SNF SATELLITE IMAGE DATA INVENTORY

Summary:

The purpose of the SNF Study was to develop the techniques to make the link from biophysical measurements made on the ground to aircraft radiometric measurements and then to scale up to satellite observations. Therefore, satellite image data were acquired for the Superior National Forest study site. These data were selected from all the scenes available from Landsat 1 through 5 and SPOT platforms. Image data substantially contaminated by cloud cover or of poor radiometric quality was not acquired. Of the Landsat scenes, only one Thematic Mapper (TM) scene was acquired, the remainder were Multispectral Scanner (MSS) images. Some of the acquired image data had cloud cover in portions of the scene or other problems with the data. These problems and other comments about the images are summarized in the data set. This data set contains a listing of the scenes that passed inspection and were acquired and archived by Goddard Space Flight Center. Although these image data are no longer available from either the Superior National Forest data collection in order to document which satellite images were used during the project.

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1. Data Set Overview:

Data Set Identification:

SNF Satellite Image Data Inventory.

Data Set Introduction:

The purpose of the SNF Study was to develop the techniques to make the link from biophysical measurements made on the ground to aircraft radiometric measurements and then to scale up to satellite observations. Therefore, satellite image data were acquired for the Superior National Forest study site. These data were selected from all the scenes available from Landsat 1 through 5 and SPOT platforms. Image data substantially contaminated by cloud cover or of poor radiometric quality was not acquired. Of the Landsat scenes, only one Thematic Mapper (TM) scene was acquired, the remainder were Multispectral Scanner (MSS) images. Some of the acquired image data had cloud cover in portions of the scene or other problems with the data. These problems and other comments about the images are summarized in the data set. This data set contains a listing of the scenes that passed inspection and were acquired and archived by Goddard Space Flight Center. Although these image data are no longer available from either the Goddard Space Flight Center or the ORNL DAAC, this data set has been included in the Superior National Forest data collection in order to document which satellite images were used during the project.

Objective/Purpose:

The purpose of the SNF Study was to develop the techniques to make the link from biophysical measurements made on the ground to aircraft radiometric measurements and then to scale up to satellite observations.

Summary of Parameters:

This data set contains a listing of the scenes that passed inspection and were acquired and archived by Goddard Space Flight Center. These problems and other comments about the images are summarized in the data set.

Discussion:

Not available.

Related Data Sets:

Not available.

2. Investigator(s):

Investigator(s) Name and Title:

Dr. Forrest G. Hall NASA Goddard Space Flight Center

Dr. K. Fred Huemmrich NASA Goddard Space Flight Center

Dr. Donald E. Strebel Versar, Inc.

Dr. Scott J. Goetz University of Maryland

Ms. Jamie E. Nickeson NASA Goddard Space Flight Center

Ms. K. D. Woods NASA Goddard Space Flight Center

Dr. Celeste Jarvis NASA Headquarters

Title of Investigation:

Biophysical, Morphological, Canopy Optical Property, and Productivity Data on the Superior National Forest.

Contact Information:

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3. Theory of Measurements:

Not available.

4. Equipment:

Sensor/Instrument Description:

Collection Environment:

Satellite.

Source/Platform:

- LANDSAT-1
- LANDSAT-2
- LANDSAT-3
- LANDSAT-4
- LANDSAT-5
- SPOT-1

Source/Platform Mission Objectives:

Not available.

Key Variables:

Observation date (obs_datc), platform, and sensor.

Principles of Operation:

Not available.

Sensor/Instrument Measurement Geometry:

Not available.

Manufacturer of Sensor/Instrument:

Not available.

Calibration:

Not available.

5. Data Acquisition Methods:

Not available.

6. Observations:

Data/Field Notes:

Not available.

7. Data Description:

Spatial Characteristics:

The study area covered a 50 x 50 km area centered at approximately 48 degrees North latitude and 92 degrees West longitude in northeastern Minnesota at the southern edge of the North American boreal forest.

Temporal Characteristics:

This data set contains an inventory of data collected from July 1973 to August 1990.

Data Characteristics:

Variable Name/ Description	Long Name	SAS Type	Generic Type
1 obs_datc "Observation da	OBS_DATE ate (dd-mmm-yy)"	\$ 12	DATE
2 sze "Average solar decimal degree	SOLAR_ZEN zenith angle in s"	8	NUMBER(3,1)
3 saz "Average solar decimal degree	SOLAR_AZM azimuth angle in s from north"	8	NUMBER(4,1)
4 vze "Average view the platform i:	VIEW_ZEN zenith angle from n decimal degrees"	8	NUMBER(3,1)
5 vaz "Average view o platform in de	VIEW_AZM azimuth from the cimal degrees from	8 north"	NUMBER(4,1)
6 tape_id "Tape ID"	TAPE_ID	\$ 12	CHAR(12)
7 comment "Satellite images regarding any with the data, it has been pro-	COMMENTS ge data comment known problems the level to which ocessed, cloud cove	\$ 70 er,	CHAR (70)

data quality, and any other appropriate remarks"

8 platform "The name of t which the inst	PLATFORM he platform on rument was mounted"	\$ 24	CHAR(8)
9 sensor "Sensor/instru collected the	INSTRUMENT ment that data"	\$ 24	CHAR (12)
10 n_pix "Number of pix across any giv	PIXELS els (samples) en record"	8	NUMBER(5,0)
11 n_recs "Number of rec in the scene"	NUM_RECORDS ords (lines)	8	NUMBER(5,0)

Sample Data Record:

obs_datc	sze	saz	vze	vaz	tape_id	comment
platiorm	sei	sensor			n_recs	
"01-AUG-76"	39	130	0	0	"2983M760801"	"Band 1 and 2 data
"Landsat-2"	"MS	SS"	3264		2983	striped, cumulus in
southern part	of SNF'	•	_			
"01-MAY-83"	38	141	0	0	"2983M830501"	
"Landsat-4"	"MS	SS"	3264		2983	
"03-JUL-73"	32	132	0	0	"2983M730703"	"Band 1 and 2 data
"Landsat-1"	"MS	SS"	3264		2983	striped, scattered
cumulus in SN	IF"					
"04-OCT-87"	53	167	3.3	102.7	"3000s871004"	"Some cirrus cloud
cover						
"SPOT"	"HI	RV2"	3000		3000	in Eastern SNF"
"05-JUL-76"	40	117	0	0	"2983M760705"	"Band 1 and 2
striped,						
"Landsat-1"	"MS	ss"	3264		2983	few cumulus,
southern						
portion of sc	ene cut	off"				
"05-JUN-82"	34	133	0	0	"2983M820605"	"Line start error N
and						
"Landsat-3"	"MS	ss"	3264		2983	W of Elv, SNF cut
off						
East of Big M	loose Lal	<e"< td=""><td></td><td></td><td></td><td></td></e"<>				
"05-MAY-87"	33	168	27.6	106.8	"3000\$870505"	"Cirrus cloud cover
in	00	200	27.0	100.0		011140 01044 00001
"SPOT"	" H I	3772"	3000		3000	Western portion of
SNF"	111		2000		2000	Meddelin porcion or
"06-SEP-76"	49	139	0	0	"2983M760906"	"Band 1 and 2 data
"Landsat-2"	тЈ "М(109 29"	3264	0	2983	striped SNE close
of	141.		5204		2,00	Striped, SMI Clear
"Landsat-2" of	"MS	SS"	3264		2983	striped, SNF clear

cloud cover"						
"08-AUG-87"	40	134	0	0	"2983M870808"	"SNF clear of cloud
"Landsat-5"		"MSS"	3264		2983	cover"
"11-JUN-79"	35	127	0	0	"2983M790611"	"Band 1 and 2 data
"Landsat-2"		"MSS"	3264		2983	striped, southern
half						
of SNF cut off						
"13-AUG-87"	35	155	3.6	102.6	"3000s870813"	"Few scattered
cumulus" "SPOT"		"HRV1"	3000		3000	striped, southern
half			0000		0000	Sollpoa, Soucholli
of SNF cut off	- 11					
"14-SEP-87"	46	157	24 1	100	"30005870914"	"SNE clear of cloud
"SPOT"	10	"HRV1"	3000	TOO	3000	cover"
"16-AUG-90"	42	134	0	0	"2983M900816"	"Band 1 and 2 data
"Landsat-5"	12	"MSS"	3264	0	2983	striped some
cirrus		1100	5201		2903	beriped, bome
cloud cover in	SNI	ריק וו				
"18TIN_83"	32	133	0	0	"2983M830618"	"SNE clear of cloud
"Landsat-4"	52	"MSS"	3264	0	2983	cover image used
as		1100	5201		2903	cover, image used
reference for	GSE					
work"	GDE	2				
"21_NIC_86"						
"Landeat-5"	•	· "Mgg"	3261	•	2083	
	36	122	0	0	"2983M770621"	"Band 1 and 2
stripod	50	122	0	0	290511/10021	
"Landeat_2"		"MCC"	3261		2083	SNE cloar SNE cut
off		100	5204		2905	SNF CIEAL, SNF Cut
East of Dig Is	leo."					
"21_MAY_76"	26	1 2 1	0	0	"2082M760521"	"Pand 1 and 2 data
"Landest_2"	50	"MCC"	3261	0	290511/00521	stripod SNE cloar
of		100	5204		2905	Striped, SNF creat
aloud cover"						
"22_ TAN_87"	69	165	23	103 /	"30009870122"	"Snow covered SNF
22-JAN-07	09	105	2.5	103.4	50005870122	SHOW COVELED, SNF
		"""""""""""""""""""""""""""""""""""""""	3000		3000	somo cirrus"
"23TIT90"	36	131	0	0	"2983M900723"	"Band 1 and 2 data
"Landsat-4"	50	"MCC"	3261	0	29031900723	stripod somo
		100	5204		2905	striped, some
outoido SNE"						
"22_ TIN_75"	25	125	0	0	"2002M750622"	"Pand 1 and 2 data
Z3-00N-75	55	IZJ	3264	0	2903M/30023	stripod SNE gloor
Lanusat-1		MSS	5204		2903	Striped, SNr Crear
oland corror"						
"24 GED 76"	Б /	1 / /	0	0	112082M7600241	"Dand 1 and 2 data
Z4-SEP-/0	54	L44 UMCCU	2264	0	290311/00924	striped CNE clear
Lanusat-2		MSS	3264		2903	Striped, SNF Clear
oloud correr"						
Cloud Cover"	F 0	1.00	1.2 0	101 4	"20000070004"	
"Z4-SEP-8/"	50		13.8	101.4	30005870924	"SNF clear of cloud
"SPUT"	4.0	"HRVI"	3000	0	3000	Cover"
ZJ-APK-04"	4 U	139 "TM"	0	U	5905T04U420"	GBRC ONLY possesses
Lanusat-5"		. T.M	090/		0900	subsection covering
SNE"	20	1 ~ 1	17 0	105 0	11 20000070405	Ullopping of owners allowed
"ZO-APK-8/"	36	164 	1/.2	105.3	"300058/0425"	"Heavy cirrus cloud
"SPOT"		"HKV2"	3000		3000	cover in northern
SNE"	0.1	4		104		
~∠ŏ-JUL-ŏ/"	J⊥	155	1.3	104	"30005870728"	"SNE CLEAR OF CLOUD
"SPOT"	~ ~	"HKVI"	3000	~	3000	cover"
"∠8-JUN-84"	32	129	U	U	"2983M840628"	"Data problem not
IULLY		"	2004		2002	
"Lanasat-5"		"MS5"	3264		2903	unaerstood, sent
раск						

```
to no avail (scaled?)"
"31-JUL-90" 38 130 0 0 "2983M900731" "Band 1 and 2 data
"Landsat-5" "MSS" 3264 2983 striped, SNF clear
of
cloud cover"
"31-MAY-87" 27 165 26.2 106.6 "3000S870531" "Heavy cumulus cloud
"SPOT" "HRV2" 3000 3000 cover throughout
SNF"
```

Footnote:

For presentation in this document, some padding blanks may have been eliminated between columns in the Sample Data Record. Due to the many fields in this data file, these columns will wrap while viewing. The actual data files, however, are column delimited with an adequate record length to prevent wrapping. See the <u>Data Format</u> <u>Section</u> for conventions used for missing data values in the data file.

8. Data Organization:

Key fields in each record are observation date (obs_datc), platform, and sensor.

Data Granularity:

This data set consists of a single ASCII file containing counts of vegetation individuals and average percent cover at each site by those vegetation species for all canopy layers.

A general description of data granularity as it applies to the IMS appears in the <u>EOSDIS</u> <u>Glossary</u>.

Data Format:

The data files associated with this data set consist of numeric and character fields of varying lengths aligned in columns. The first row of each data file contains the 8 character SAS variable name that links to the data format definition file. Character fields are enclosed in double quotes and numeric fields are listed without quotes.

Missing data values can be of two varieties:

- 1. Values that were identified as missing in the original data files. Missing numeric values of this type are identified in these data as -999.
- 2. Those holes that were created as a result of combining files that contained a slightly different variable set. Missing values of this type are identified in these data files as empty double quotes for character fields and a single period, '.' for numeric fields.

9. Data Manipulations:

Not available.

10. Errors:

Sources of Error:

Not available.

Quality Assessment:

Data Validation by Source:

Not available.

Confidence Level/Accuracy Judgment:

Not available.

Measurement Error for Parameters:

Not available.

Additional Quality Assessments:

Not available.

Data Verification by Data Center:

The Superior National Forest data were received from the Goddard Space Flight Center in three media:

- As data dumps from the original Oracle SNF database maintained by GSFC, transferred electronically from the GSFC system to the ORNL system;
- As ASCII files that mirrored the tables published in the Tech Memo; and
- As hard copy (Tech Memo).

Data from both electronic sources were input into SAS by ORNL DAAC data management staff and compared using computer code developed to process the SNF data. In many cases, the data values from both sources were found to be identical. In some cases, however, differences were identified and the providers of the data were consulted to resolve inconsistencies.

Additionally, some variable columns were available in one source, but not the other for various reasons. For example, some calculated variables/columns were provided in the ASCII files (reflecting the Tech Memo tables) that were not stored in the Oracle database for purposes of space conservation.

For similar reasons, coded values were used for many of the site and species identifier variables. A separate reference table was provided to link the coded variable with its definition (e.g., the SPECIES_REF file and the SITE_REF file).

The database produced by the ORNL DAAC is a hybrid product that is a composite of data and information extracted from all three source media. In data sets where coded variables were included, the code definition variables have been added to improve usability of the data set as a stand-alone product.

Therefore the ASCII files that are available through the ORNL DAAC on-line search and order systems are output from a data set that is a product of the essential core of numeric data provided by the data source (GSFC), augmented with additional descriptive information provided by GSFC and reorganized by the ORNL DAAC into a data structure consistent with other similar data sets maintained by the ORNL DAAC.

11. Notes:

Limitations of the Data:

Not available.

Known Problems with the Data:

Problems with the data are recorded in the Comment field of the data file.

Usage Guidance:

Not available.

Any Other Relevant Information about the Study:

None.

12. Application of the Data Set:

Not available.

13. Future Modifications and Plans:

None known at this revision.

14. Software:

Not available.

15. Data Access:

Contact Information:

ORNL DAAC User Services Oak Ridge National Laboratory Telephone: (865) 241-3952 Fax: (865) 574-4665 E-mail: <u>ornldaac@ornl.gov</u>

Data Center Identification:

ORNL Distributed Active Archive Center Oak Ridge National Laboratory Telephone: (865) 241-3952 Fax: (865) 574-4665 E-mail: <u>ornldaac@ornl.gov</u>

Procedures for Obtaining Data:

Users may place requests by telephone, electronic mail, or fax. Data are also available via the World Wide Web at <u>http://daac.ornl.gov</u>.

Data Center Status/Plans:

The Superior National Forest Data are available from the ORNL DAAC. Please contact the ORNL DAAC User Services Office for the most current information about these data.

16. Output Products and Availability:

Available via FTP or on CD-ROM.

17. References:

Not available.

Archive/DBMS Usage Documentation.

Contact the ORNL DAAC, Oak Ridge, Tennessee (see the *Data Center Identification Section*).

18. Glossary of Terms:

A general glossary is located at EOSDIS Glossary.

19. List of Acronyms:

TM Thematic Mapper MSS Multispectral Scanner URL Uniform Resource Locator

A general list of acronyms is available at <u>http://cdiac.ornl.gov/pns/acronyms.html</u>.

20. Document Information:

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February 25, 1997.

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