

## Summary:

The aim of the FIFE soil moisture transect work was to characterize spatial and temporal patterns of soil moisture along selected transects at the FIFE study area. Two levels of ground data were collected to support the passive microwave (PBMR) flights over the Konza experimental area. The water content measurements were collected using gravimetric methods.

Soil moisture measured along a transect is necessary to calibrate airborne moisture instruments or compare data obtained from them. Soil units in a landscape are inherently heterogeneous, which leads to variations in moisture content along an aircraft flight path on the ground. In order to reduce errors, values on the flight path were sampled at close intervals.

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## 1. Data Set Overview:

### Data Set Identification:

Soil Moisture Transect Data (FIFE).

### Data Set Introduction:

This data set contains soil water content measurements collected using gravimetric methods. The data was collected along selected transects within the FIFE study area. There were two levels of

ground data collection. The top level consisted of three transects of 13 to 17 samples each. Other transects were measured less frequently.

### **Objective/Purpose:**

The aim of the FIFE soil moisture transect work was to characterize spatial and temporal patterns of soil moisture along selected transects at the FIFE study area, to help validate and calibrate remote sensing measurements of soil moisture, and to evaluate alternative methods of measuring soil moisture both from the air and on the ground.

### **Summary of Parameters:**

- Gravimetric soil moisture,
- Volumetric soil moisture,
- Bulk density,
- Wet and dry soil weight, and
- Soil temperature.

### **Discussion:**

Ground data were collected to support the passive microwave (PBMR) flights over the Konza experimental area. There were two levels of ground data collection. The top level consisted of three transects of 13 to 17 samples each that traversed watersheds 1D and 2D. These transects were also the flight lines for the low level PBMR flights (aircraft elevation approximately 300 m above ground surface). The three top level transects were sampled for each CMP-3 mission by taking gravimetric samples and soil impedance measurements at each pre-marked sampling site. Sample sites were marked by flags and the actual samples were taken from a circular area with a radius of about 5 m. Other transects were measured less frequently depending on the need to support specific instruments (radar or gamma) or scientists' needs.

### **Related Data Sets:**

- [Soil Moisture Release.](#)
- [Soil Water Properties.](#)
- [Gravimetric Soil Moisture.](#)
- [Soil Properties Reference Information.](#)
- [Neutron Probe Soil Moisture.](#)
- [Peck Airborne Gamma Ray Soil Moisture.](#)
- Soil Moisture Contours. (Imagery Data)
- FIFE Level-3 Pushbroom Microwave Radiometer (PBMR) Soil Moisture Imagery. (Imagery Data)

### **FIS Data Base Table Name:**

SOIL\_MOIST\_TRANSECT\_DATA.

## **2. Investigator(s):**

### **Investigator(s) Name and Title:**

James Wang  
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### **Title of Investigation:**

Estimation of Soil Moisture and other Surface Parameters from Airborne and Satellite Visible, Infrared and Microwave Data.

### **Contact Information:**

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### **Requested Form of Acknowledgment.**

The Soil Moisture Transect data were collected for FIFE by E.T. Engman and his colleagues at the Goddard Space Flight Center, and Barc at USDA.

## **3. Theory of Measurements:**

Soil moisture measured along a transect is necessary to calibrate airborne moisture instruments or compare data obtained from them. Soil units in a landscape are inherently heterogeneous, which leads to variations in moisture content along an aircraft flight path on the ground. In order to reduce errors that arise due to use of average values covering large areas, it is more prudent to use values on the flight path, sampled at closer intervals.

Water content measurements by gravimetric methods involve weighing the wet sample, drying the sample in an oven, and reweighing the sample to determine the amount of water removed. Water content is obtained by dividing the difference between wet and dry masses by the mass of the dry sample to obtain the ratio of the mass of water to the mass of dry soil. When multiplied

by 100, this becomes the percentage of water in the sample on a dry-mass (or, as often expressed, on a dry-weight) basis.

## **4. Equipment:**

### **Sensor/Instrument Description:**

Soils were sampled with an auger, sampling tube or other suitable device to take a soil sample. Samples were stored in soil containers with tight-fitting lids and/or tape, dried in an oven with means for controlling the temperature between 100 and 110 degrees Celsius. Samples were weighed with a balance.

### **Collection Environment:**

Ground.

### **Source/Platform:**

Ground.

### **Source/Platform Mission Objectives:**

The aim was to determine soil moisture and bulk density along established transects, in support of airborne soil moisture measurements.

### **Key Variables:**

Soil moisture, bulk density, dry weight, and wet weight.

### **Principles of Operation:**

Previously weighed soil samples are dried to a constant weight, usually at about 105 degrees Celsius, and then weighed again. The difference in dry and wet weight of soil is expressed as a percentage of the dry weight. The bulk density is determined after drying the sample to constant weight, and using the volume of the sample as taken in the field, to find the ratio of mass of dry solids to the bulk volume of the sample.

### **Sensor/Instrument Measurement Geometry:**

Soil samples were obtained with a 2 cm diameter coring tube or a 5 x 5 x 5 cm sample tool.

### **Manufacturer of Sensor/Instrument:**

Assorted vendors for gravimetric moisture components.

**Calibration:**

The weighing balance did not require calibration.

**Specifications:**

None.

**Tolerance:**

Not applicable.

**Frequency of Calibration:**

None.

**Other Calibration Information:**

None.

## 5. Data Acquisition Methods:

Soil samples of the top 5 cm of soil were taken using the special sampling tool, carving a sample with a putty knife, or taking several cores with a 2 cm diameter coring tube. The total sample (approximately 100-150 grams) was put in a tin sample can and sealed with plastic tape. Each sample can was identified by the sample site ID code. The cans were returned to the laboratory, and the cans were opened and weighed to obtain the wet weight. Open cans were placed in ovens at 105 degrees Celsius for a minimum of 24 hours for drying, then they were weighed again to obtain the dry weight.

Bulk density is determined by excavating a quantity of soil, drying and weighing it, and determining the volume of the excavation. The volume was determined by inserting a rubber-balloon into the excavation and filling it with water until the excavation was just full. The volume of the excavated soil sample is equal to the volume of the fluid dispensed from a graduated cylinder.

Soil samples were collected from the following transects:

**Transect 883:**

Approximate coordinates: 39 04' 53" N, 96 33' 42" W  
39 04' 53" N, 96 33' 17" W

Transect 883 is numbered from West to East; Sample sites are approximately 50 m apart.

- Sample 2175: 10 m from road, on top.
- Sample 2125: 50 m east of 2175 on top.

- Sample 2075: 50 m east of 2125 on small terrace west of channel.
- Sample 2000: 50 m east of 2075 near insect traps, stoney slope.
- Sample 1925: 50 m east of 2000 on top, gentle slope.
- Sample 1875: 50 m east of 1925 on top, 30 m west of flight marker.
- Sample 1825: 50 m east of 1875 on top in unburned watershed 2D.
- Sample 1750: 50 m east of 1825 on top.
- Sample 1700: 50 m east of 1750 on tongue between gullies.
- Sample 1650: 35 m east of 1700 on tongue between gullies.
- Sample 1600: 28 m east of 1650 in gully.
- Sample 1575: 35 m east of 1600, half way up hill.
- Sample 1525: 50 m east of 1575 on top.
- Sample 1450: 50 m east of 1525 on top, near fence corner.

**Transect 884:**

Approximate coordinates: 39 04' 43" N, 96 33' 50" W  
39 04' 43" N, 96 33' 14" W.

Transect 884 is numbered from west to east; sample sites are approximately 50 m apart.

- Sample 2100: 10 m east of road on top.
- Sample 2050: 42 m east of 2100 just before slope down but flat.
- Sample 2000: 42 m east of 2050 at bottom of slope, alluvial soil.
- Sample 1950: 50 m east of 2000 on tongue between channels, alluvial.
- Sample 1900: 50 m east of 1950 on gentle slope before steep slope.
- Sample 1850: 50 m east of 1900 on top of nob, stoney soil.
- Sample 1800: 50 m east of 1850 25 m from flight marker, stoney soil.
- Sample 1725: 50 m east of 1800 25 m east of marker, unburned, just before drop-off.
- Sample 1675: 50 m east of 1725 bottom of slope, just before gully.
- Sample 1625: 35 m east of 1675 between gullies on high tongue.
- Sample 1575: 50 m east of main channel
- Sample 1525: 50 m east of 1575 parallel to large gully up a gentle slope
- Sample 1475: 50 m east of 1525 parallel to large gully on small bench.
- Sample 1400: 50 m east of 1475 parallel to gully on hillside.
- Sample 1325: 50 m east of 1400 parallel to gully but on the south side of it (crossed over).
- Sample 1275: 50 m east of 1325 almost at head of gully on gentle slope near top.
- Sample 1200: 50 m east of 1275 on top 10 m from fire road.

**Transect 885:**

Approximate coordinates: 39 04' 36" N, 96 33' 20" W  
39 04' 36" N, 96 33' 56" W.

Transect 885 is numbered from east to west; sample sites are approximately 50 m apart.

- Sample 1490: 10 m west of fire road on top of hill.
- Sample 1540: 50 m west of 1490 half way down slope.
- Sample 1590: 50 m west of 1540 middle of long gentle slope to stream
- Sample 1640: 50 m west of 1590 near bottom of slope and parallel to small gully.
- Sample 1690: 50 m west of 1640 on tongue between channels.
- Sample 1740: 50 m west of 1690 mid-way up slope to marker.
- Sample 1790: 50 m west of 1740 and 5 m west of marker, fire road mid-way between 15-7 and 15-8.
- Sample 1840: 50 m west of 1790 near bottom of stoney slope.
- Sample 1883: 43 m west of 1840 near center of gradual slope to channel and big tree (at 50 m).
- Sample 1953: 70 m west of channel on stoney soil.
- Sample 2003: 50 m west of 1953 at base of hill, stoney soil.
- Sample 2048: 45 m west of 2003 & 5 m before drop into gully.
- Sample 2103: 55 m west of 2048 in gully slump area.
- Sample 2153: 50 m west of 2103 about 2/3 up slope.
- Sample 2203: 50 m west of 2153 on top 20 m from fire road on west end of transect.

**Transect 886:**

Approximate coordinates: 39 04' 34" N, 96 33' 56" W  
39 04' 34" N, 96 33' 21" W

Transect 886 is numbered from west to east; sample sites are approximately 50 m apart.

Between IFC-1 and IFC-2, transect 885 was moved approximately 65 m south, so that the transect 886 was in line with the southern-most dead tree of the six trees (second tree from the south of the total of six trees) along the channel in 2D. The transect 885 used in IFC-1 was in line with the northern-most of the six trees. The new transect is numbered 886 and the sample sites run from west to east (as do 883 and 884). Each sample site is spaced about 50 to 55 m from the previous site. Site 885-1 is located about 10 m east of the fire road on the western boundary of watershed 1D, sample number 2164.

**Transect 881:**

Approximate coordinates: 39 03'07 N, 96 32'35 W  
39 03'07 N, 96 34'00 W.

Transect 881 is numbered from east to west; sample sites are approximately 50 m apart.

Transect 881 was chosen to monitor the privately owned, burned cover, to provide a calibration line for the NOAA gamma instrument, and to provide a relatively level ground data track for the Kansas radar mounted on the NASA helicopter. The 18 sites on transect 881 were located about 50 m apart, starting about 50 m west of Shashi Verma's EC/S, PAM6 site (site-grid = 4439). The sample sites were not flagged so subsequent samples taken on different days were not necessarily within 5 m of the previous samples.

**Transect 884 extended:**

Approximate coordinates: 39 04'43" N, 96 34'05" W  
39 04'43" N, 96 34'45" W.

Transect 884 extended is a western extension of transect 884 into the unburned area of watershed N1B. Sample sites are approximately 50 m apart.

Transect 884 extended was chosen to monitor soil moisture in an unburned area that had been sampled in 1985 to provide comparable data. The sample sites (7 sites numbered 2871 through 2421) started about 50 m west of the fire road and extended at about 50 m intervals down a rough and steep hill. The sample sites were flagged.

**Transect 882:**

Approximate coordinates: 39 04'30" N, 96 36'00" W  
39 04'30" N, 96 36'30" W.

Transect 882 consisted of 6 unflagged sample sites approximately 50 m apart starting 50 m west of the fire road and crossing the northern arm of watershed 4B. Sample sites progressed East to West.

Locations of 1985 transects (station numbers 851 through 855) are included in the Miscellaneous Geographic Reference data on FIFE CD-ROM Volume 5.

## **6. Observations:**

**Data Notes:**

Not available.

**Field Notes:**

None.

## **7. Data Description:**

**Spatial Characteristics:**

The FIFE study area, with areal extent of 15 km by 15 km, is located south of the Tuttle Reservoir and Kansas River, and about 10 km from Manhattan, Kansas, USA. The northwest corner of the area has UTM coordinates of 4,334,000 Northing and 705,000 Easting in UTM Zone 14.

**Spatial Coverage:**

Transect data were gathered mostly from watershed 1D in the northwest quadrant of the FIFE study area (a diagram of watershed 1D is on FIFE CD-ROM Volume 5 in the Miscellaneous GIS Raster Images data grouping). The stations and sitegrids for the starting point for each of the soil moisture transects are shown below:

	SITEGRID	STN	NORTHING	EASTING	LATITUDE	LONGITUDE
2829-SMT	855	4328480	710850	39 04 55	-96 33 45	
2840-FTR	883	4328485	712935	39 04 53	-96 32 18	
2940-FTR	884	4328177	712943	39 04 43	-96 32 18	
3040-FTR	885	4327961	712949	39 04 36	-96 32 18	
3126-SMT	853	4327790	710280	39 04 33	-96 34 09	
3140-FTR	886	4327899	712951	39 04 34	-96 32 18	
3140-FTR	882	4327776	712954	39 04 30	-96 32 18	
3228-SMT	852	4327700	710640	39 04 30	-96 33 54	
3229-SMT	851	4327700	710700	39 04 30	-96 33 52	
4440-FTR	881	4325217	713023	39 03 07	-96 32 18	

**Spatial Coverage Map:**

Not available.

**Spatial Resolution:**

These were point data, collected approximately 50 m apart along transect lines. FIS staff converted site numbers to estimates of distance from the road (U.S. Rt. 177) in meters. The distance estimate is probably +/-20 m at most, see the [Data Acquisition Methods Section](#).

**Projection:**

Not available.

**Grid Description:**

Not available.

**Temporal Characteristics:**

**Temporal Coverage:**

Prior to FIFE 1987 IFC, data were collected from June 13 through July 11, 1985. Soil samples were collected from late spring through the fall of 1987, during the Intensive Field Campaigns (IFC) of approximately 2 weeks each. Specifically, 1987 data were collected from May 28 through October 15, 1987.

**Temporal Coverage Map:**

Not available.

## Temporal Resolution:

Maximum of one set (one transect) of measurements per day during the IFCs.

## Data Characteristics:

The SQL definition for this table is found in the SM\_TRAN.TDF file located on FIFE CD-ROM Volume 1.

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### Parameter/Variable Name

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Parameter/Variable Source	Description	Range	Units
SITEGRID_ID	This is a FIS grid location code. Site grid codes (SSEE-III) give the south (SS) and east (EE) cell number in a 100 x 100 array of 200 m square cells. The last 3 characters (III) are an instrument identifier.		FIS
STATION_ID	The three-digit FIFE site identification number for the site where the data were collected.	min = 851, max = 886	FIS
OBS_DATE	The date on which the observation was made. max = 15-OCT-87	min = 13-JUN-85,	GSFC
OBS_TIME	The time of day that the data were collected, given as the midpoint of 30-minute average.	min = 608, max = 2157, missing = -999	[GMT] GSFC
SAMPLE_NUM	The sample number, an approximation of the distance along the transect in meters.	min = 0, max = 5885	GSFC
SAMPLE_DEPTH			

The depth of the sample. min = 5, [cm] SCALE  
max = 5 MEASURE

---

SOIL\_TEMP  
The temperature of the soil at min = 10, [degrees  
THERMOMETER max = 38, Celsius]  
the sample depth.  
missing = -99.9

---

WET\_WEIGHT  
The weight of the soil sample min = 37.29, [grams]  
WEIGHING max = 196.65,  
before drying.  
BALANCE  
missing = -9.99

---

DRY\_WEIGHT  
The weight of the soil sample min = 26.37, [grams]  
WEIGHING max = 168.4,  
after drying.  
BALANCE  
missing = -9.99

---

BULK\_DENSITY  
The bulk density of the soil. min = .53, [grams] FIXED  
RING max = 1.29, [cm<sup>-3</sup>]  
missing = -9.99

---

GRAVMTRC\_SOIL\_MOISTURE  
The gravimetric soil moisture. min = 4.4, [percent] SOIL  
CORE max = 63.68,  
missing = -9.99

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VOLUMTRC\_SOIL\_MOISTURE  
The volumetric soil moisture. min = 4, [percent] SOIL  
CORE max = 72.6,  
missing = -9.99

---

FIFE\_DATA\_CRTFCN\_CODE \*\*  
The FIFE Certification Code for CPI = checked FIS  
the data, in the following format: by principal  
CPI (Certified by PI), CPI-??? investigator,  
(CPI - questionable data). CPI-UPS=checked  
by principal  
investigator and  
updated position  
of sample

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LAST\_REVISION\_DATE  
data, in the format (DD-MMM-YY).      max = 11-MAY-90

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Footnote:

\*\* Decode the FIFE\_DATA\_CRTFCN\_CODE field as follows:

The primary certification codes are: EXM Example or Test data (not for release). PRE Preliminary (unchecked, use at your own risk). CPI Checked by Principal Investigator (reviewed for quality). CGR Checked by a group and reconciled (data comparisons and cross checks). The certification code modifiers are: PRE-NFP Preliminary - Not for publication, at the request of investigator. CPI-MRG PAMS data that is "merged" from two separate receiving stations to eliminate transmission errors. CPI-??? Investigator thinks data item may be questionable.

### Sample Data Record:

SITEGRID_ID	STATION_ID	OBS_DATE	OBS_TIME	SAMPLE_NUM	SAMPLE_DEPTH	SOIL_TEMP
4440-FTR	881	30-JUN-87	1935	408	5	22.00
4440-FTR	881	30-JUN-87	1938	450	5	21.00
4440-FTR	881	30-JUN-87	1942	508	5	21.00
4440-FTR	881	30-JUN-87	1945	558	5	21.00
WET_WEIGHT	DRY_WEIGHT	BULK_DENSITY	GRAVMTRC_SOIL_MOISTURE			
122.280	97.610	.9000	41.900			
117.750	95.950	.9000	38.100			
126.140	104.830	.9000	32.200			
102.140	83.100	.9000	42.900			
VOLUMTRC_SOIL_MOISTURE	FIFE_DATA_CRTFCN_CODE	LAST_REVISION_DATE				
37.700	CPI	11-MAY-90				
34.300	CPI	11-MAY-90				
29.000	CPI	11-MAY-90				
38.600	CPI	11-MAY-90				

## 8. Data Organization:

### Data Granularity:

These were point data, collected approximately 50 m apart along transect lines. Soil samples were collected from May 28 through the October 15, 1987, during the Intensive Field Campaigns (IFC) of approximately 2 weeks each.

A general description of data granularity as it applies to the IMS appears in the [EOSDIS Glossary](#).

### Data Format:

The CD-ROM file format consists of numerical and character fields of varying length separated by commas. The character fields are enclosed with a single apostrophe. There are no spaces between the fields. Each file begins with five header records. Header records contain the following information: Record 1 Name of this file, its table name, number of records in this file, path and name of the document that describes the data in this file, and name of principal investigator for these data. Record 2 Path and filename of the previous data set, and path and filename of the next data set. (Path and filenames for files that contain another set of data taken at the same site on the same day.) Record 3 Path and filename of the previous site, and path and filename of the next site. (Path and filenames for files of the same data set taken on the same day for the previous and next sites (sequentially numbered by SITEGRID\_ID)). Record 4 Path and filename of the previous date, and path and filename of the next date. (Path and filenames for files of the same data set taken at the same site for the previous and next date.) Record 5 Column names for the data within the file, delimited by commas. Record 6 Data records begin.

Each field represents one of the attributes listed in the chart in the [Data Characteristics Section](#) and described in detail in the TDF file. These fields are in the same order as in the chart.

## 9. Data Manipulations:

### Formulae:

#### Derivation Techniques and Algorithms:

Percent soil moisture on a weight basis was calculated according to the following formula:

$$\text{Gravimetric soil moisture} = ((\text{Wet wt.} - \text{Dry wt.}) / (\text{Dry wt.})) \times 100$$

Percent soil moisture on a volume basis was calculated according to the following formula:

$$\text{Volumetric moisture (soil moisture on weight basis)} \times \text{Bulk density}$$

Calculate the bulk density according to:

$$\text{Bulk density} = \frac{\text{Dry soil wt. (grams)}}{(\text{Volume 1} - \text{Volume 2})}$$

### Data Processing Sequence:

#### Processing Steps:

1. Assemble pre-drying weight values by can number,
2. Assemble post-drying weight values by can number,
3. Determine tare weight values for each can, and
4. Calculate soil moisture and bulk density.

**Processing Changes:**

None.

**Calculations:****Special Corrections/Adjustments:**

None.

**Calculated Variables:**

- Gravimetric soil moisture, and
- Bulk density.

**Graphs and Plots:**

None.

**10. Errors:****Sources of Error:**

Minor errors could arise in water content measurements depending on the technique used to avoid absorption of water from the air during cooling and prior to weighing. Also, the time necessary to reach constant weight will depend upon the type of oven used (e.g., convection type forced draft), the size or depth of the sample, the nature of the soil, and if the oven is over-loaded. Major errors could result from mistakenly spilling soil samples.

Water content values for stony or gravelly soils can be misleading. Large rocks can occupy appreciable volume in a soil sample and contribute appreciably to the mass without a commensurate contribution to the porosity or water capacity of the soil.

**Quality Assessment:****Data Validation by Source:**

Consistency checks (spatial and temporal) were made by the Principal Investigator and no unusual values were found.

**Confidence Level/Accuracy Judgment:**

The Principal Investigator is confident that the transect data were good.

**Measurement Error for Parameters:**

No quantitative assessment was made, see [Confidence Level/Accuracy Judgment Section](#).

### **Additional Quality Assessments:**

FIS staff applied a general Quality Assessment (QA) procedure to the data to identify inconsistencies and problems for potential users. As a general procedure, the FIS QA consisted of examining the maximum, minimum, average, and standard deviation for each numerical field in the data table. An attempt was made to find an explanation for unexpected high or low values, values outside of the normal physical range for a variable, or standard deviations that appeared inconsistent with the mean. In some cases, histograms were examined to determine whether outliers were consistent with the shape of the data distribution.

### **Data Verification by Data Center:**

The data verification performed by the ORNL DAAC deals with the quality of the data format, media, and readability. The ORNL DAAC does not make an assessment of the quality of the data itself except during the course of performing other QA procedures as described below.

The FIFE data were transferred to the ORNL DAAC via CD-ROM. These CD-ROMs are distributed by the ORNL DAAC unmodified as a set or in individual volumes, as requested. In addition, the DAAC has incorporated each of the 98 FIFE tabular datasets from the CD-ROMs into its online data holdings. Incorporation of these data involved the following steps:

- Copying the entire FIFE Volume 1, maintaining the directory structure on the CD-ROM.
- Using data files, documentation, and SQL code provided on the CD-ROM to create a database in Statistical Analysis System (SAS).
- Creating transfer files to transfer the SAS metadata database to Sybase tables.

Each distinct type of data (i.e. "data set" on the CD-ROM), is accompanied by a documentation file (i.e., .doc file) and a data format/structure definition file (i.e., .tdf file). The data format files on the CD-ROM are Oracle SQL commands (e.g., "create table") that can be used to set up a relational database table structure. This file provides column/variable names, character/numeric type, length, and format, and labels/comments. These SQL commands were converted to SAS code and were used to create SAS data sets and subsequently to input data files directly from the CD-ROM into a SAS dataset. During this process, file names and directory paths were captured and metadata was extracted to the extent possible electronically. No files were found to be corrupted or unreadable during the conversion process.

Additional Quality Assurance procedures were performed as follows:

- Statistical operations were performed to calculate minimum and maximum values for all numeric fields and to create a listing of all values of the character fields. During this process, it was determined that various conventions were used to represent missing values. (Note: no modifications were made to any data by the DAAC). In most cases, missing value identification conventions were discussed in the accompanying .doc file. Based on a visual check of the minimum and maximum values, no glaring errors or holes

were identified that might indicate errors introduced during CD-ROM mastering by the FIFE project or data ingest by the DAAC.

- Some minor inconsistencies and typographical errors were identified in some of the character fields and column labels, however, no modifications were made to the data by the DAAC.
- Some conversions of ASCII data were necessary to move the data from a DOS platform to a UNIX platform. Standard operating system conversion utilities were used (e.g., dos2unix).
- Much of the metadata required for archival is imbedded in the narrative documentation accompanying the data sets and extracted manually by DAAC staff who have read the .doc files provided on the CD-ROM and have hand entered this information into the metadata database maintained by the DAAC. QA procedures have been performed on these metadata to identify and eliminate typographical errors and inconsistencies in naming conventions, to ensure that all required metadata is present, and to ensure the accuracy of file names and paths for retrieval.
- Data requested for distribution to users are checked to verify that files copied from disk to other media remain uncorrupted.

As errors are discovered in the online tabular data by investigators, users, or DAAC staff, corrections are made in cooperation with the principal investigators. These corrections are then distributed to users. CD-ROM data are corrected when re-mastering occurs for replenishment of CD-ROM stock.

## **11. Notes:**

### **Limitations of the Data:**

Not available.

### **Known Problems with the Data:**

None.

### **Usage Guidance:**

This data set can be used in conjunction with other soil moisture data to validate the soil moisture values predicted by the airborne remote sensing instruments during FIFE (i.e., Peck Airborne Gamma Ray Soil Moisture and FIFE Level-3 Pushbroom Microwave Radiometer (PBMR) Soil Moisture Imagery).

### **Any Other Relevant Information about the Study:**

None.

## **12. Application of the Data Set:**

This data set can be used in conjunction with other soil moisture data to validate the soil moisture values predicted by the airborne remote sensing instruments during FIFE.

### **13. Future Modifications and Plans:**

The FIFE field campaigns were held in 1987 and 1989 and there are no plans for new data collection. Field work continues near the FIFE site at the Long-Term Ecological Research (LTER) Network Konza research site (i.e., LTER continues to monitor the site). The FIFE investigators are continuing to analyze and model the data from the field campaigns to produce new data products.

### **14. Software:**

Software to access the data set is available on the all volumes of the FIFE CD-ROM set. For a detailed description of the available software see the [Software Description Document](#).

### **15. Data Access:**

#### **Contact Information:**

ORNL DAAC User Services  
Oak Ridge National Laboratory  
Telephone: (865) 241-3952  
FAX: (865) 574-4665  
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#### **Data Center Identification:**

ORNL Distributed Active Archive Center  
Oak Ridge National Laboratory  
USA

Telephone: (865) 241-3952  
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#### **Procedures for Obtaining Data:**

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

#### **Data Center Status/Plans:**

FIFE 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:

The Soil Moisture Transect data are available on FIFE CD-ROM Volume 1. The CD-ROM file name is as follows:

```
\DATA\SOILMSTR\SM_TRAN\GRIDxxxx\yddgrid.SMT
```

Where *xxxx* is the four digit code for the location within the FIFE site grid. Note: capital letters indicate fixed values that appear on the CD-ROM exactly as shown here, lower case indicates characters (values) that change for each path and file.

The format used for the filenames is: *ydddgrid.sfx*, where *grid* is the four-number code for the location within the FIFE site grid, *y* is the last digit of the year (e.g., 7 = 1987, and 9 = 1989), and *ddd* is the day of the year (e.g., 061 = sixty-first day in the year). The filename extension (*.sfx*), identifies the data set content for the file (see the [Data Characteristics Section](#)) and is equal to .SMT for this data set.

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## **Archive/DBMS Usage Documentation.**

The Collected Data of the First ISLSCP Field Experiment is archived at the EOS Distributed Active Archive Center (DAAC) at Oak Ridge National Laboratory (ORNL), Oak Ridge, Tennessee (see [Data Center Identification](#)). Documentation about using the archive and/or online access to the data at the ORNL DAAC is not available at this revision.

## **18. Glossary of Terms:**

A general glossary for the DAAC is located at [Glossary](#).

## **19. List of Acronyms:**

CD-ROM Compact Disk-Read Only Memory CMP Coordinated Mission Plan DAAC Distributed Active Archive Center EOSDIS Earth Observing System Data and Information System FIFE First ISLSCP Field Experiment FIS FIFE Information System GMT Greenwich Mean Time GSFC Goddard Space Flight Center IFC Intensive Field Campaign ISLSCP International Satellite Land Surface Climatology Project ORNL Oak Ridge National Laboratory PBMR Pushbroom Microwave Radiometer URL Uniform Resource Locator UTM Universal Transverse Mercator

A general list of acronyms for the DAAC is available at [Acronyms](#).

## **20. Document Information:**

May 6, 1994 (citation revised on October 15, 2002).

Warning: This document has not been checked for technical or editorial accuracy by the FIFE Information Scientist. There may be inconsistencies with other documents, technical or editorial errors that were inadvertently introduced when the document was compiled or references to preliminary data that were not included on the final CD-ROM.

Previous versions of this document have been reviewed by the Principal Investigator, the person who transmitted the data to FIS, a FIS staff member, or a FIFE scientist generally familiar with the data.

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