

SAFARI 2000 MAS Flight 00148

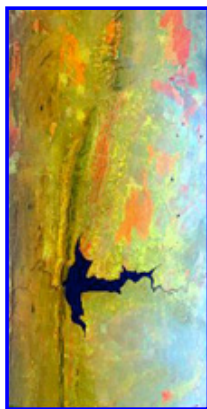
To obtain tracks from this flight, click the checkbox for the desired track in the "Browse Images" table below. When you have selected your desired flights, click the "List" button to see a list of your tracks prior to placing into the shopping cart.

This is **Flight #00-148**

RBG Images

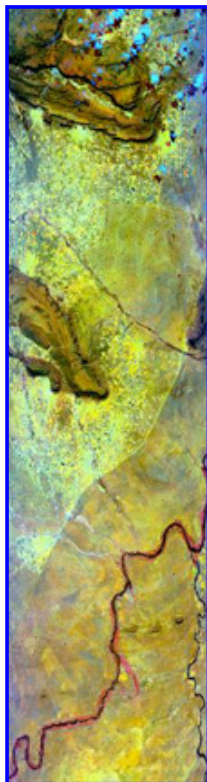
[Click Image](#)

Track #06



R: 11.01 microns
G: 2.15 microns
B: 0.46 microns

Track #10



R: 11.01 microns
G: 2.15 microns
B: 0.46 microns

Summary Information

Date: **August 20, 2000**

ER-2 Flight Number: **00-148**

Location: **South Africa to Botswana**

Principal Investigator: **Dr. Michael King (NASA GSFC)**

Flight Scientist:

Additional Sensors: **AirMISR, CLS, LAS, MAS, MOPITT-A, S-HIS, SSFR** (see [Instrument Status](#) below)

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**

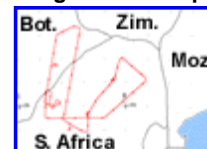
Level-1B Browse Imagery

Straight Line Flight Tracks: **16 processed**

Scanlines Processed: **53928**

[Solar Azimuth and Zenith Angles](#)

Flight Track Map



[Click to enlarge](#)

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 m (msl)
<input type="checkbox"/>	01	07:22-07:31	128	23.14-23.78	30.04-30.89	3551	17999
<input type="checkbox"/>	02	07:33-07:53	224	23.95-25.47	30.90-29.04	7496	19710
<input type="checkbox"/>	03	07:54-08:15	268	25.50-25.50	28.95-26.33	7698	19836
<input type="checkbox"/>	04	08:16-08:25	3	25.38-24.43	26.20-26.27	3129	19813
<input type="checkbox"/>	05	08:28-08:32	189	24.45-24.90	26.51-26.42	1528	19766
<input type="checkbox"/>	06	08:42-08:44	279	24.96-24.91	26.64-26.30	1016	19741
<input type="checkbox"/>	07	08:46-08:48	7	24.74-24.53	26.21-26.23	706	19734
<input type="checkbox"/>	08	08:48-08:52	20	24.50-24.12	26.23-26.36	1311	19764
<input type="checkbox"/>	09	08:52-09:11	13	24.09-22.03	26.37-26.79	7048	19920
<input type="checkbox"/>	10	09:12-09:18	66	21.96-21.67	26.86-27.54	2445	20025
<input type="checkbox"/>	11	09:19-09:20	95	21.65-21.67	27.61-27.76	511	20028
<input type="checkbox"/>	12	09:22-09:49	189	21.79-24.77	27.87-27.24	9999	20083
<input type="checkbox"/>	13	09:49-09:55	191	24.77-25.50	27.24-27.08	2503	20226
<input type="checkbox"/>	14	09:57-10:01	124	25.62-25.90	27.14-27.63	1774	20224
<input type="checkbox"/>	15	10:02-10:05	120	25.90-26.08	27.64-28.01	1309	20202

	16	10:07-10:12	360	26.00-25.41	28.23-28.22	1904	20149
All images in sequence							

ER-2 Flight Log

Author: [Dr. Michael King](#)
Mission Scientist: [Dr. Michael King](#)
ER-2 Pilot: [Ken Broda](#)
Takeoff: [20Aug2000 0705 UTC](#)
Landing: [20Aug2000 1050 UTC](#)
Duration: [03:45:00](#)

Objective:

The objective of this mission was to fly the ER-2 over Rustenburg Platinum mines (25°30'S, 27°30'E), then over to 25°30'S, 26°11'E, where the ER-2 turned NNE on a heading of 12° to overfly a prescribed burn of the Madikwe Game Reserve at the time of the Terra overpass at 0840 UTC. After working the Madikwe fire for about 40 minutes, the ER-2 proceeded NNE along the Terra ground track into northeastern Botswana (22°S, 26°48'E). The ER-2 then moved eastward and flew a parallel track SSW from 21°39'S, 27°54'E to 25°30'S, 27°05'E, overflying Selibe-Phikwe copper and nickel mines in Botswana. Following this flight line, which went directly over Pilansberg National Park, the ER-2 overflew Waterkloof Air Base in Pretoria for photographs at the request of the RSA Air Force.

Key Flight Legs:

The mission was coordinated with JRA and Terra over Madikwe at 0840 UTC, and with JRB over Selibe-Phikwe at 0923 UTC. The RC-10 camera was turned on for flights over Rustenburg, Madikwe, Selibe-Phikwe, Pilansberg, and Waterkloof.

Pilot Report:

The ER-2 pilot reported cloudy skies over the early part of the flight up the Blyde River Canyon and over the escarpment, and some altocumulus clouds near Madikwe, but clear skies dominated the region throughout much of the rest of the flight.

Meteorology:

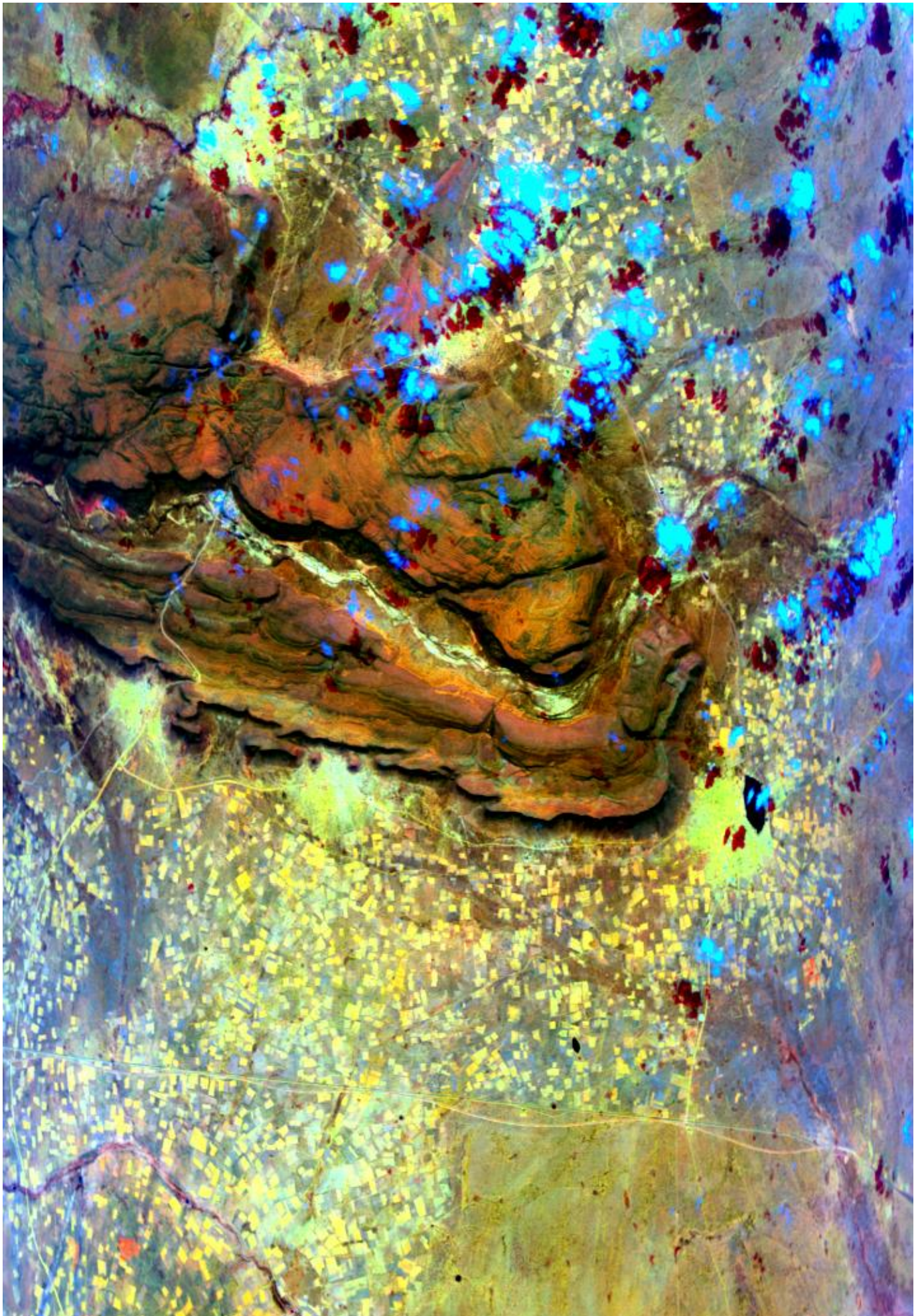
A high pressure cell was situated to the southeast of the subcontinent, extending a ridge northwestwards and causing an influx of low level moisture into the northeastern areas of South Africa and southeastern Zimbabwe. A low was centered over the southwestern Cape. This low, coupled with an upper-level trough to the west of the country, caused extensive cloud over the western parts of the country. Although it was generally subsident to the east, a band of middle level moisture was being trapped beneath an inversion at about 16000 ft. over eastern Namibia and the central and southeastern parts of Botswana. It was cloudy over the northern and eastern parts of the Northern Province in the morning, clearing partially during the afternoon. Partly cloudy over central and southeastern Botswana and Gauteng. The cloudy weather over the western areas spread across the southern areas and a few light showers resulted in these areas.

Instrument Status:

- AirMISR (Airborne Multi-angle Imaging Spectroradiometer): Not on plane; being repaired
- CLS (Cloud Lidar System): Lidar worked properly, but navigation data not recorded
- LAS (Leonardo Airborne Simulator): Failed prior to take off
- MAS (MODIS Airborne Simulator): Worked well
- MOPITT-A (MOPITT Airborne Simulator): CO bands worked well, but CH4 bands not working (software error)
- S-HIS (High-resolution Interferometer Sounder): Not installed on aircraft due to instrument problem in interferometer
- SSFR (Solar Spectral Flux Radiometer): Worked well



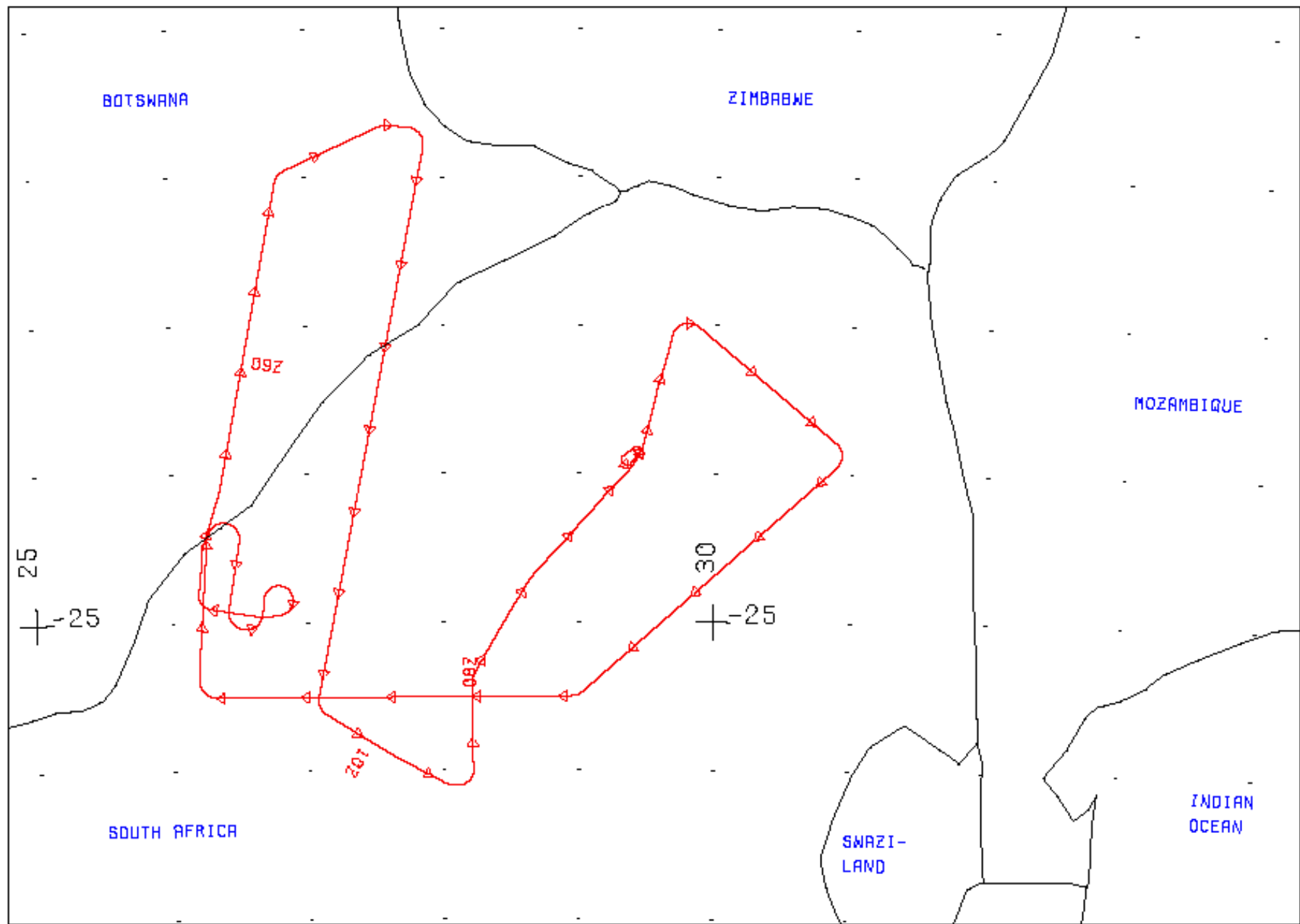












FLIGHT 00-148

20 AUGUST 2000

A/C 809

SAFARI

LAND



FLIGHT 00-148

20 AUGUST 2000

R/C 809

SAFARI

50 MAS Configuration for 00-148 20 Aug 2000 S. Africa and Botswana

01	01	16	0	0.034790	0.0000	0.452	0.472	0.493	0.100	1981.92
02	02	16	0	0.037694	0.0000	0.534	0.554	0.577	0.100	1857.88
03	03	16	0	0.025886	0.0000	0.635	0.658	0.689	0.100	1549.55
04	04	16	0	0.030442	0.0000	0.687	0.708	0.731	0.100	1386.41
05	05	16	0	0.023220	0.0000	0.729	0.750	0.773	0.100	1260.07
06	06	16	0	0.024057	0.0000	0.810	0.830	0.855	0.100	1053.65
07	07	16	0	0.023965	0.0000	0.853	0.874	0.895	0.100	962.82
08	08	16	0	0.019204	0.0000	0.893	0.912	0.934	0.100	869.28
09	09	16	0	0.020637	0.0000	0.933	0.954	0.974	0.100	784.92
10	10	16	0	0.003328	0.0000	1.586	1.612	1.640	0.100	244.16
11	11	16	0	0.003071	0.0000	1.642	1.668	1.695	0.010	227.32
12	12	16	0	0.002820	0.0000	1.698	1.722	1.749	0.010	201.29
13	13	16	0	0.002787	0.0000	1.751	1.776	1.801	0.010	176.56
14	14	16	0	0.002873	0.0000	1.805	1.830	1.855	0.010	156.28
15	15	16	0	0.002748	0.0000	1.855	1.880	1.906	0.010	139.66
16	16	16	0	0.002613	0.0000	1.906	1.932	1.956	0.100	131.21
17	17	16	0	0.002367	0.0000	1.956	1.982	2.006	0.010	122.76
18	18	16	0	0.002317	0.0000	2.006	2.032	2.057	0.010	109.78
19	19	16	0	0.002242	0.0000	2.058	2.082	2.107	0.010	98.67
20	20	16	0	0.002282	0.0000	2.107	2.132	2.157	0.010	86.28
21	21	16	0	0.002405	0.0000	2.156	2.180	2.205	0.010	76.85
22	22	16	0	0.002620	0.0000	2.205	2.230	2.255	0.010	73.57
23	23	16	0	0.002697	0.0000	2.255	2.280	2.305	0.010	68.38
24	24	16	0	0.002545	0.0000	2.306	2.330	2.354	0.010	58.53
25	25	16	0	0.002496	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/er2/00-148
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 20 Aug 2000
 NASA FLIGHT NUMBER 00-148

START OF FLIGHT LINE					END OF FLIGHT				
LINE	FLIGHT DATA								
LINE	TIME	LAT	LON	SOLAR	TIME	LAT	LON	SOLAR	TIME
	HH:MM:SS	DEG	DEG	ZEN	HH:MM:SS	DEG	DEG	ZEN	HH:MM:SS
	SCAN	LINES	HEAD	ALT	AZIM	DEG	DEG	AZIM	AZIM
			DEG	M (GPS)					
1	07:22:26	-23.137	30.041	53.0	52.2	07:31:56	-23.785	30.891	51.1
49.1	3551	128.2	17999						
2	07:33:37	-23.950	30.896	50.9	48.6	07:53:41	-25.467	29.042	49.8
44.8	7496	224.2	19710						
3	07:54:28	-25.499	28.951	49.8	44.6	08:15:04	-25.502	26.327	48.2
42.1	7698	267.7	19836						
4	08:16:44	-25.376	26.197	48.0	41.9	08:25:07	-24.432	26.267	45.9
40.2	3129	2.5	19813						
5	08:28:22	-24.448	26.506	45.4	39.0	08:32:27	-24.901	26.423	45.2
37.7	1528	188.5	19766						
6	08:42:04	-24.957	26.639	43.8	34.6	08:44:47	-24.908	26.300	43.6
34.2	1016	278.8	19741						
7	08:46:39	-24.744	26.211	43.3	33.8	08:48:33	-24.531	26.228	42.8
33.4	706	6.8	19734						
8	08:48:49	-24.500	26.234	42.8	33.3	08:52:20	-24.122	26.362	42.0
32.3	1311	19.5	19764						
9	08:52:34	-24.095	26.369	41.9	32.2	09:11:26	-22.035	26.793	37.8
26.4	7048	13.4	19920						
10	09:12:23	-21.957	26.857	37.6	26.0	09:18:56	-21.665	27.541	36.4
22.7	2445	66.1	20025						
11	09:19:32	-21.653	27.608	36.4	22.4	09:20:54	-21.666	27.765	36.2
21.6	511	95.1	20028						
12	09:22:27	-21.786	27.869	36.1	20.8	09:49:13	-24.773	27.241	37.5

```

10.2  9999  188.6  20083
  13 09:49:13 -24.773  27.241 37.5 10.2 09:55:55 -25.504  27.082 38.0
7.6  2503  190.6  20226
  14 09:57:12 -25.622  27.141 38.1  7.0 10:01:57 -25.897  27.626 38.2
4.3  1774  123.9  20224
  15 10:02:03 -25.902  27.636 38.2  4.3 10:05:33 -26.085  28.013 38.4
2.3  1309  120.4  20202
  16 10:07:50 -25.995  28.228 38.2  1.1 10:12:56 -25.413  28.221 37.7
359.1  1904  359.5  20149

```

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NUMBER OF FILES FOR THIS FLIGHT = 16
TOTAL NUMBER OF SCAN LINES = 53928
DATE THESE FILES WERE PROCESSED = 15-Oct-2002
DATE THIS LIST WAS CREATED = Wed Oct 16

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16:44:01 PDT 2002

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GRANULE VERSION = 2

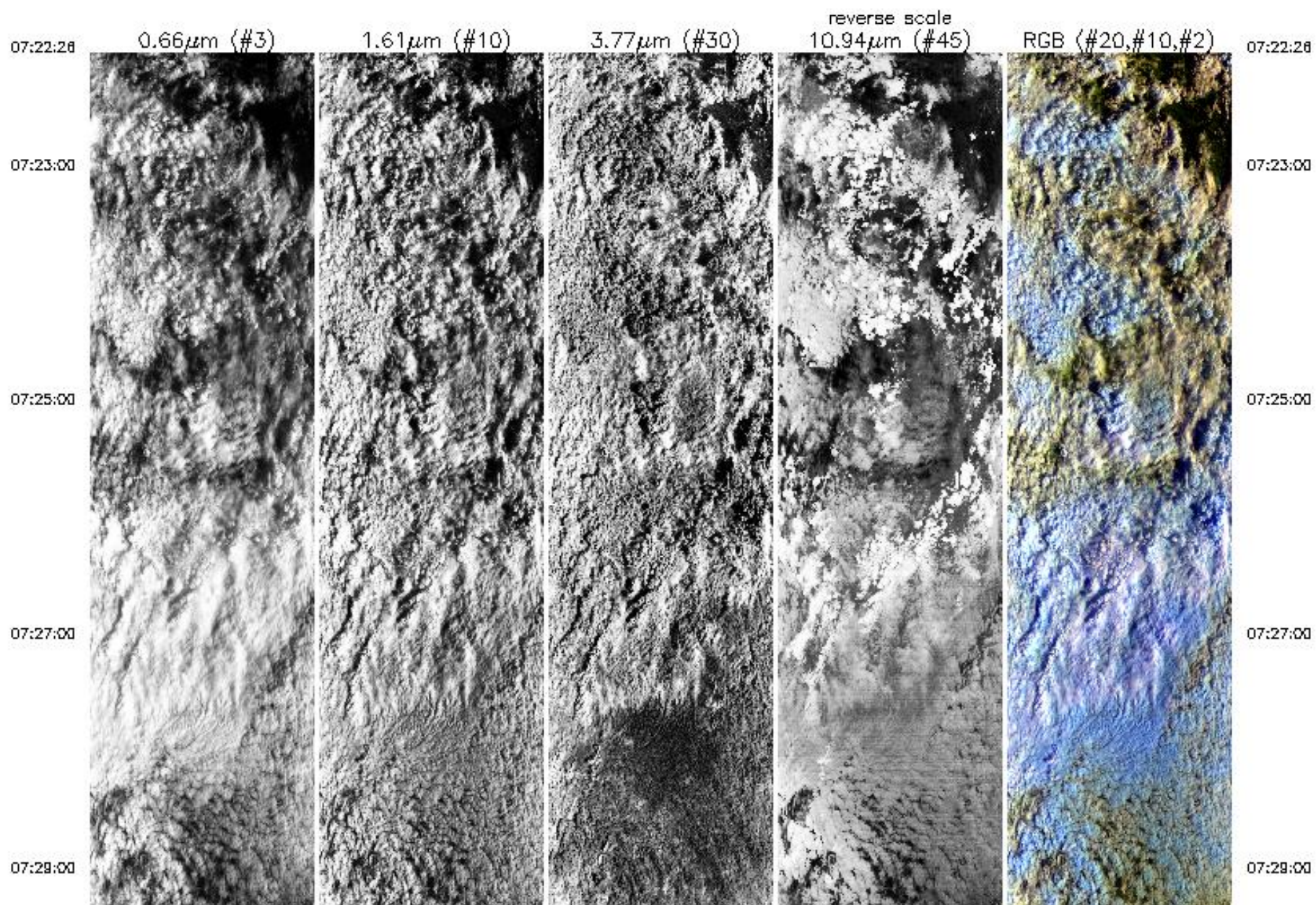
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GLOBAL ATTRIBUTES

Attribute Name	Description
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CreationDate	15-Oct-2002 17:28:54
AircraftPlatform	NASA ER-2 (809)
NavFormatCode	Format (A-1)
LocationCode	Inertial (INU)
AltitudeCode	Inertial (INU)
NavDataSource	ER2 navigation recorder
NavDataPath	/nav/2000/er2/00-148
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	00-148
FlightDate	20 Aug 2000

SiteLineRun	void
GeographicArea	South Africa
SRF_FTP	ftp://asapdata/mas/srf/Oct_00/
SRF_dataset	/rarray/calibrat/mas/srf/Oct_00/
FlightLineNumber	1
TotalFlightLines	16
DataUsersGuideSource	http://ltpwww.gsfc.nasa.gov/MAS/
SoftwareVersion	Level-1b Version 10.1.2 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
Principal_Investigator	King
lat_UL	-23.24535
lon_UL	29.94859
lat_UR	-23.02467
lon_UR	30.12661
lat_LL	-23.90840
lon_LL	30.78037
lat_LR	-23.66409
lon_LR	31.00245
begin_date	20000820 072226
end_date	20000820 073157
RunTime	240,890 ms, or 67 ms/scanline
CompletionDate	15-Oct-2002 17:35:04
producer_granule_id	
MASL1B_00148_01_20000820_0722_0731_V02.hdf	

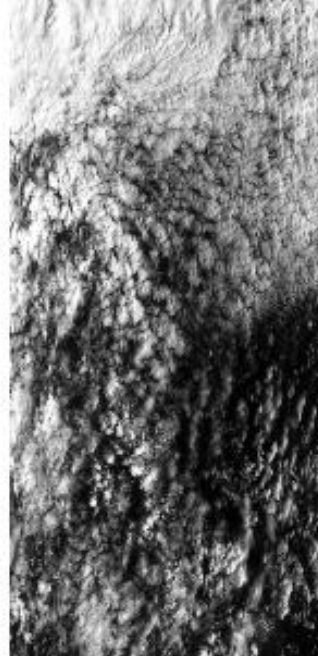
MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 20 Aug 2000
South Africa
Flight #00-148 Track #1



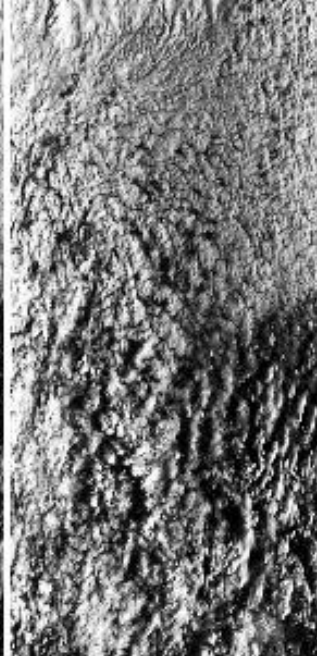
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07:31:00

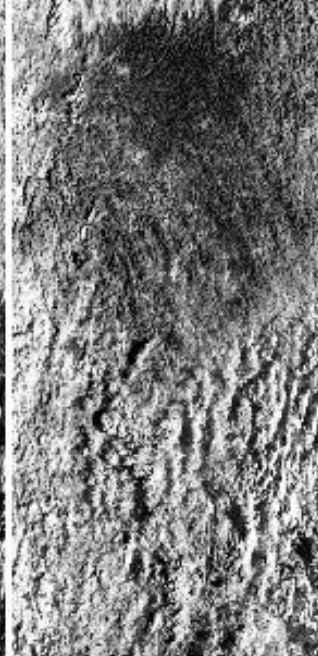
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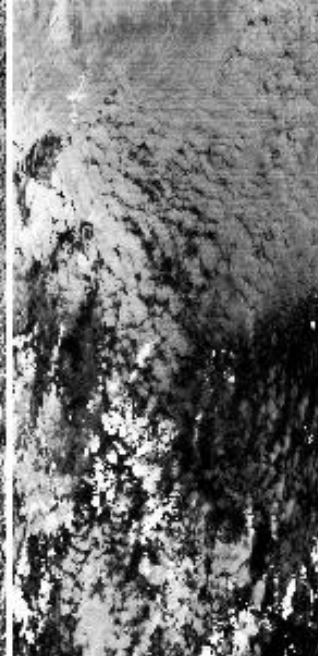
0.66 μ m (#3)



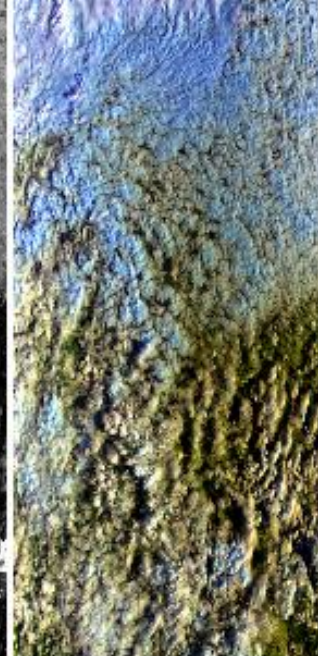
1.61 μ m (#10)



3.77 μ m (#30)



10.94 μ m (#45)
reverse scale



RGB (#20,#10,#2)

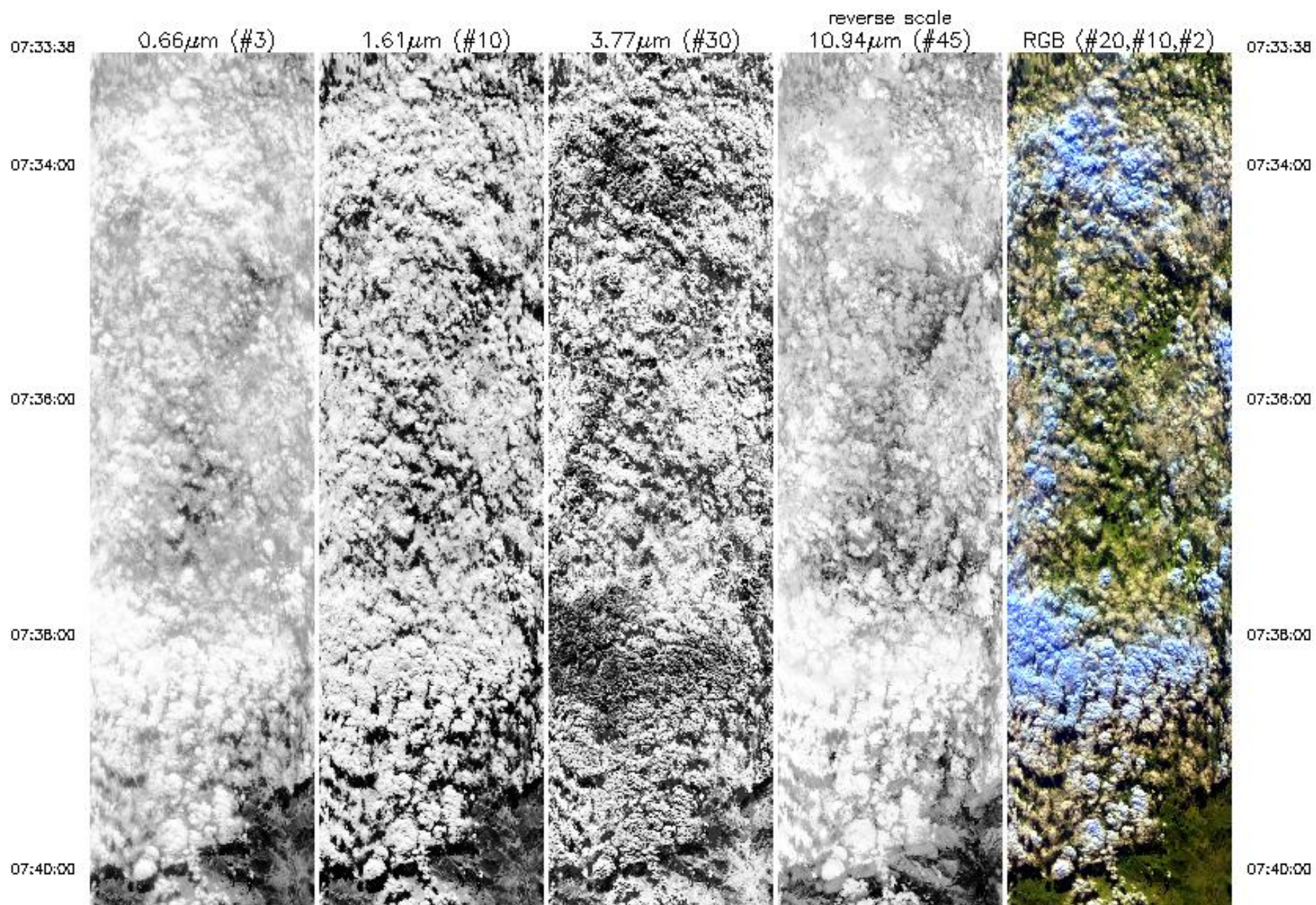
07:29:00

07:31:00

07:31:57

Upper Left Lat, Lon = -23.2°, 29.9°
Lower Right Lat, Lon = -23.7°, 31.0°
Aircraft Heading = 126.6°
Solar Zenith = 53.1°
GPS Altitude = 18300. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign - 20 Aug 2000
South Africa
Flight #00-148 Track #2



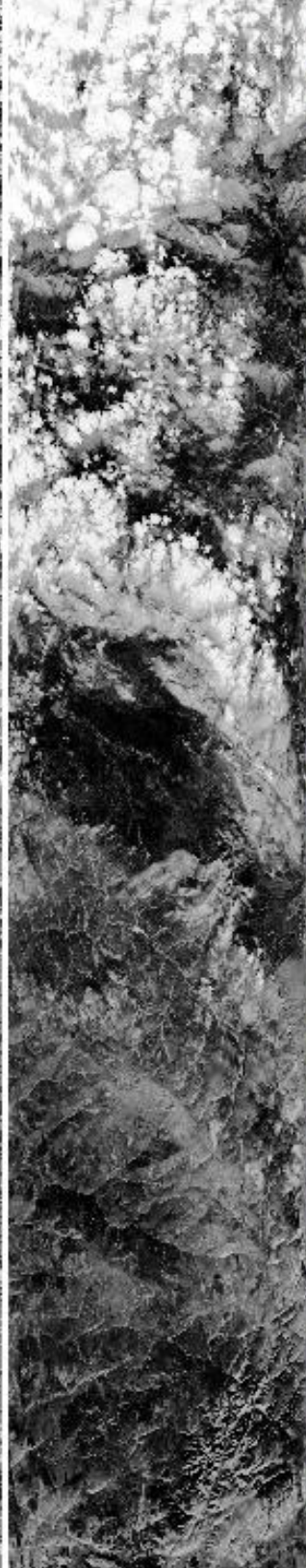
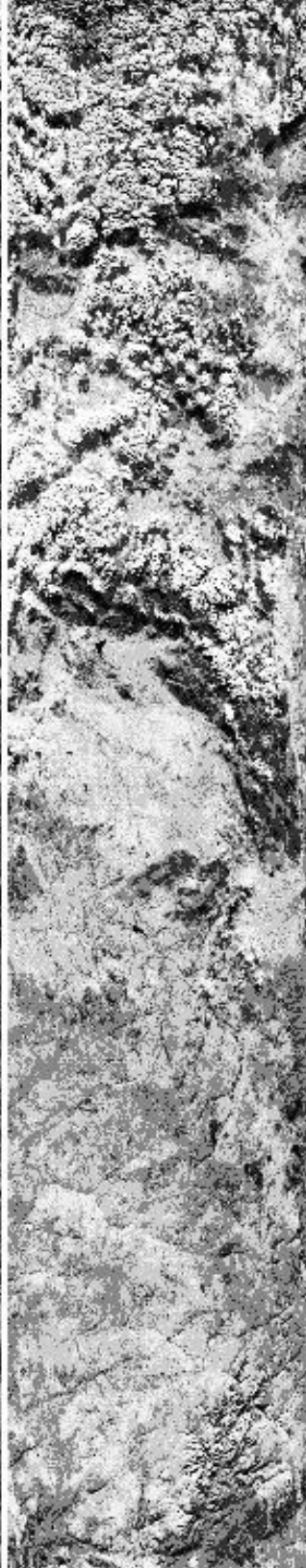
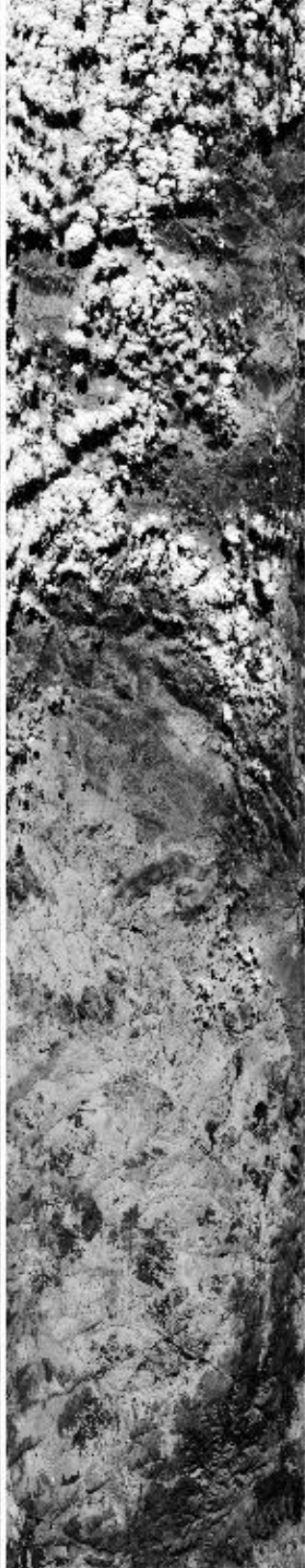
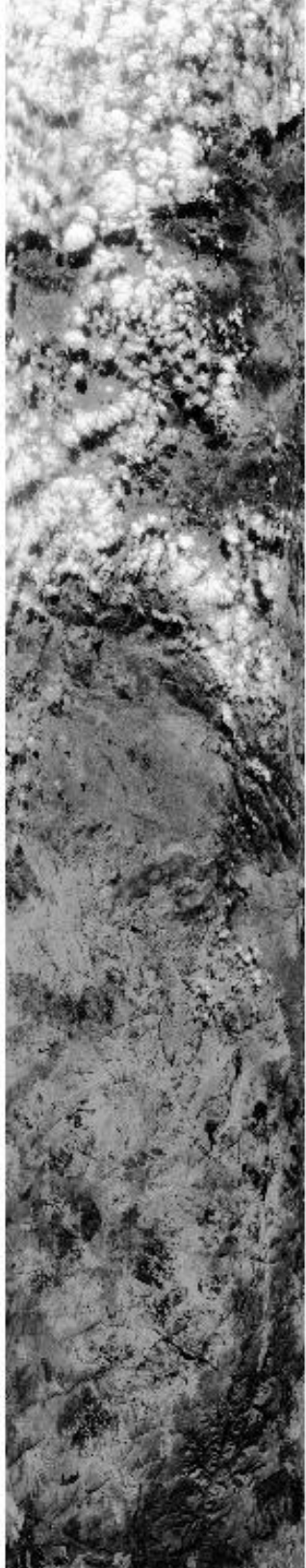
07:40:00

07:42:00

07:44:00

07:46:00

07:48:00



07:40:00

07:42:00

07:44:00

07:46:00

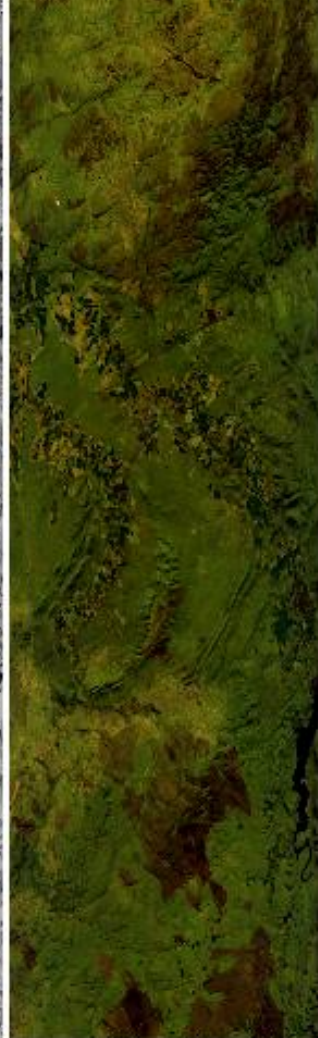
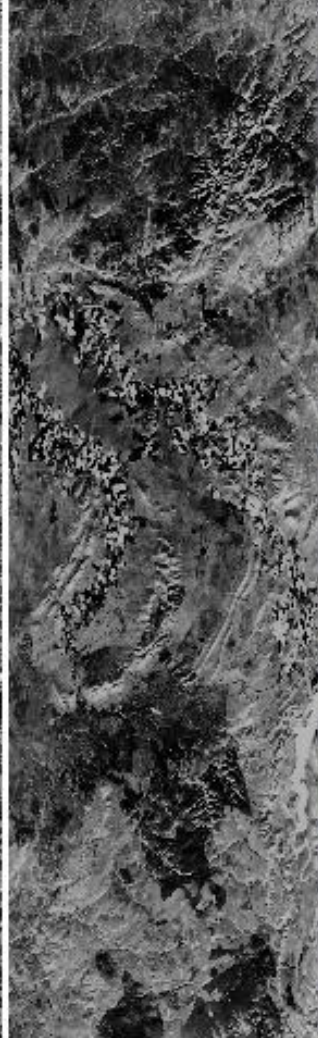
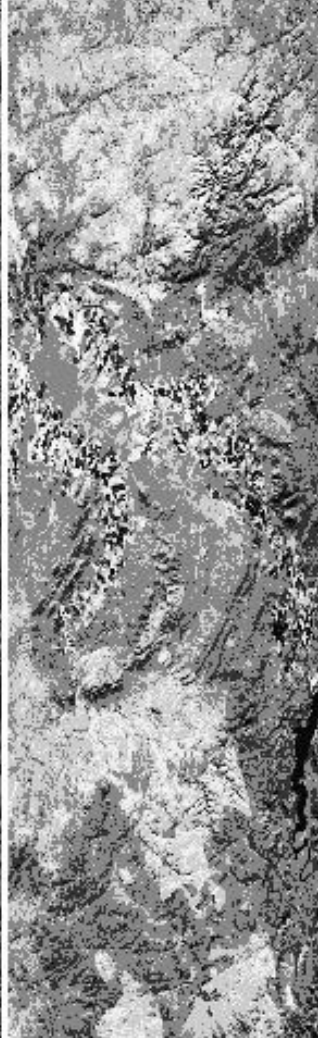
07:48:00

07:48:00

07:50:00

07:52:00

07:53:42



07:48:00

07:50:00

07:52:00

07:53:42

0.66µm (#3)

1.61µm (#10)

3.77µm (#30)

10.94µm (#45)
reverse scale

RGB (#20,#10,#2)

Upper Left Lat, Lon = -23.8°, 30.8°

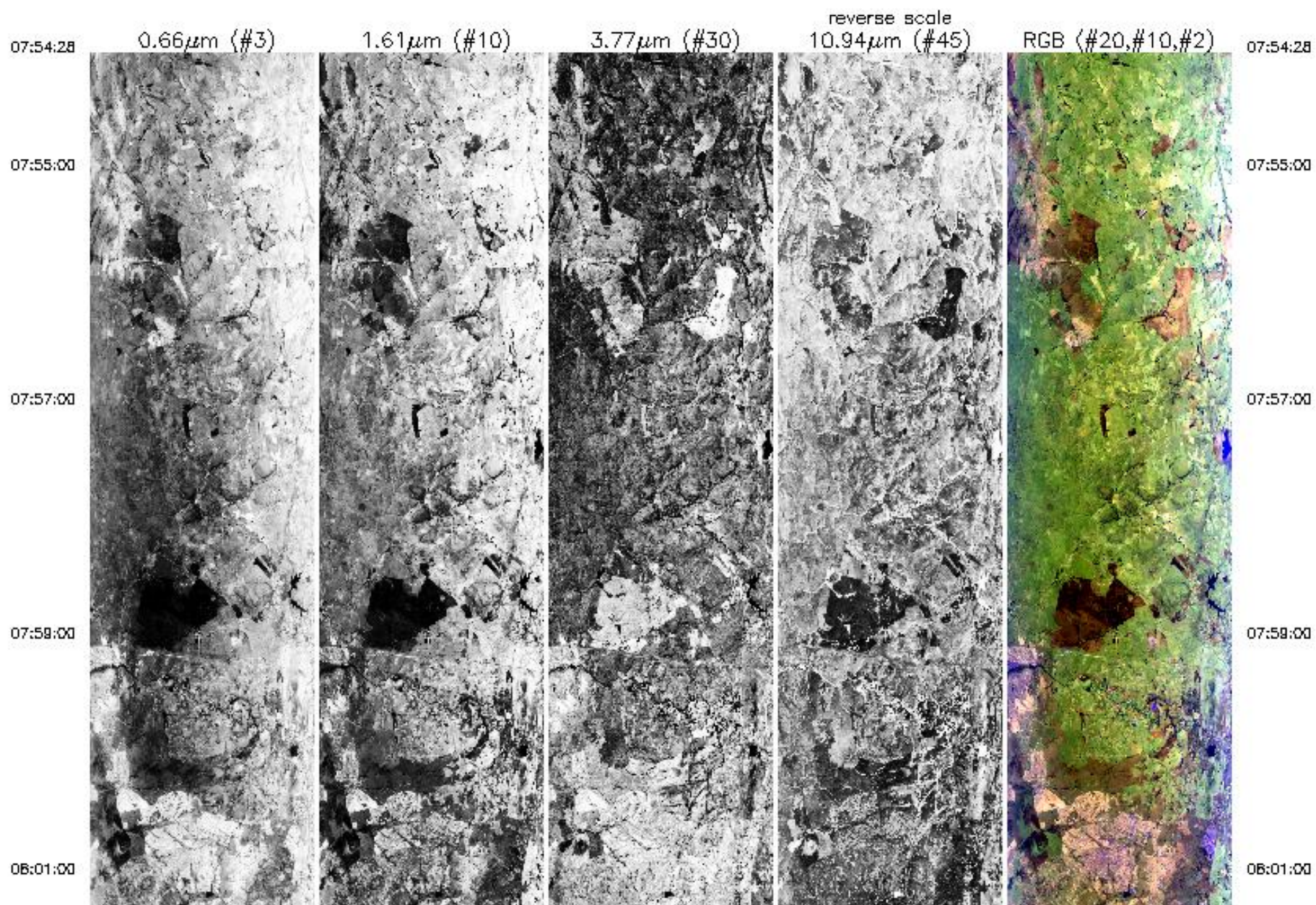
Lower Right Lat, Lon = -25.6°, 29.2°

Aircraft Heading = 220.8°

Solar Zenith = 50.9°

GPS Altitude = 19828. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 20 Aug 2000
South Africa
Flight #00-148 Track #3



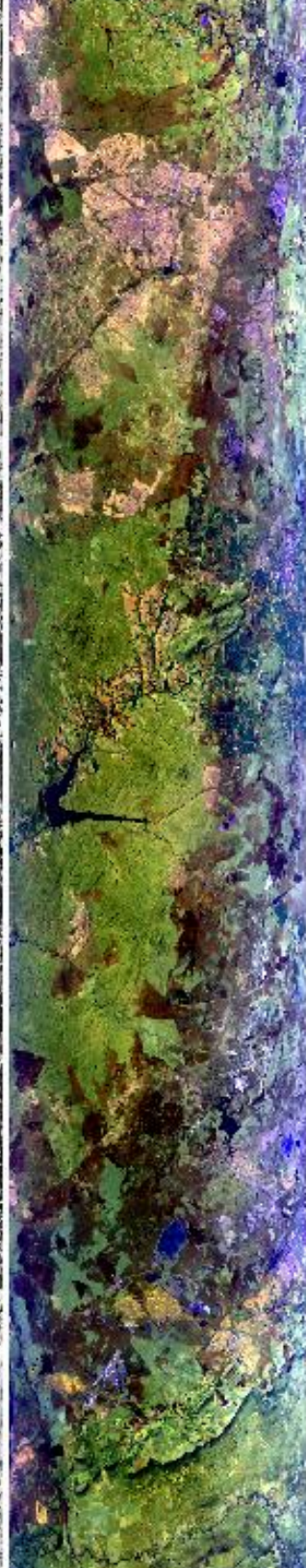
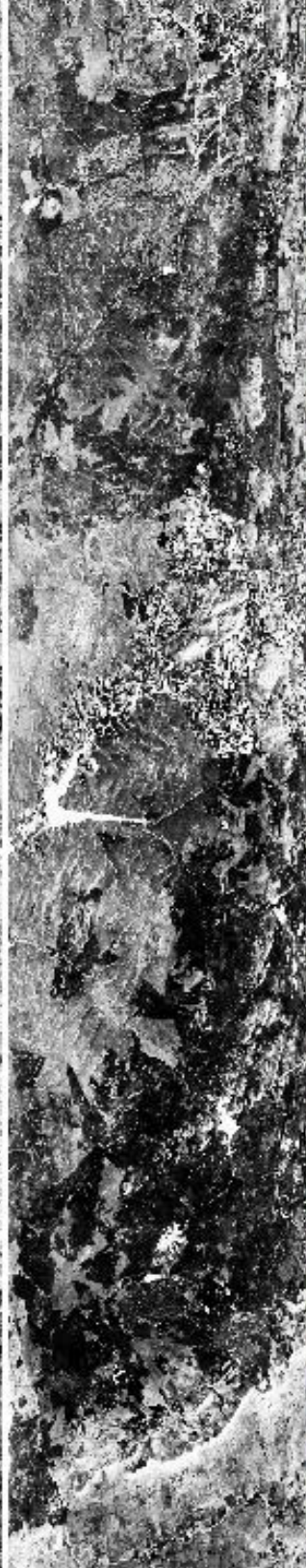
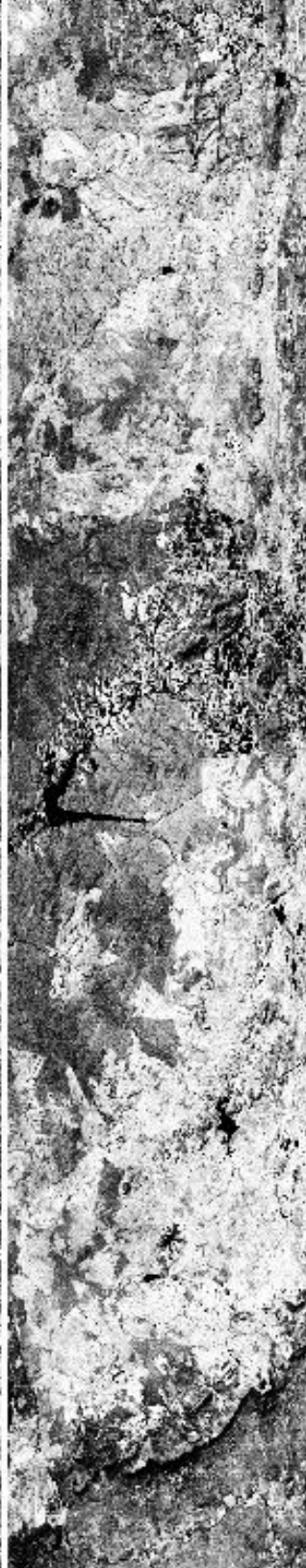
06:01:00

06:03:00

06:05:00

06:07:00

06:09:00



06:01:00

06:03:00

06:05:00

06:07:00

06:09:00

06:09:00

06:11:00

06:13:00

06:15:05



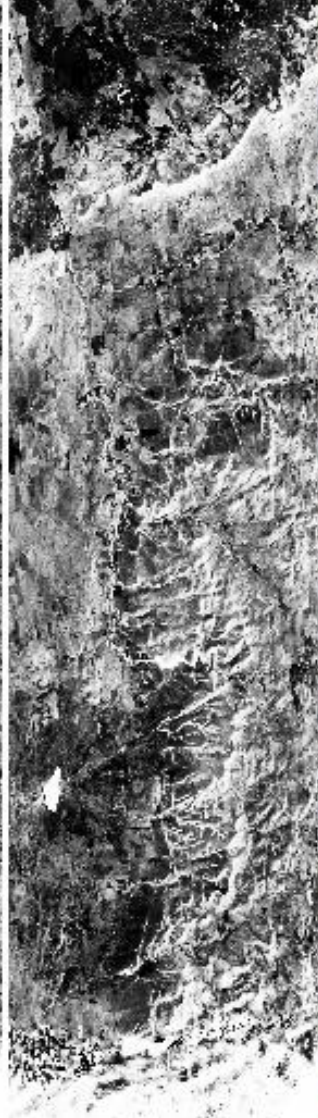
0.66µm (#3)



1.61µm (#10)



3.77µm (#30)



10.94µm (#45)
reverse scale



RGB (#20,#10,#2)

06:09:00

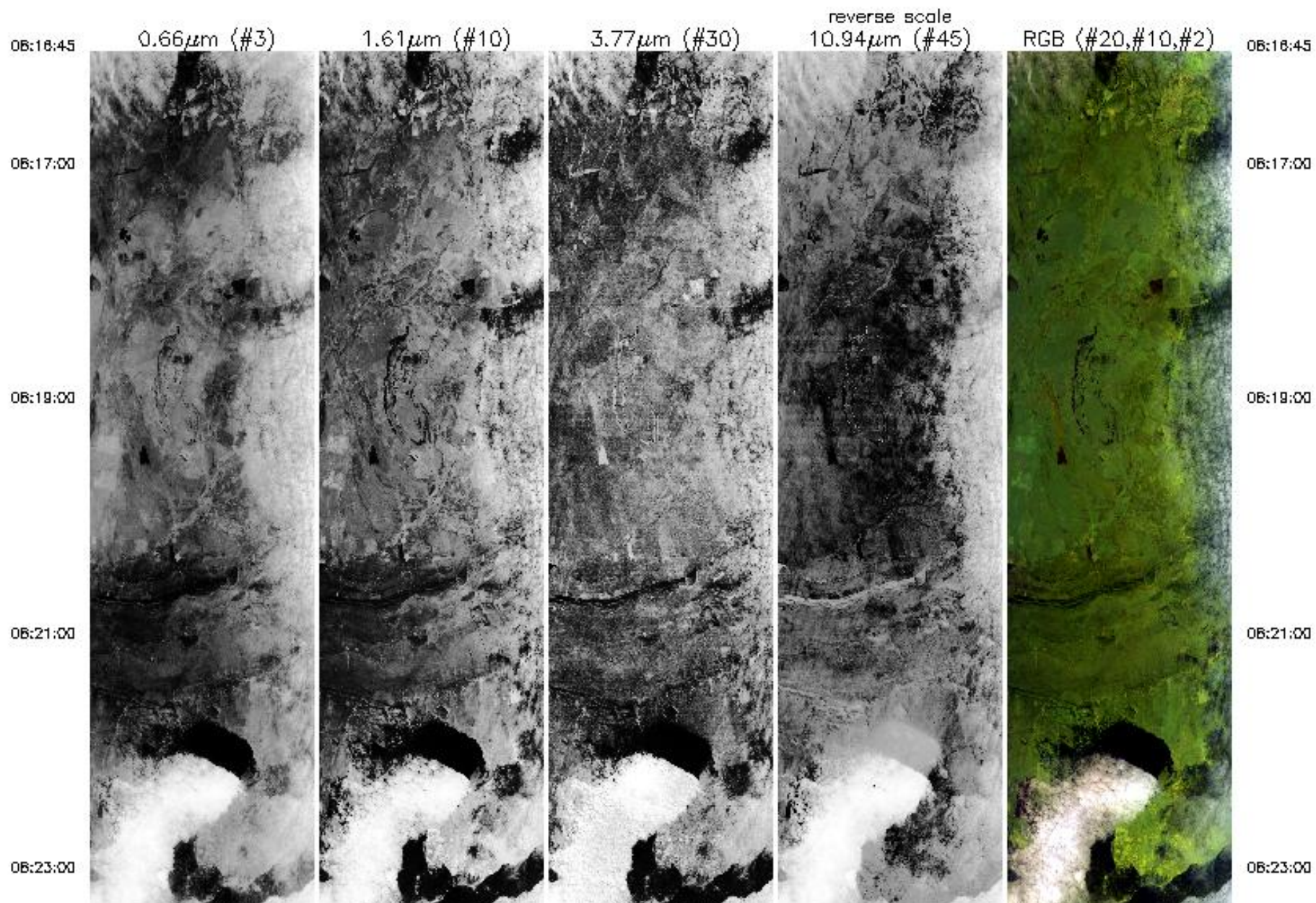
06:11:00

06:13:00

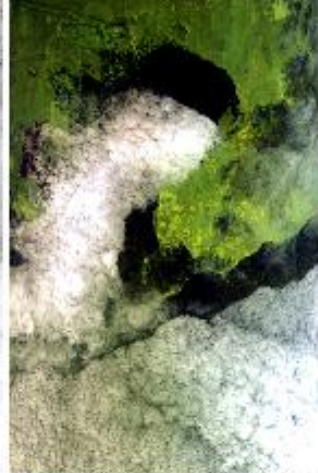
06:15:05

Upper Left Lat, Lon = -25.3°, 28.9°
 Lower Right Lat, Lon = -25.7°, 26.3°
 Aircraft Heading = 265.2°
 Solar Zenith = 49.7°
 GPS Altitude = 19873. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign - 20 Aug 2000
South Africa
Flight #00-148 Track #4



06:23:00



06:23:00

06:25:07

0.66µm (#3)

1.61µm (#10)

3.77µm (#30)

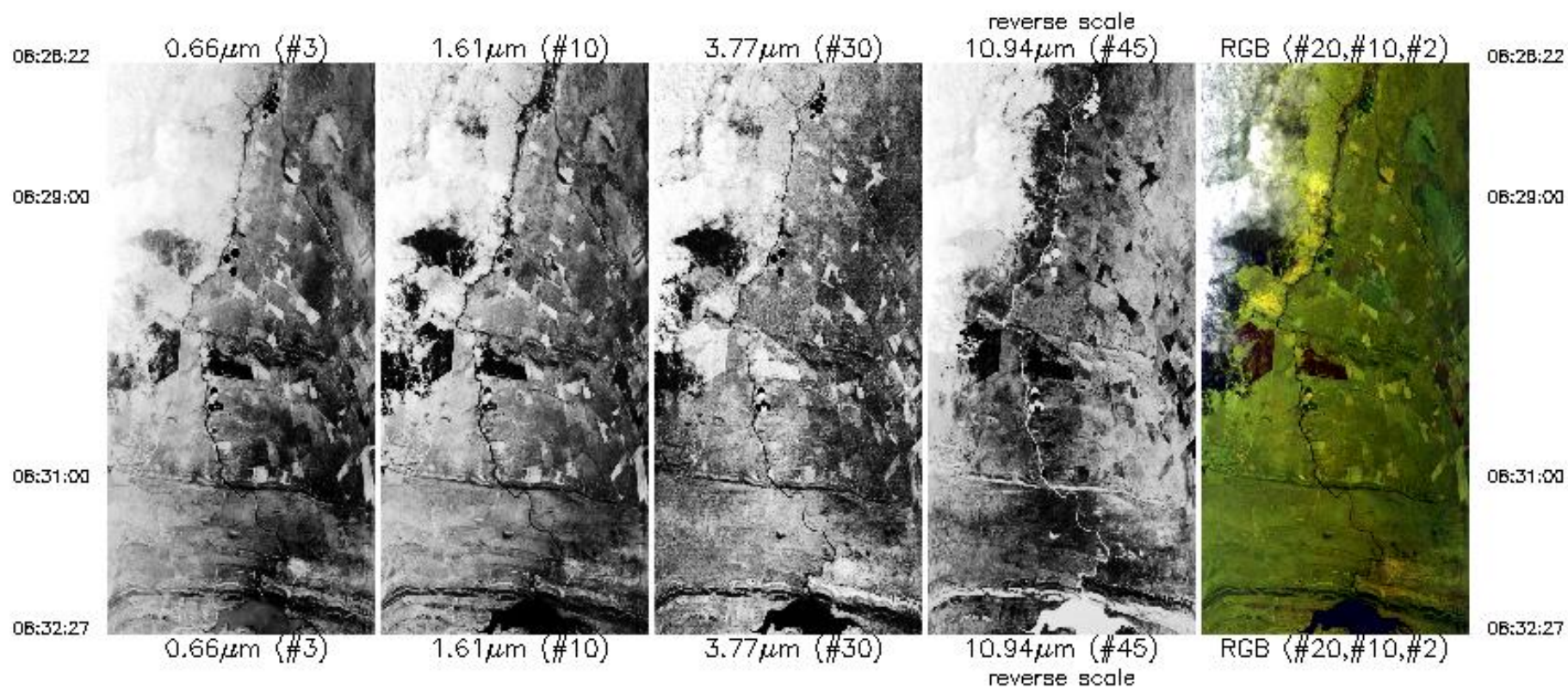
10.94µm (#45)
reverse scale

RGB (#20,#10,#2)

06:25:07

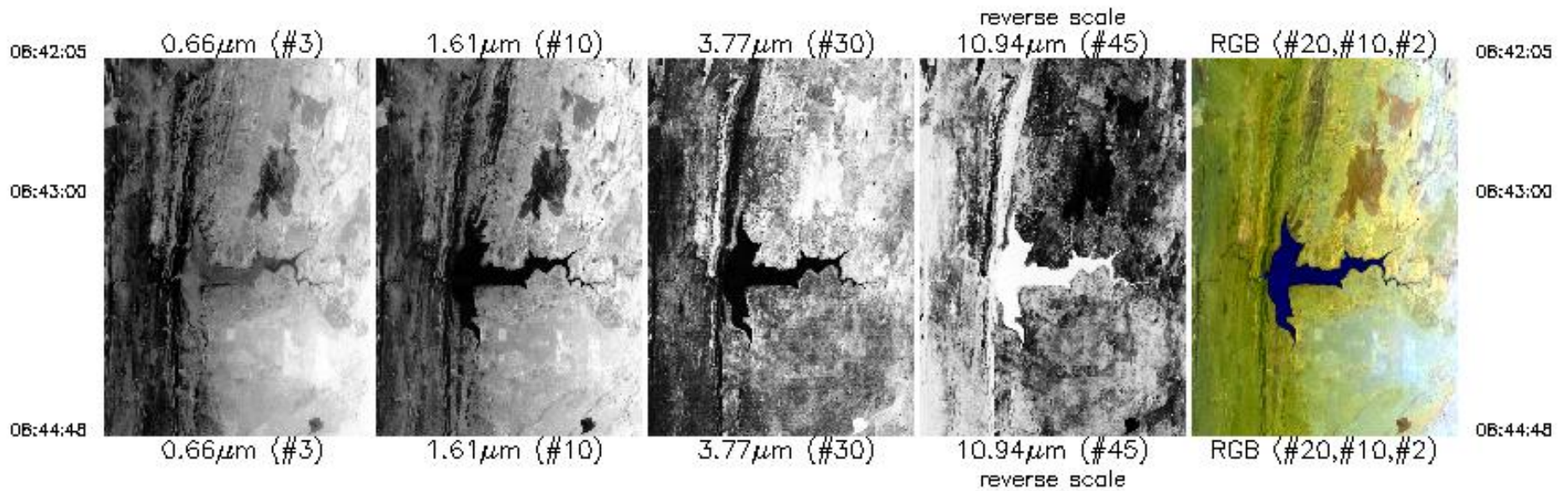
Upper Left Lat, Lon = -25.4°, 26.4°
 Lower Right Lat, Lon = -24.4°, 26.1°
 Aircraft Heading = 359.5°
 Solar Zenith = 47.8°
 GPS Altitude = 19845. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign – 20 Aug 2000
 Botswana
 Flight #00-148 Track #5



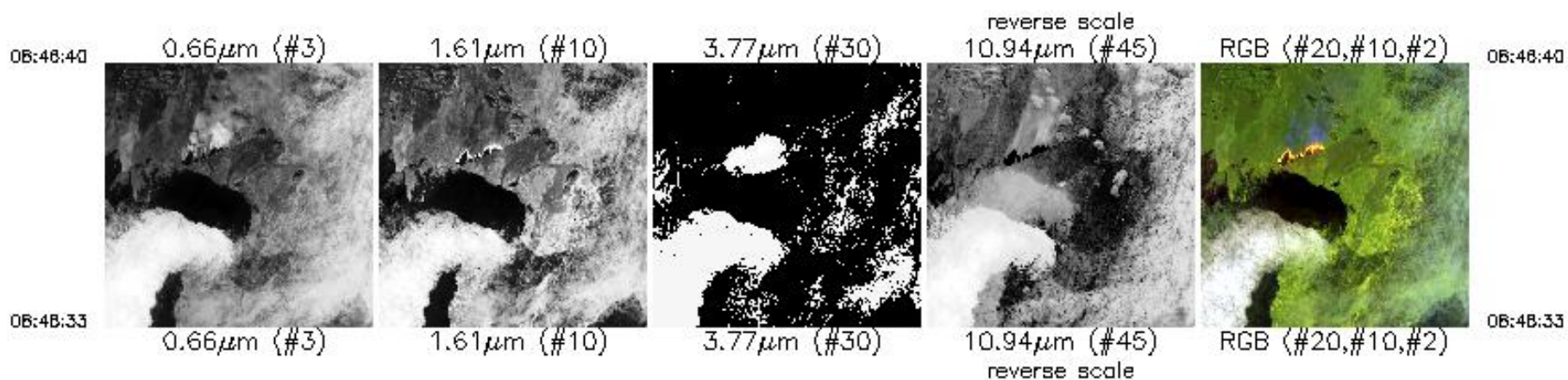
Upper Left Lat, Lon = -24.4° , 26.3°
 Lower Right Lat, Lon = -24.9° , 26.6°
 Aircraft Heading = 187.8°
 Solar Zenith = 45.4°
 GPS Altitude = 19761. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign – 20 Aug 2000
 Botswana
 Flight #00-148 Track #6



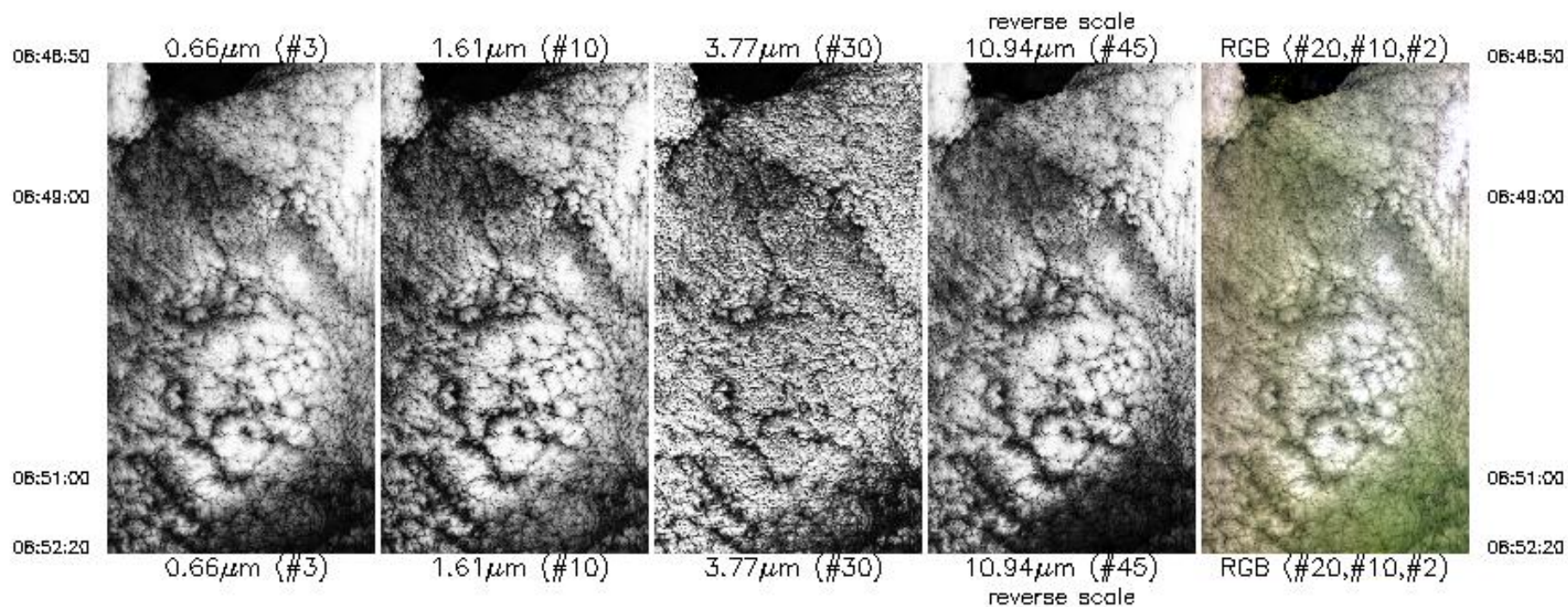
Upper Left Lat, Lon = -24.8°, 26.7°
 Lower Right Lat, Lon = -25.1°, 26.3°
 Aircraft Heading = 278.4°
 Solar Zenith = 43.7°
 GPS Altitude = 19745. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 20 Aug 2000
Botswana
Flight #00–148 Track #7



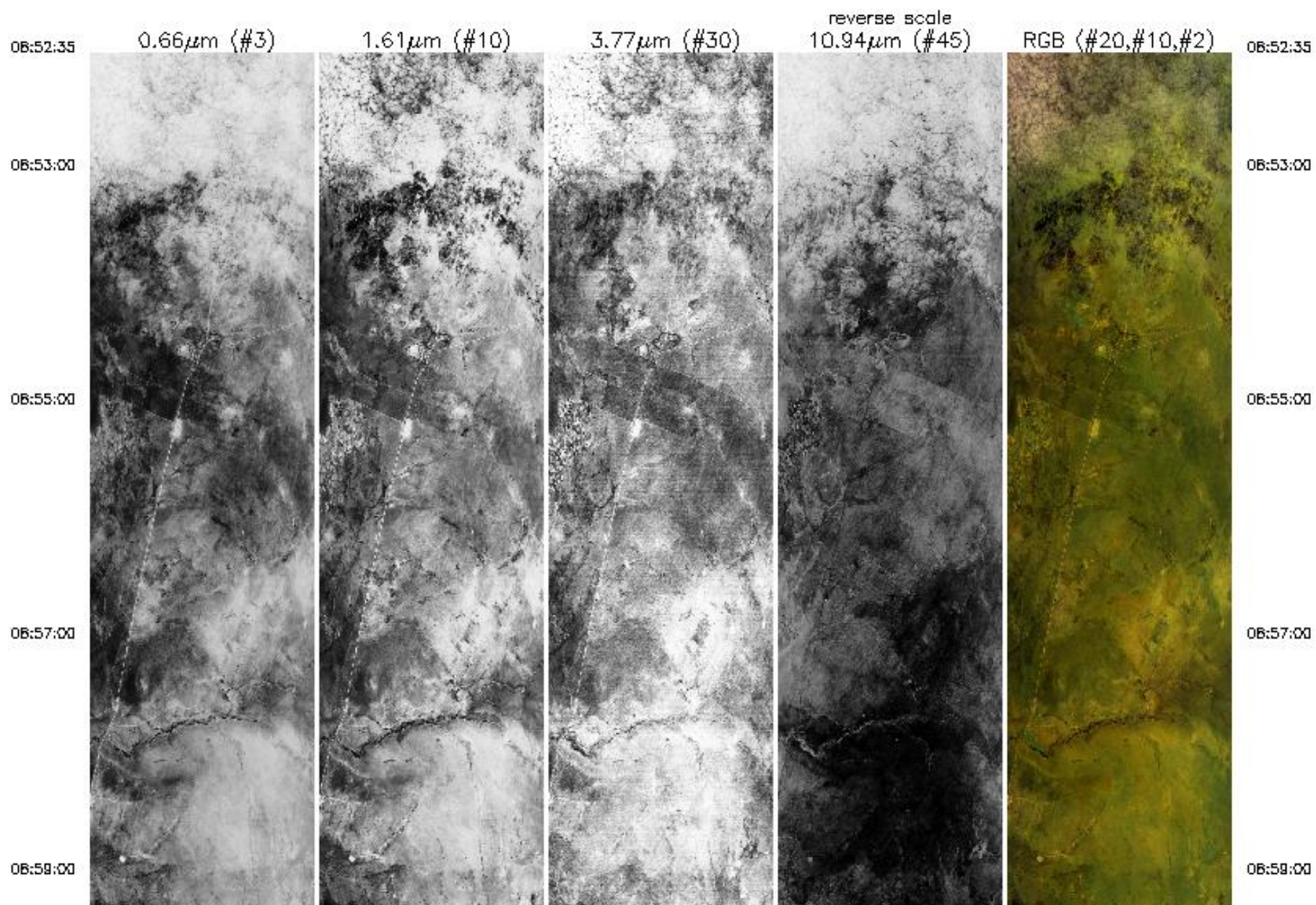
Upper Left Lat, Lon = -24.8° , 26.4°
Lower Right Lat, Lon = -24.5° , 26.1°
Aircraft Heading = 7.3°
Solar Zenith = 43.2°
GPS Altitude = 19734. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign – 20 Aug 2000
 Botswana
 Flight #00-148 Track #8



Upper Left Lat, Lon = -24.6° , 26.4°
 Lower Right Lat, Lon = -24.1° , 26.2°
 Aircraft Heading = 18.9°
 Solar Zenith = 42.7°
 GPS Altitude = 19772. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign - 20 Aug 2000
Botswana
Flight #00-148 Track #9



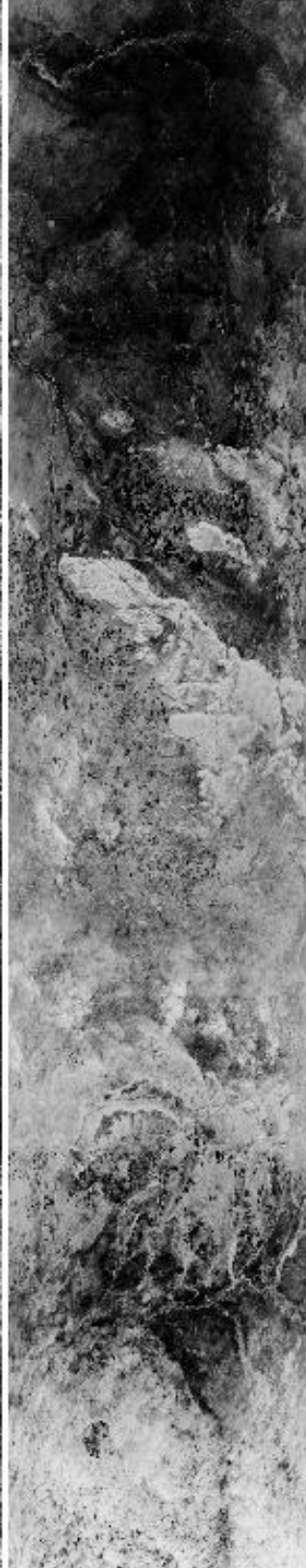
08:58:00

09:01:00

09:03:00

09:05:00

09:07:00



08:58:00

09:01:00

09:03:00

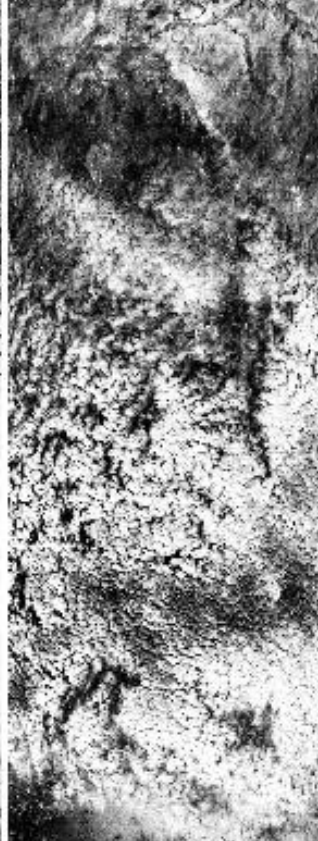
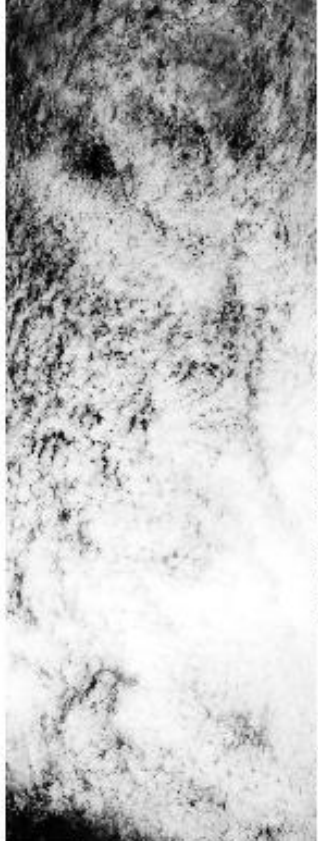
09:05:00

09:07:00

09:07:00

09:09:00

09:11:27



09:07:00

09:09:00

09:11:27

0.66µm (#3)

1.61µm (#10)

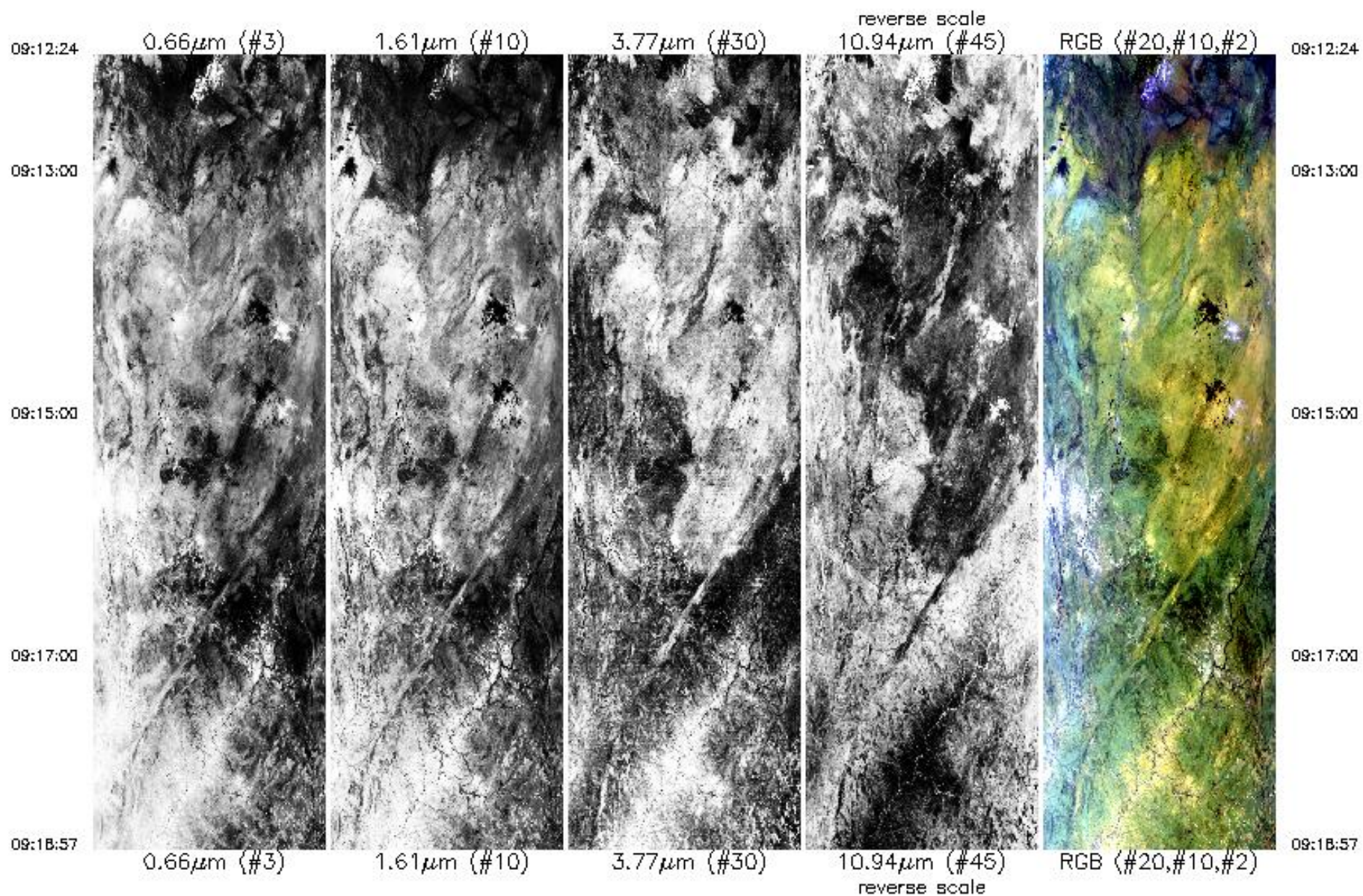
3.77µm (#30)

10.94µm (#45)
reverse scale

RGB (#20,#10,#2)

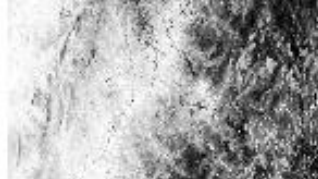
Upper Left Lat, Lon = -24.1°, 26.5°
 Lower Right Lat, Lon = -22.0°, 26.6°
 Aircraft Heading = 13.3°
 Solar Zenith = 41.9°
 GPS Altitude = 19953. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign – 20 Aug 2000
 Botswana
 Flight #00-148 Track #10



Upper Left Lat, Lon = -22.1°, 26.9°

09:18:57



0.66 μ m (#3)



1.61 μ m (#10)



3.77 μ m (#30)



10.94 μ m (#45)
reverse scale

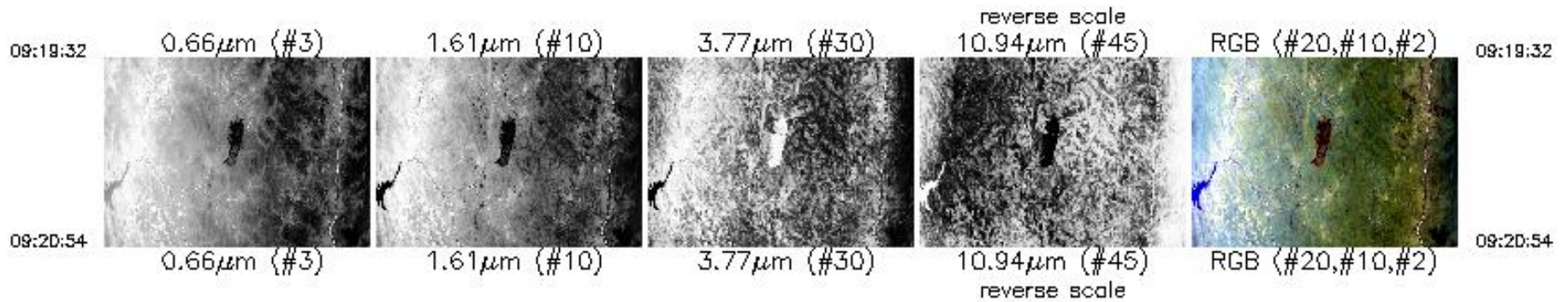


RGB (#20,#10,#2)

09:18:57

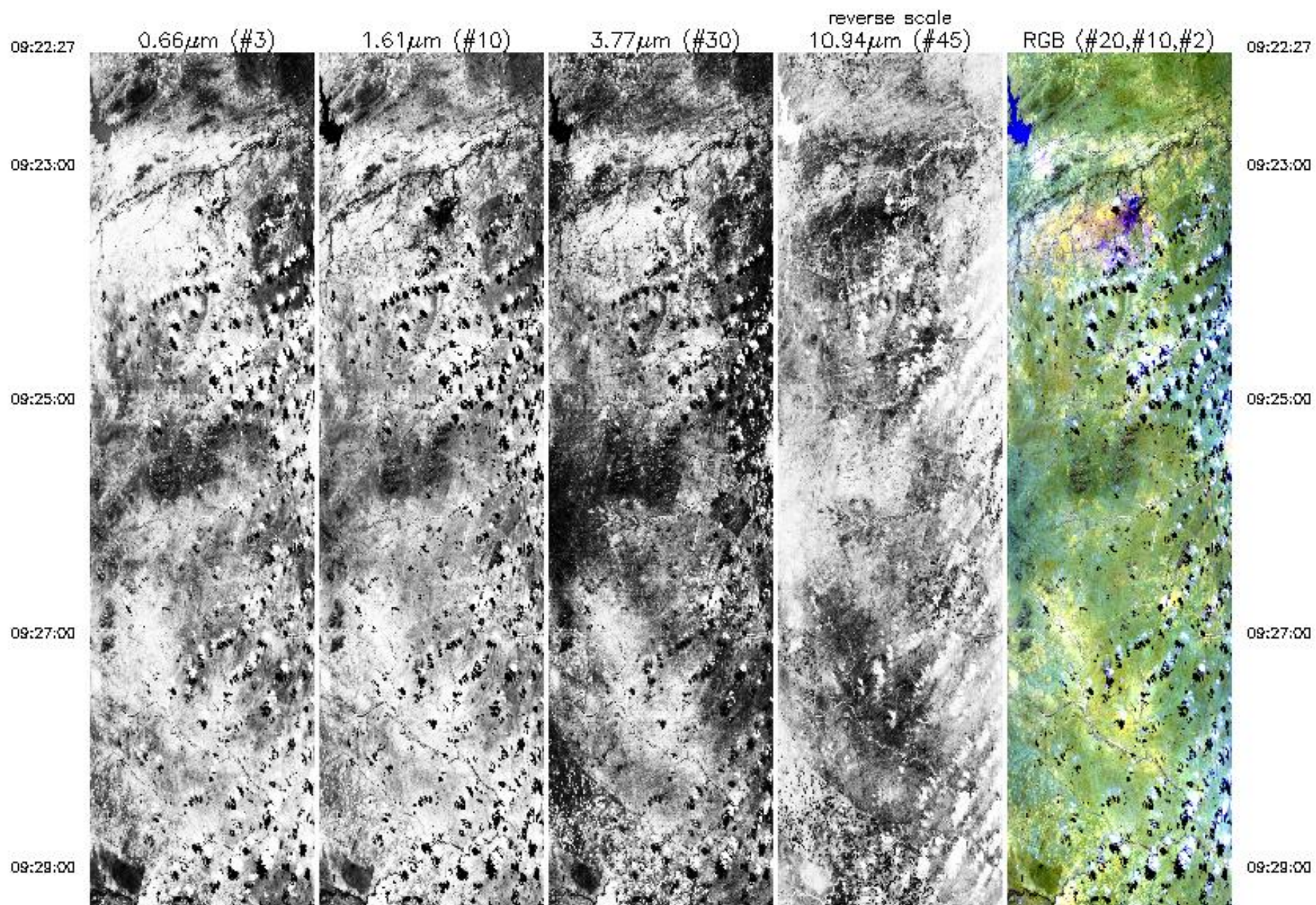
Upper Left Lat, Lon = -22.1°, 26.9°
Lower Right Lat, Lon = -21.5°, 27.5°
Aircraft Heading = 65.8°
Solar Zenith = 37.7°
GPS Altitude = 20012. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 20 Aug 2000
South Africa
Flight #00-148 Track #11



Upper Left Lat, Lon = -21.8°, 27.6°
Lower Right Lat, Lon = -21.5°, 27.8°
Aircraft Heading = 94.7°
Solar Zenith = 36.5°
GPS Altitude = 20032. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign - 20 Aug 2000
South Africa
Flight #00-148 Track #12



09:29:00



09:31:00



09:33:00



09:35:00



09:37:00



09:29:00

09:31:00

09:33:00

09:35:00

09:37:00

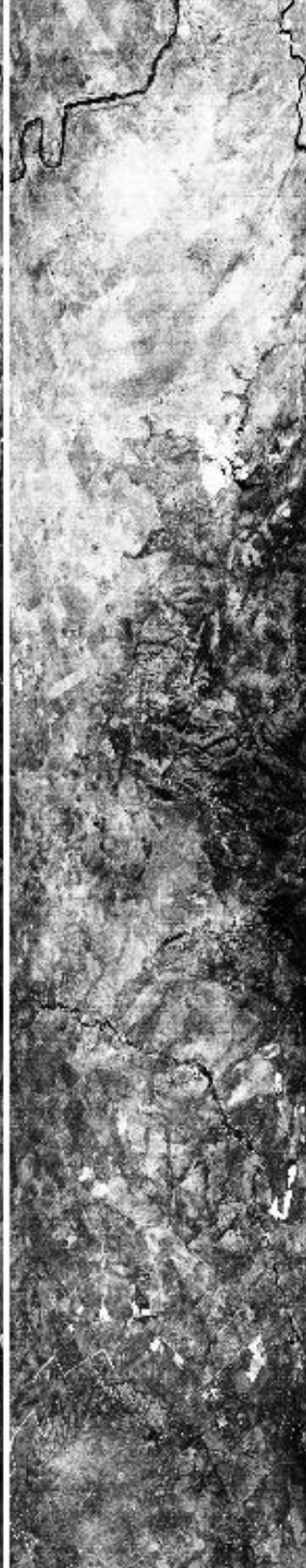
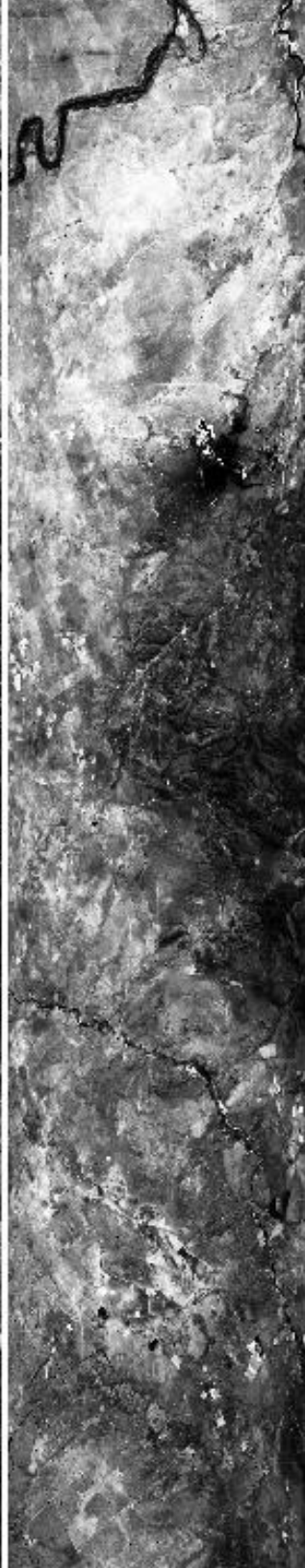
09:37:00

09:38:00

09:41:00

09:43:00

09:45:00



09:37:00

09:38:00

09:41:00

09:43:00

09:45:00

09:45:00

09:47:00

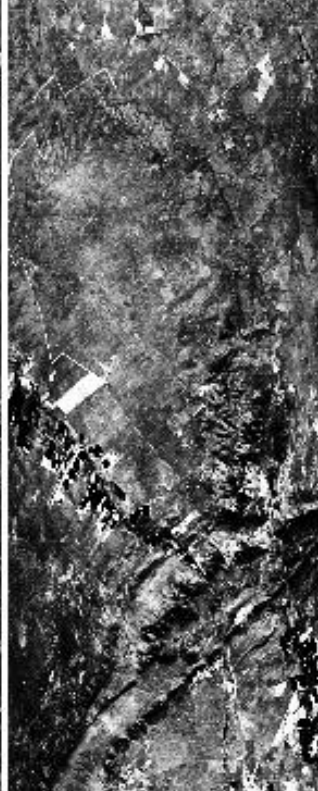
09:48:14



0.66µm (#3)



1.61µm (#10)



3.77µm (#30)



10.94µm (#45)
reverse scale



RGB (#20,#10,#2)

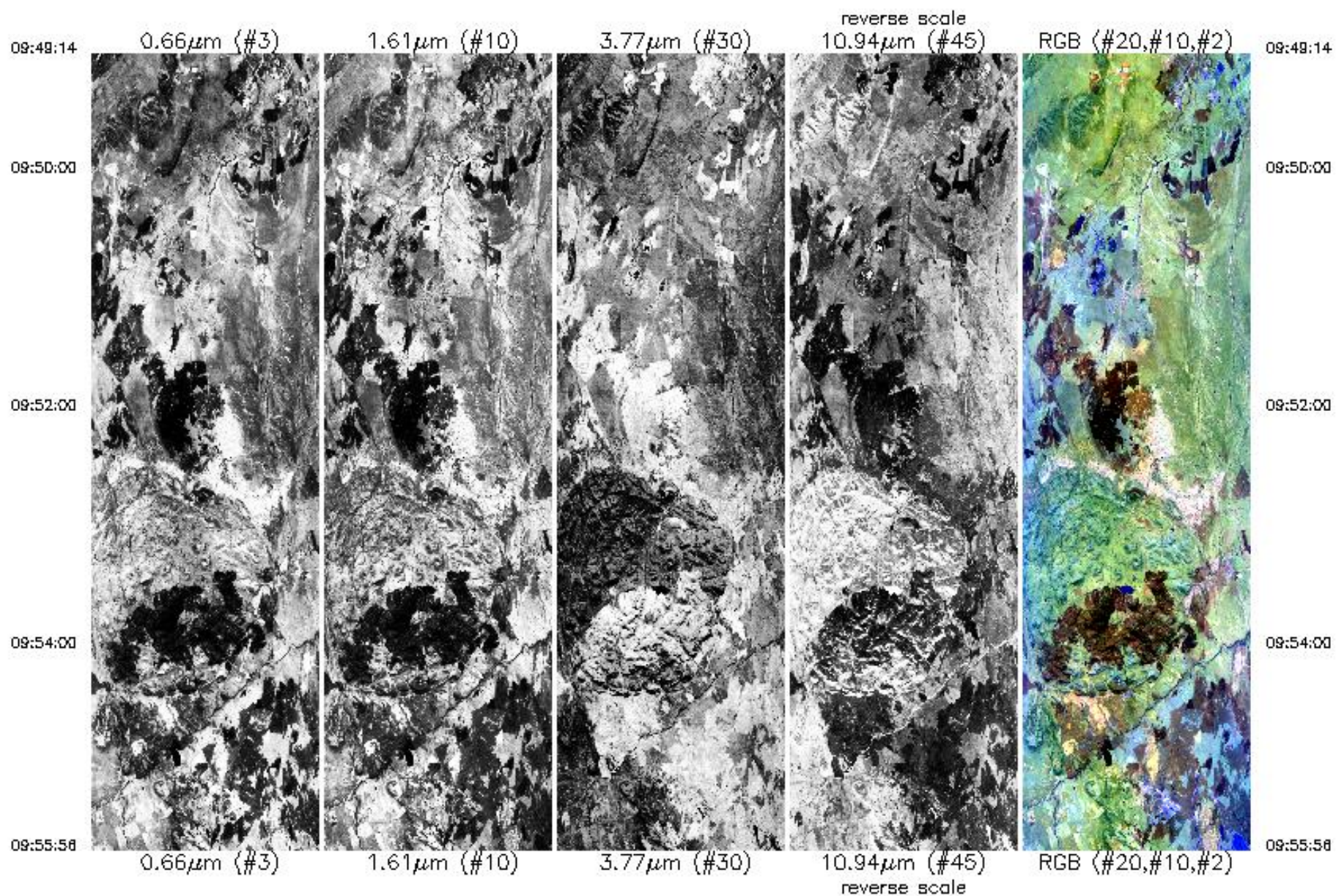
09:45:00

09:47:00

09:48:14

Upper Left Lat, Lon = -21.8° , 27.7°
 Lower Right Lat, Lon = -24.8° , 27.4°
 Aircraft Heading = 186.5°
 Solar Zenith = 36.2°
 GPS Altitude = 20093. m (MSL)

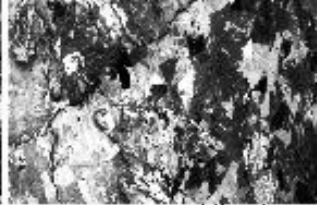
MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 20 Aug 2000
South Africa
Flight #00-148 Track #13



09:55:56



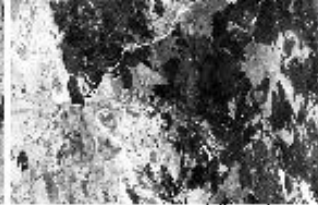
0.66 μm (#3)



1.61 μm (#10)



3.77 μm (#30)



10.94 μm (#45)
reverse scale

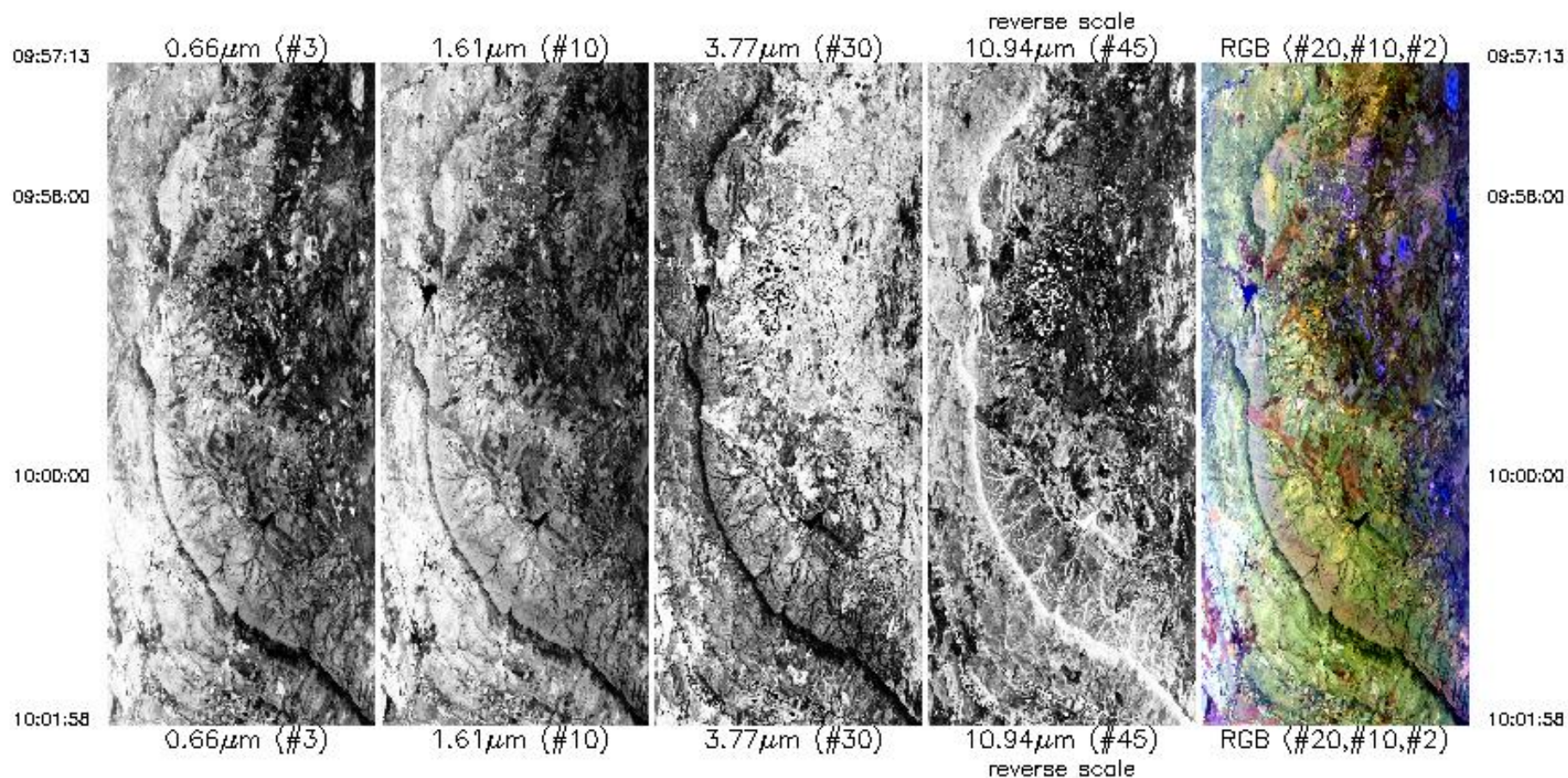


RGB (#20, #10, #2)

09:55:56

Upper Left Lat, Lon = -24.7° , 27.1°
Lower Right Lat, Lon = -25.5° , 27.3°
Aircraft Heading = 190.7°
Solar Zenith = 37.5°
GPS Altitude = 20212. m (MSL)

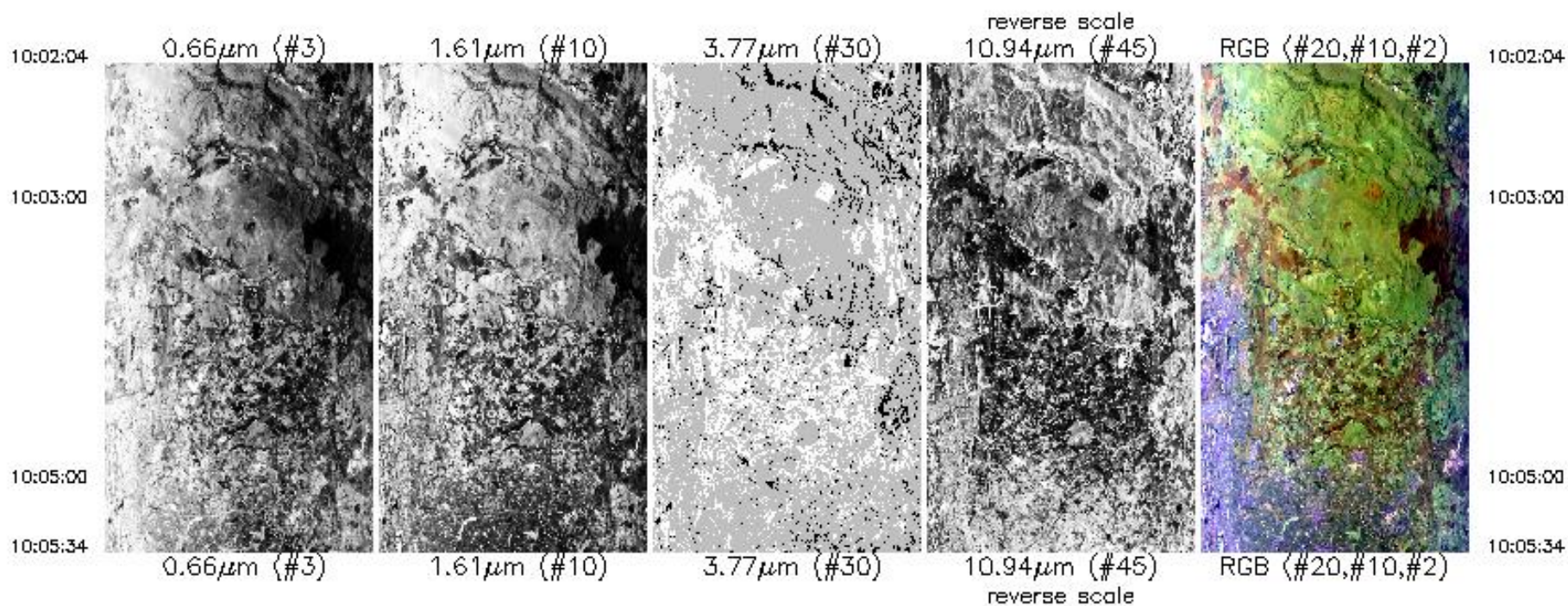
MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign – 20 Aug 2000
 South Africa
 Flight #00-148 Track #14



Upper Left Lat, Lon = -25.8°, 27.0°
 Lower Right Lat, Lon = -25.8°, 27.7°
 Aircraft Heading = 124.5°
 Solar Zenith = 38.3°
 GPS Altitude = 20210. m (MSL)

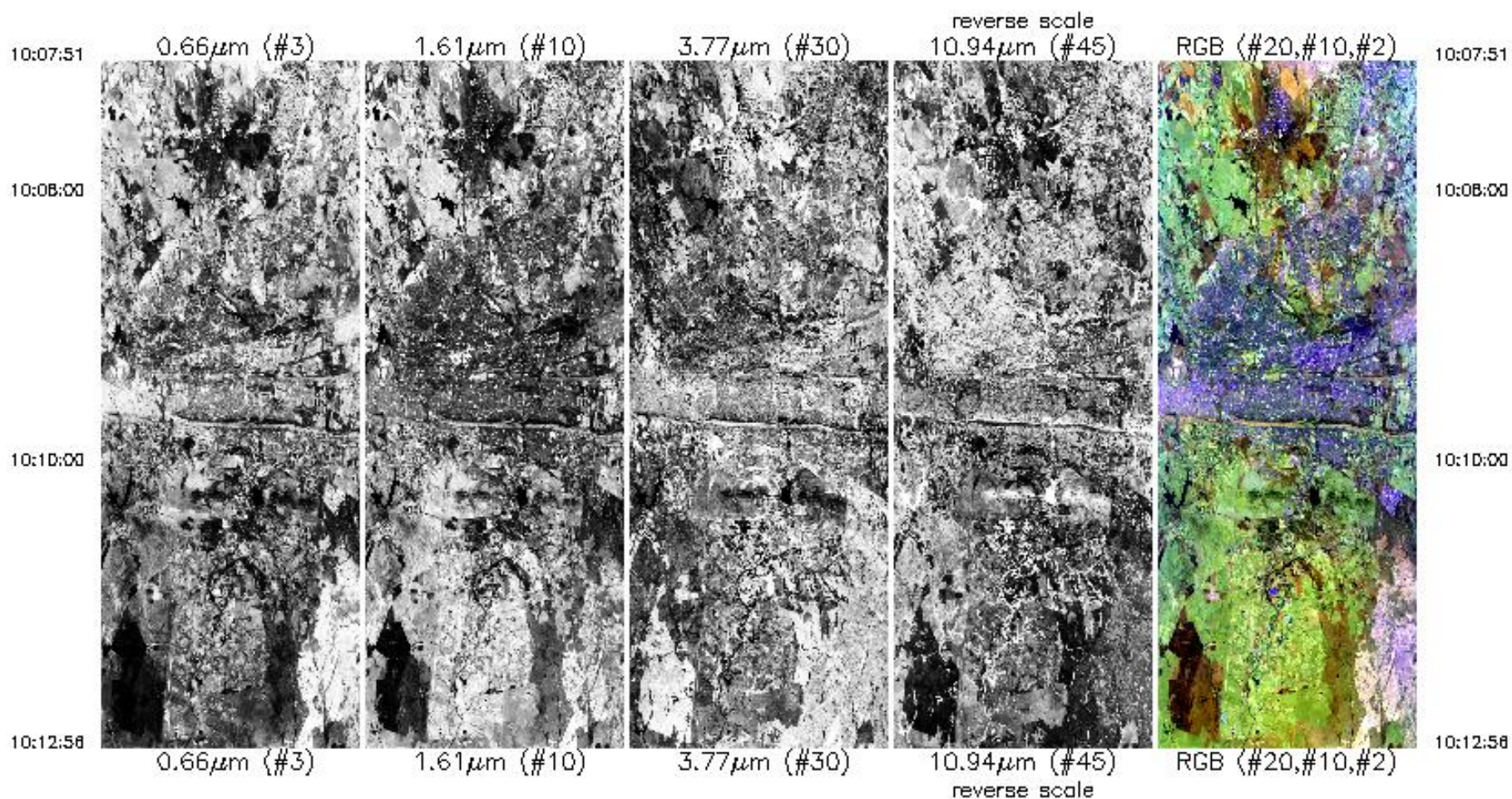
Lower Right Lat, Lon = -25.8° , 27.7°
Aircraft Heading = 124.5°
Solar Zenith = 38.3°
GPS Altitude = 20210. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign – 20 Aug 2000
 South Africa
 Flight #00-148 Track #15



Upper Left Lat, Lon = -26.0° , 27.5°
 Lower Right Lat, Lon = -25.9° , 28.1°
 Aircraft Heading = 120.9°
 Solar Zenith = 38.4°
 GPS Altitude = 20196. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign – 20 Aug 2000
 South Africa
 Flight #00-148 Track #16

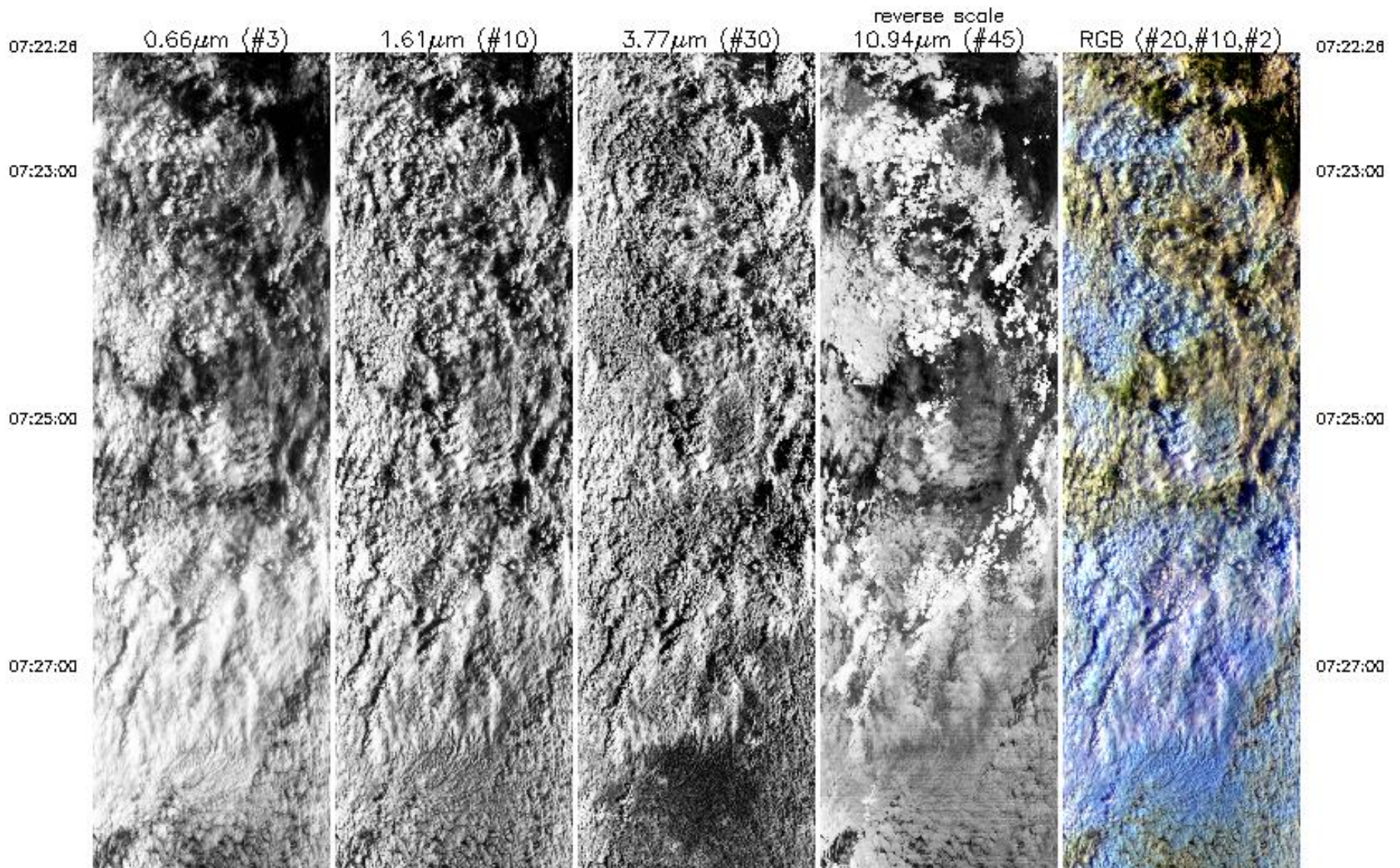


Upper Left Lat, Lon = -26.0° , 28.4°
 Lower Right Lat, Lon = -25.4° , 28.0°
 Aircraft Heading = 358.3°
 Solar Zenith = 38.2°
 GPS Altitude = 20152. m (MSL)

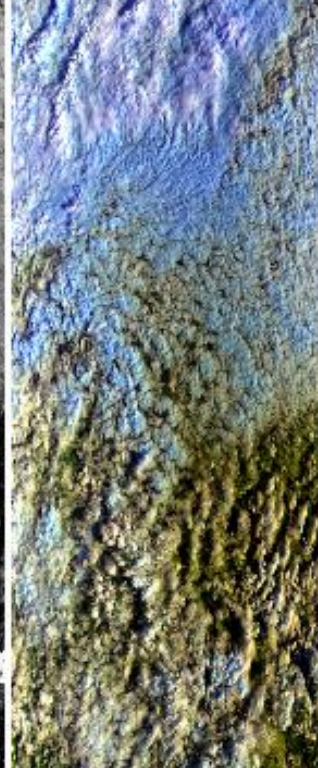
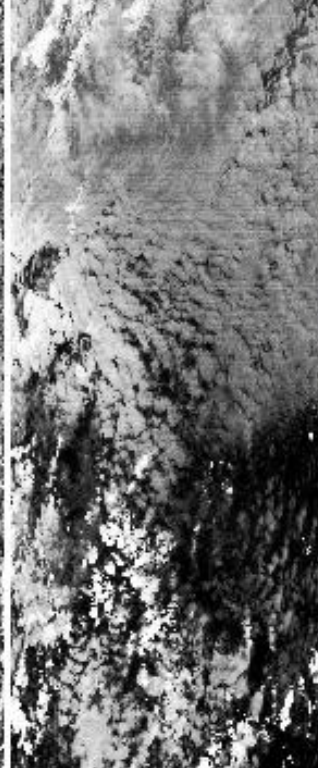
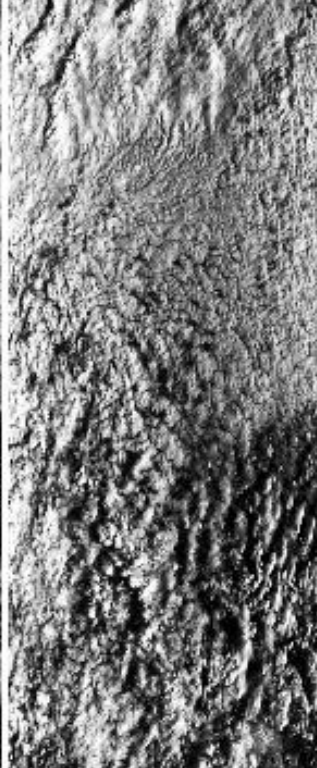
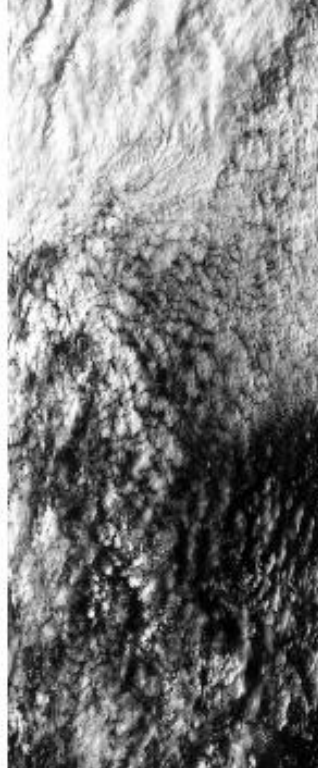
Upper Left Lat, Lon = -26.0° , 28.4°
Lower Right Lat, Lon = -25.4° , 28.0°
Aircraft Heading = 358.3°
Solar Zenith = 38.2°
GPS Altitude = 20152. m (MSL)

Flight #00-148 Browse Imagery

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign - 20 Aug 2000
South Africa
Flight #00-148 Track #1



07:27:00



07:27:00

07:28:00

07:28:00

07:31:00

07:31:00

07:31:57

07:31:57

0.66µm (#3)

1.61µm (#10)

3.77µm (#30)

10.94µm (#45)
reverse scale

RGB (#20,#10,#2)

Upper Left Lat, Lon = -23.2°, 29.9°

Lower Right Lat, Lon = -23.7°, 31.0°

Aircraft Heading = 126.6°

Solar Zenith = 53.1°

GPS Altitude = 18300. m (MSL)

MODIS Airborne Simulator Browse Imagery

SAFARI 2000 Campaign - 20 Aug 2000

South Africa

Flight #00-148 Track #2

07:33:38

0.66µm (#3)

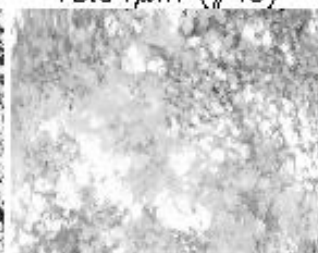
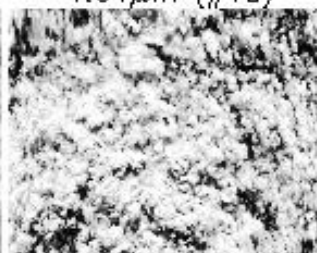
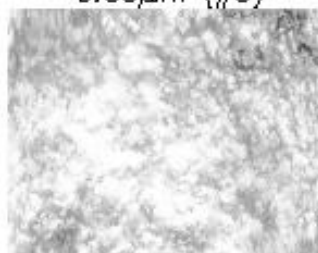
1.61µm (#10)

3.77µm (#30)

reverse scale
10.94µm (#45)

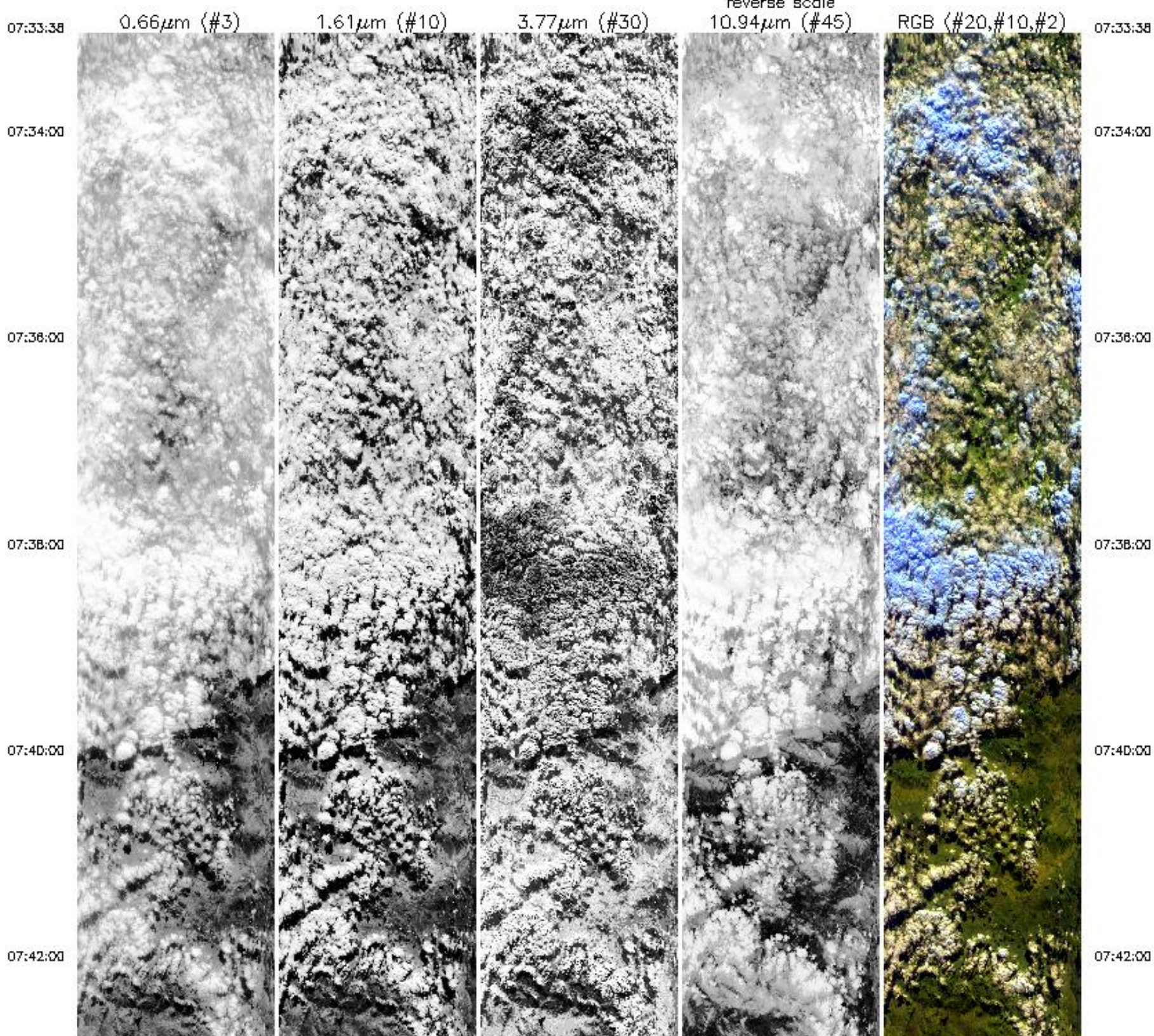
RGB (#20,#10,#2)

07:33:38



07:34:00

07:34:00



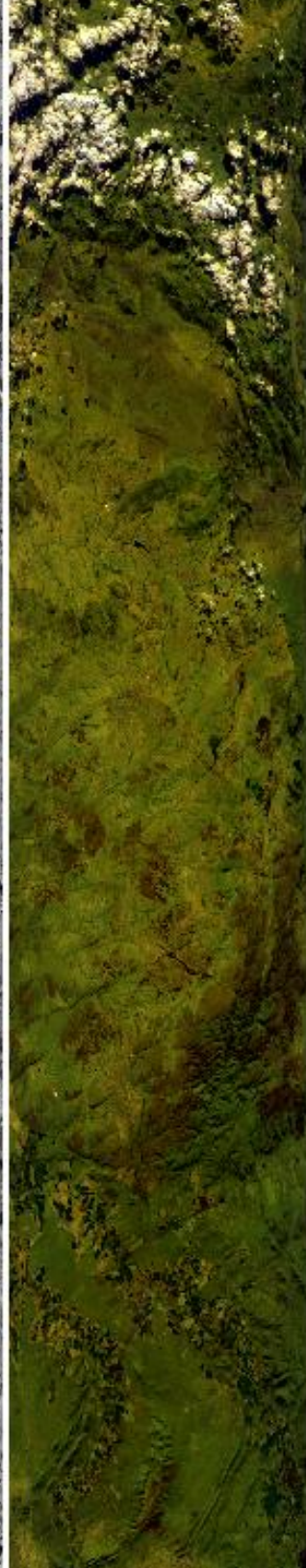
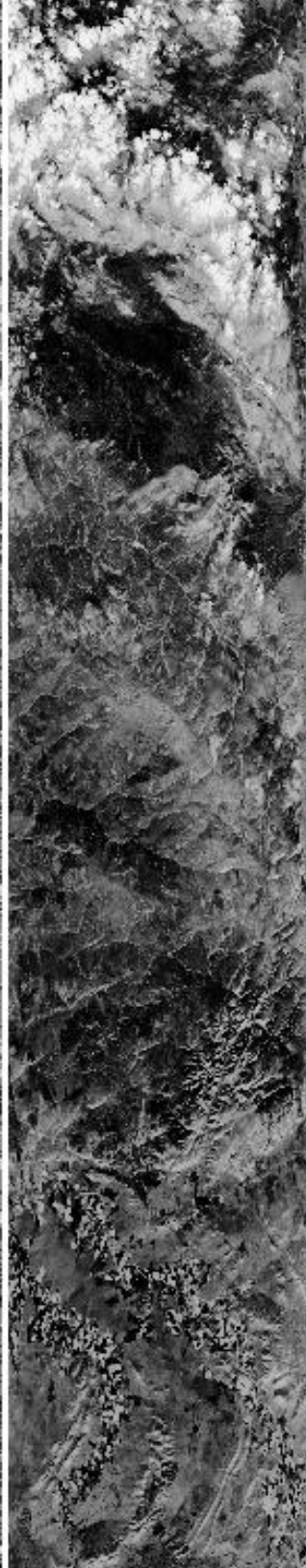
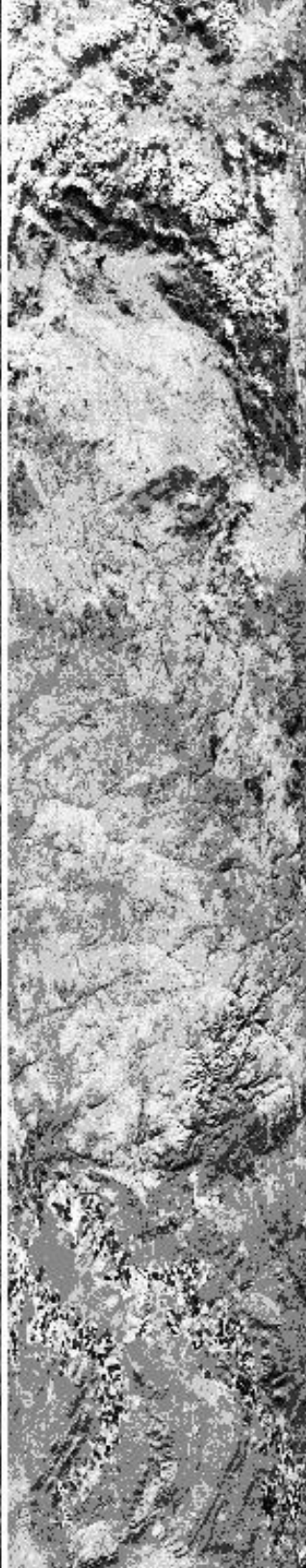
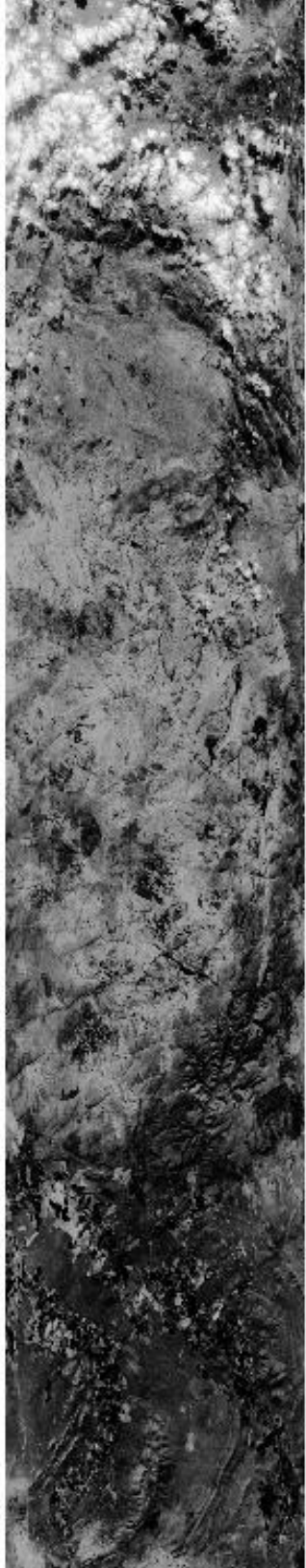
07:42:00

07:44:00

07:46:00

07:48:00

07:50:00



07:42:00

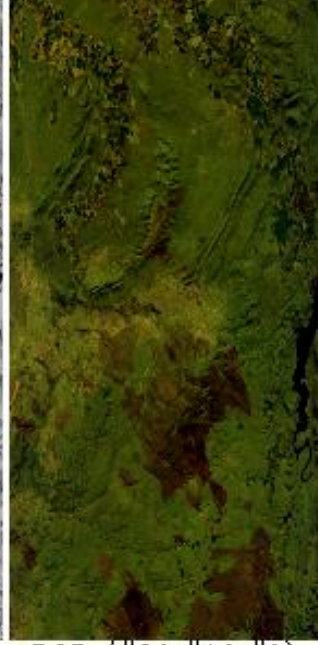
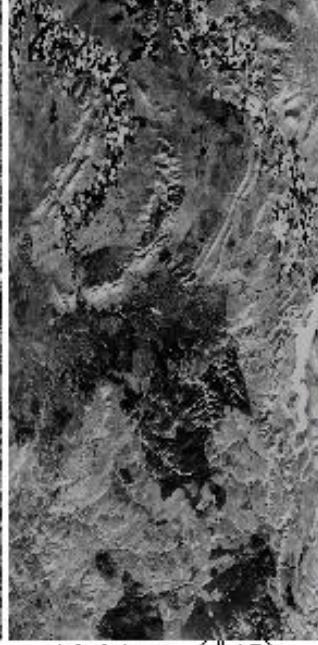
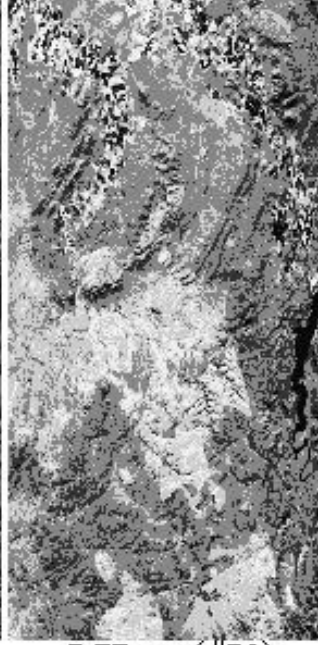
07:44:00

07:46:00

07:48:00

07:50:00

07:50:00



07:50:00

07:52:00

07:52:00

07:53:42

07:53:42

0.66µm (#3)

1.61µm (#10)

3.77µm (#30)

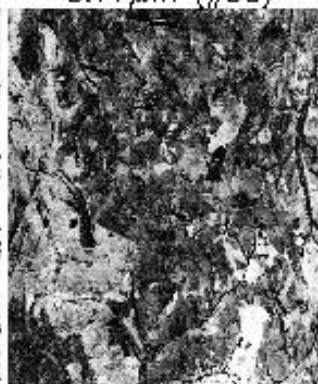
10.94µm (#45)
reverse scale

RGB (#20,#10,#2)

Upper Left Lat, Lon = -23.8°, 30.8°
 Lower Right Lat, Lon = -25.6°, 29.2°
 Aircraft Heading = 220.8°
 Solar Zenith = 50.9°
 GPS Altitude = 19828. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign - 20 Aug 2000
 South Africa
 Flight #00-148 Track #3

07:54:28



07:54:28

07:55:00

07:55:00

0.66µm (#3)

1.61µm (#10)

3.77µm (#30)

reverse scale
10.94µm (#45)

RGB (#20,#10,#2)

07:55:00



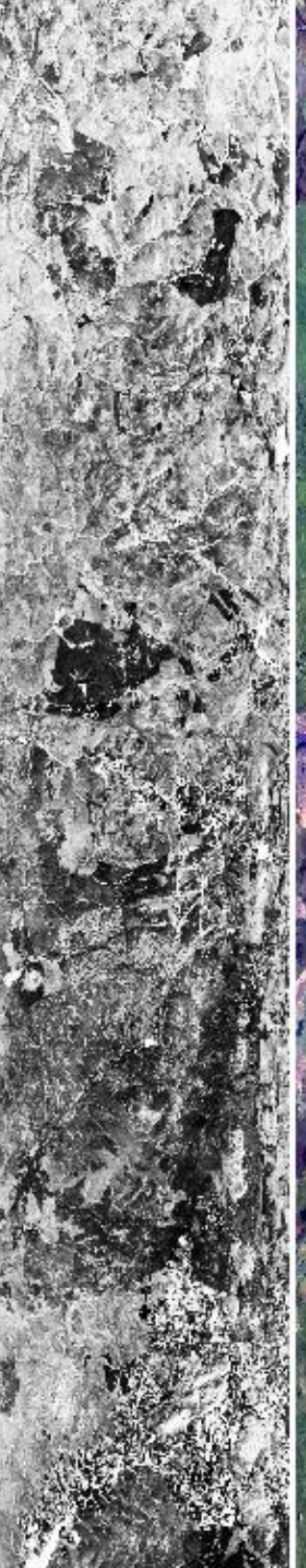
07:57:00



07:58:00



06:01:00



06:03:00



07:55:00

07:57:00

07:58:00

06:01:00

06:03:00

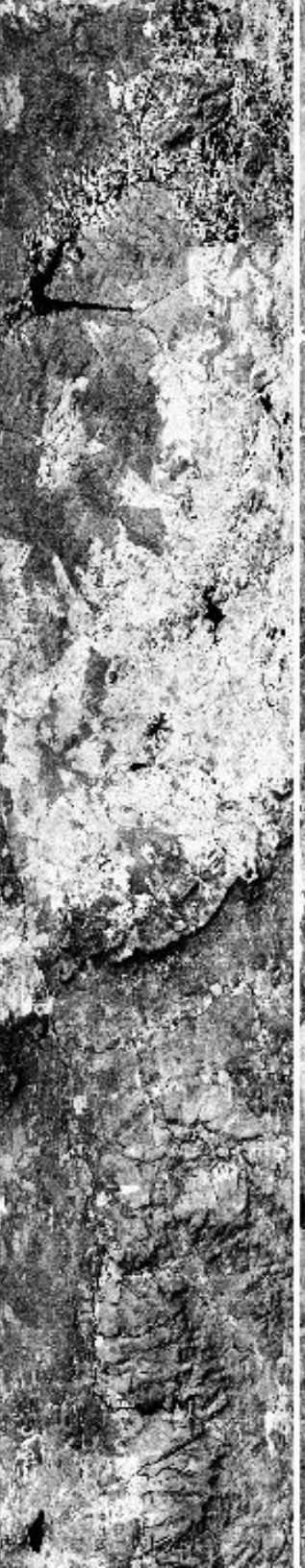
06:03:00



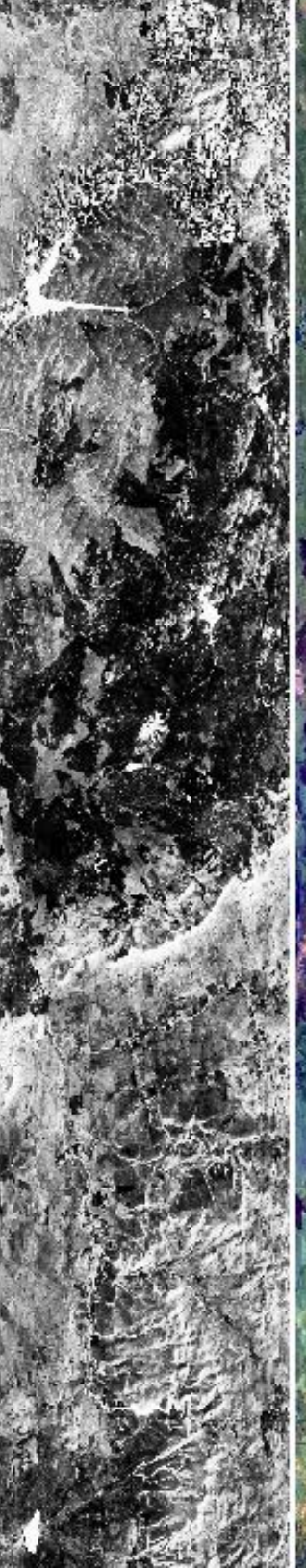
06:05:00



06:07:00



06:08:00



06:11:00



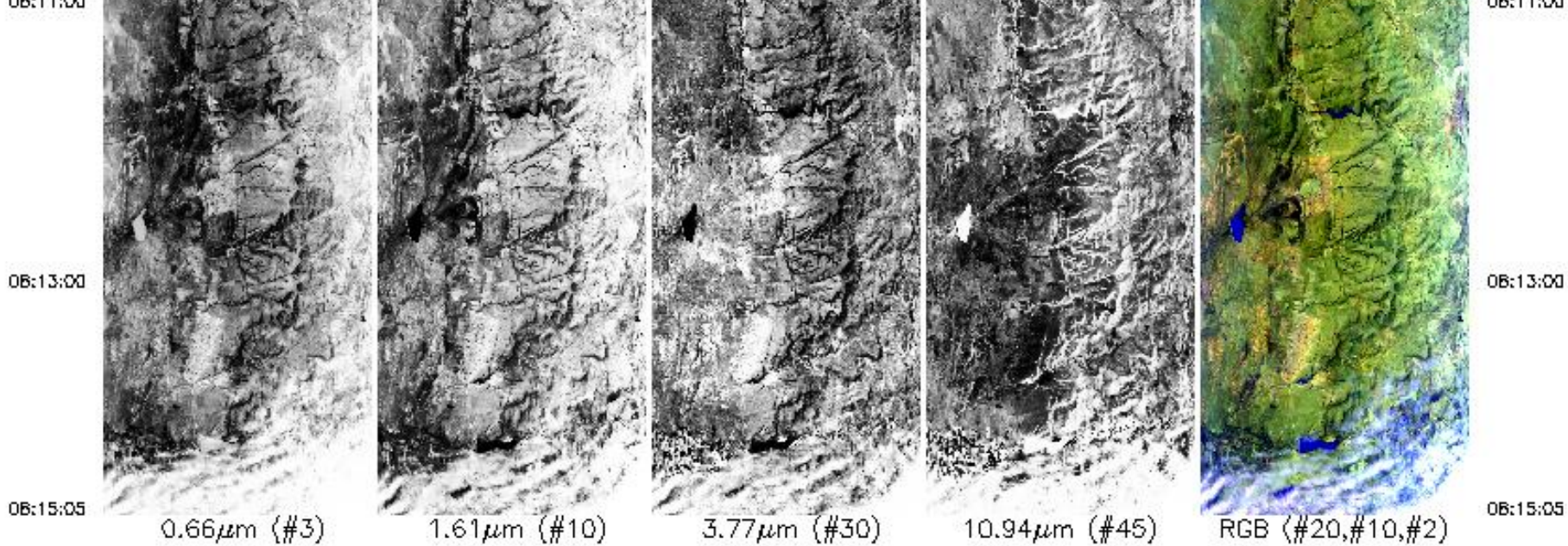
06:03:00

06:05:00

06:07:00

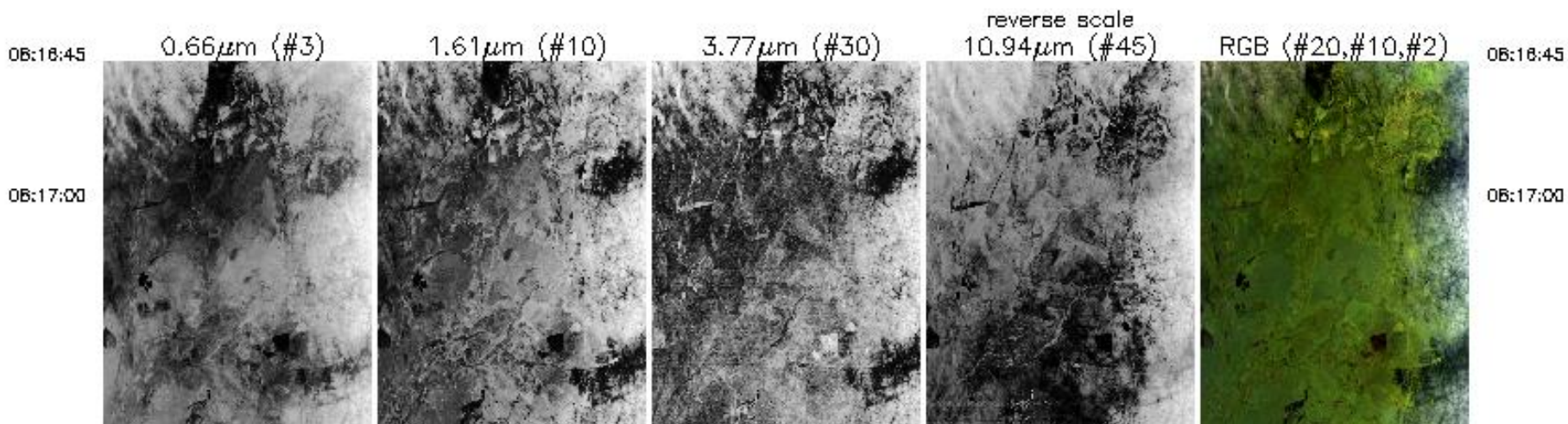
06:08:00

06:11:00



Upper Left Lat, Lon = -25.3° , 28.9°
 Lower Right Lat, Lon = -25.7° , 26.3°
 Aircraft Heading = 265.2°
 Solar Zenith = 49.7°
 GPS Altitude = 19873. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign - 20 Aug 2000
 South Africa
 Flight #00-148 Track #4



06:17:00

06:19:00

06:21:00

06:23:00

06:25:07



06:17:00

06:19:00

06:21:00

06:23:00

06:25:07

0.66µm (#3)

1.61µm (#10)

3.77µm (#30)

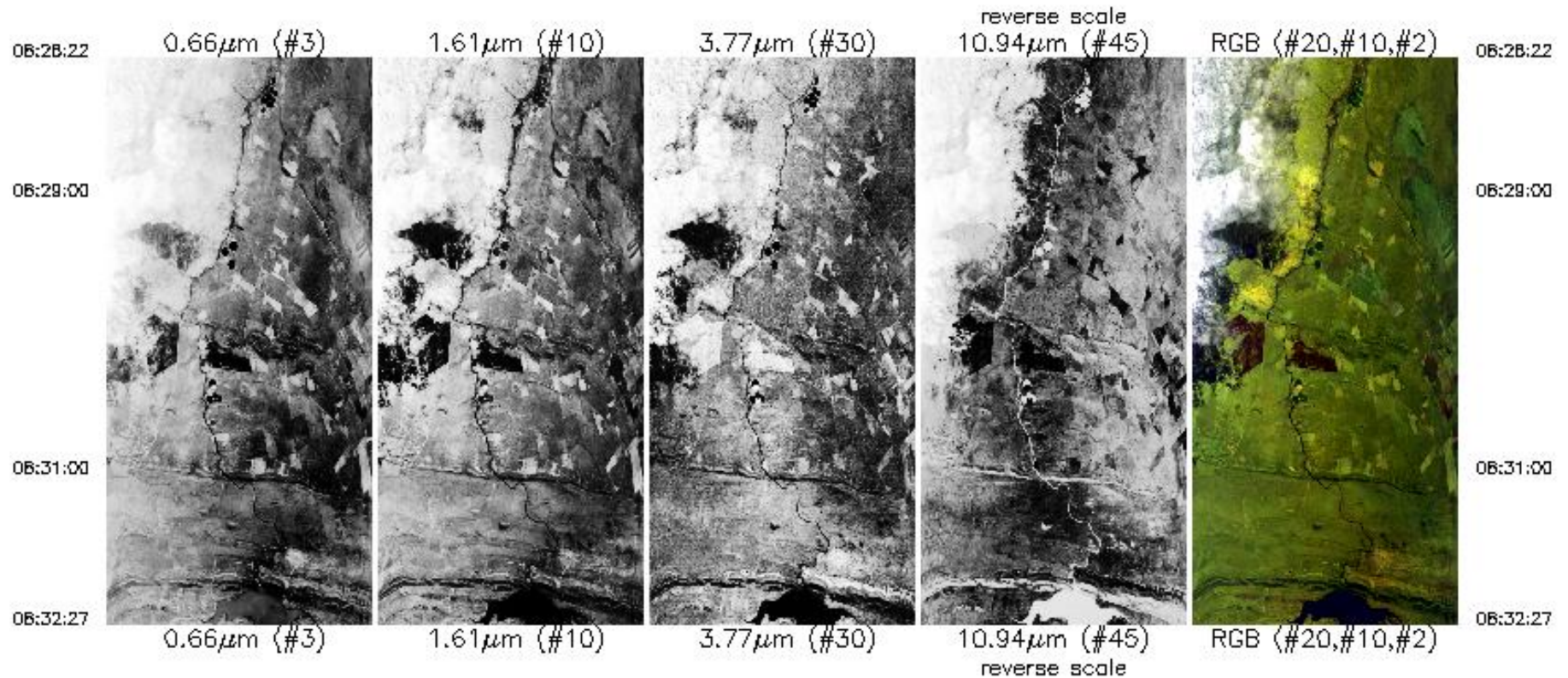
10.94µm (#45)
reverse scale

RGB (#20,#10,#2)

Upper Left Lat, Lon = -25.4°, 26.4°
Lower Right Lat, Lon = -24.4°, 26.1°
Aircraft Heading = 359.5°
Solar Zenith = 47.8°
GPS Altitude = 19845. m (MSL)

Upper Left Lat, Lon = -23.4°, 26.4°
 Lower Right Lat, Lon = -24.4°, 26.1°
 Aircraft Heading = 359.5°
 Solar Zenith = 47.8°
 GPS Altitude = 19845. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign - 20 Aug 2000
 Botswana
 Flight #00-148 Track #5



Upper Left Lat, Lon = -24.4°, 26.3°
 Lower Right Lat, Lon = -24.9°, 26.6°
 Aircraft Heading = 187.8°
 Solar Zenith = 45.4°
 GPS Altitude = 19761. m (MSL)

Lower Right Lat, Lon = -24.9°, 26.6°

Aircraft Heading = 187.8°

Solar Zenith = 45.4°

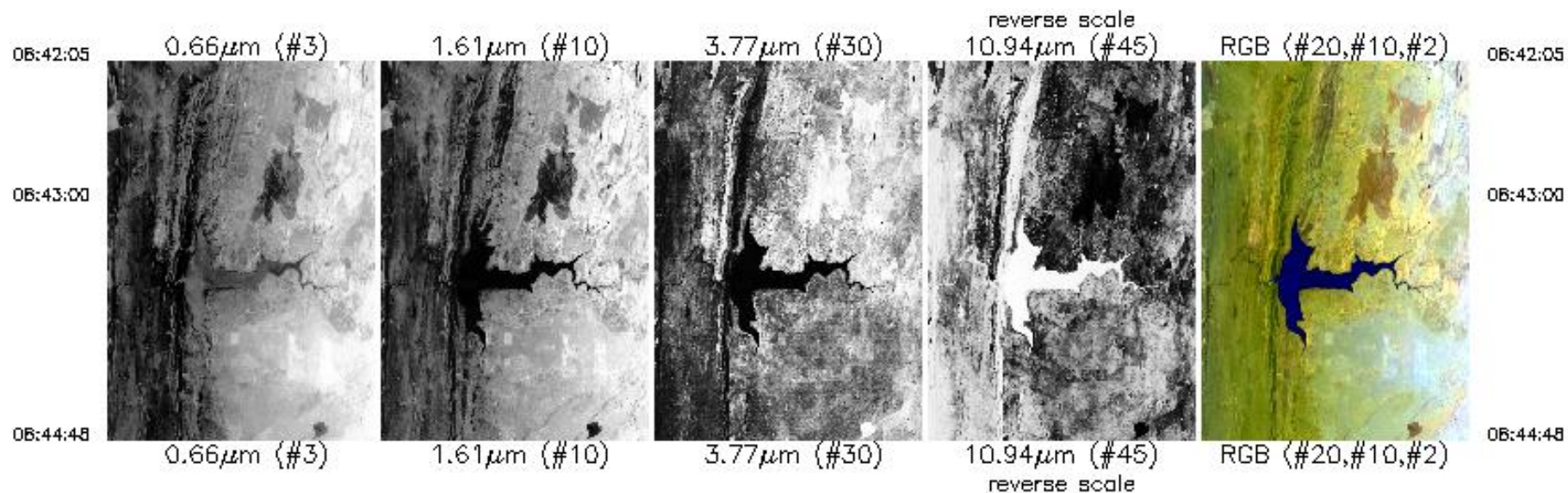
GPS Altitude = 19761. m (MSL)

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SAFARI 2000 Campaign - 20 Aug 2000

Botswana

Flight #00-148 Track #6



Upper Left Lat, Lon = -24.8°, 26.7°

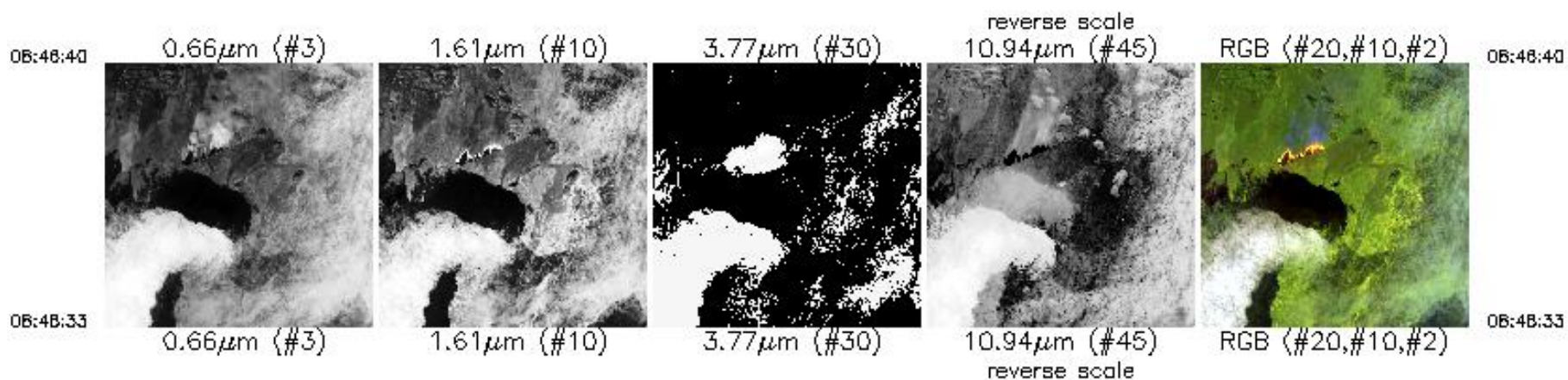
Lower Right Lat, Lon = -25.1°, 26.3°

Aircraft Heading = 278.4°

Solar Zenith = 43.7°

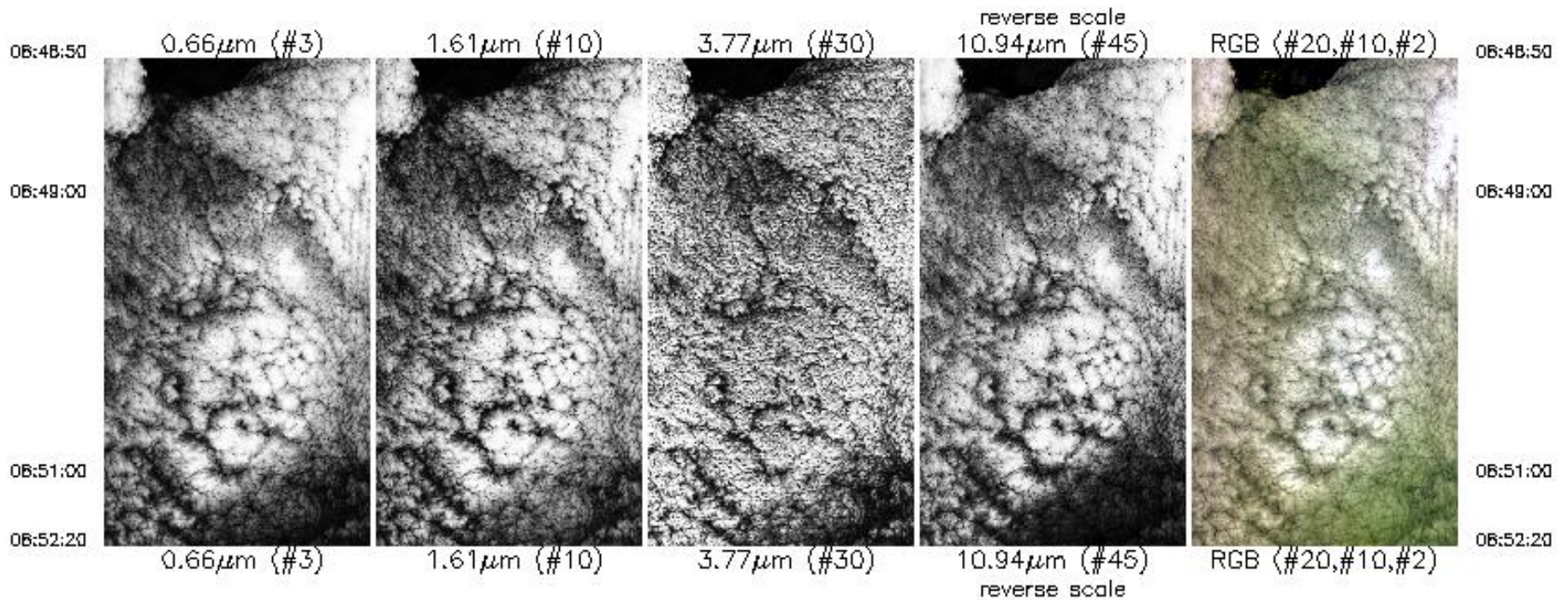
GPS Altitude = 19745. m (MSL)

MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 20 Aug 2000
Botswana
Flight #00-148 Track #7



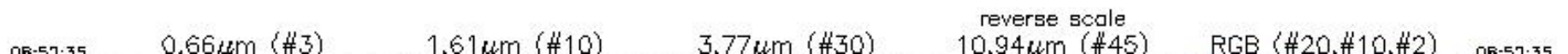
Upper Left Lat, Lon = -24.8° , 26.4°
Lower Right Lat, Lon = -24.5° , 26.1°
Aircraft Heading = 7.3°
Solar Zenith = 43.2°
GPS Altitude = 19734. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign – 20 Aug 2000
 Botswana
 Flight #00–148 Track #8

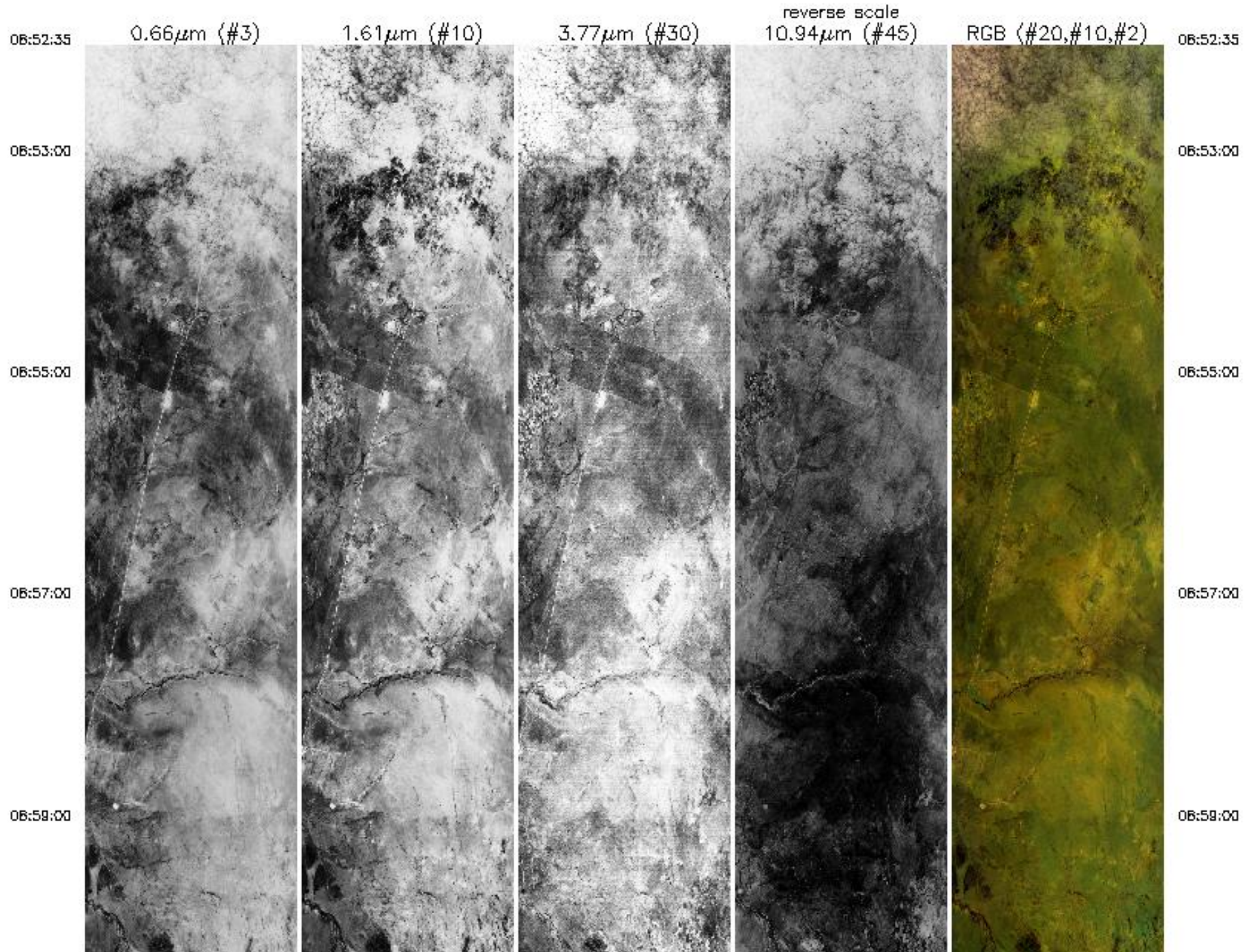


Upper Left Lat, Lon = -24.6° , 26.4°
 Lower Right Lat, Lon = -24.1° , 26.2°
 Aircraft Heading = 18.9°
 Solar Zenith = 42.7°
 GPS Altitude = 19772. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign – 20 Aug 2000
 Botswana
 Flight #00–148 Track #9



MODIS Airborne Simulator Browse Imagery
SAFARI 2000 Campaign – 20 Aug 2000
Botswana
Flight #00-148 Track #9



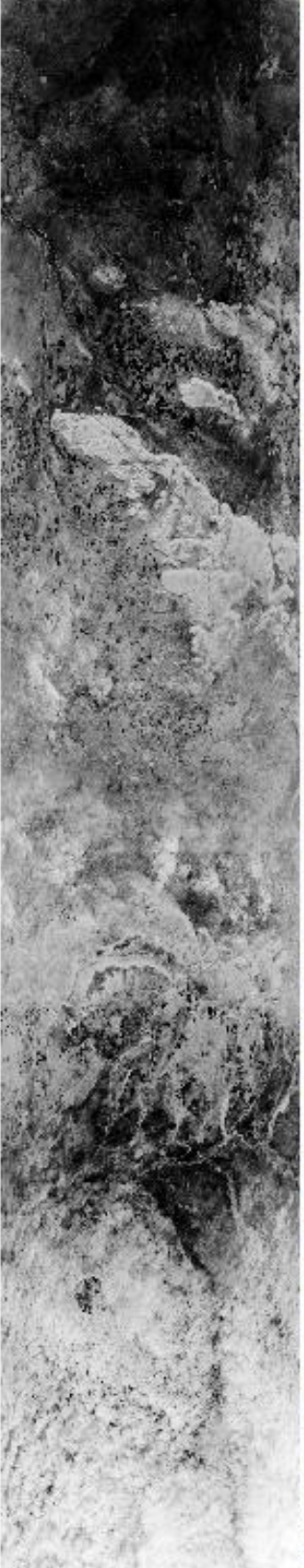
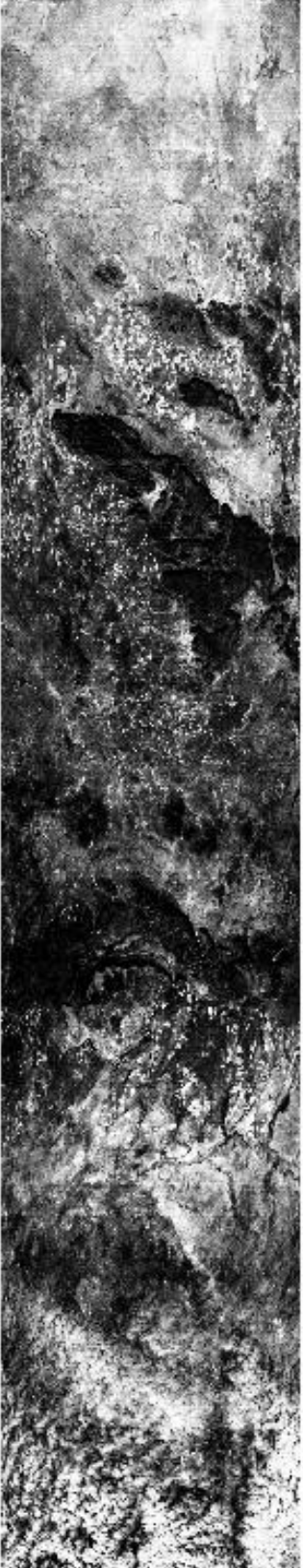
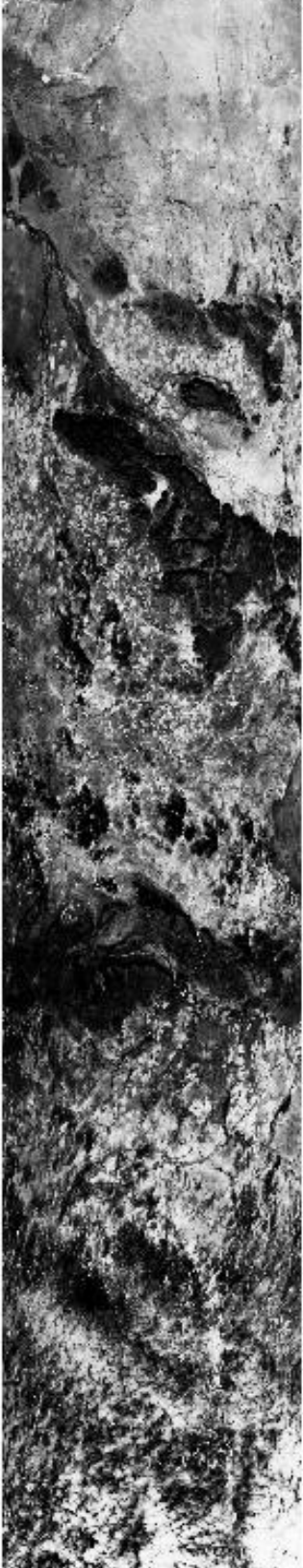
06:59:00

08:01:00

08:03:00

08:05:00

08:07:00



06:59:00

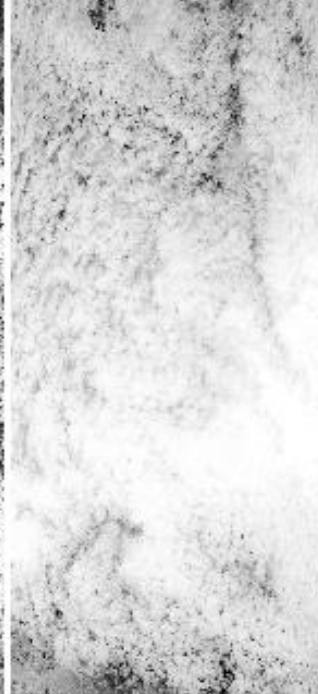
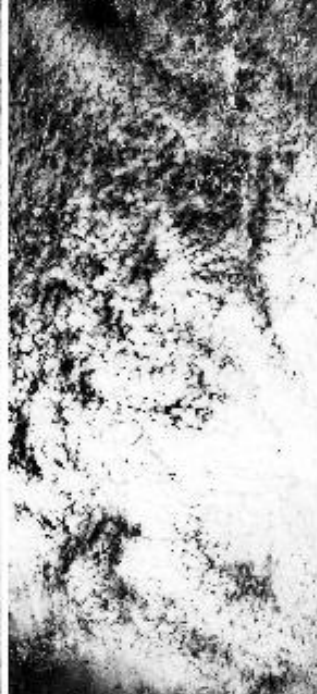
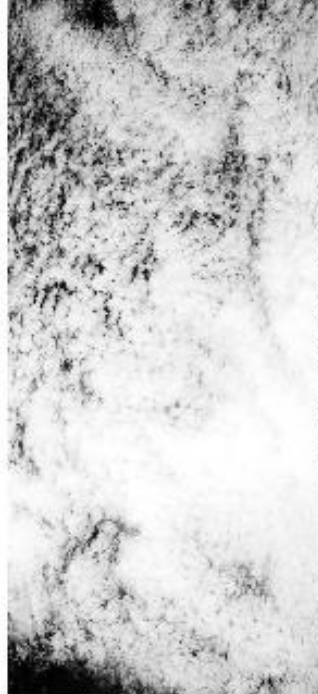
08:01:00

08:03:00

08:05:00

08:07:00

09:07:00



09:07:00

09:09:00

09:09:00

09:11:27

09:11:27

0.66µm (#3)

1.61µm (#10)

3.77µm (#30)

10.94µm (#45)
reverse scale

RGB (<#20,#10,#2)

Upper Left Lat, Lon = -24.1°, 26.5°

Lower Right Lat, Lon = -22.0°, 26.6°

Aircraft Heading = 13.3°

Solar Zenith = 41.9°

GPS Altitude = 19953. m (MSL)

MODIS Airborne Simulator Browse Imagery

SAFARI 2000 Campaign - 20 Aug 2000

Botswana

Flight #00-148 Track #10

09:12:24

0.66µm (#3)

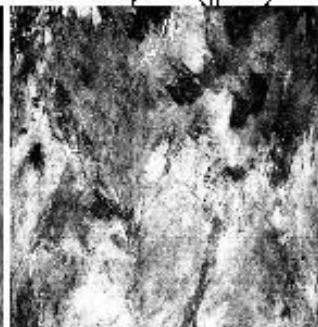
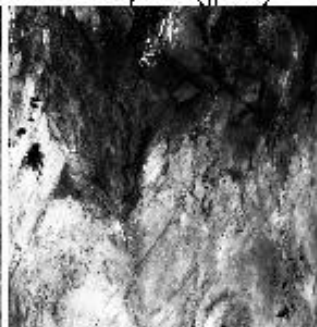
1.61µm (#10)

3.77µm (#30)

reverse scale
10.94µm (#45)

RGB (<#20,#10,#2)

09:12:24



09:13:00

09:13:00

09:13:00

09:15:00

09:17:00

09:18:57



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)

09:13:00

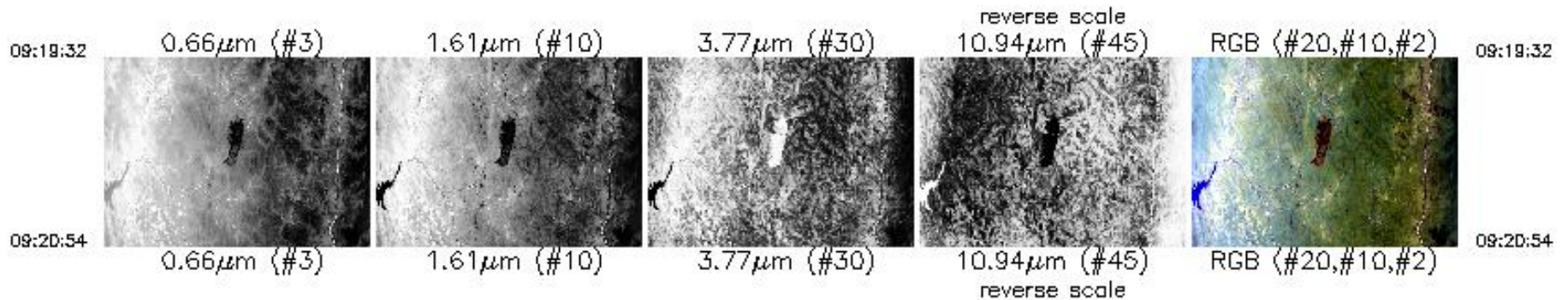
09:15:00

09:17:00

09:18:57

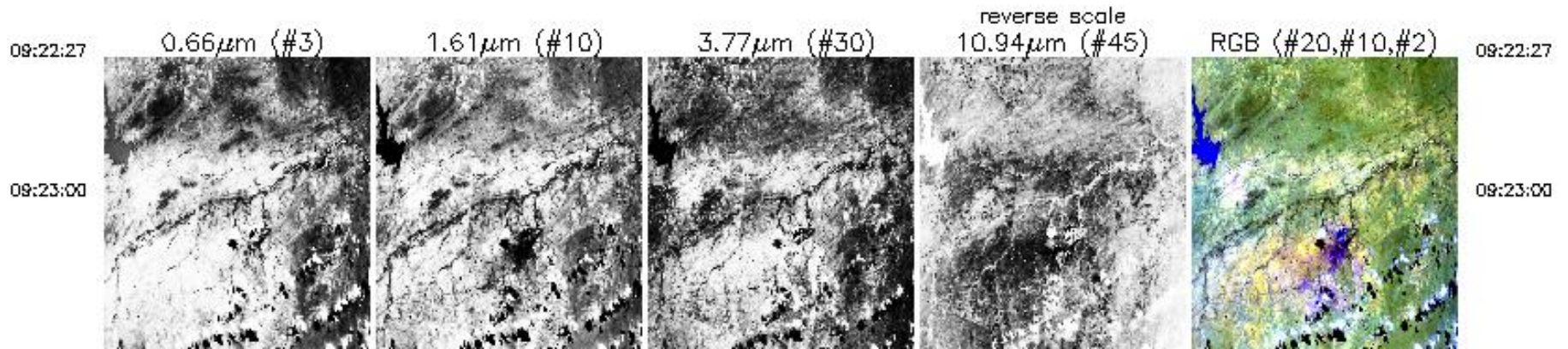
Upper Left Lat, Lon = -22.1° , 26.9°
 Lower Right Lat, Lon = -21.5° , 27.5°
 Aircraft Heading = 65.8°
 Solar Zenith = 37.7°
 GPS Altitude = 20012. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign – 20 Aug 2000
 South Africa
 Flight #00–148 Track #11



Upper Left Lat, Lon = -21.8°, 27.6°
 Lower Right Lat, Lon = -21.5°, 27.8°
 Aircraft Heading = 94.7°
 Solar Zenith = 36.5°
 GPS Altitude = 20032. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign – 20 Aug 2000
 South Africa
 Flight #00–148 Track #12



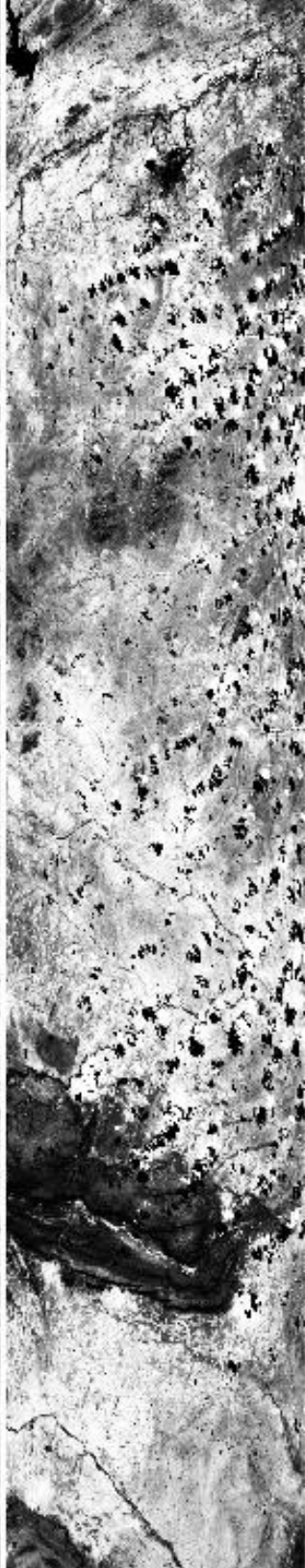
09:23:00

09:25:00

09:27:00

09:29:00

09:31:00



09:23:00

09:25:00

09:27:00

09:29:00

09:31:00

09:31:00



09:33:00



09:35:00



09:37:00



09:38:00



09:31:00

09:33:00

09:35:00

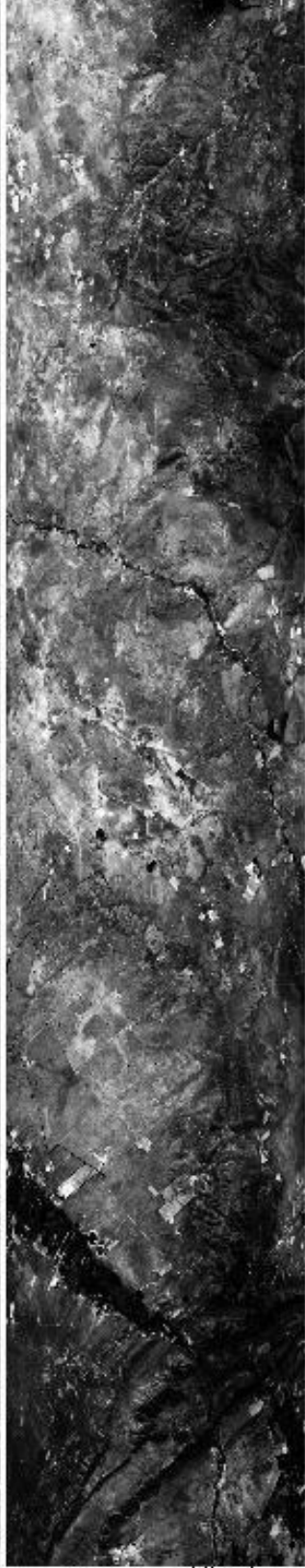
09:37:00

09:38:00

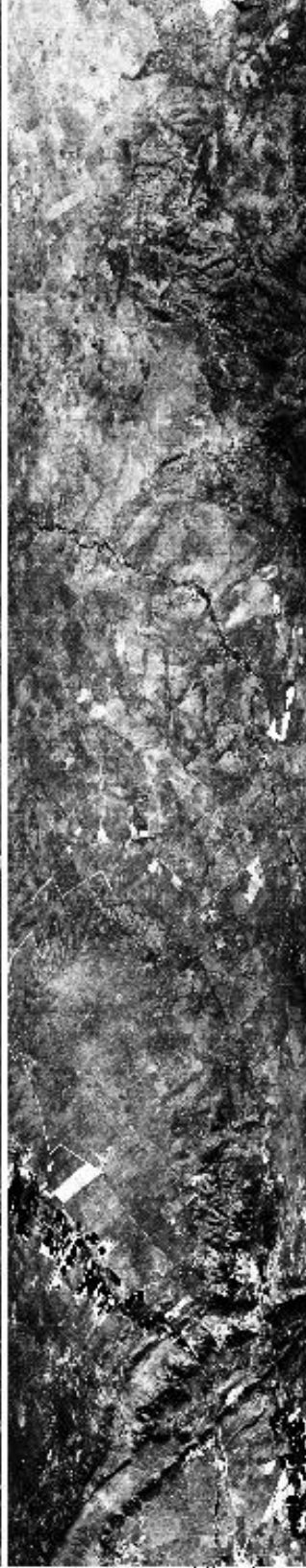
09:39:00



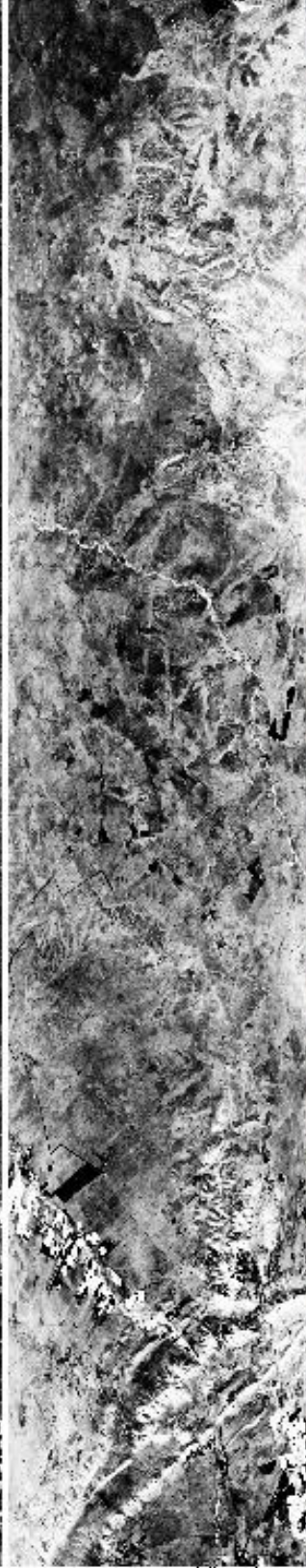
09:41:00



09:43:00



09:45:00



09:47:00



09:49:14

09:39:00

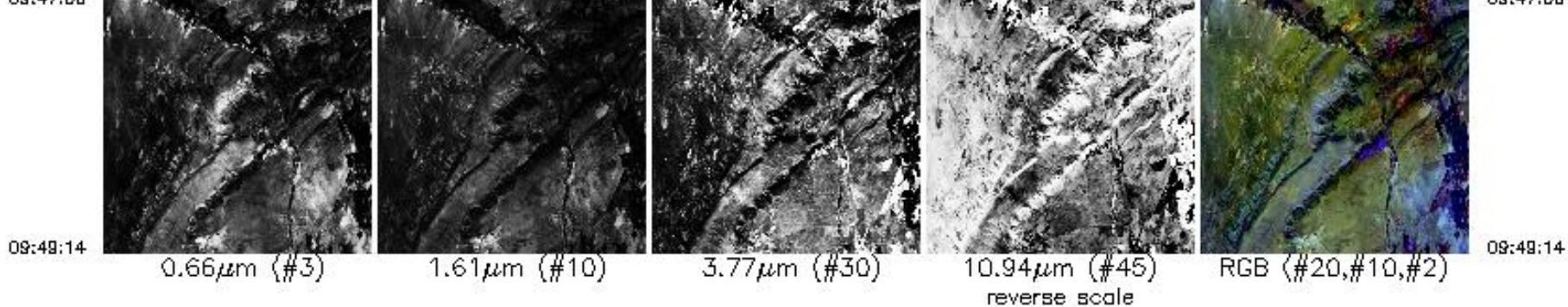
09:41:00

09:43:00

09:45:00

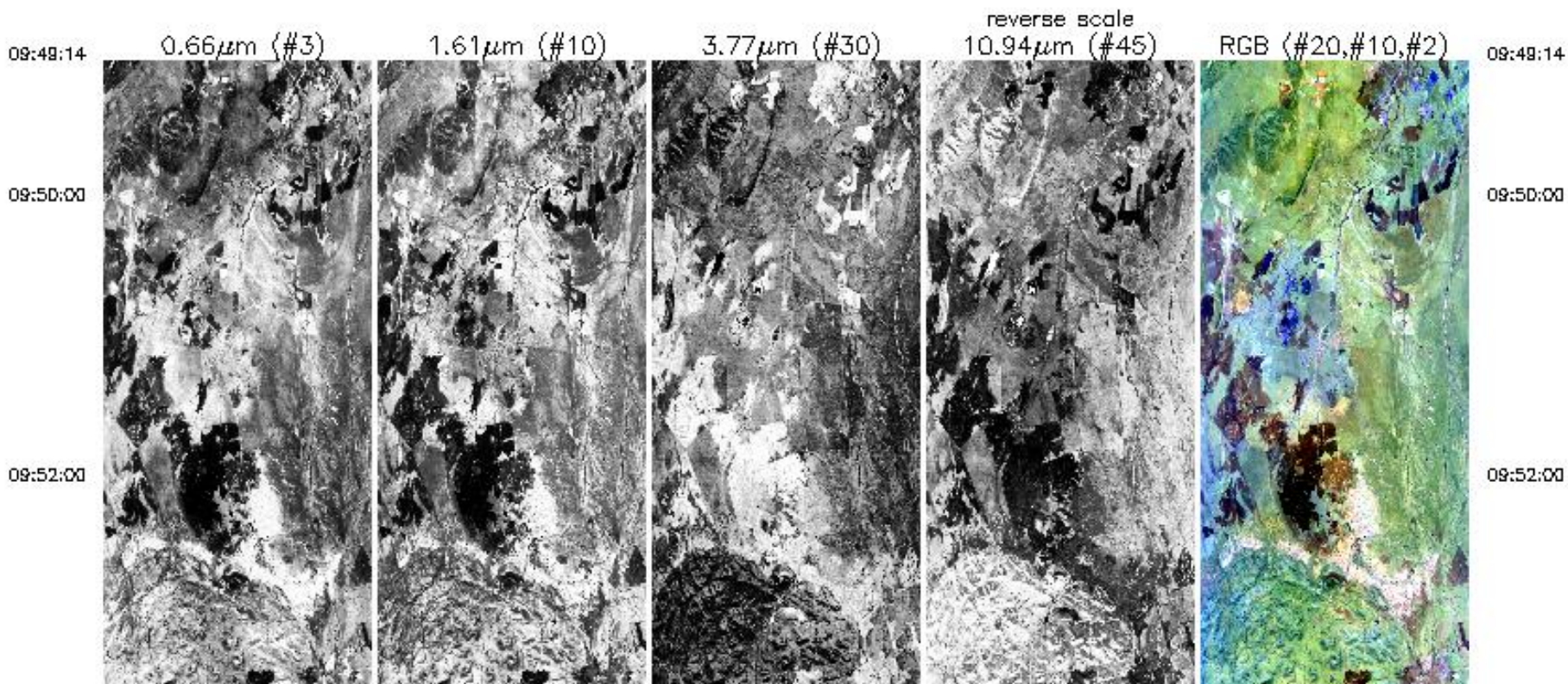
09:47:00

09:49:14



Upper Left Lat, Lon = -21.8°, 27.7°
 Lower Right Lat, Lon = -24.8°, 27.4°
 Aircraft Heading = 186.5°
 Solar Zenith = 36.2°
 GPS Altitude = 20093. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign - 20 Aug 2000
 South Africa
 Flight #00-148 Track #13



09:52:00

09:54:00

09:55:58



09:52:00

09:54:00

09:55:58

0.66 μ m (#3)

1.61 μ m (#10)

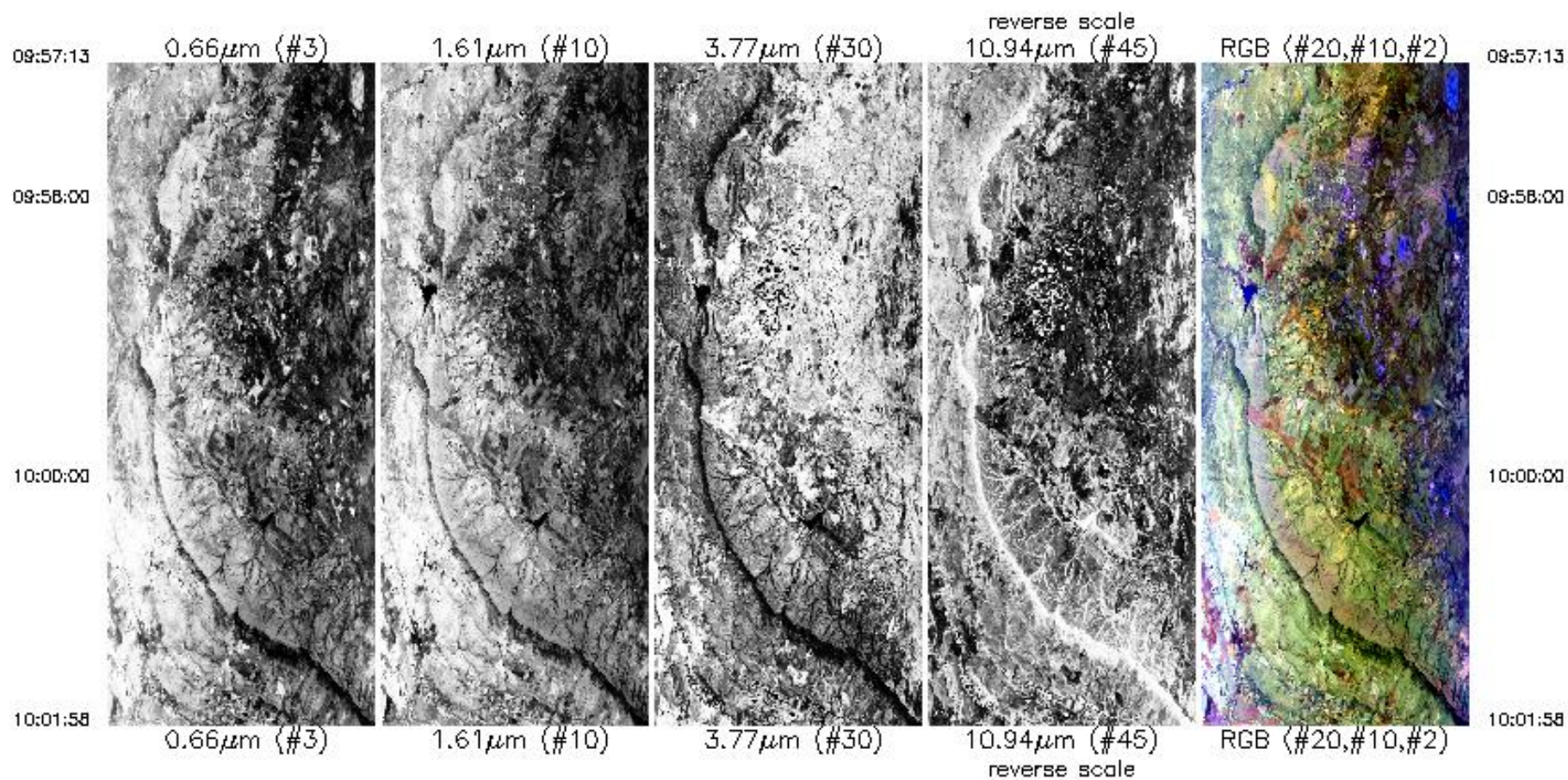
3.77 μ m (#30)

10.94 μ m (#45)
reverse scale

RGB (#20,#10,#2)

Upper Left Lat, Lon = -24.7° , 27.1°
Lower Right Lat, Lon = -25.5° , 27.3°
Aircraft Heading = 190.7°
Solar Zenith = 37.5°
GPS Altitude = 20212. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign – 20 Aug 2000
 South Africa
 Flight #00-148 Track #14



Upper Left Lat, Lon = -25.8° , 27.0°
 Lower Right Lat, Lon = -25.8° , 27.7°
 Aircraft Heading = 124.5°
 Solar Zenith = 38.3°
 GPS Altitude = 20210. m (MSL)

Lower Right Lat, Lon = -25.8° , 27.7°

Aircraft Heading = 124.5°

Solar Zenith = 38.3°

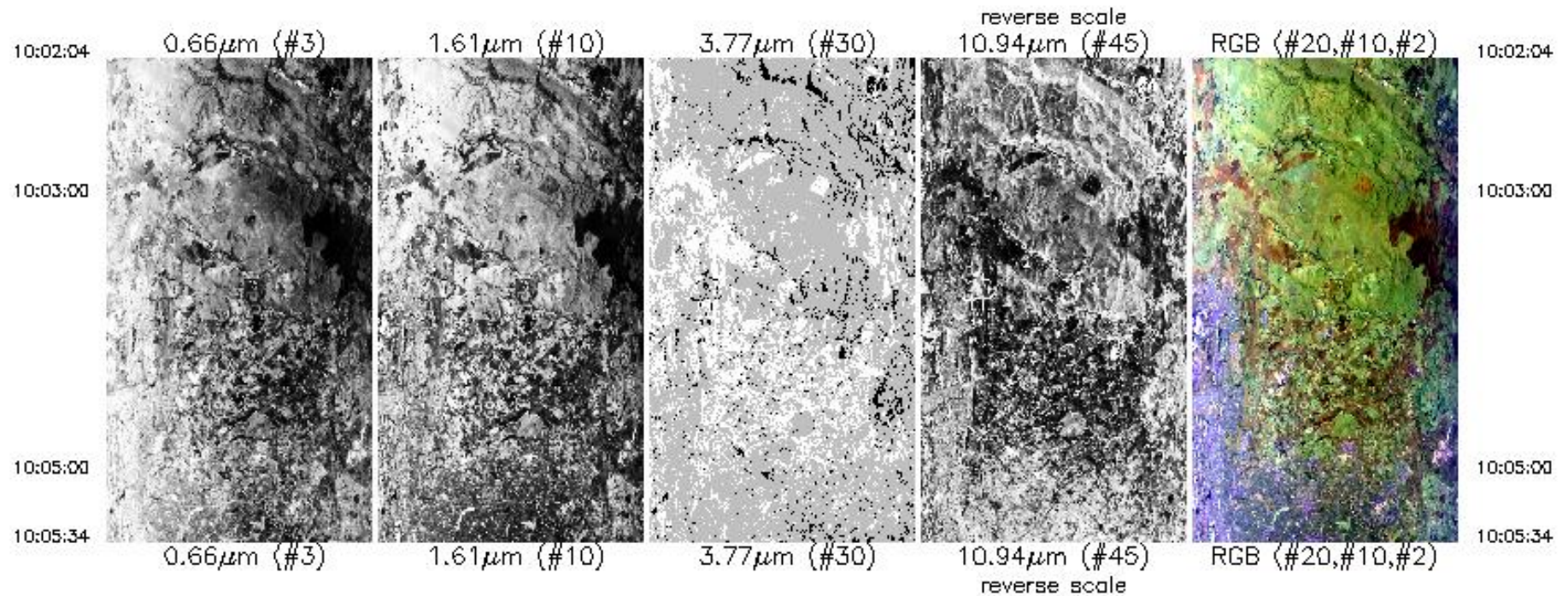
GPS Altitude = 20210. m (MSL)

MODIS Airborne Simulator Browse Imagery

SAFARI 2000 Campaign - 20 Aug 2000

South Africa

Flight #00-148 Track #15



Upper Left Lat, Lon = -26.0° , 27.5°

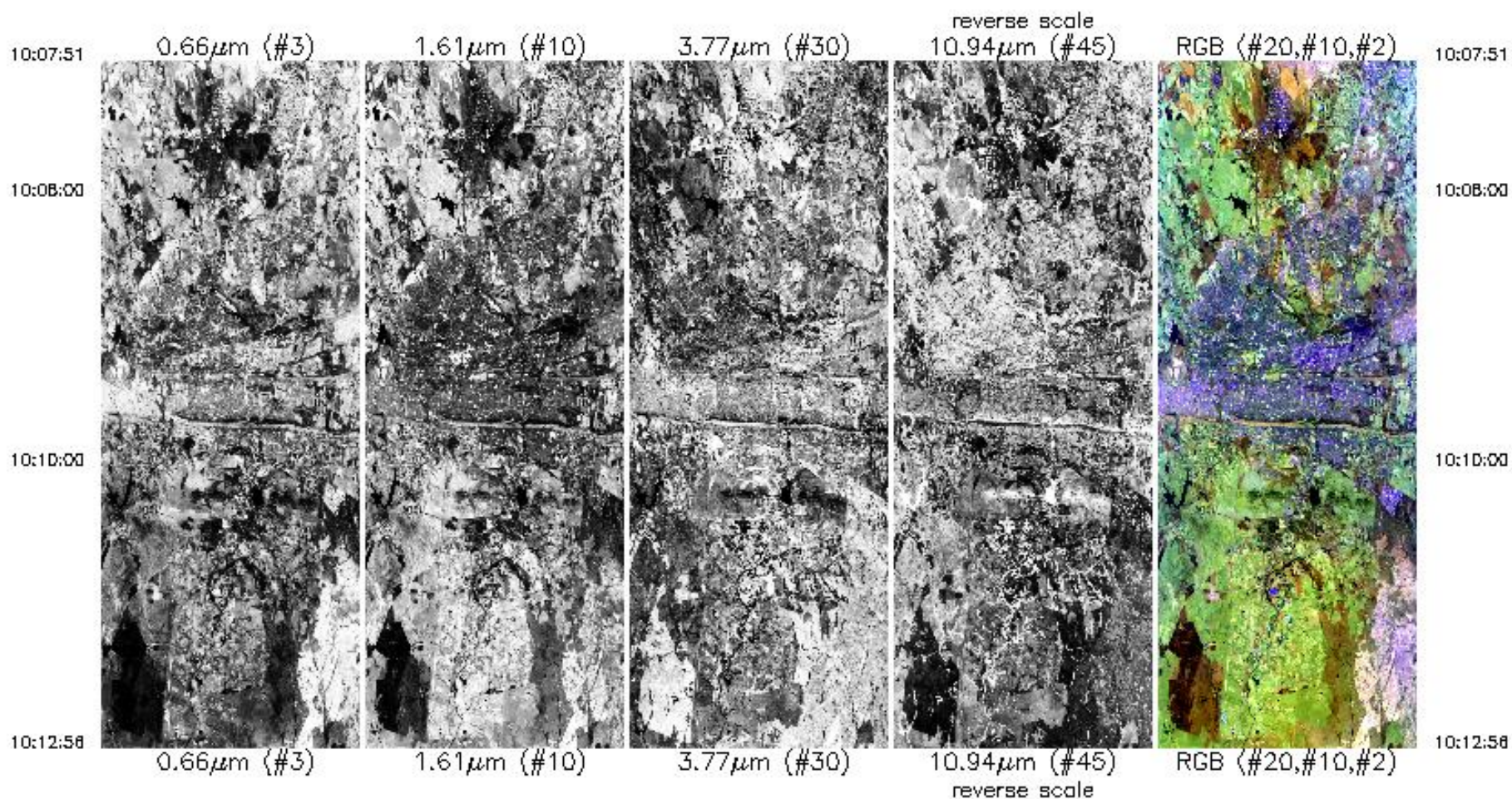
Lower Right Lat, Lon = -25.9° , 28.1°

Aircraft Heading = 120.9°

Solar Zenith = 38.4°

GPS Altitude = 20196. m (MSL)

MODIS Airborne Simulator Browse Imagery
 SAFARI 2000 Campaign – 20 Aug 2000
 South Africa
 Flight #00-148 Track #16



Upper Left Lat, Lon = -26.0° , 28.4°
 Lower Right Lat, Lon = -25.4° , 28.0°
 Aircraft Heading = 358.3°
 Solar Zenith = 38.2°
 GPS Altitude = 20152. m (MSL)

Upper Left Lat, Lon = -26.0° , 28.4°
Lower Right Lat, Lon = -25.4° , 28.0°
Aircraft Heading = 358.3°
Solar Zenith = 38.2°
GPS Altitude = 20152. m (MSL)