22.03601
lon_UL	28.55692
lat_UR	-22.27752
lon_UR	28.36146
lat_LL	-21.12136
lon_LL	27.20684
lat_LR	-21.38137
lon_LR	27.00281
begin_date	20000904 082915
end_date	20000904 084331
RunTime	372,980 ms, or 69 ms/scanline
CompletionDate	16-Sep-2002 20:09:52
producer_granule_id	

MASL1B_00156_01_20000903_0829_0843_V02.hdf

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 04 Sep 2000
Botswana
Flight #00-156 Track #1





Upper Left Lat, Lon = -22.0° , 28.6°
 Lower Right Lat, Lon = -21.4° , 27.0°
 Aircraft Heading = 306.9°

06:43:31



0.66 μ m (#3)



1.61 μ m (#10)



3.77 μ m (#30)



10.94 μ m (#45)
reverse scale

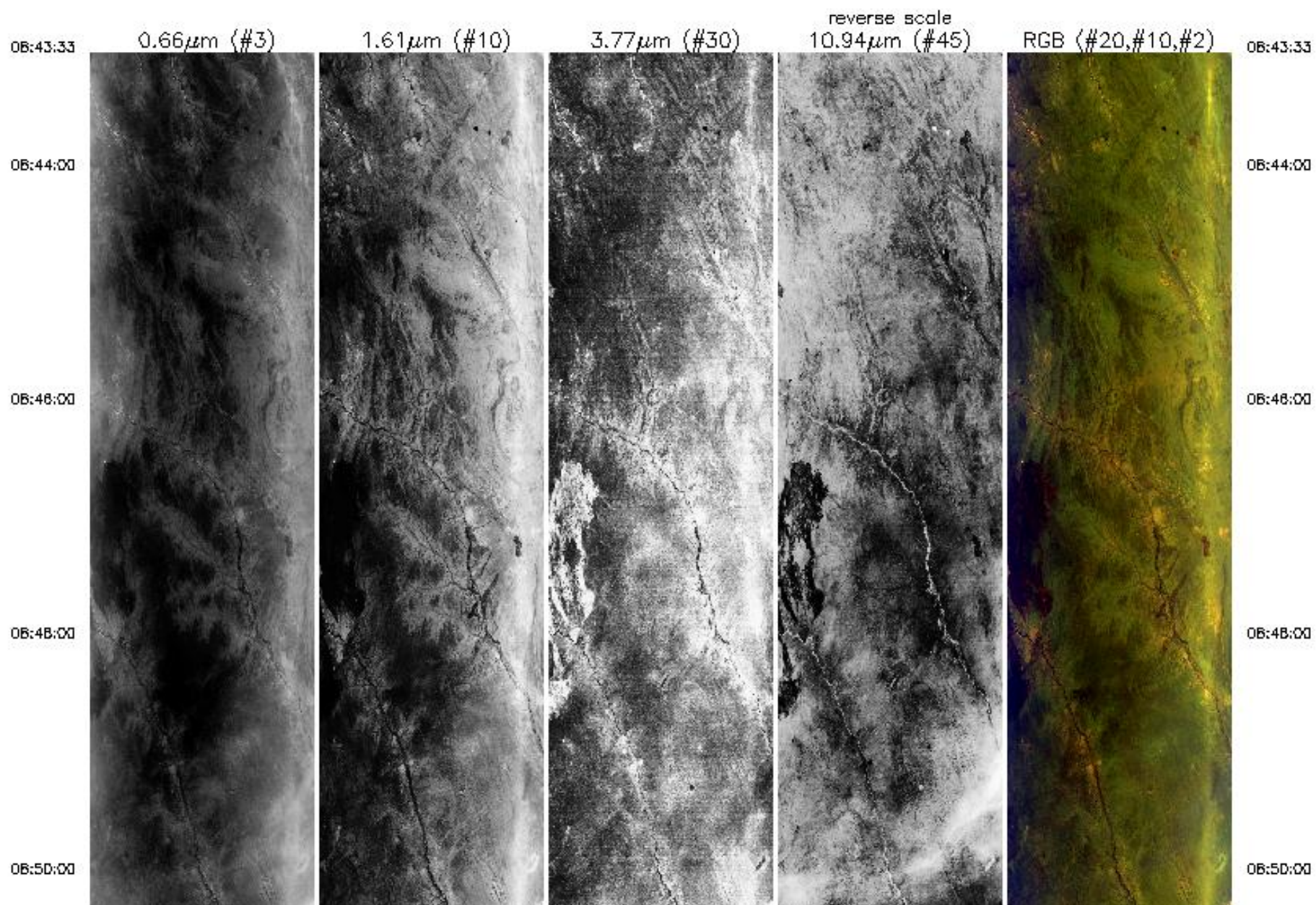


RGB (#20,#10,#2)

06:43:31

Upper Left Lat, Lon = -22.0°, 28.6°
Lower Right Lat, Lon = -21.4°, 27.0°
Aircraft Heading = 306.9°
Solar Zenith = 37.3°
GPS Altitude = 19131. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 04 Sep 2000
Botswana
Flight #00-156 Track #2



06:50:00



06:52:00



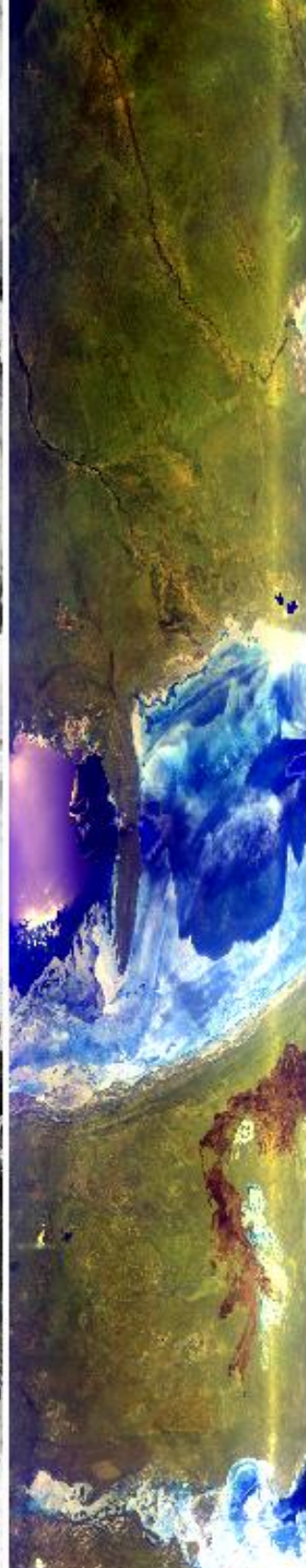
06:54:00



06:56:00



06:58:00



06:50:00

06:52:00

06:54:00

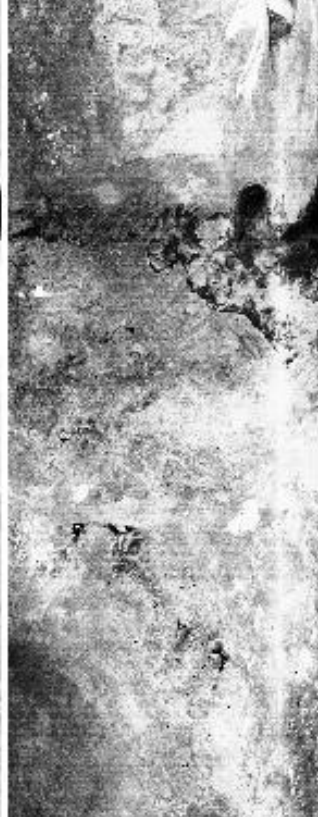
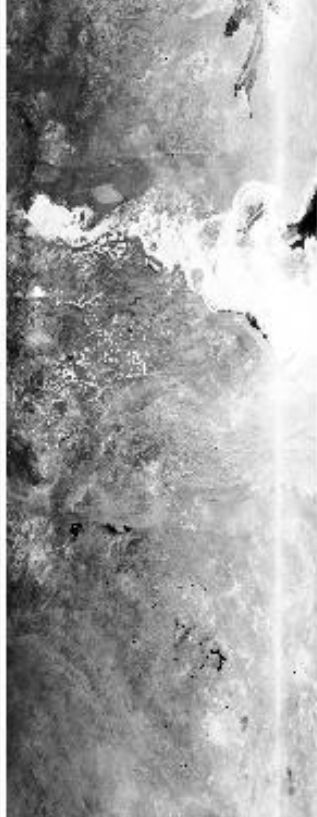
06:56:00

06:58:00

06:58:00

09:00:00

09:02:16



06:58:00

09:00:00

09:02:16

0.66µm (#3)

1.61µm (#10)

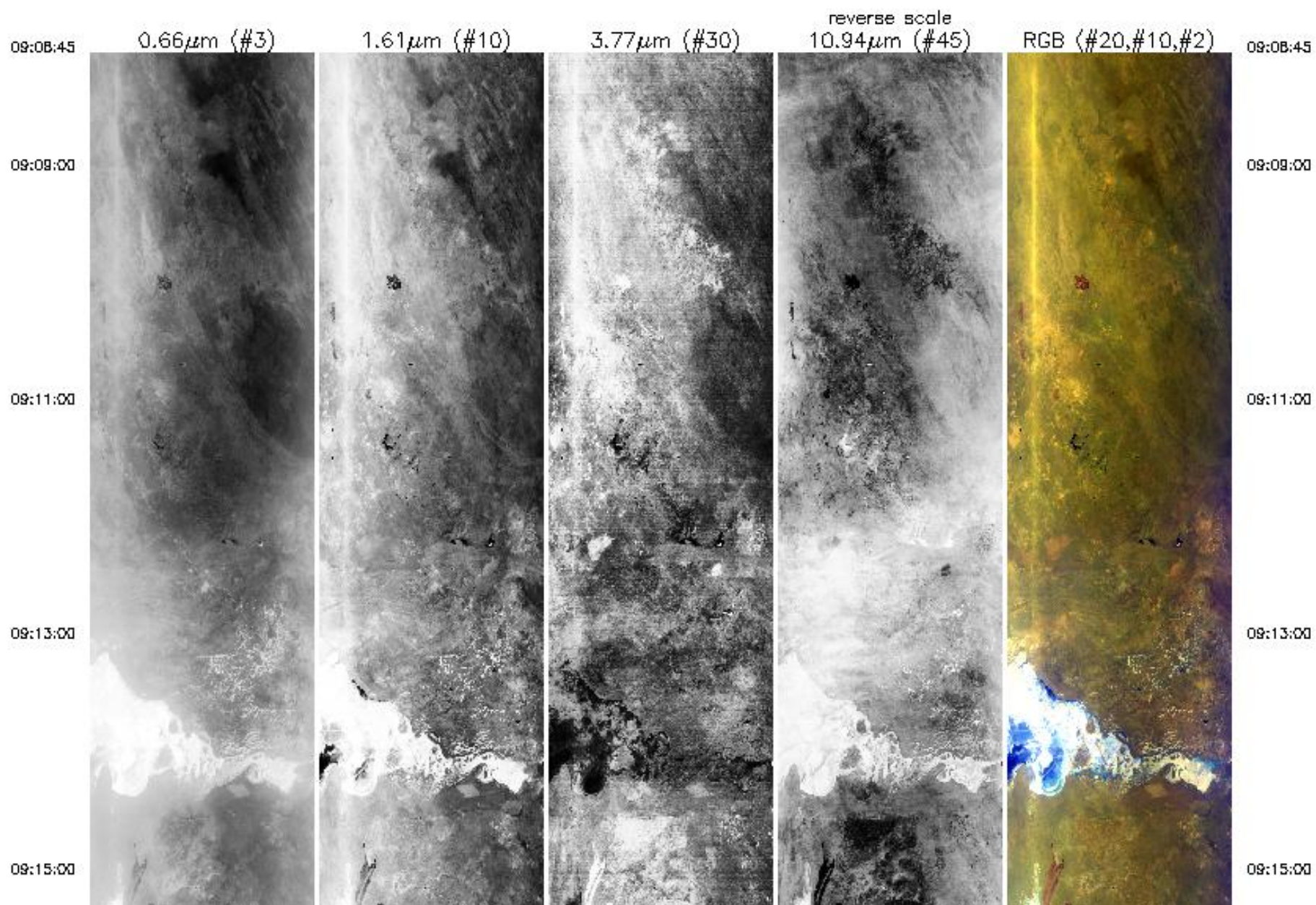
3.77µm (#30)

10.94µm (#45)
reverse scale

RGB (#20,#10,#2)

Upper Left Lat, Lon = -21.1°, 27.2°
 Lower Right Lat, Lon = -20.2°, 25.1°
 Aircraft Heading = 306.8°
 Solar Zenith = 35.2°
 GPS Altitude = 19813. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 04 Sep 2000
Botswana
Flight #00-156 Track #3



09:15:00



09:17:00



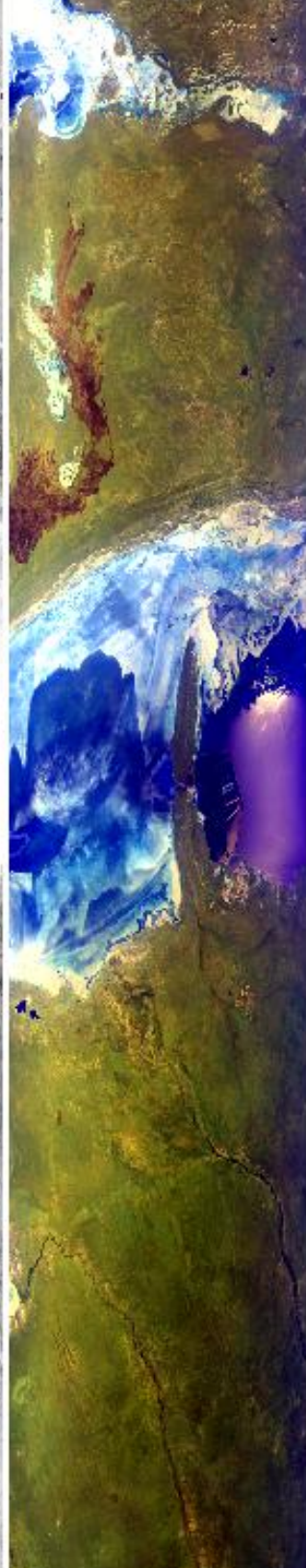
09:19:00



09:21:00



09:23:00



09:15:00

09:17:00

09:19:00

09:21:00

09:23:00

09:23:00



09:23:00

09:25:58

0.66 μ m (#3)

1.61 μ m (#10)

3.77 μ m (#30)

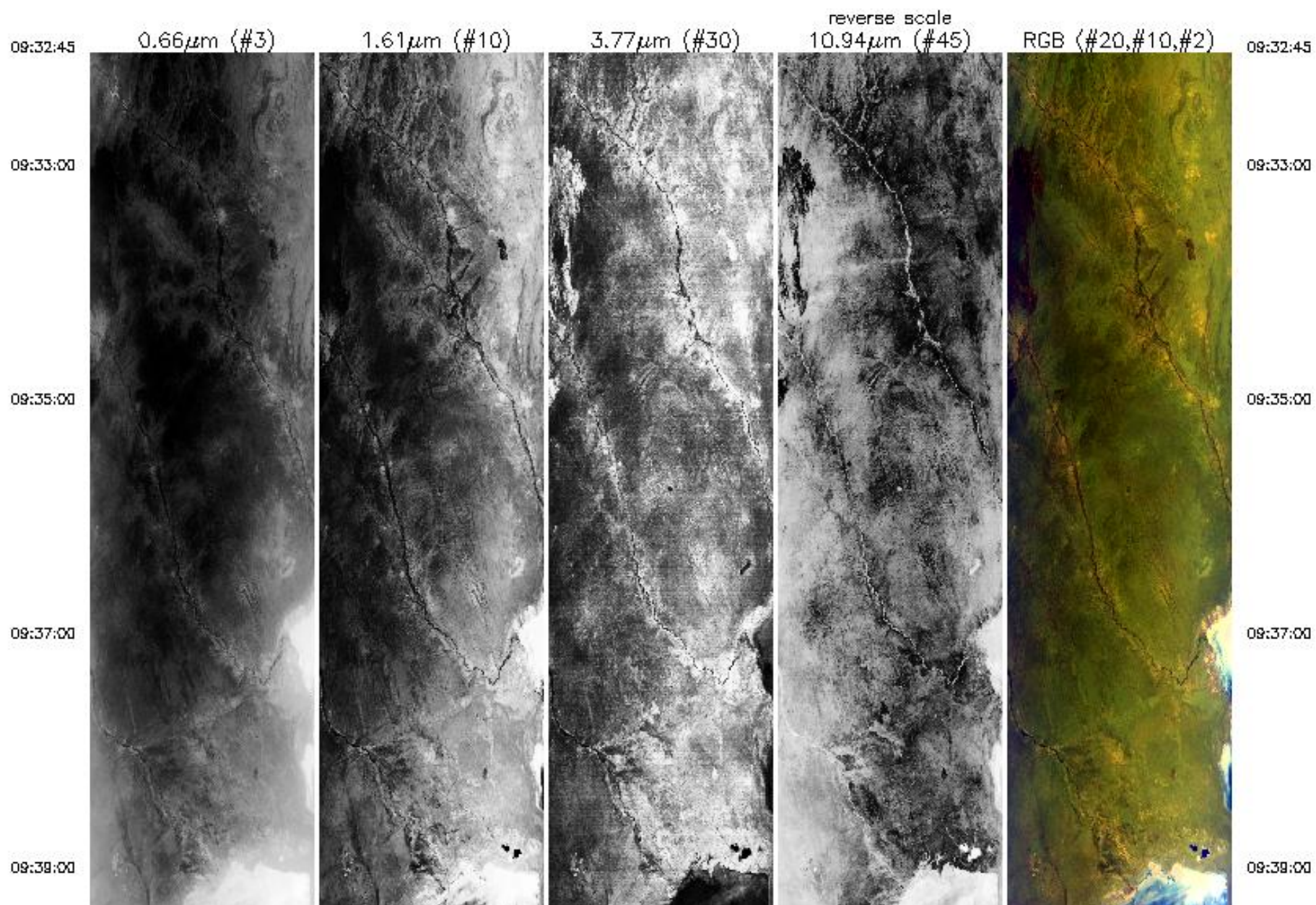
10.94 μ m (#45)
reverse scale

RGB (#20,#10,#2)

09:25:58

Upper Left Lat, Lon = -20.0°, 24.9°
Lower Right Lat, Lon = -20.8°, 26.8°
Aircraft Heading = 122.9°
Solar Zenith = 32.1°
GPS Altitude = 20013. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 04 Sep 2000
Botswana
Flight #00-156 Track #4



09:39:00



09:41:00



09:43:00



09:45:00



09:47:00



09:39:00

09:41:00

09:43:00

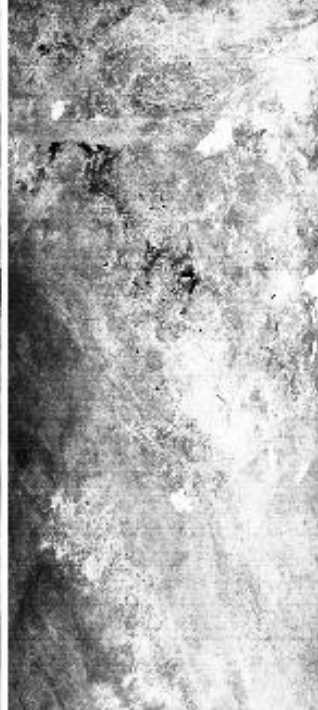
09:45:00

09:47:00

09:47:00

09:48:00

09:50:50



09:47:00

09:48:00

09:50:50

0.66µm (#3)

1.61µm (#10)

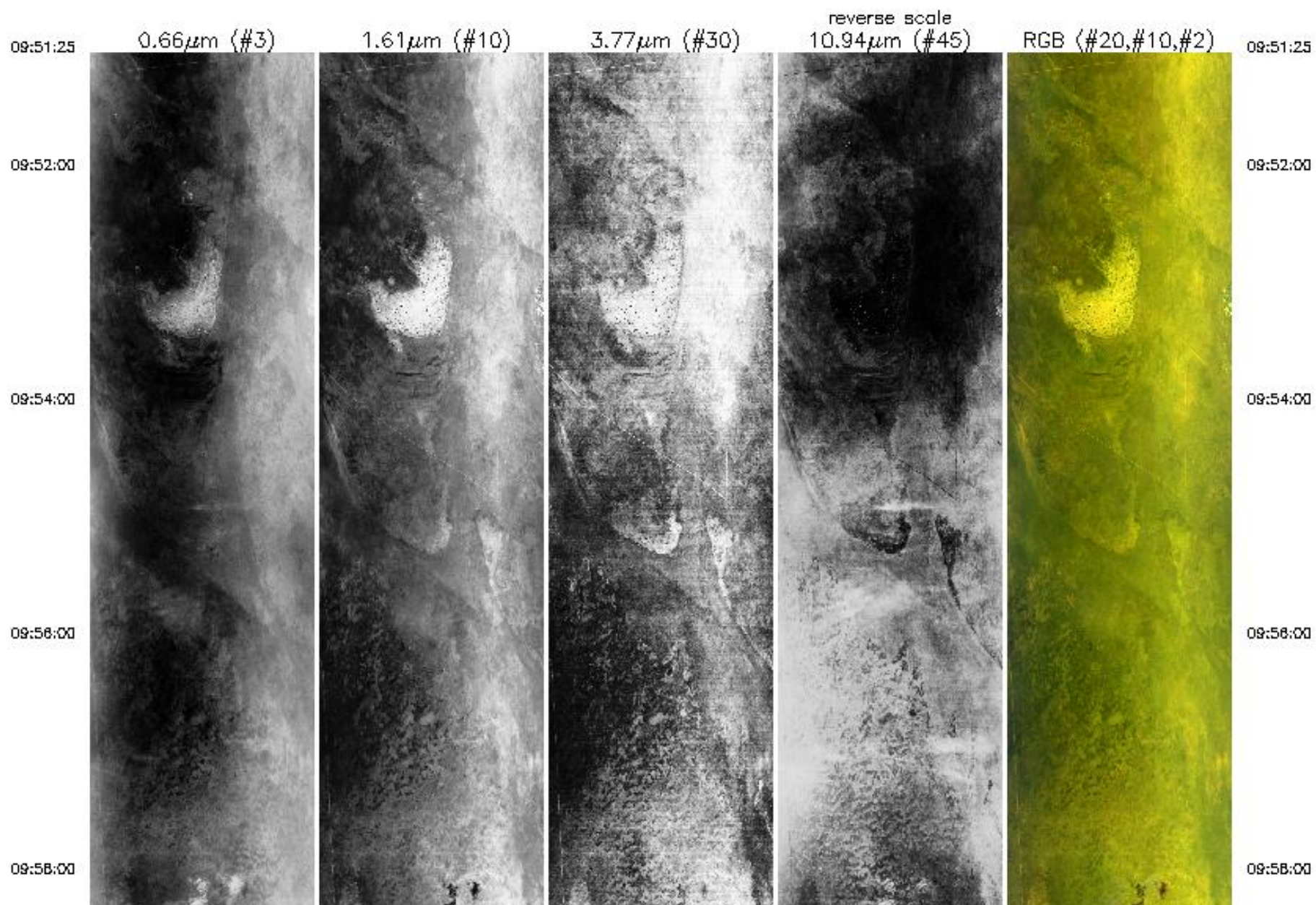
3.77µm (#30)

10.94µm (#45)
reverse scale

RGB (#20,#10,#2)

Upper Left Lat, Lon = -20.9°, 26.9°
 Lower Right Lat, Lon = -20.1°, 25.0°
 Aircraft Heading = 297.9°
 Solar Zenith = 29.4°
 GPS Altitude = 20169. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 04 Sep 2000
Botswana
Flight #00-156 Track #5



09:58:00



10:00:00



10:02:00



10:04:00



10:06:00



09:58:00

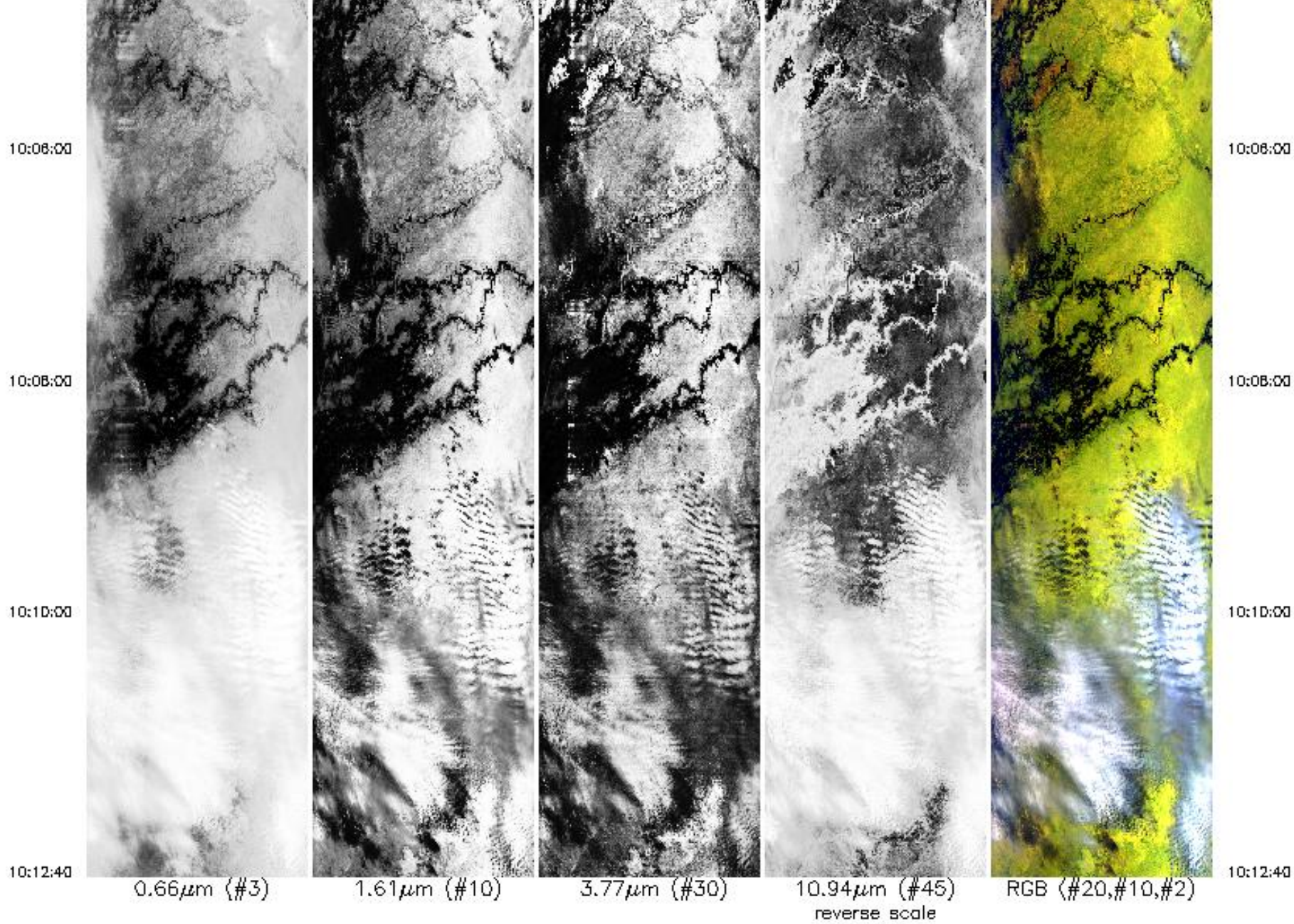
10:00:00

10:02:00

10:04:00

10:06:00

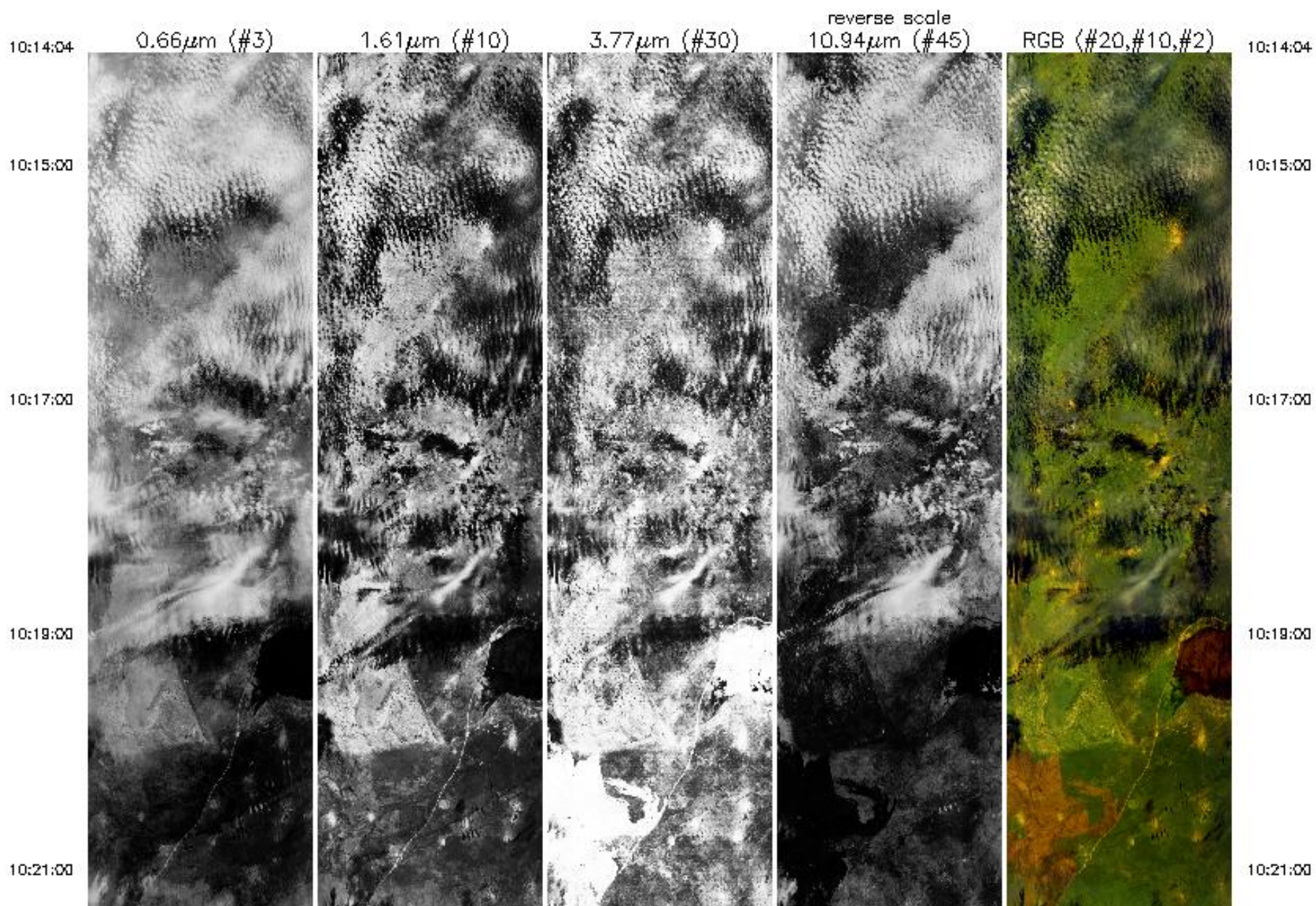




Upper Left Lat, Lon = -19.8° , 25.0°
 Lower Right Lat, Lon = -20.1° , 22.4°
 Aircraft Heading = 276.5°
 Solar Zenith = 27.5°
 GPS Altitude = 20288. m (MSL)

Upper Left Lat, Lon = 19.6°, 22.4°
Lower Right Lat, Lon = -20.1°, 22.4°
Aircraft Heading = 276.5°
Solar Zenith = 27.5°
GPS Altitude = 20288. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 04 Sep 2000
Botswana
Flight #00-156 Track #6



10:21:00



10:23:00



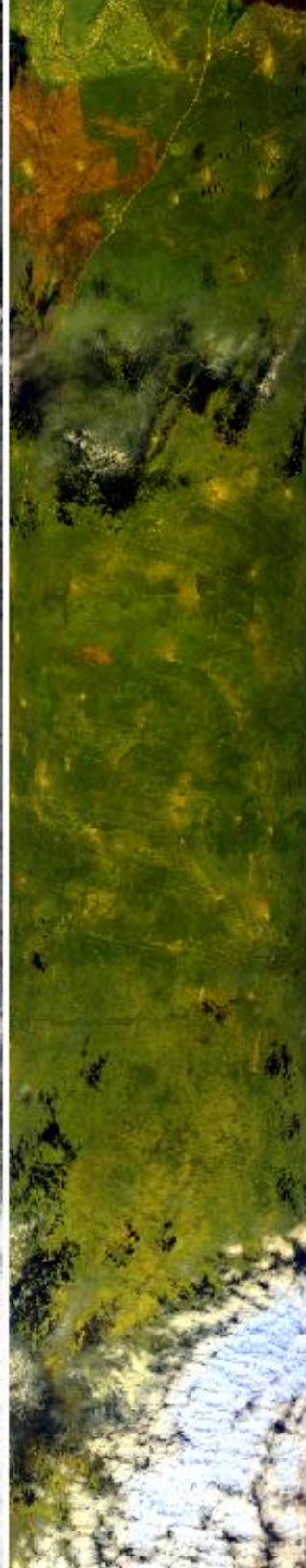
10:25:00



10:27:00



10:29:00



10:21:00

10:23:00

10:25:00

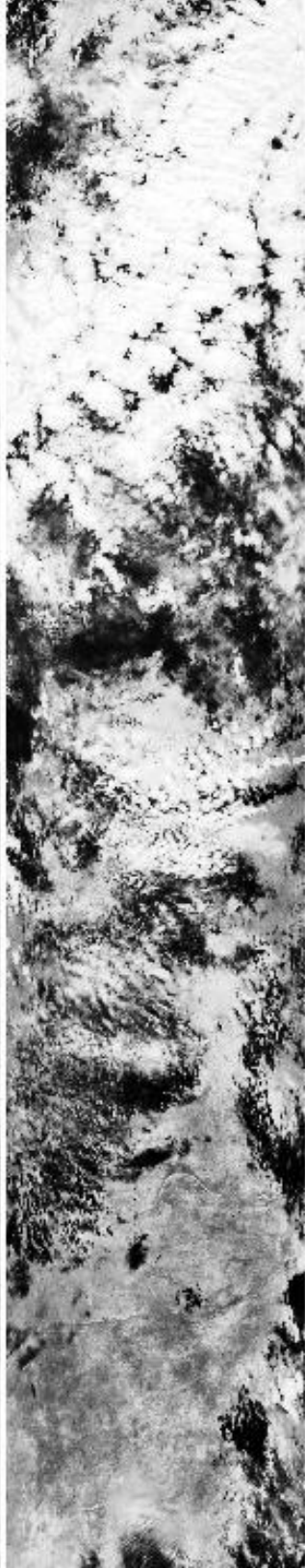
10:27:00

10:29:00

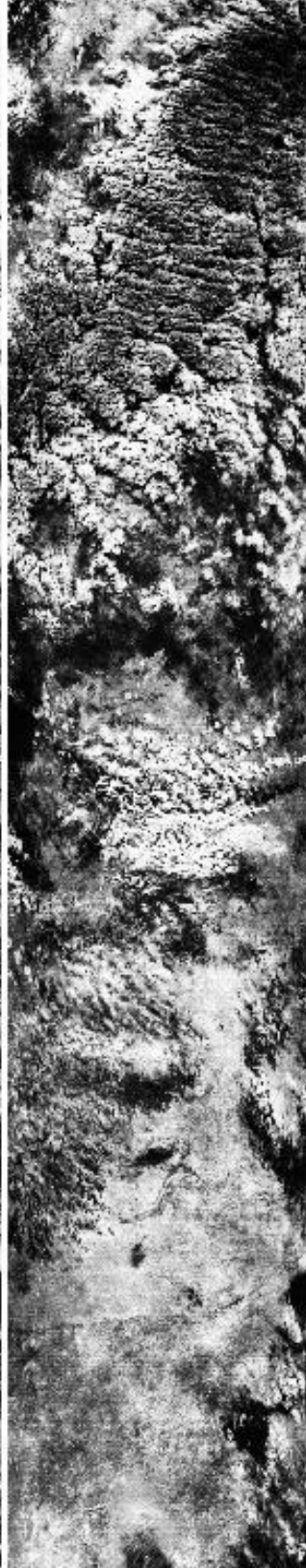
10:29:00



10:31:00



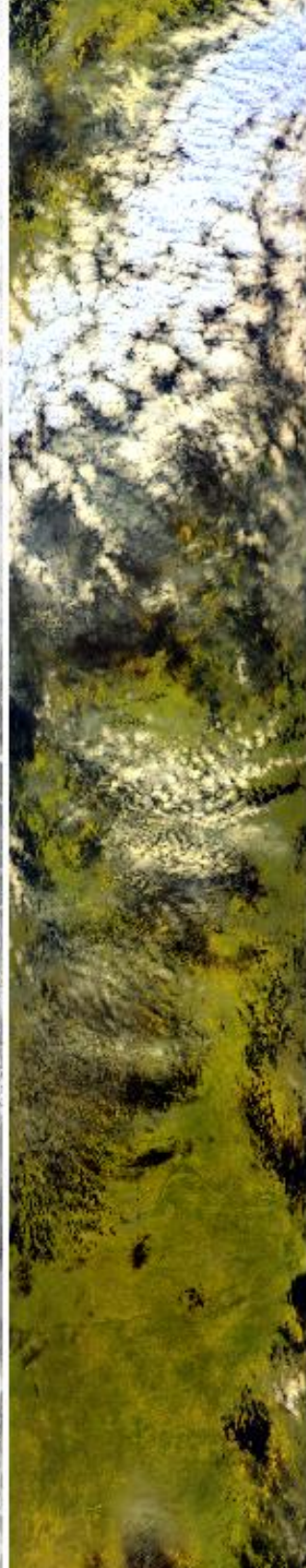
10:33:00



10:35:00



10:37:00



10:29:00

10:31:00

10:33:00

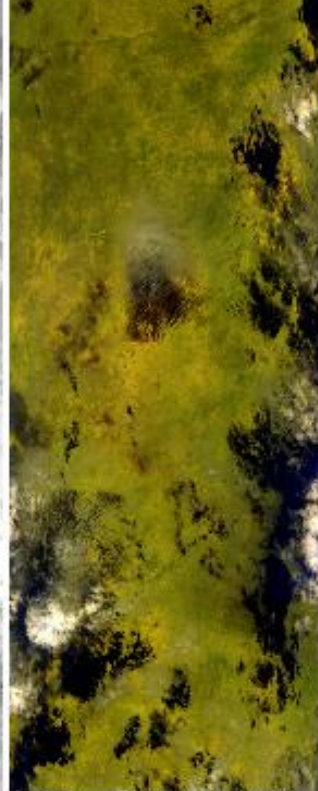
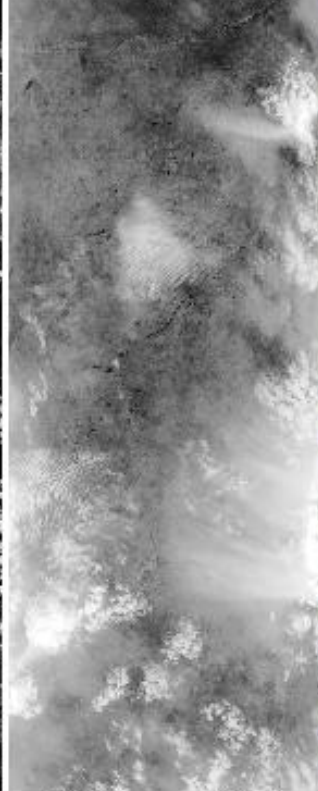
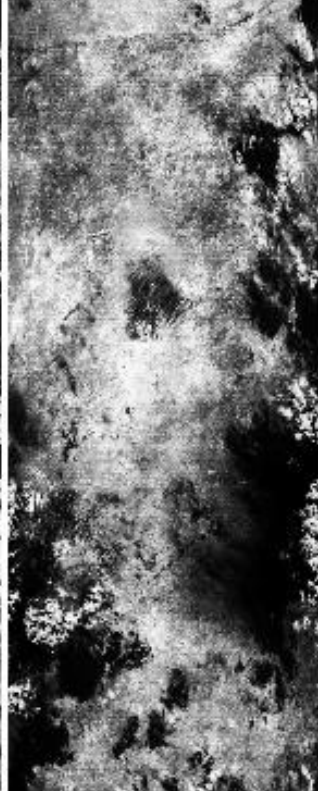
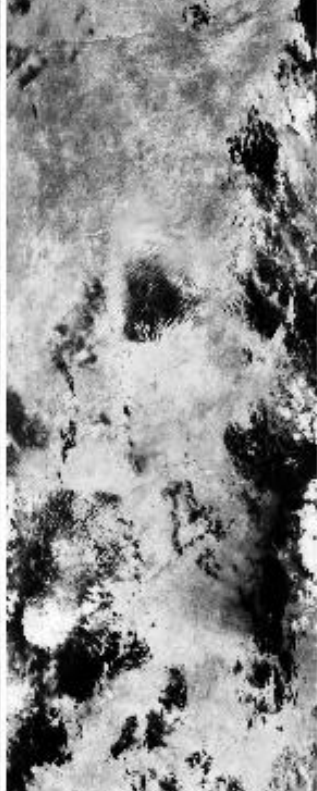
10:35:00

10:37:00

10:37:00

10:39:00

10:40:50



10:37:00

10:39:00

10:40:50

0.66µm (#3)

1.61µm (#10)

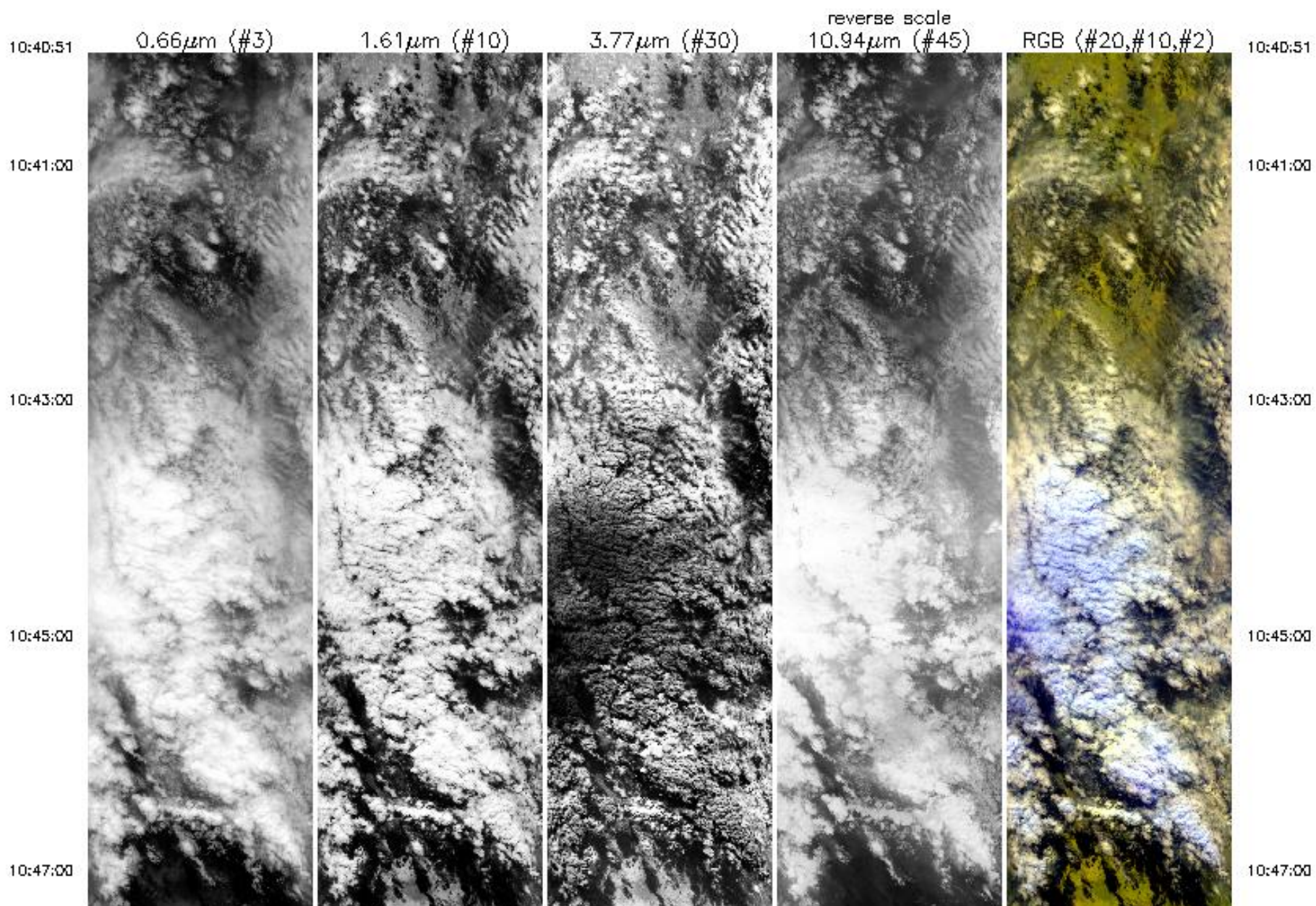
3.77µm (#30)

10.94µm (#45)
reverse scale

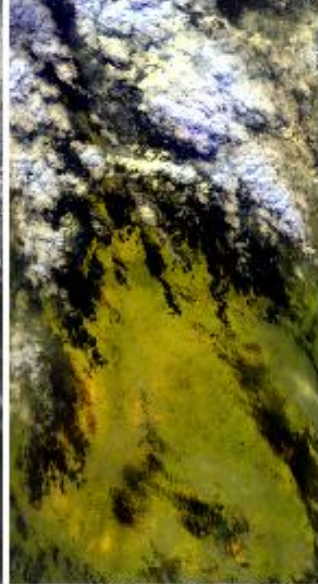
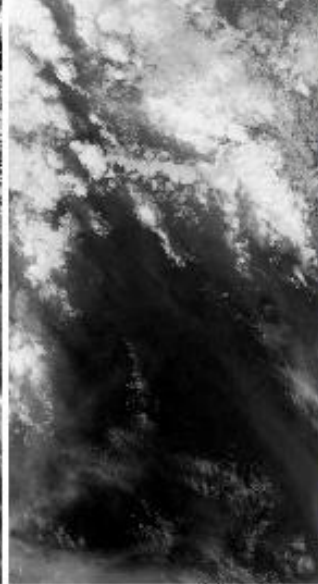
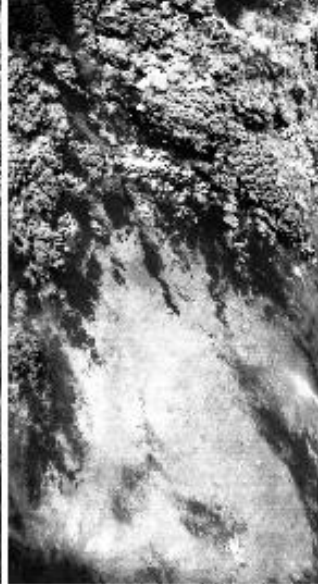
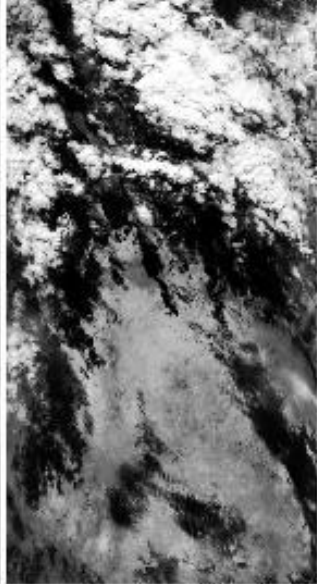
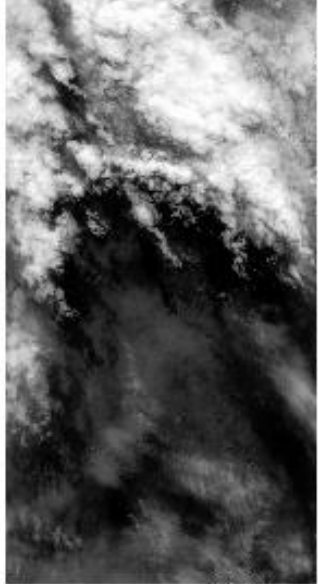
RGB (#20,#10,#2)

Upper Left Lat, Lon = -20.0° , 22.2°
 Lower Right Lat, Lon = -22.9° , 23.2°
 Aircraft Heading = 172.0°
 Solar Zenith = 27.3°
 GPS Altitude = 20195. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 04 Sep 2000
Botswana
Flight #00-156 Track #7



10:47:00



10:47:00

10:49:53

0.66μm (#3)

1.61μm (#10)

3.77μm (#30)

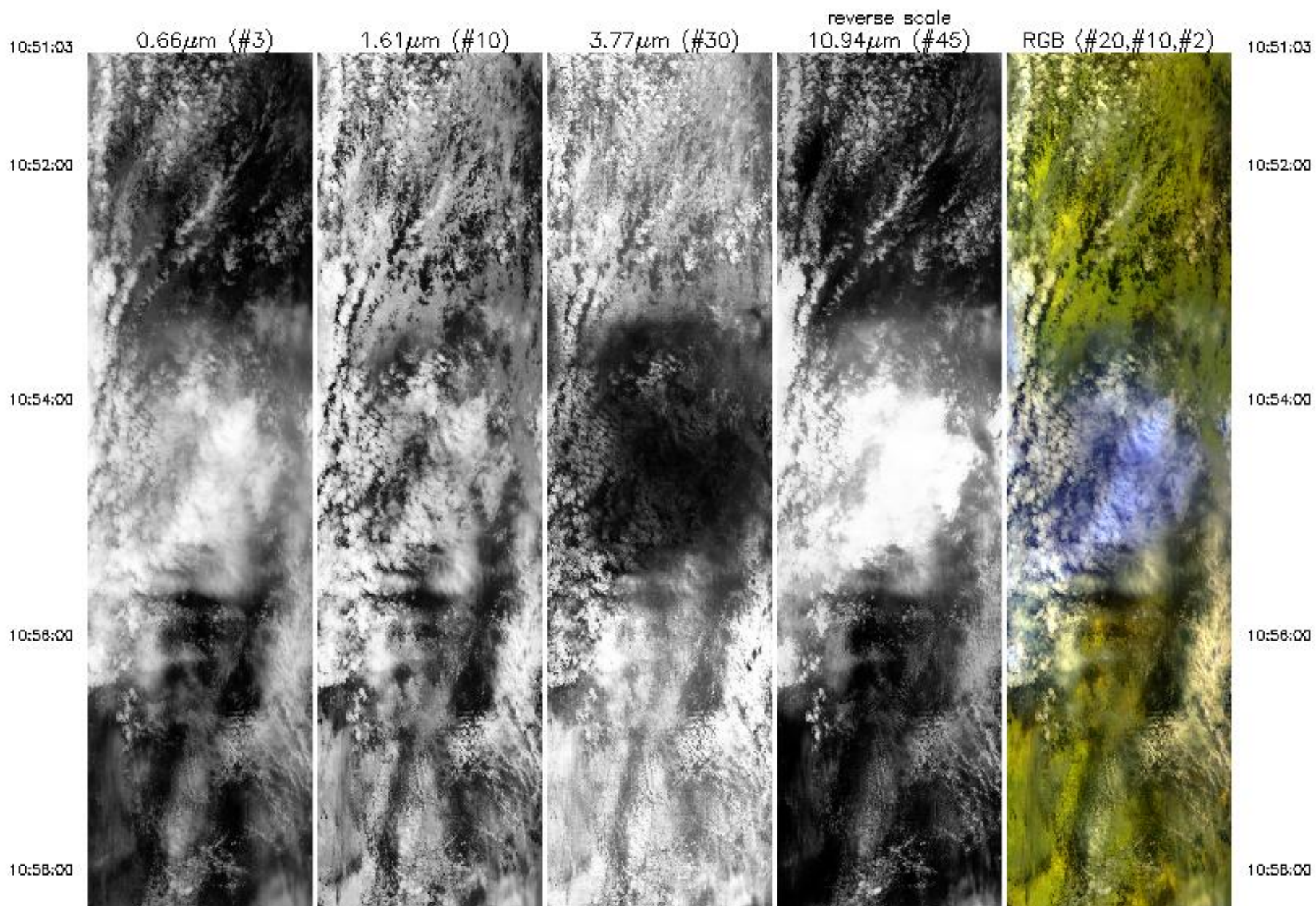
10.94μm (#45)
reverse scale

RGB (#20,#10,#2)

10:49:53

Upper Left Lat, Lon = -23.0° , 22.9°
Lower Right Lat, Lon = -23.9° , 23.5°
Aircraft Heading = 167.8°
Solar Zenith = 30.1°
GPS Altitude = 20002. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 04 Sep 2000
Botswana
Flight #00-156 Track #8



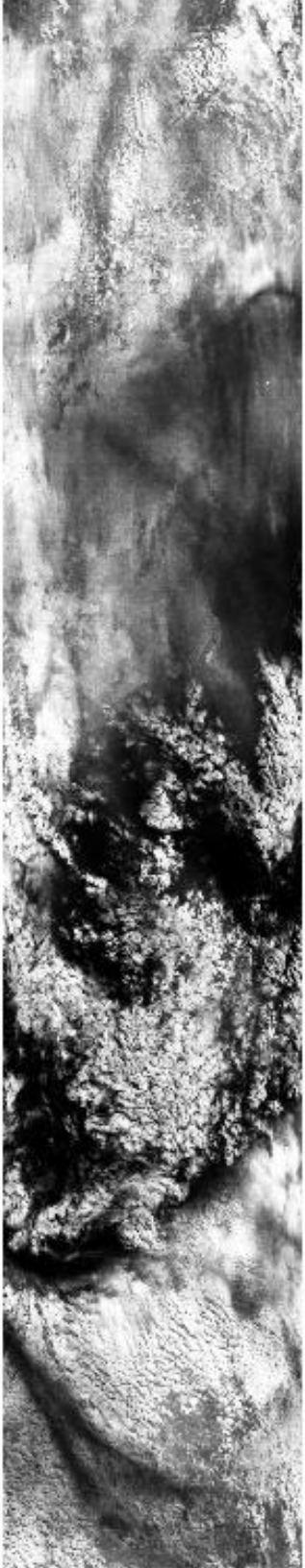
10:58:00



11:00:00



11:02:00



11:04:00



11:06:00



10:58:00

11:00:00

11:02:00

11:04:00

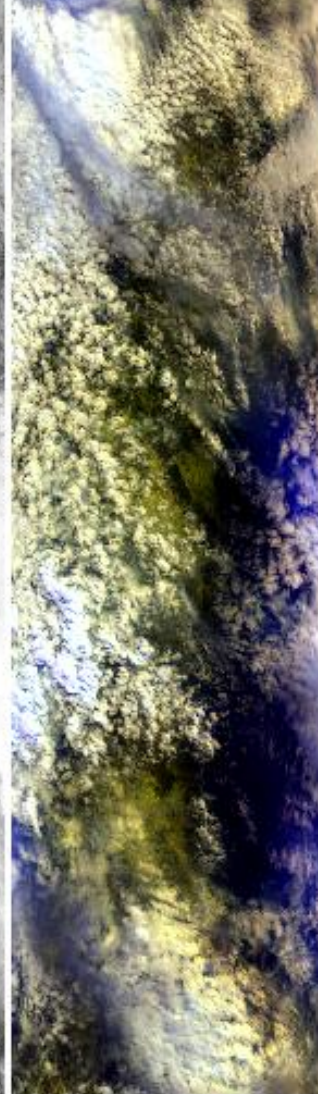
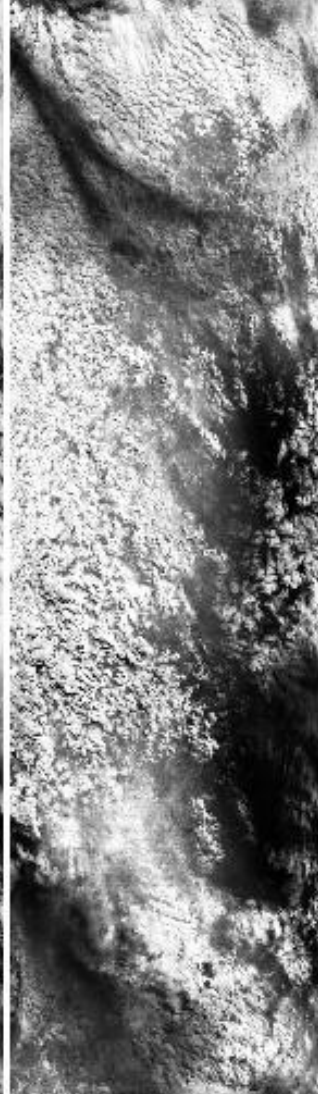
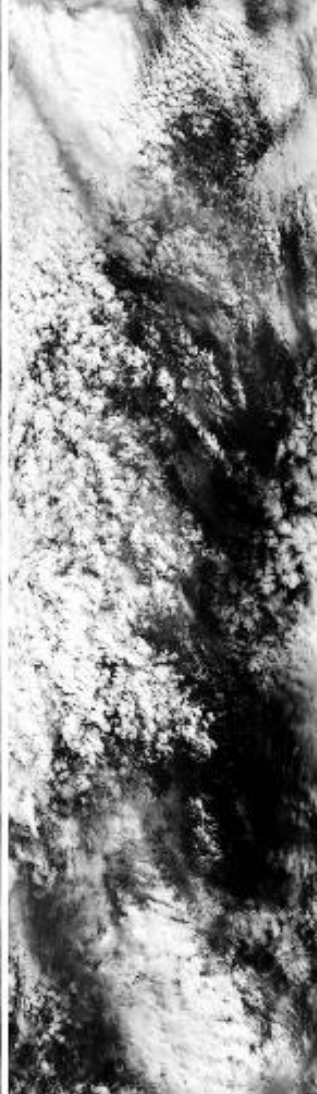
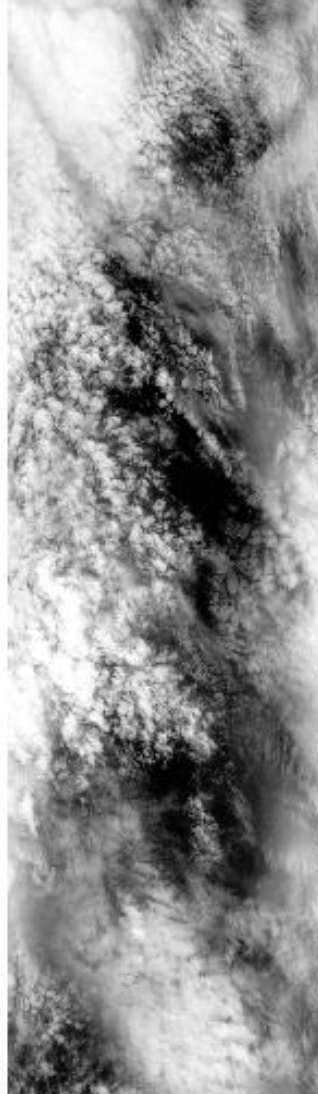
11:06:00

11:08:00

11:08:00

11:10:00

11:11:27



11:08:00

11:08:00

11:10:00

11:11:27

0.66 μ m (#3)

1.61 μ m (#10)

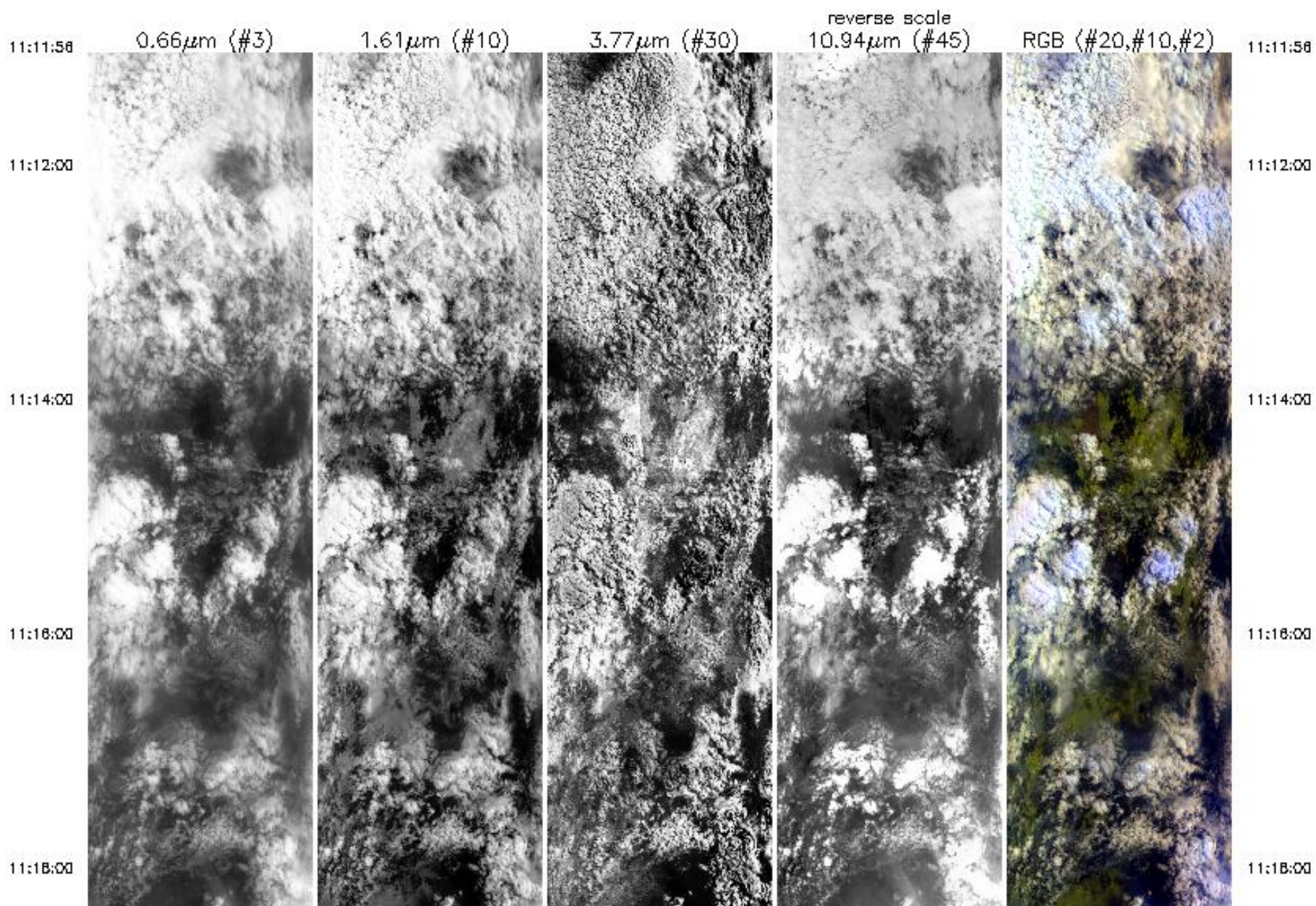
3.77 μ m (#30)

10.94 μ m (#45)
reverse scale

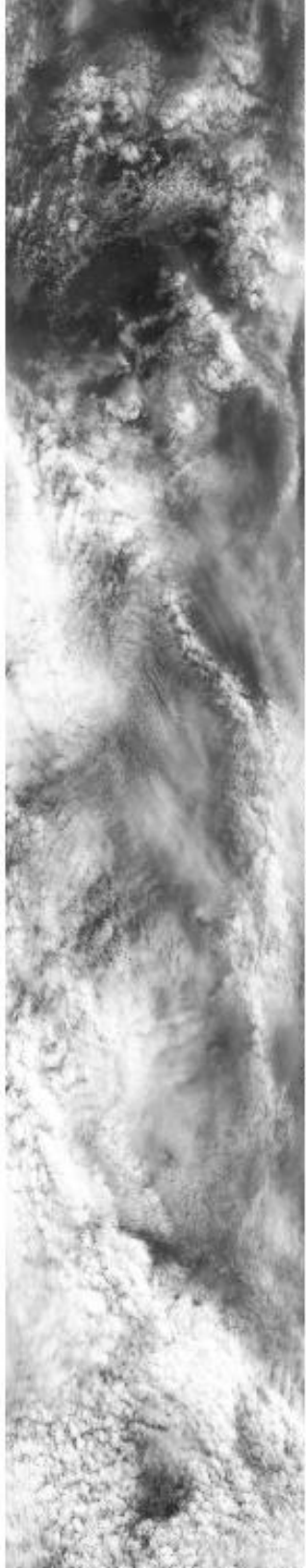
RGB (#20,#10,#2)

Upper Left Lat, Lon = -24.2° , 23.3°
Lower Right Lat, Lon = -24.6° , 25.9°
Aircraft Heading = 112.1°
Solar Zenith = 31.8°
GPS Altitude = 20027. m (MSL)

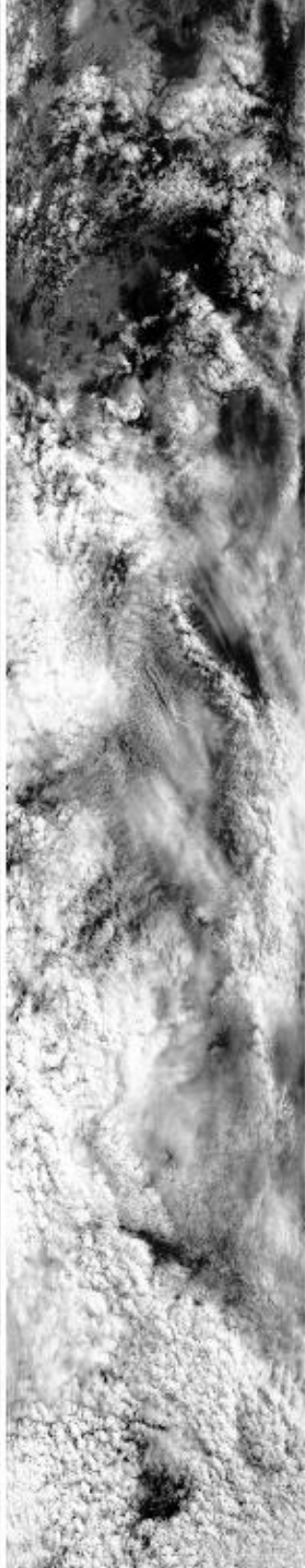
MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 04 Sep 2000
Botswana
Flight #00-156 Track #9



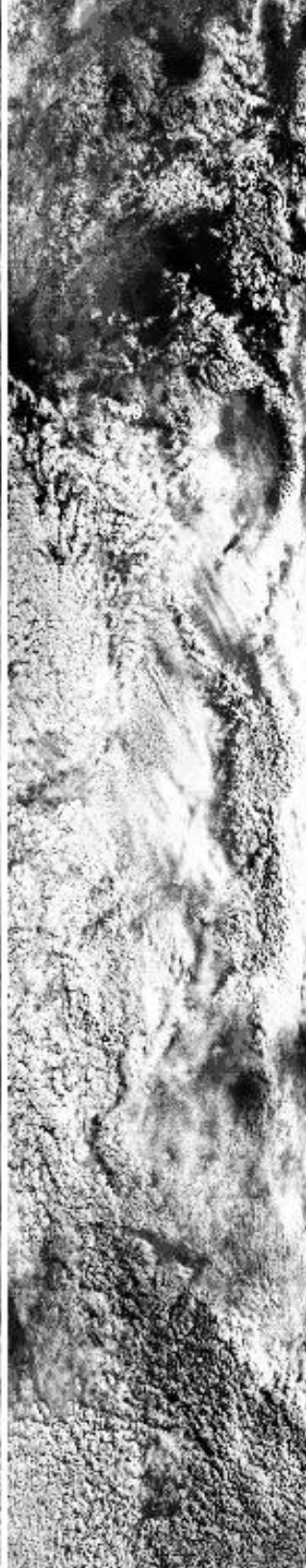
11:18:00



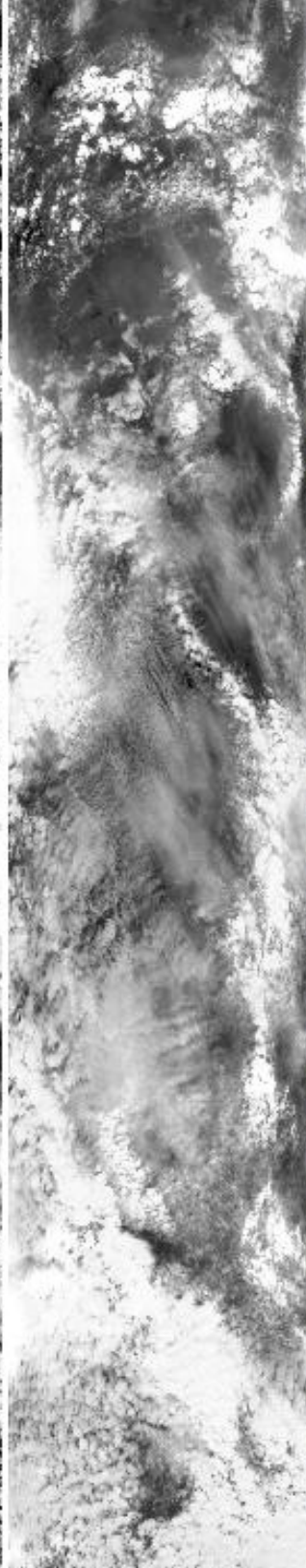
11:20:00



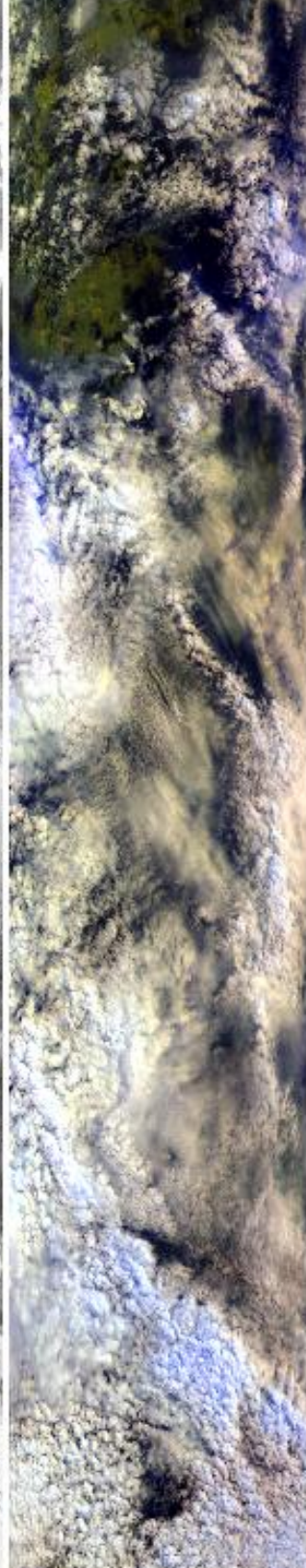
11:22:00



11:24:00



11:26:00



11:18:00

11:20:00

11:22:00

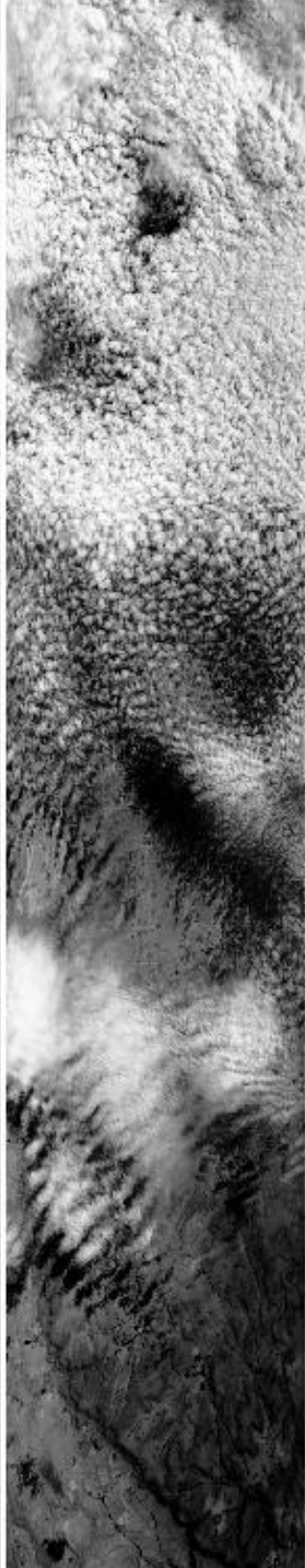
11:24:00

11:26:00

11:26:00



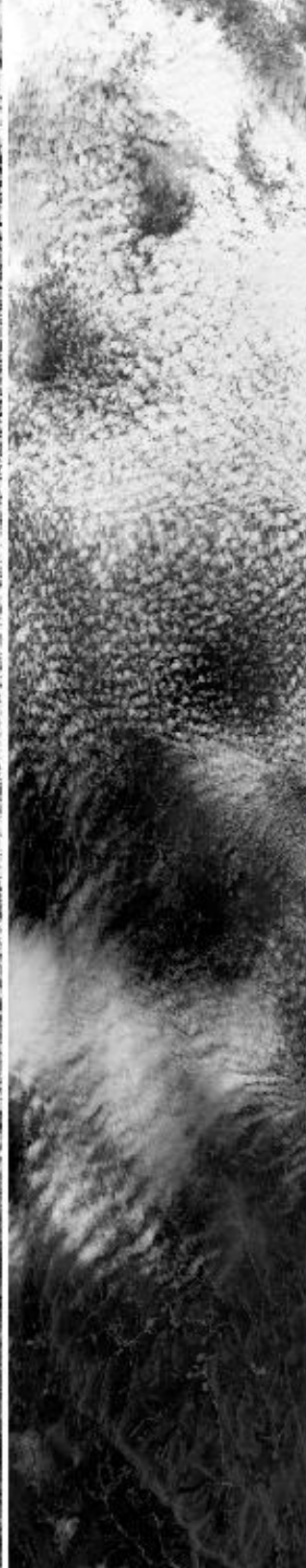
11:26:00



11:30:00



11:32:00



11:34:00



11:26:00

11:26:00

11:30:00

11:32:00

11:34:00

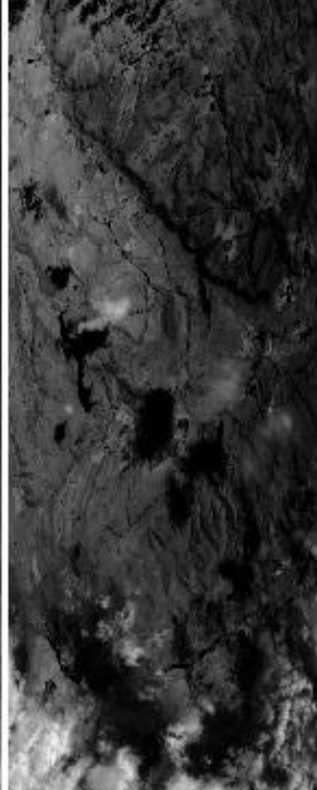
11:34:00

11:38:00

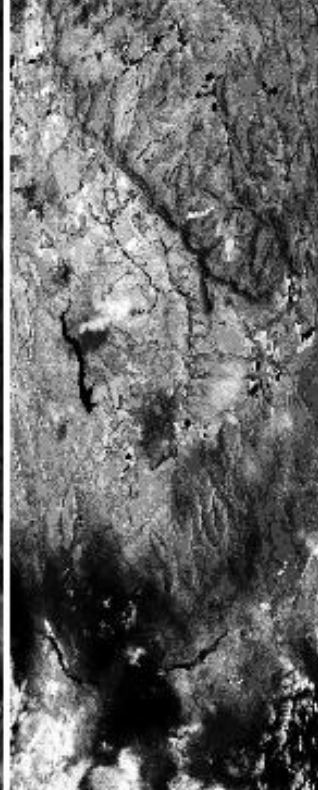
11:38:43



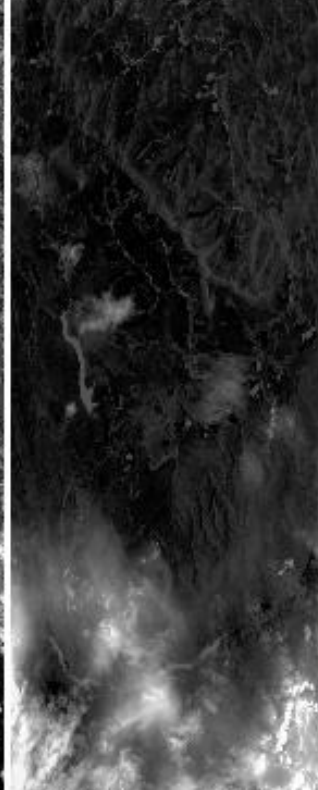
0.66 μ m (#3)



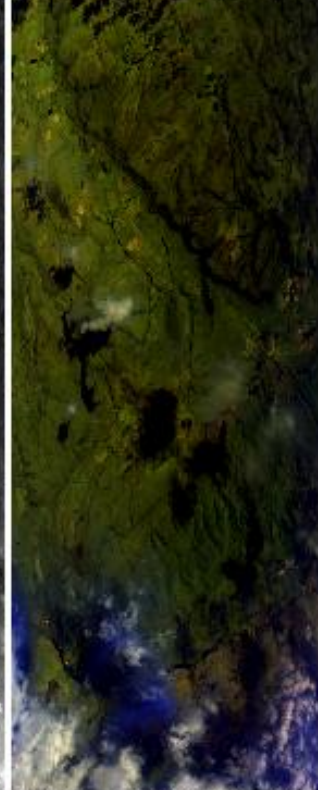
1.61 μ m (#10)



3.77 μ m (#30)



10.94 μ m (#45)
reverse scale



RGB (#20,#10,#2)

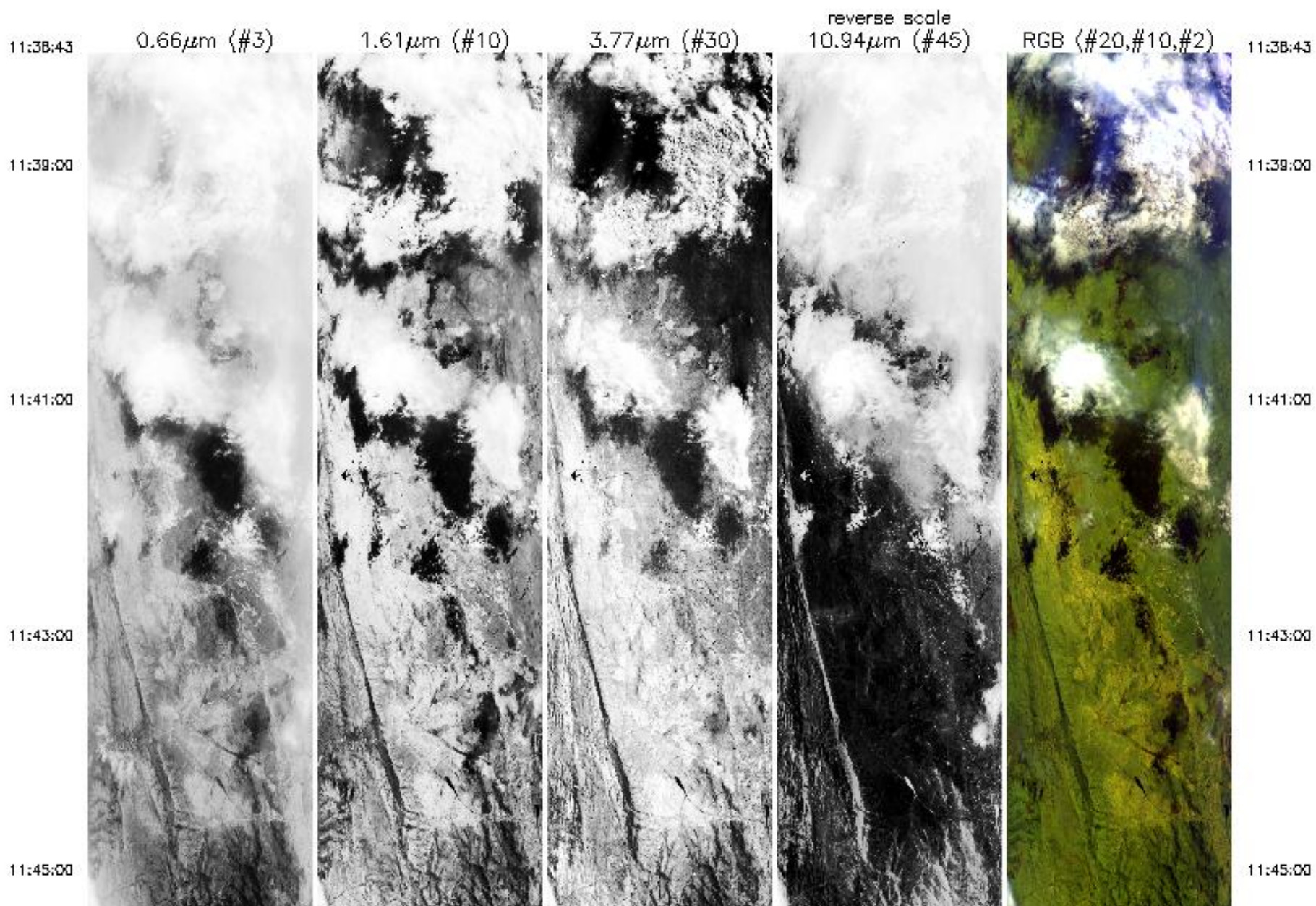
11:34:00

11:38:00

11:38:43

Upper Left Lat, Lon = -24.9° , 25.9°
Lower Right Lat, Lon = -24.0° , 29.0°
Aircraft Heading = 85.8°
Solar Zenith = 34.7°
GPS Altitude = 20210. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 04 Sep 2000
South Africa
Flight #00-156 Track #10



11:45:00



11:47:00



11:49:00



11:51:00



11:53:00



11:45:00

11:47:00

11:49:00

11:51:00

11:53:00

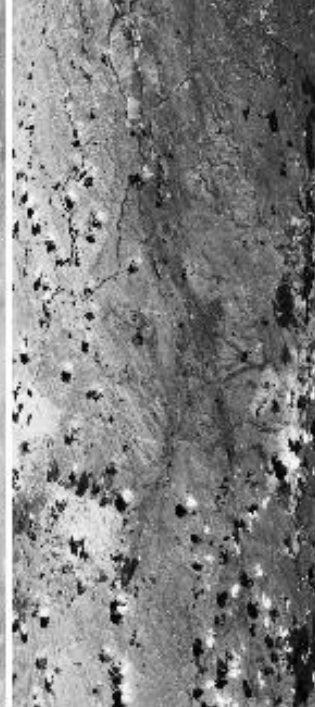
11:53:00

11:55:00

11:56:44



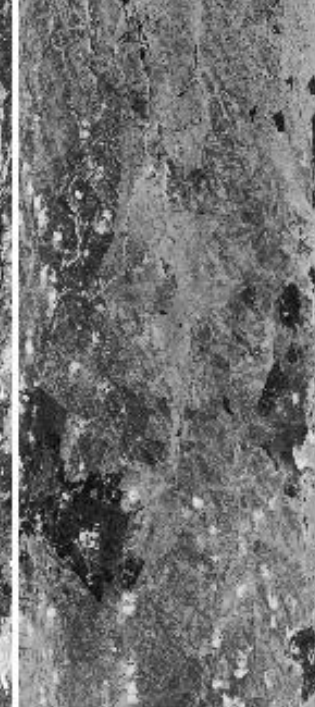
0.66 μm (#3)



1.61 μm (#10)



3.77 μm (#30)



10.94 μm (#45)
reverse scale



RGB (#20,#10,#2)

11:53:00

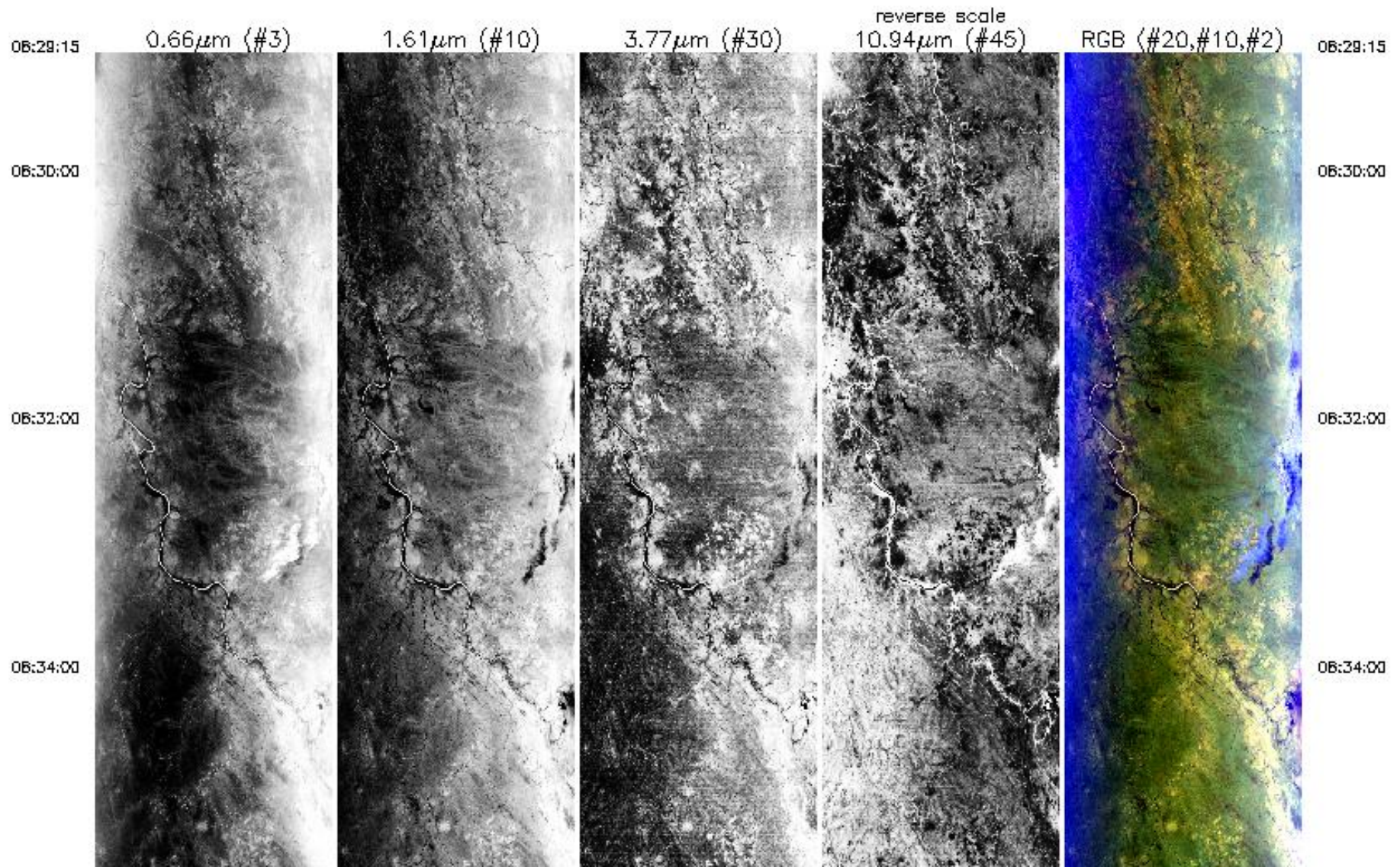
11:55:00

11:56:44

Upper Left Lat, Lon = -24.3° , 29.1°
Lower Right Lat, Lon = -23.6° , 31.1°
Aircraft Heading = 81.8°
Solar Zenith = 39.1°
GPS Altitude = 20113. m (MSL)

Flight #00-156 Browse Imagery

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 04 Sep 2000
Botswana
Flight #00-156 Track #1



06:34:00

06:36:00

06:38:00

06:40:00

06:42:00

06:43:31



06:34:00

06:36:00

06:38:00

06:40:00

06:42:00

06:43:31

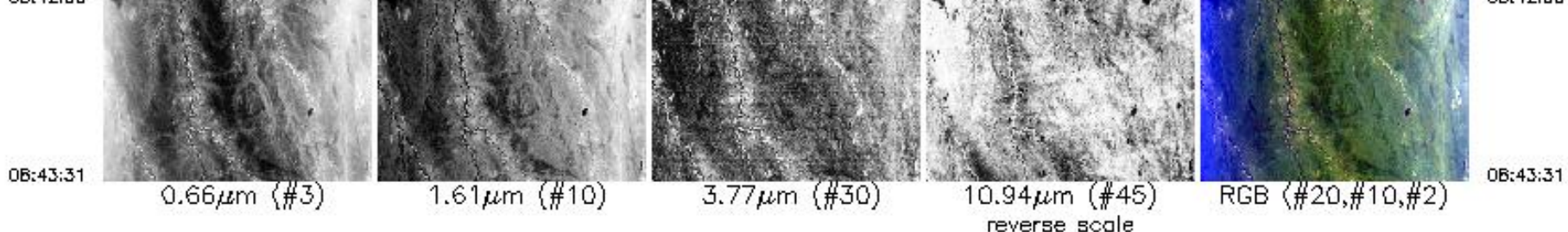
0.66 μm (#3)

1.61 μm (#10)

3.77 μm (#30)

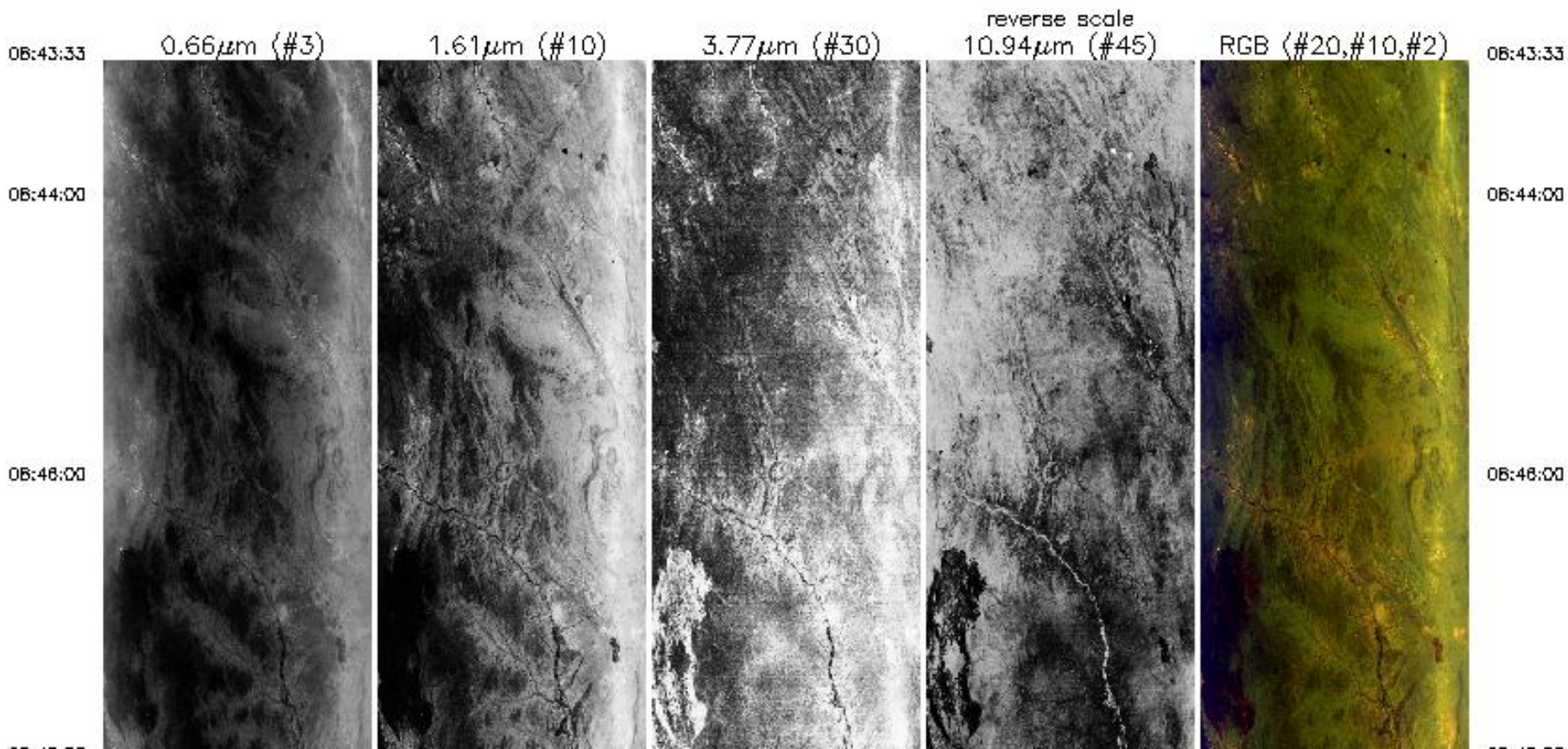
10.94 μm (#45)
reverse scale

RGB (#20,#10,#2)



Upper Left Lat, Lon = -22.0° , 28.6°
 Lower Right Lat, Lon = -21.4° , 27.0°
 Aircraft Heading = 306.9°
 Solar Zenith = 37.3°
 GPS Altitude = 19131. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign – 04 Sep 2000
 Botswana
 Flight #00-156 Track #2



06:48:00



06:50:00



06:52:00



06:54:00



06:56:00



06:48:00

06:50:00

06:52:00

06:54:00

06:56:00

06:58:00

06:58:00

09:00:00

09:02:16



0.66 μ m (#3)



1.61 μ m (#10)



3.77 μ m (#30)



10.94 μ m (#45)
reverse scale



RGB (#20,#10,#2)

06:58:00

06:58:00

09:00:00

09:02:16

Upper Left Lat, Lon = -21.1° , 27.2°
 Lower Right Lat, Lon = -20.2° , 25.1°
 Aircraft Heading = 306.8°
 Solar Zenith = 35.2°
 GPS Altitude = 19813. m (MSL)

Lower Right Lat, Lon = -20.2°, 25.1°

Aircraft Heading = 306.8°

Solar Zenith = 35.2°

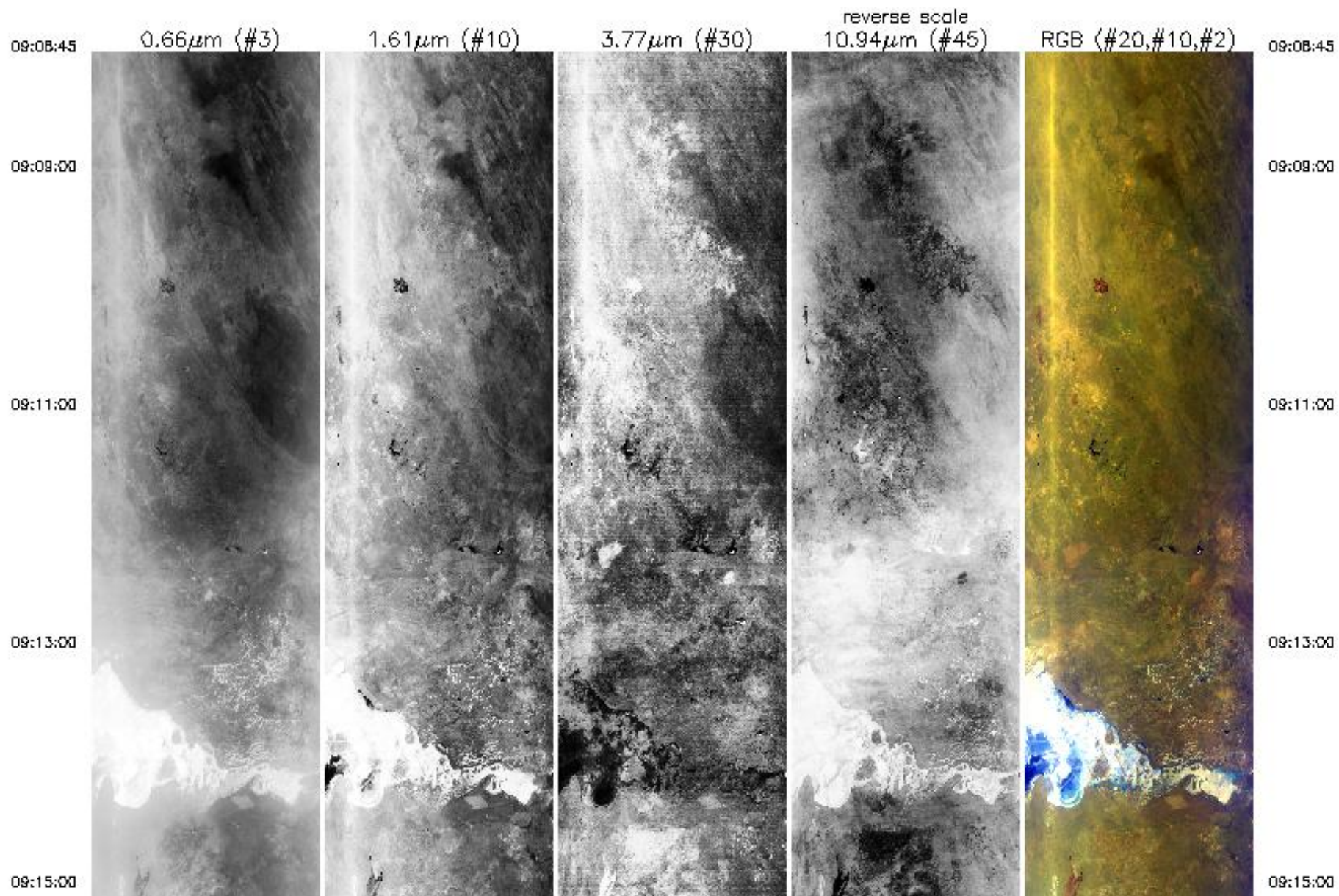
GPS Altitude = 19813. m (MSL)

MODIS Airborne Simulator Browse Imagery

SAFARI 2000 Campaign - 04 Sep 2000

Botswana

Flight #00-156 Track #3



09:15:00



09:17:00



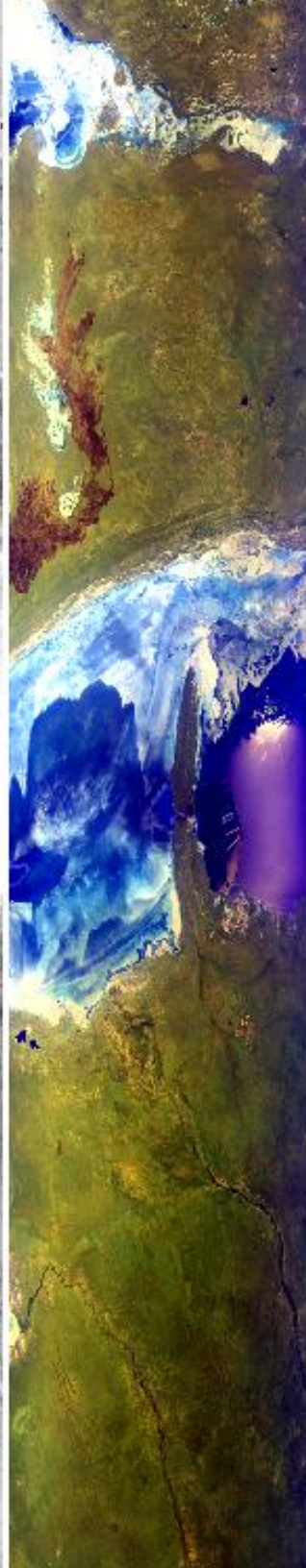
09:19:00



09:21:00



09:23:00



09:15:00

09:17:00

09:19:00

09:21:00

09:23:00

09:23:00



09:23:00

09:25:58

0.66µm (#3)

1.61µm (#10)

3.77µm (#30)

10.94µm (#45)
reverse scale

RGB (#20,#10,#2)

09:25:58

Upper Left Lat, Lon = -20.0°, 24.9°

Lower Right Lat, Lon = -20.8°, 26.8°

Aircraft Heading = 122.9°

Solar Zenith = 32.1°

GPS Altitude = 20013. m (MSL)

MODIS Airborne Simulator Browse Imagery

SAFARI 2000 Campaign - 04 Sep 2000

Botswana

Flight #00-156 Track #4

09:32:45

0.66µm (#3)

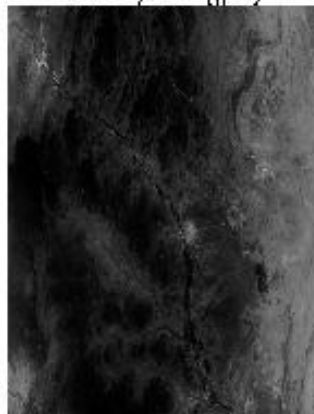
1.61µm (#10)

3.77µm (#30)

reverse scale
10.94µm (#45)

RGB (#20,#10,#2)

09:32:45



09:33:00

09:33:00

09:33:00



09:35:00



09:37:00



09:39:00



09:41:00



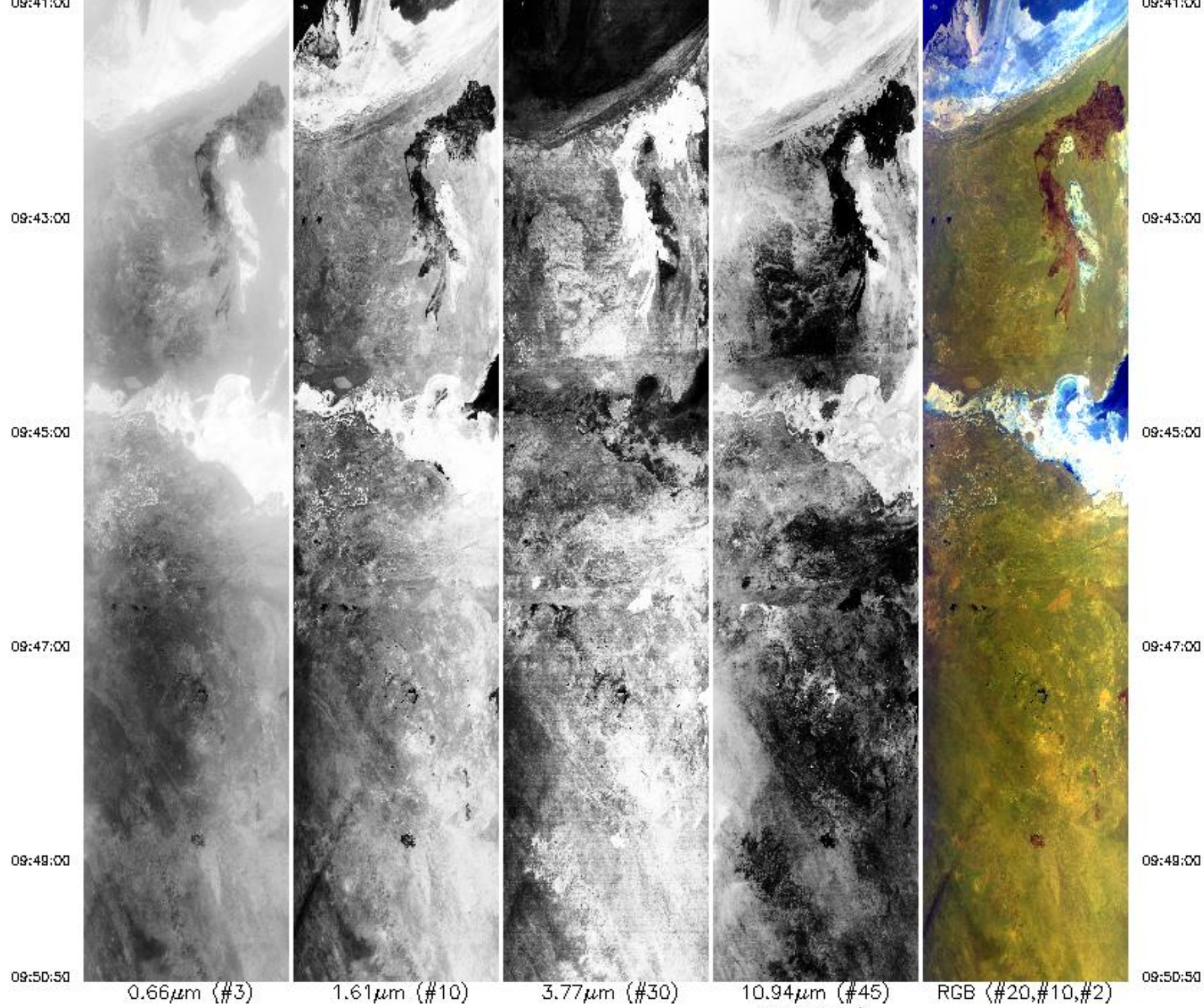
09:33:00

09:35:00

09:37:00

09:39:00

09:41:00



Upper Left Lat, Lon = -20.9° , 26.9°

Lower Right Lat, Lon = -20.1° , 25.0°

09:50:50



0.66µm (#3)



1.61µm (#10)



3.77µm (#30)



10.94µm (#45)

reverse scale



RGB (#20,#10,#2)

09:50:50

Upper Left Lat, Lon = -20.9°, 26.9°

Lower Right Lat, Lon = -20.1°, 25.0°

Aircraft Heading = 297.9°

Solar Zenith = 29.4°

GPS Altitude = 20169. m (MSL)

MODIS Airborne Simulator Browse Imagery

SAFARI 2000 Campaign - 04 Sep 2000

Botswana

Flight #00-156 Track #5

09:51:25

0.66µm (#3)



1.61µm (#10)



3.77µm (#30)



reverse scale

10.94µm (#45)



RGB (#20,#10,#2)



09:51:25

09:52:00

09:52:00

09:54:00

09:54:00

09:56:00

09:56:00

10:04:00

10:06:00

10:08:00

10:10:00

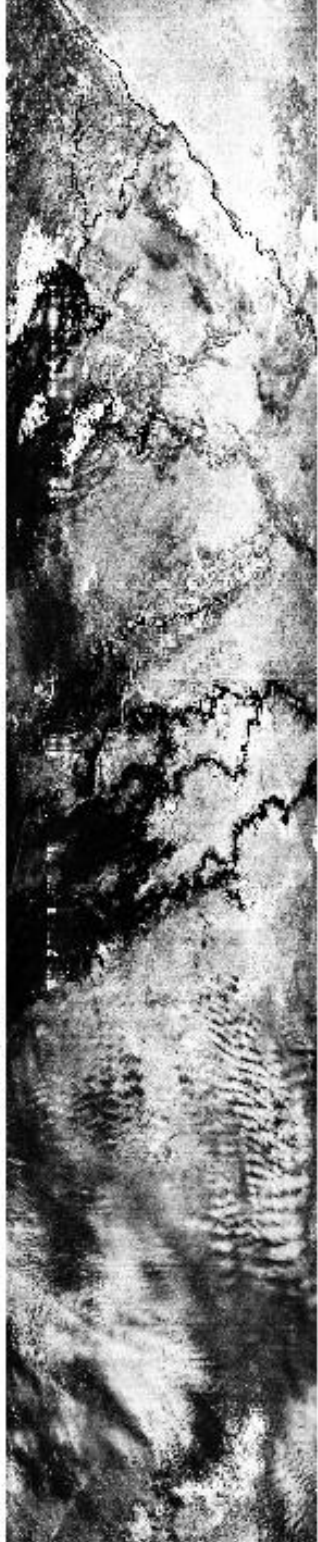
10:12:40



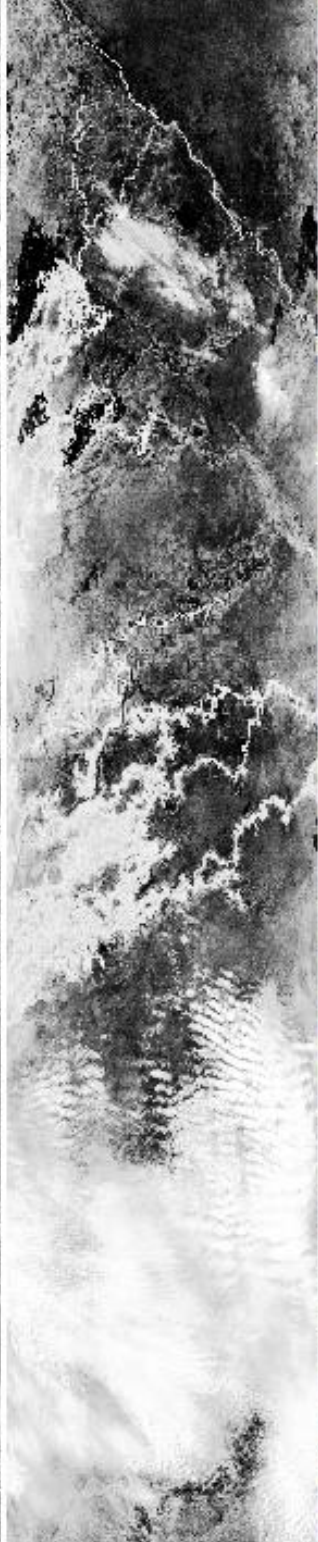
0.66 μm (#3)



1.61 μm (#10)



3.77 μm (#30)



10.94 μm (#45)
reverse scale



RGB (#20,#10,#2)

10:04:00

10:06:00

10:08:00

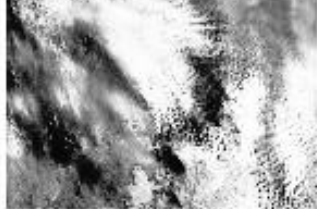
10:10:00

10:12:40

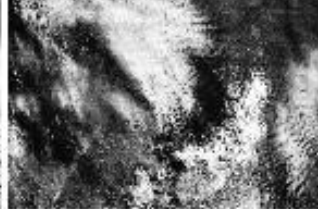
10:12:40



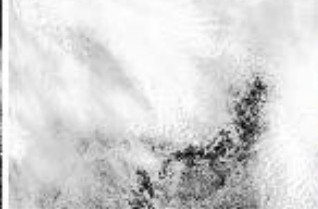
0.66µm (#3)



1.61µm (#10)



3.77µm (#30)



10.94µm (#45)
reverse scale



RGB (#20,#10,#2)

10:12:40

Upper Left Lat, Lon = -19.8°, 25.0°
Lower Right Lat, Lon = -20.1°, 22.4°
Aircraft Heading = 276.5°
Solar Zenith = 27.5°
GPS Altitude = 20288. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign - 04 Sep 2000
Botswana
Flight #00-156 Track #6

10:14:04

0.66µm (#3)



1.61µm (#10)



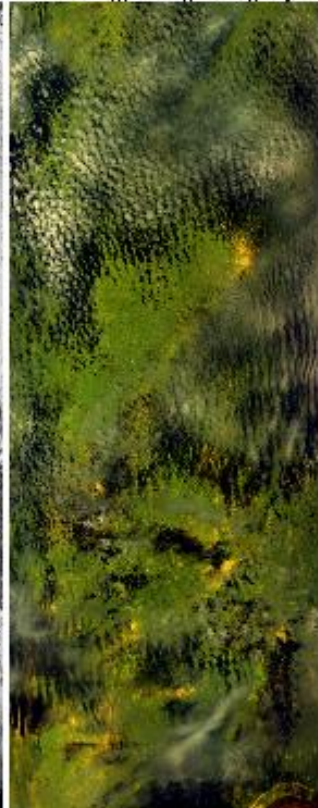
3.77µm (#30)



reverse scale
10.94µm (#45)



RGB (#20,#10,#2)



10:14:04

10:15:00

10:15:00

10:17:00

10:17:00

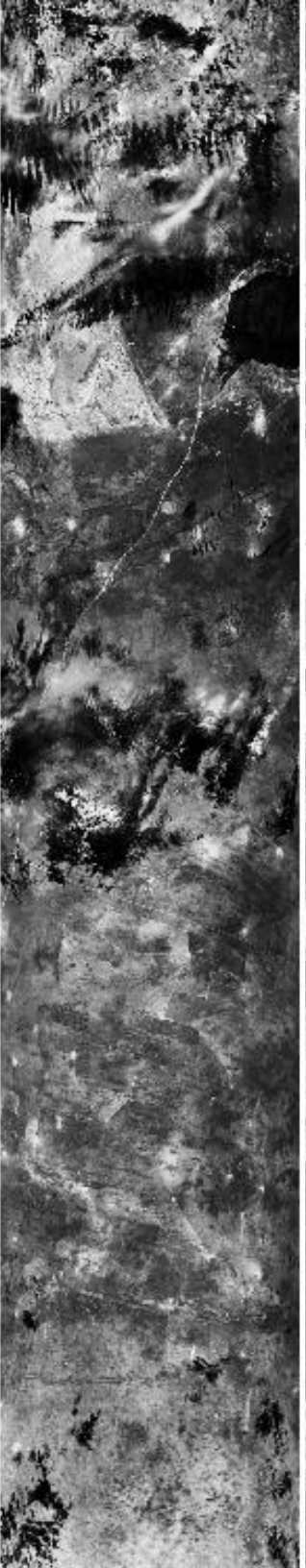
10:18:00

10:18:00

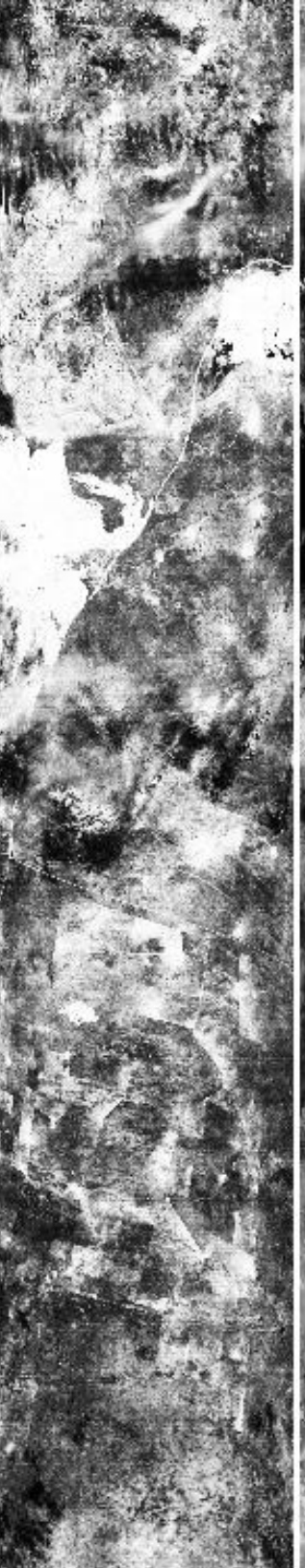
10:18:00



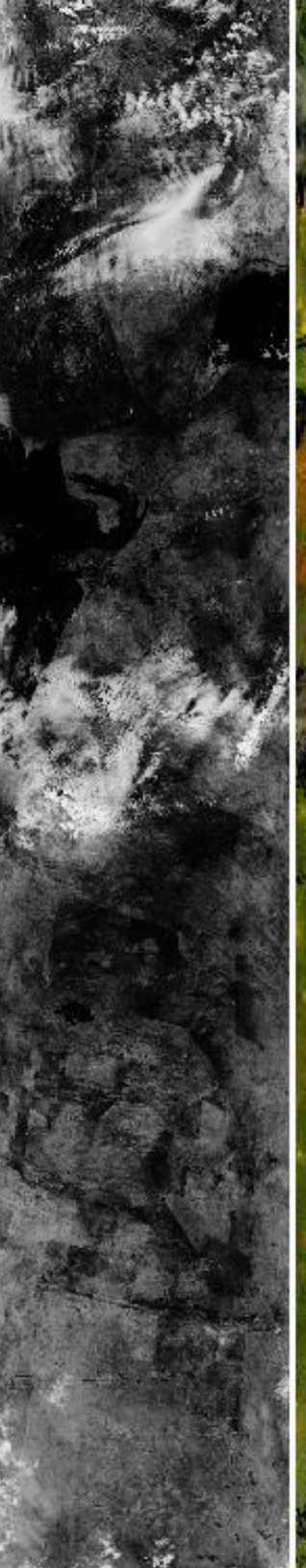
10:21:00



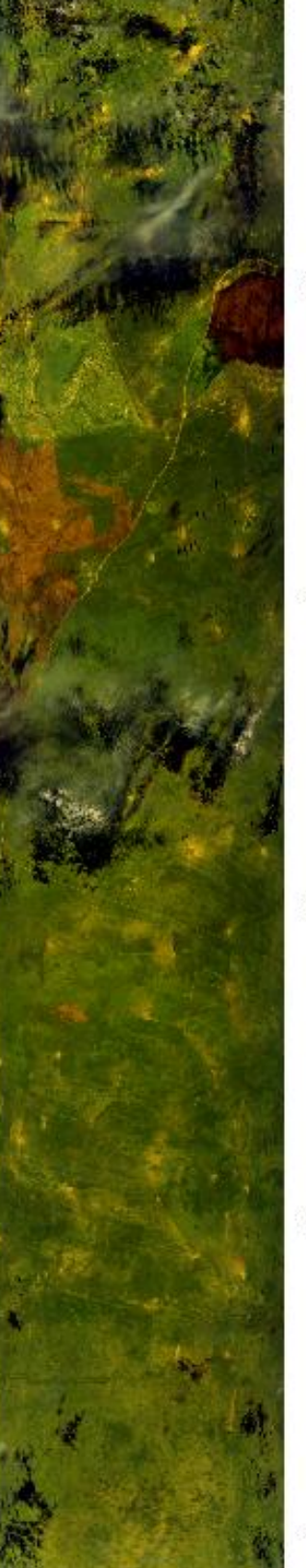
10:23:00



10:25:00



10:27:00



10:18:00

10:21:00

10:23:00

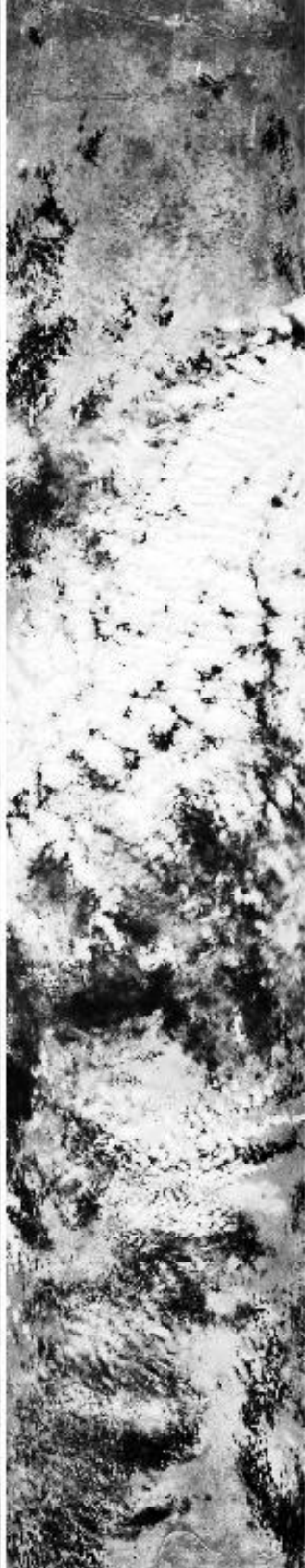
10:25:00

10:27:00

10:27:00



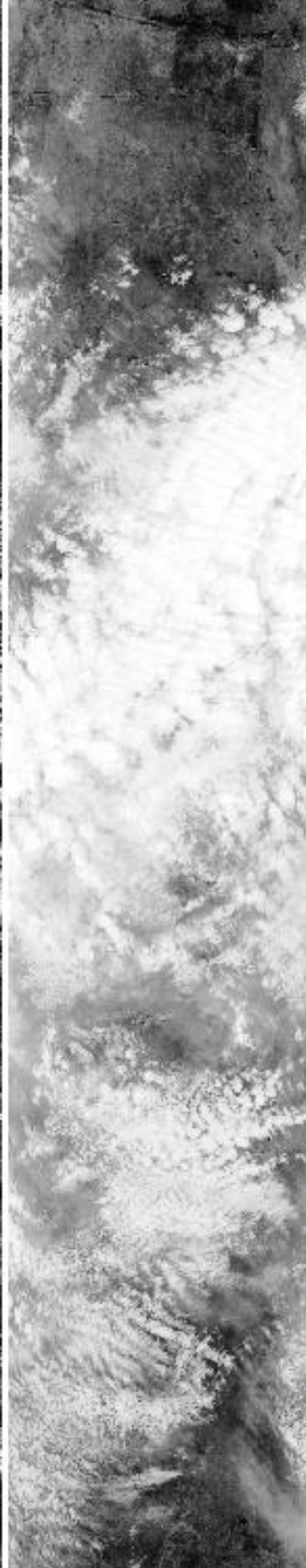
10:28:00



10:31:00



10:33:00



10:35:00



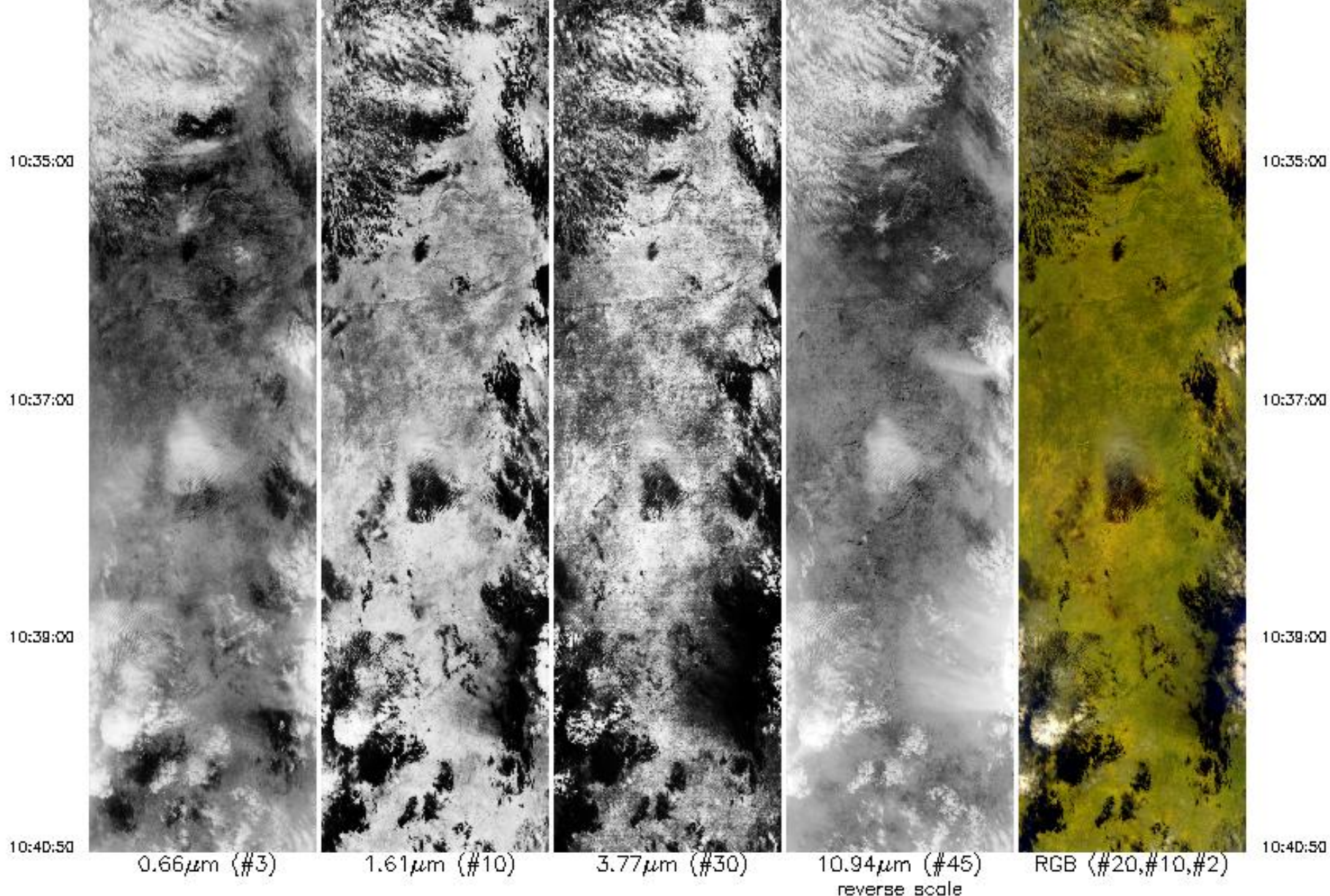
10:27:00

10:28:00

10:31:00

10:33:00

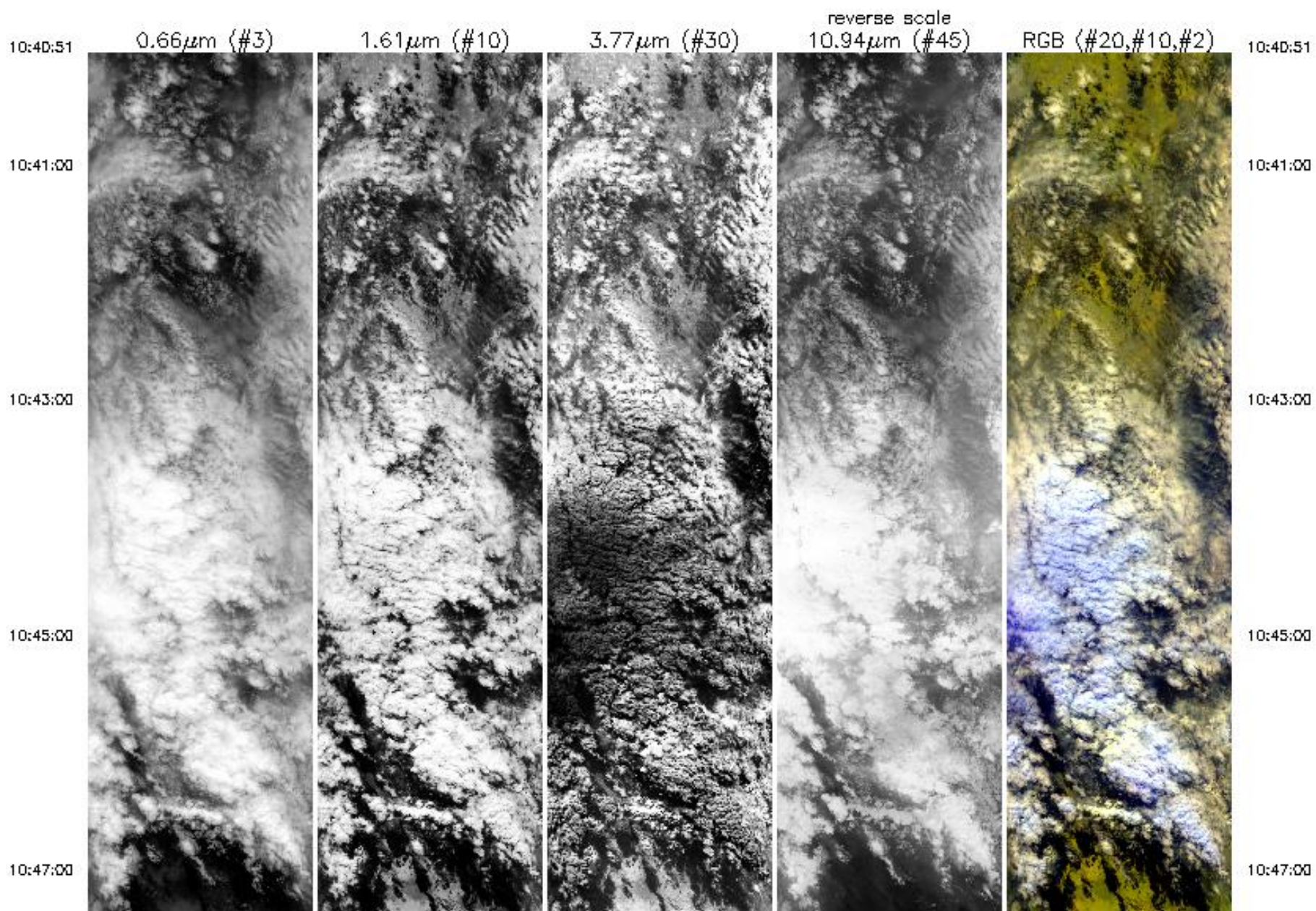
10:35:00



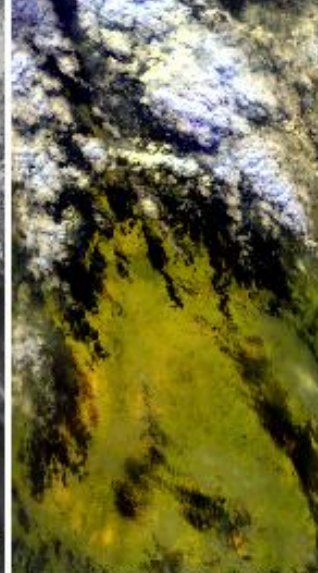
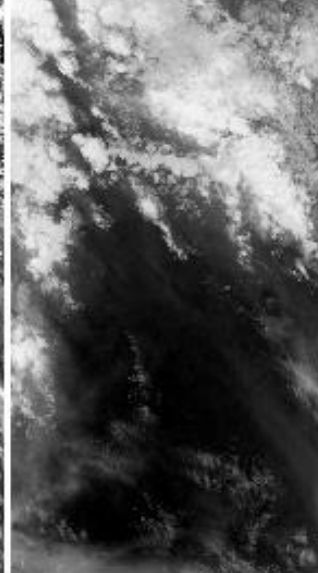
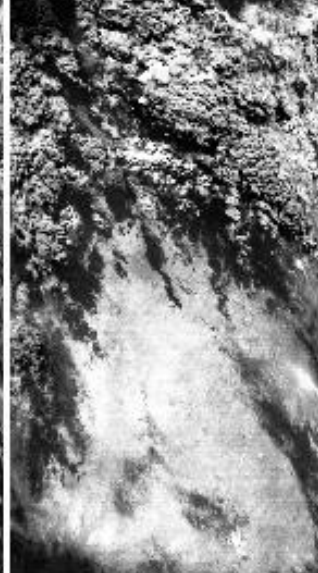
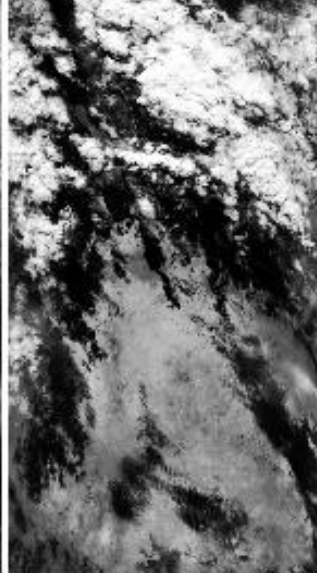
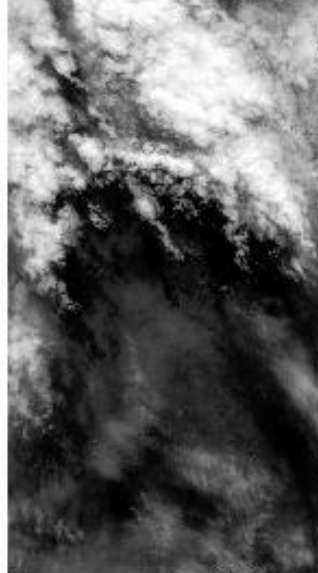
Upper Left Lat, Lon = -20.0° , 22.2°
 Lower Right Lat, Lon = -22.9° , 23.2°
 Aircraft Heading = 172.0°
 Solar Zenith = 27.3°
 GPS Altitude = 20195. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign - 04 Sep 2000
 Botswana
 Flight #00-156 Track #7

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 04 Sep 2000
Botswana
Flight #00-156 Track #7



10:47:00



10:47:00

10:48:53

0.66µm (#3)

1.61µm (#10)

3.77µm (#30)

10.94µm (#45)
reverse scale

RGB (#20,#10,#2)

10:48:53

Upper Left Lat, Lon = -23.0°, 22.9°
Lower Right Lat, Lon = -23.9°, 23.5°
Aircraft Heading = 167.8°
Solar Zenith = 30.1°
GPS Altitude = 20002. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign - 04 Sep 2000
Botswana
Flight #00-156 Track #8

10:51:03

0.66µm (#3)

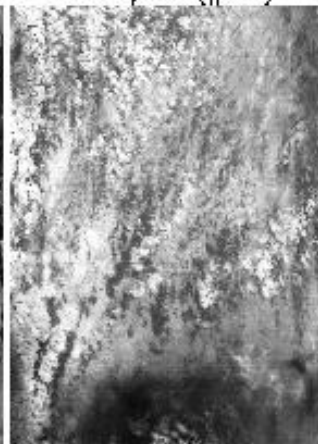
1.61µm (#10)

3.77µm (#30)

reverse scale
10.94µm (#45)

RGB (#20,#10,#2)

10:51:03



10:52:00

10:52:00

10:52:00



10:54:00



10:56:00



10:58:00



11:00:00



10:52:00

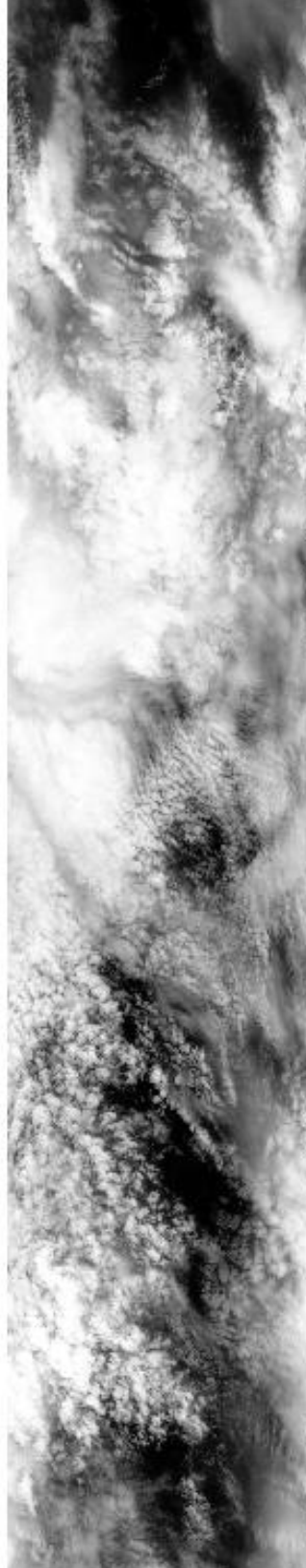
10:54:00

10:56:00

10:58:00

11:00:00

11:02:00



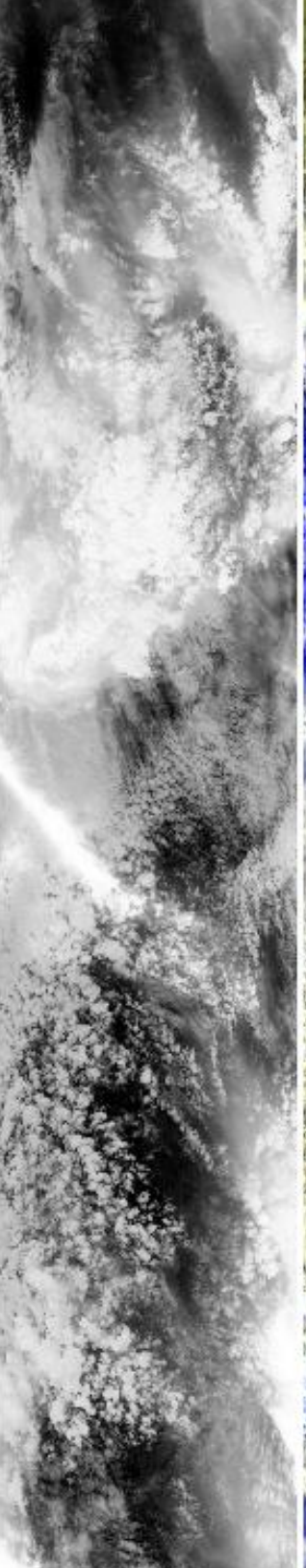
11:04:00



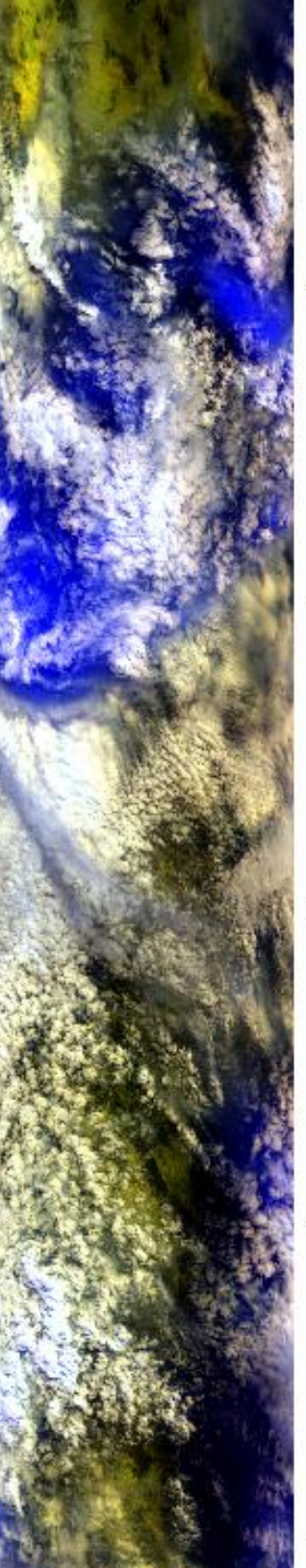
11:06:00



11:08:00



11:10:00



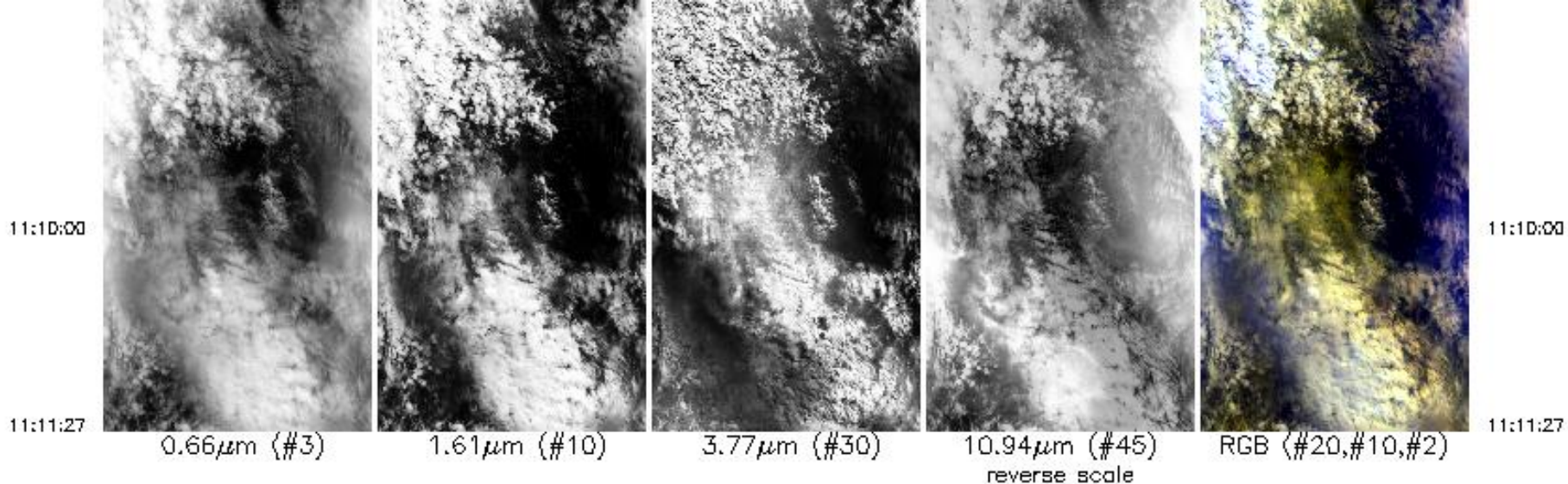
11:02:00

11:04:00

11:06:00

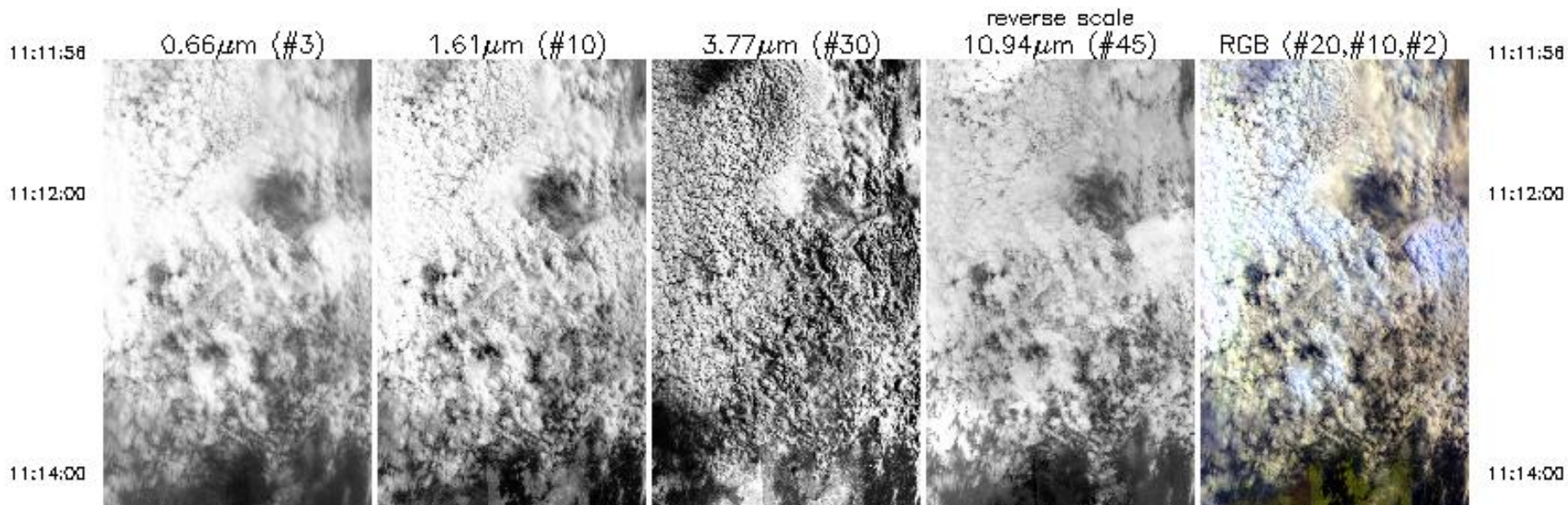
11:08:00

11:10:00



Upper Left Lat, Lon = -24.2° , 23.3°
 Lower Right Lat, Lon = -24.6° , 25.9°
 Aircraft Heading = 112.1°
 Solar Zenith = 31.8°
 GPS Altitude = 20027. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign – 04 Sep 2000
 Botswana
 Flight #00-156 Track #9



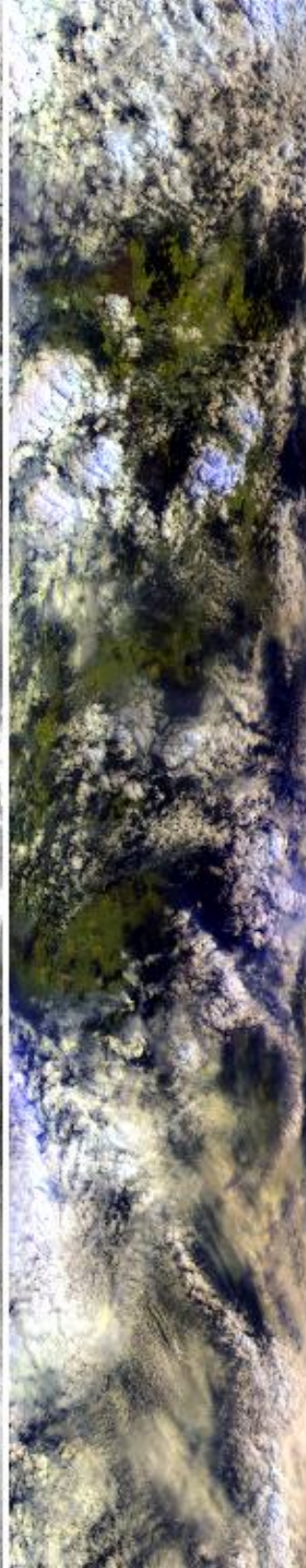
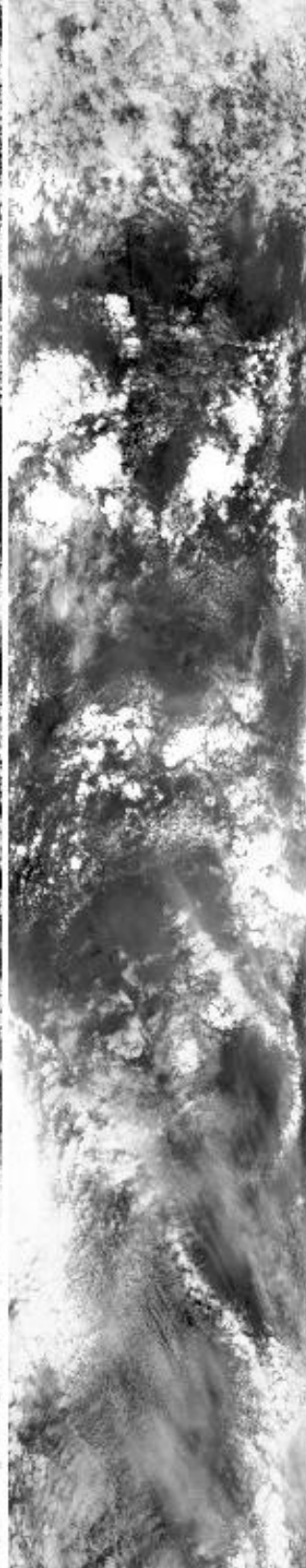
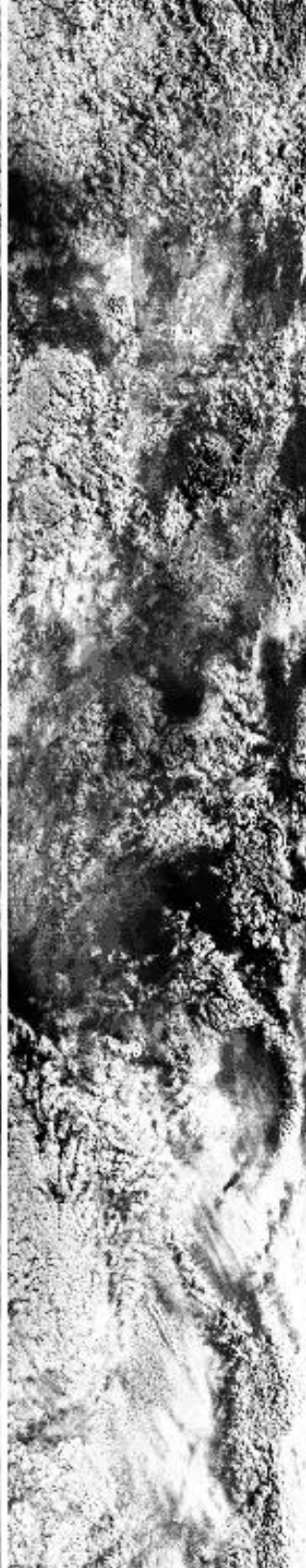
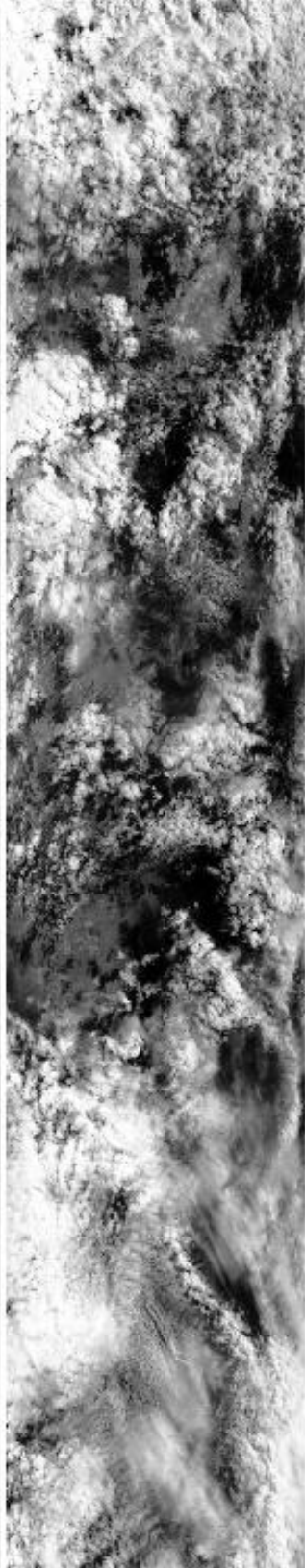
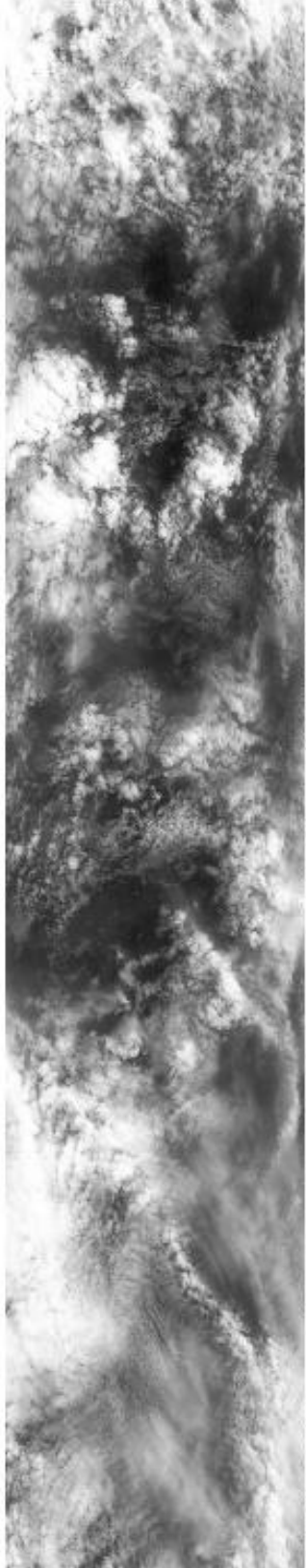
11:14:00

11:16:00

11:18:00

11:20:00

11:22:00



11:14:00

11:16:00

11:18:00

11:20:00

11:22:00

11:22:00



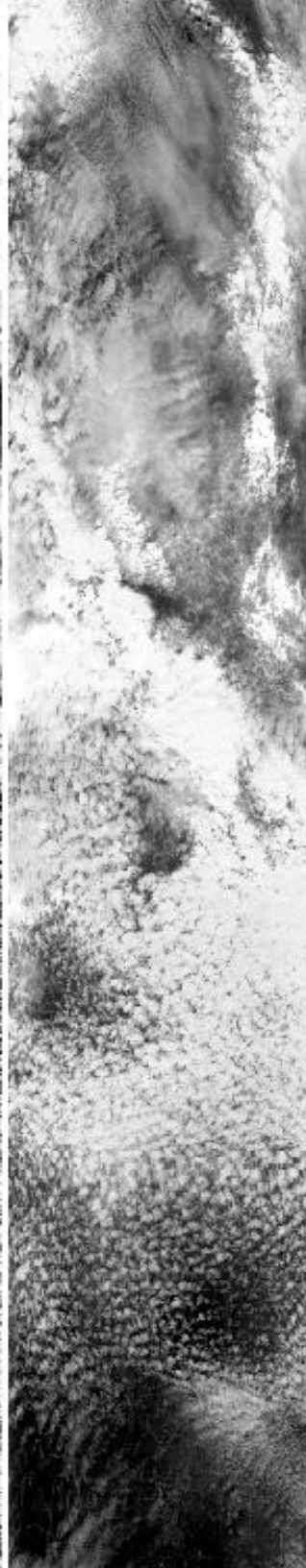
11:24:00



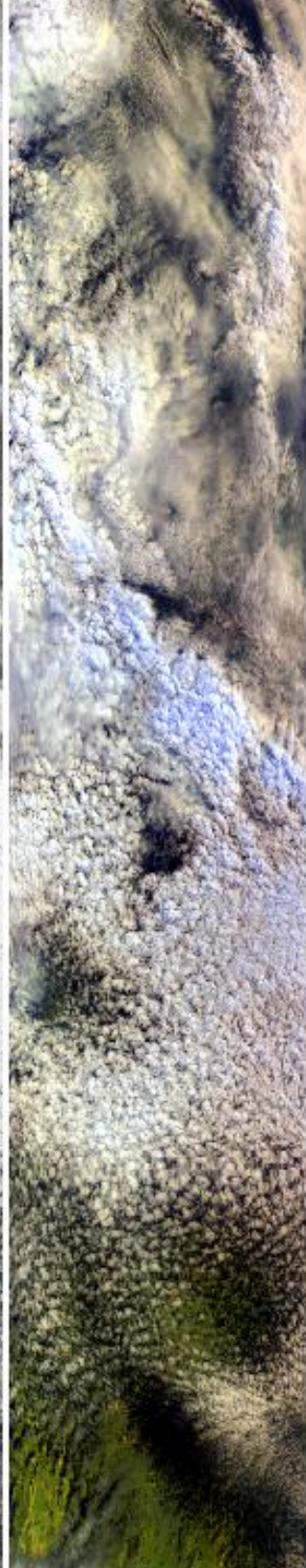
11:26:00



11:26:00



11:30:00



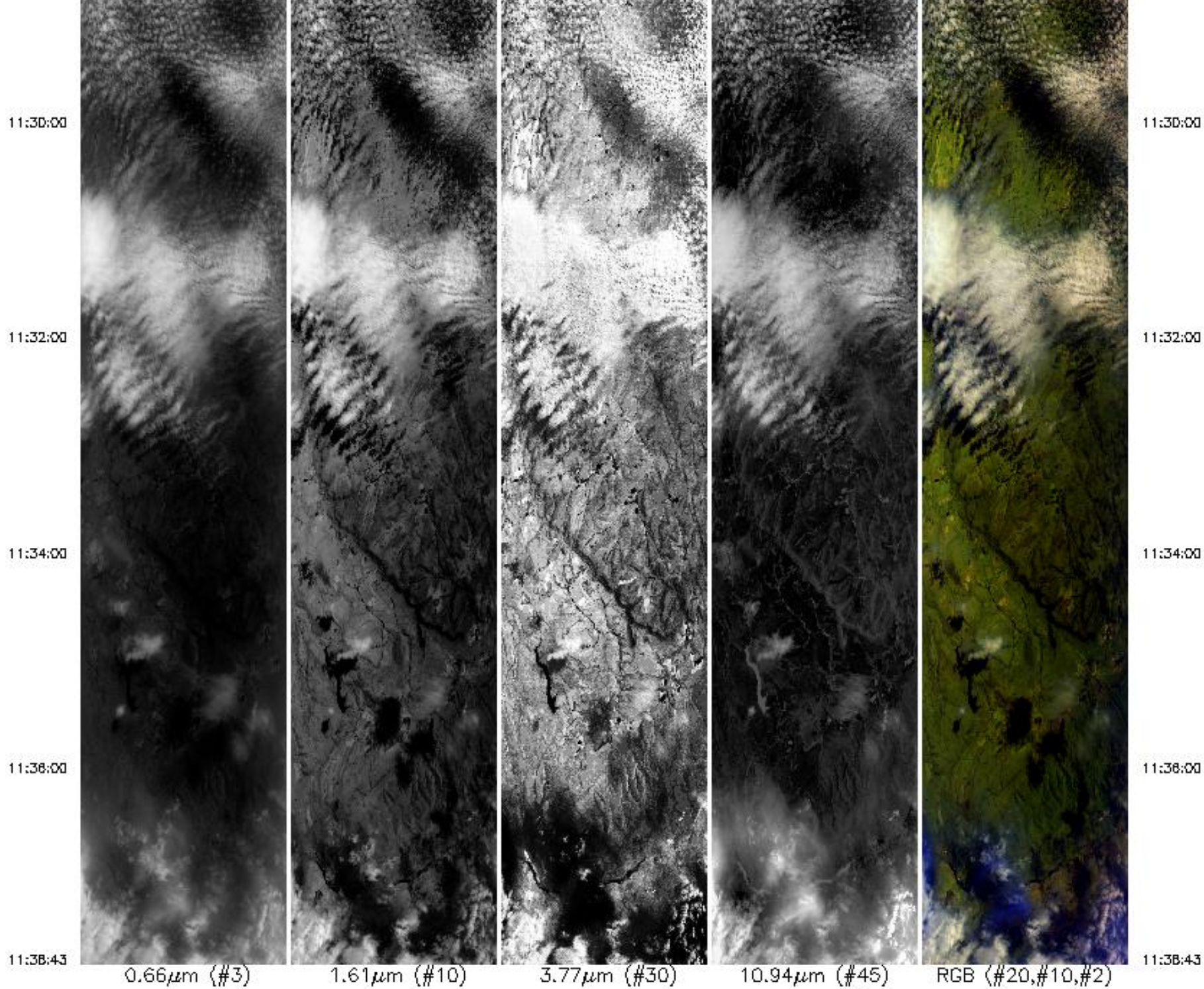
11:22:00

11:24:00

11:26:00

11:26:00

11:30:00



0.66 μm (#3)

1.61 μm (#10)

3.77 μm (#30)

10.94 μm (#45)
reverse scale

RGB (#20, #10, #2)

Upper Left Lat, Lon = -24.9° , 25.9°
 Lower Right Lat, Lon = -24.0° , 29.0°

11:38:43



0.66µm (#3)



1.61µm (#10)



3.77µm (#30)



10.94µm (#45)
reverse scale



RGB (#20,#10,#2)

11:38:43

Upper Left Lat, Lon = -24.9°, 25.9°

Lower Right Lat, Lon = -24.0°, 29.0°

Aircraft Heading = 85.8°

Solar Zenith = 34.7°

GPS Altitude = 20210. m (MSL)

MODIS Airborne Simulator Browse Imagery

SAFARI 2000 Campaign - 04 Sep 2000

South Africa

Flight #00-156 Track #10

11:38:43

0.66µm (#3)



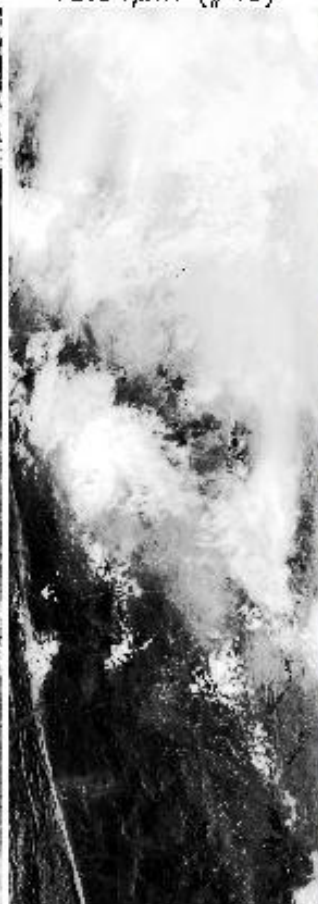
1.61µm (#10)



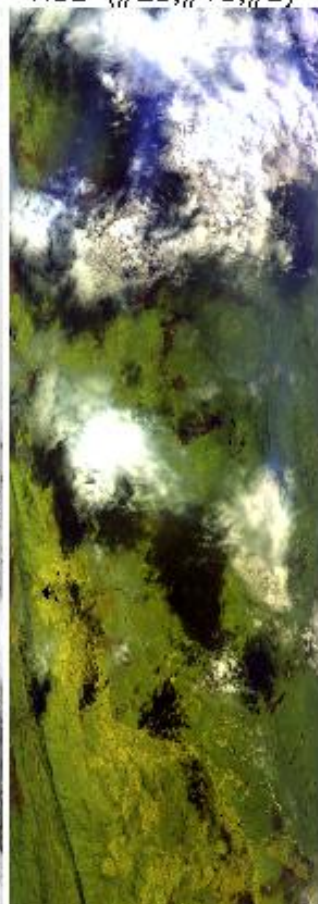
3.77µm (#30)



reverse scale
10.94µm (#45)



RGB (#20,#10,#2)



11:38:43

11:39:00

11:39:00

11:41:00

11:41:00

11:43:00

11:43:00

11:43:00



11:45:00



11:47:00



11:49:00



11:51:00



11:43:00



11:45:00



11:47:00



11:49:00



11:51:00

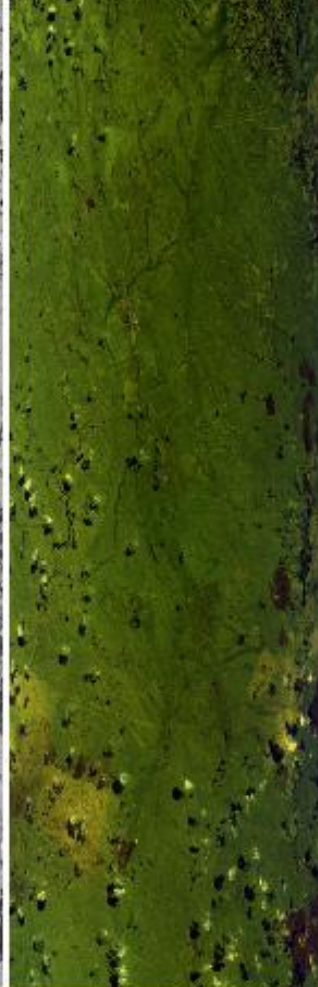
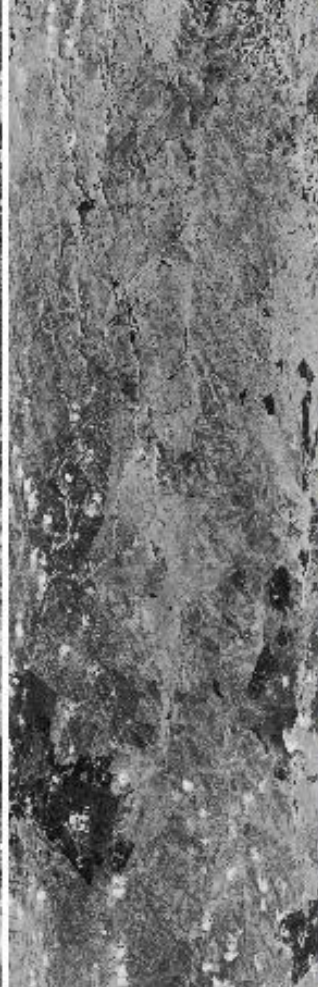
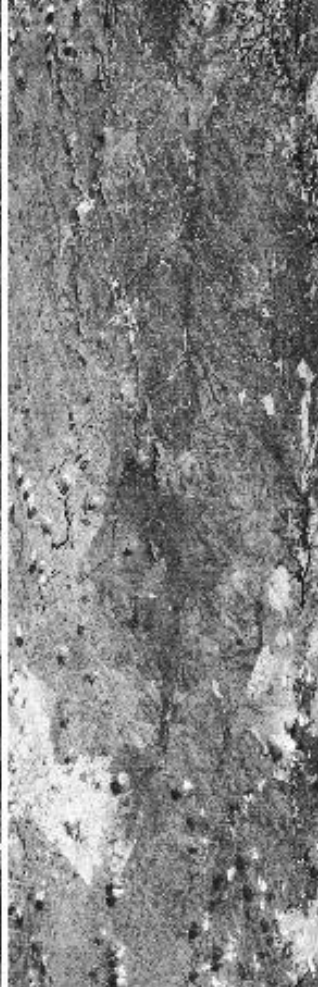
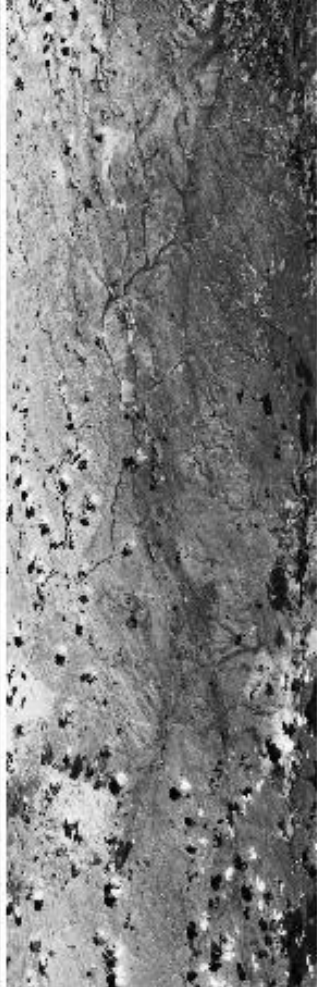


11:51:00

11:53:00

11:55:00

11:56:44



11:51:00

11:53:00

11:55:00

11:56:44

0.66 μm (#3)

1.61 μm (#10)

3.77 μm (#30)

10.94 μm (#45)
reverse scale

RGB (#20,#10,#2)

Upper Left Lat, Lon = -24.3° , 29.1°
Lower Right Lat, Lon = -23.6° , 31.1°
Aircraft Heading = 81.8°
Solar Zenith = 39.1°
GPS Altitude = 20113. m (MSL)