



**Surface Dust Flux Model
Support Plan**



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By
Linda M. Hasselbarth
Benjamin H. Barnum
Bruce A. Toth

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1 OVERVIEW

1.1 *System Overview*

This document describes the Surface Dust Flux modeling software package. The model uses forecasted surface winds to estimate the rate at which ground level dust is being produced from source areas within a mesoscale theater. Surface dust fluxes vary in desert regions from 10 –100 $\mu\text{gm}/\text{m}^2\text{-s}$ for small to moderate fluxes, and 500 to 2000 $\mu\text{gm}/\text{m}^2\text{-s}$ or more under dust storm conditions.

The model uses MM5 forecasted wind fields, soil moisture and estimated precipitation as input. Surface dust flux is calculated at each MM5 model grid location (~45 km intervals) in the mesoscale theater. The flux is calculated using forecasted 10 meter winds and the dust source database and model developed by Dr. Paul Ginoux at NASA GSFC/GIT.

The dust model can make forecasts for 2 MM5 mesoscale regions covering Northern Africa and the Middle East (T9z) and Southwest Asia (T4y). The surface dust fluxes are displayed as regional maps with color overlays showing dust fluxes in $\mu\text{gm}/\text{m}^2\text{-s}$. The user should note that this model does not forecast the transport of dust in the atmosphere. It only makes a prediction of the rate at which dust is generated at the surface.

1.2 *Document Overview*

The purpose of this document is to outline the resources necessary to install, run, and evaluate the Surface Dust Flux Model software system.

2 Product Support Resources

2.1 *Facilities*

The Surface Dust Flux Model software has been adapted for the AFWA facilities. No resources other than those listed in the following subsections will be required from these facilities.

2.2 *Hardware*

The software was developed for use on a SUN platform (see section 2.3 below for operating system requirements). For installation and operation of the software, access to a Sun platform with a color display, approximately 11 MB of disk space for software, 550 MB of disk space for test data, and a 4mm DAT tape drive is required.

2.3 Software

The software was developed under Solaris 2.7 and Solaris 2.8. IDL version 5.4 should be present on the target system.

There are possible incompatibilities that need to be worked arising from version differences in the operating system and the required software. We do not expect problems arising from operating system minor version differences, as very few operating system services are used.

2.4 Data

The software was tested with MM5 data files for input. The contents are up to the discretion of the individuals at AFSWC that will evaluate the software. The format of the MM5 data is described in the following reference:

C. H. Dey. GRIB, Edition 1, NCEP Central Operations, National Weather Service, NOAA, U.S. Dept. of Commerce, Office Note 388, 1998.

2.5 Personnel

2.5.1 Personnel required for installation

The installation process is expected to take less than 1 business day. We request that the UNIX system administrator be responsible for the installation process. During this time, access to the individual(s) that will be evaluating the software will be required. The APL Transition Team will be available during this period, via email or telephone, to answer questions or troubleshoot.

2.5.2 Personnel required for evaluation

We recommend that one person be assigned to the evaluation at a level of effort conducive to the desired level of intensity of the evaluation. This person should be competent to evaluate the output of the software.

2.6 Error handling

Currently, the error reporting mechanisms in the software are written to the screen.

3 Recommended Procedures for Operation

The software as delivered is designed to run with human intervention. User accessible options are contained in the setup file, *dust_setup.txt*, as well as part of the GUI interface.

4 Training

Person(s) at AFWA conducting the installation and evaluation will be able to contact the UPOS Transition Team by telephone or email to ask questions.

5 Anticipated Areas of Change

Additional software changes can be made through the UPOS Transition Team corrective action process (reference needed).

6 Evaluation and Transition

The software is being delivered to AFWA for the purpose of evaluation. We will make resources available to support the evaluations conducted at AFWA. Additional requirements, documentation and training may be negotiated as a result of the evaluation.

7 Acronyms and Abbreviations

Acronym	Definition
AACGM	Attitude Adjusted Corrected Geomagnetic
AFCCC	Air Force Combat Climatology Center
AFOSR	Air Force Office of Scientific Research
AFRL	Air Force Research Laboratory
AFSCN	Air Force Satellite Control Network
AFSPACECOM	Air Force Space Command
AFSWC	Air Force Space Weather Center
AFWA	Air Force Weather Agency
AFWIN	Air Force Weather Information Network
AF/XOW	Air Force Director of Weather
APL	Applied Physics Laboratory of Johns Hopkins University
ASCII	American Standard Code for Information Interchange
ASPAM	Atmospheric Slant Path Analysis Model
AVHRR	Advanced Very High Resolution Radiometer
AVN	Aviation Model
AVO	Alaska Volcano Observatory
BATS	Biosphere-Atmosphere Transfer Scheme
CLASS	Canadian Land Surface Scheme
COE	Common Operating Environment
DII	Defense Information Infrastructure
DMSP	Defense Meteorological Satellite Program
ECMWF	European Center for Medium-Range Weather Forecasts
FNMOC	Fleet Numerical Meteorology and Oceanography Center
FSL	Forecast Systems Laboratory
FTP	File Transfer Protocol
GI	Geophysical Institute
GIF	Graphic Interchange Format
GIT	Georgia Institute of Technology
GMT	Generic Mapping Tools
GOLD	Geophysical On-Line Data
GRIB	Gridded Binary
GSFC	Goddard Space Flight Center
HLBL	High Latitude Boundary Layer

IDL	Interactive Data Language
IMF	Interplanetary Magnetic Field
JHU	Johns Hopkins University
LAN	Local Area Network
LAPS	Local Analysis and Prediction System
LSM	Land Surface Model
MM5	Fifth Generation Mesoscale Model
NASA	National Aeronautics and Space Administration
NCAR	National Center for Atmospheric Research
NCEP	National Centers for Environmental Prediction
netCDF	Network Common Data Form
NGDC	National Geophysical Data Center
NGM	Nested Grid Forecast Model
NOGAPS	Navy Operational Global Atmospheric Prediction System
NWP	Numerical Weather Prediction
OWS	Operational Weather Squadron
PACE	Polar Anglo-American Conjugate Experiment
PBL	Planetary Boundary Layer
PCA	Polar Cap Absorption
PFRR	Poker Flat Research Range
SABER	Sounding of the Atmosphere using Broadband Emission Radiometry
SD	Space Department of the Applied Physics Laboratory
SDP	Software Development Plan
SEC	Space Environment Center
SEE	Solar EUV Experiment
SEON	Solar Electro-optical Observing Network
SFOC	Spaceflight Operations Center
STP	Solar Terrestrial Physics
SWOC	Space Weather Operations Center (Offutt)
SWXS	Space Weather Squadron
Tcl	Tool Command Language
Tk	Toolkit
Tix	Tk Interface Extension
UAF	University of Alaska, Fairbanks
UCAR	University Corporation for Atmospheric Research
UPOS	University Partnering for Operational Support

WDC	World Data Center
WF	Weather Flight
WMO	World Meteorological Organization
XDR	External Data Representation