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Stratospheric Aerosol and Gas Experiment (SAGE III)

Data Products User's Guide

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03/04

SAGE III Data Products User's Guide

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SAGE III Data Products User's Guide

Change Record Page

Issue	Date	Pages Affected	Description
Version 1.0	11/ 2001	All	Baseline
Version 1.1	10/ 2002	Pg 4, Appendix C	Removed ISS references, updated to include Least Squares ozone method and update composite ozone method transition points
Version 1.2	04/ 2003	Pgs 1, 2, 9 Appendices A, B, C, D, E	Modifications to appendices to reflect instrument and data product format changes over time, updated Start-End WL in Figure 2, updated file naming convention for the data product version
Version 1.2	06/2003	Pg 101, 102, Appendix E	Modifications to Record 1 definition. A more definitive explanation of the various bytes. Inserted Instruction file header-Inst Hdr. Info.
Version 1.3	08/2003	Appendices B, C, D, E	Corrected section titles for HDF products.
	08/2003	Appendix A	O ₂ A-band science pixels 314 through 338 are now used for altitude registration
	09/2003	Appendix D	Added Event Status Bit Flag and A-band Altitude Registration Offset from the ephemeris-based method to Table D 1.3. (Effective in data version 3).
	10/2003	Page 7	A paragraph was added to the end of the Level 2 Cloud Product (from solar data) section.
	01/2004	Appendix D	Added Event Status Bit Flag to Section 4.0 of HDF File Format Sheet. Added a new section 6.0A, A-Band Altitude Registration Offset from the ephemeris-based method to HDF File Format Sheet.



Change Record Page - continued

Issue	Date	Pages Affected	Description
Version 1.3	01/2004	Page 8	A statement about tangent height regulations was added to the end of the third paragraph under Level 2 Lunar Species Product section.
	02/2004	All Appendices	Removed all HDF tables
	02/2004	Page viii	Added additional information to the "Information for using the SAGE III Data Product Users Guide" paragraph.
	02/2004	Page 3	Added additional information to the "Instrument Description and Operation" section.
	02/2004	Page 7	Added additional information to the "Level 2 Solar Species Products" section.
	02/2004	Page 11	Added additional information to the "Quality Assurance Bit Flags" section.
	02/2004	Page 11	Changed the "Event Status Bit Flag" Information
Version 1.4	03/2004	Appendix B & C	Added event status bit flag to solar transmission and solar species products.
	05/2004	Page 9	Added information on retrieved profile bit flags.
Version 1.5	07/2004	Page 7, 8	Replaced the entire section entitled, "Level 2 Cloud Product (from solar data)

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Acronyms and Abbreviations

ATBD	Algorithm Theoretical Basis Document
CCD	charge-coupled device
Ch	channel
Char	Character
DAO	Data Assimilation Office
EFOV	effective field of view
EOS	Earth Observing System
ESE	Earth Science Enterprise
ETOS	Elapsed Time on Station
FOV	field of view
HDF	Hierarchical Data Format
IFOV	instantaneous field of view
InGaAs	Indium Gallium Arsenide
Int	integer
IR	infrared
ISS	International Space Station
LASDC	Langley Atmospheric Sciences Data Center
LOS	line of sight
NCEP	National Center for Environmental Prediction
NOAA	National Oceanic and Atmospheric Administration
QA	quality assurance
RASA	Russian Aviation and Space Agency
SAGE	Stratospheric Aerosol and Gas Experiment
SAM	Stratospheric Aerosol Measurement
SP	Slant Path
STD	standard
T/P	temperature/pressure
VBP	vertex blue pixels
VRP	vertex red pixels

Information for using the SAGE III Data Product User's Guide

This Data Products User's Guide (Version 1.5) provides a general description of the measurement technique, instrument, mission, and sampling coverage. Additional information on these topics or details on the retrieval algorithms are provided at the websites specified below. This document also provides information on the charge-coupled device (CCD) pixel assignments used for the retrieval algorithms. These assignments and the periods they represent are described in Appendix A. Instructions for accessing the SAGE III Data Product files are also provided, with detailed descriptions of their content and format given in Appendices B through E.

Reference Material	Website Location:
SAGE III Algorithm Theoretical Basis Documents	http://eospso.gsfc.nasa.gov/atbd/sagetables.html
SAGE III Mission Web Site	http://www-sage3.larc.nasa.gov/

Introduction

The Stratospheric Aerosol and Gas Experiment (SAGE) III is an improved extension of the successful Stratospheric Aerosol Measurement (SAM) II, SAGE I, and SAGE II satellite experiments and is designed to acquire measurements of aerosols and gases in the stratosphere and upper troposphere.^[1] These measurements are needed to enhance our understanding of natural and human-derived atmospheric processes. The experiment is a component of NASA's Earth Observing System (EOS) and is mounted on the Russian Meteor-3M spacecraft. The mission is managed by NASA's Langley Research Center.

Advances in the SAGE III instrument design permit measurement of additional wavelengths during both lunar and solar occultation events. The added measurement capabilities

- improve aerosol characterization
- improve the gaseous retrievals of O₃, H₂O, and NO₂
- add retrievals of temperature, pressure, NO₃, and OCIO
- extend the vertical range of measurements
- provide a self-calibrating instrument independent of external data needed for retrieval
- expand the sampling coverage

Measurement Technique

The SAGE III instrument measures the attenuation of solar radiation resulting from the scattering and absorption by atmospheric constituents in the Earth's atmosphere as the spacecraft observes a sunrise or sunset event. The enhanced capabilities of the SAGE III instrument allow similar measurements to be made during moonrise and moonset.^[1,7] The lunar measurements are made only during the second and third quarter phases of the Moon and when the atmosphere along the line-of-sight (LOS) is not

directly illuminated by the Sun.

The viewing geometry of the satellite and the radiant target (Sun or Moon) during an occultation is illustrated in **Figure 1**. Measurement opportunities occur when the satellite ascends or descends from behind the Earth. Measurement begins when the instrument acquires the radiant target and uses a scanning mirror to scan the target image across the instrument field-of-view (FOV) aperture. A measurement is considered to occur at the point along the line of sight from the instrument to the target that comes closest to the Earth's surface (i.e., the subtangent point). The altitude of that point above the Earth's surface is commonly referred to as the tangent altitude.

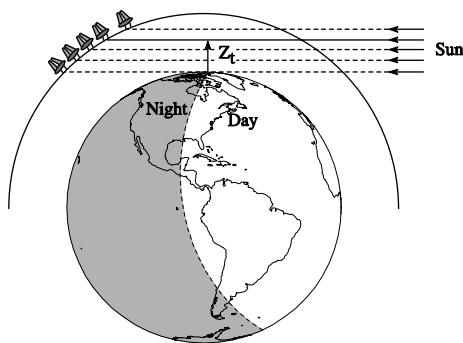


Figure 1. Occultation geometry.

The use of a scanning mirror provides multiple samples at each tangent altitude that are combined to construct transmission profiles from the Earth's surface (or cloud top) to an altitude of 100 km. Above this altitude, irradiance measurements are acquired between 100 and 300 km to characterize the instrument's performance across its wavelength range. This information is used to calibrate the instrument for each solar occultation event. By using this procedure, SAGE III data are relatively unaffected by changes in the instrument characteristics over the lifetime of the mission. A general description of the solar occultation measurement technique is provided by McCormick et al., 1979.^[6]

The atmospheric extinction at any point along the line-of-sight typically includes contributions from aerosols and several gas constituents. **Figure 2** illustrates the principal extinction contributions for an altitude of 18 km. Both aerosol and molecular (Rayleigh) scattering contribute to extinction at all wavelengths. Ozone has strong absorption in the Hartley-Huggins band in the ultraviolet region of the spectrum and in the Chappius band in the visible spectrum. NO₂ absorbs between 350 and 600 nm. Water vapor has absorption lines throughout the visible spectrum, with an additional strong band near 940 nm. Although they are not depicted in this figure, NO₃ has absorption features between 500 and 650 nm, and OCIO has a strong band between 380 and 400 nm.

Instrument Description and Operation

The design of the SAGE III sensor relies heavily upon the flight-proven designs used in the SAM II and SAGE I and II instruments. The SAGE III sensor assembly is illustrated in **Figure 3**. It consists of a pointing subsystem, an imaging subsystem, and a spectrometer. The pointing subsystem uses a scan mirror to acquire radiant energy from either the Sun or the Moon by

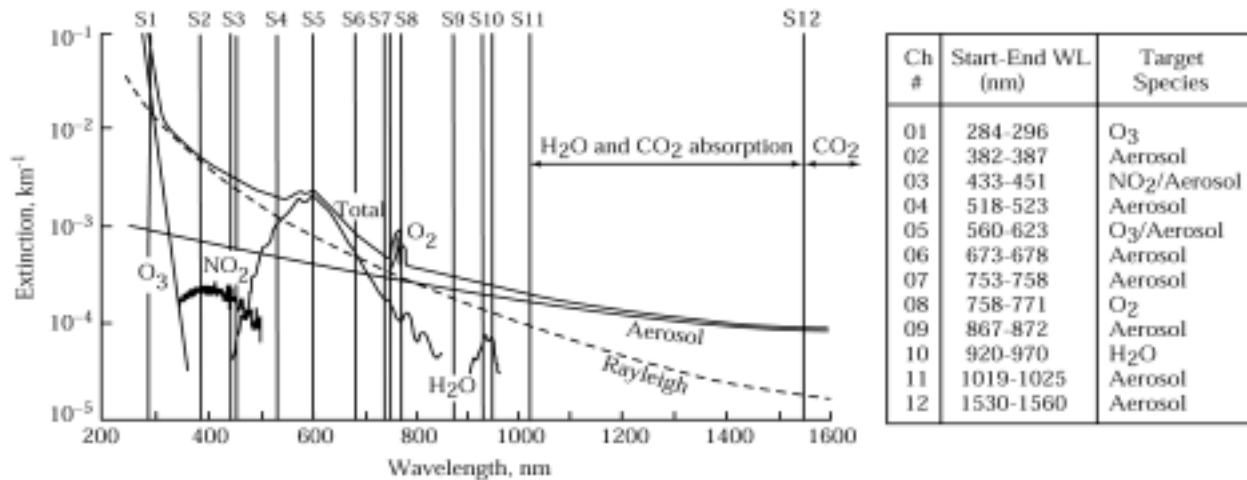


Figure 2. Principal extinction contributions at 18 km. Vertical lines (S1–S12) denote spectral bands measured during solar events by SAGE III.



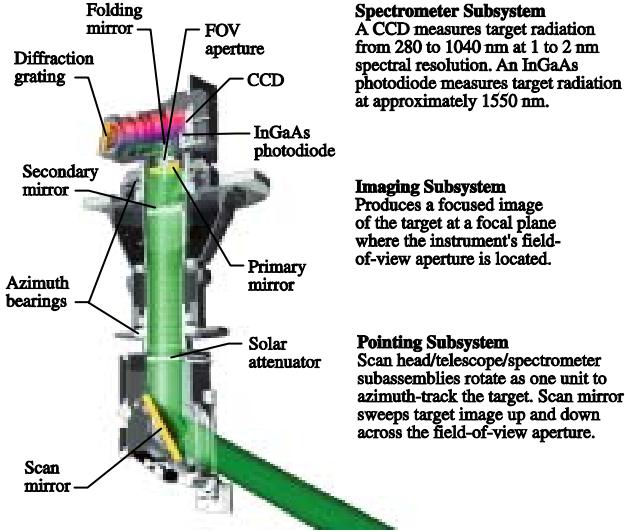


Figure 3. SAGE III sensor subsystems.

vertically scanning across the target's image. The imaging subsystem produces a focused image of the target at the focal plane where the science aperture is located. The aperture defines the instrument's instantaneous field of view (IFOV). A removable neutral-density filter is located along the optical path of this subsystem. The filter is inserted into the optical path to attenuate the solar signal by approximately a factor of 10^6 and is removed for lunar measurements.

The spectrometer is located behind the science aperture and uses an 809×10 pixel charge-coupled device (CCD) array to measure target radiation. The solar radiance between 280 and 1040 nm is measured with a spectral resolution of 1 to 2 nm along the 809 pixel array. An additional Indium Gallium Arsenide (InGaAs) infrared (IR) photodiode measures light near 1550 nm with a bandwidth of 30 nm for near infrared aerosol extinction measurements. This spectral coverage permits the measurement of multiple absorption features of each gaseous species and multiwavelength measurements of broadband extinction by aerosols. Because of limitations in the telemetry bandwidth of the Meteor-3M spacecraft, only 87 pixel groups (86 from the CCD and 1 from the photodiode) are transmitted from the satellite. These pixel groups are divided among 12 channels for solar observations and 3 channels

for lunar observations. One of the new features of the SAGE III instrument is the ability to reassign CCD pixels among these channels during flight to optimize instrument and retrieval performance. A listing of the different pixel assignments and the periods that they cover is provided in Appendix A.

As noted above, the CCD has 10 pixels for each of the 809 wavelength segments. The number of pixels utilized, consequently, defines the effective field of view (EFOV). For solar measurements, 3 of the pixels are averaged at 64 samples per second, which results in an EFOV of 30 arc seconds in the vertical and 1.5 arc minutes in the horizontal. This sampling translates to a vertical resolution of 0.5 km and a horizontal resolution of 1.5 km at the tangent point location.

For lunar measurements, the measurement integration time is increased, the sample rate is decreased to 16 samples per second, and the EFOV is widened to include all 10 elements of the CCD to improve the measurement's signal-to-noise ratio. The increased integration time and slower sample rate result in an increase in the EFOV to 1 arc minute in the vertical (or 1 km at the tangent point). The use of all 10 pixels increases the horizontal view to 5 arc minutes (or 5 km at the tangent point).

SAGE III Meteor-3M Mission

The SAGE III/Meteor-3M mission is a joint research experiment between NASA and the Russian Aviation and Space Agency (RASA).^[7] Other instruments aboard the Meteor-3M provide hydrometeorological, heliogeophysical, and other types of data to organizations in Russia, Morocco, and Pakistan. Nominal sampling coverage for this mission is shown in **Figure 4**. The satellite was launched on December 10, 2001 into a Sun-synchronous orbit at an altitude of 1020 km and with an approximate 9:00 a.m. equatorial crossing time. With these orbital parameters, solar occultation measurement opportunities are limited to mostly high latitudes in the Northern Hemisphere (between 50° and 80° N) and mid-latitudes in the Southern Hemisphere (between 30° and 50° S).

Lunar observations extend over all latitudes, but with less dense coverage. These observations are limited by solar zenith angles > 95° and beta angles < 40°.

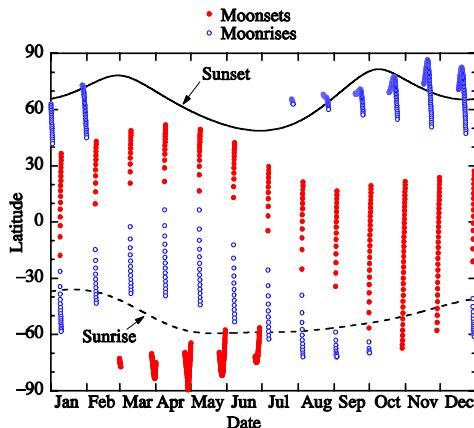


Figure 4. Nominal SAGE III/Meteor-3M coverage.

Data Products and Availability

A list of the profile measurements contained in the Science Data Products produced for the SAGE III mission is provided in **Table 1**. The reporting resolution for all species is 0.5 km.

A general description of the importance of measurements, as related to the Earth Science Enterprise's (ESE) Science Implementation Plan, is described in the EOS Science Plan (1999) and in the EOS Data Products Handbook, Volume 2 (2000).^[4] These data products, with attendant metadata, are archived and available in either HDF-EOS or binary format from the Langley Atmospheric Sciences Data Center (LASDC - formerly known as the LaRC Distributed Active Archive Center)^[8] at

<http://eosweb.larc.nasa.gov/>

This data retrieval system allows the user to select Level 1B and Level 2 products based on specified periods of time and measurement locations. Most data products are organized into individual solar or lunar events (denoted as granules). The Level 2 Cloud product is a file that accumulates cloud data from solar events for a calendar month. SAGE III product files may be requested through the LASDC at any time. Software needed to ingest these products is also available at this web site.

Product Content and Formats

This section provides a description of the content and format for the HDF-EOS and binary Level 1B and Level 2 data products. Format details for each product are listed in detail in Appendices B, C, D, and E. This section also provides a description of the file-naming convention.

Level 1B Transmission Product

The Level 1B Transmission product contains the SAGE III atmospheric slant path transmission profiles at 87 spectral channels, as listed in Appendix B. The profiles are skewed vertically and extend from sea level to an altitude of 100 km in 0.5 km intervals. The standard deviation of the binned transmission

Table 1. SAGE III Measurement Inventory

Reported Measurement	Units	Vertical Range	Expected Precision	Product Residence
Transmission Profiles (@ 85 wavelengths) Slant Path Transmission	none	0 - 100 km	0.05%	Level 1B Transmission
Aerosol Profiles (@ 9 wavelength bands) Extinction Stratospheric Optical Depth 1020nm Aerosol/Rayleigh Extinction Ratio	km^{-1} none none	0 - 40 km	5%	Level 2 Solar
Ozone Profiles (solar) Concentration Slant Path Column Density	cm^{-3} cm^{-2}	6 - 85 km	10%	Level 2 Solar
Ozone Profiles (lunar) Concentration	cm^{-2}	16 - 35 km	10%	Level 2 Lunar
NO₂ Profiles (solar) Concentration Slant Path Column Density	cm^{-3} cm^{-2}	10 - 50 km	10%	Level 2 Solar
NO₂ Profiles (lunar) Concentration	cm^{-3}	20 - 50 km	10%	Level 2 Lunar
Water Vapor Profiles Concentration	cm^{-3}	0 - 50 km	5 - 15% (<5% below 33km)	Level 2 Solar
NO₃ Profiles Concentration	cm^{-3}	20 - 55 km	10%	Level 2 Lunar
OCIO Profiles Concentration	cm^{-3}	15 - 25 km	25%	Level 2 Lunar
Temperature/Pressure Profiles Temperature Profile Pressure Profile	K hPa	0 - 85 km 1000 - 0.004 hPa	2 K 2%	Level 2 Solar
Cloud Presence Profile Cloud Presence	none	0 - 30 km	not applicable	Level 2 Cloud

data is also provided for each reported altitude and channel. These data have been geolocated and normalized against exoatmospheric solar measurements to produce slant path transmission profiles. Algorithm retrievals outlined in the Algorithm Theoretical Basis Document (ATBD) are used to reduce and invert these data into the Level 2 products listed in Appendices C and D. The Level 1B product is only available for solar measurements.

In the construction of the transmission profiles, atmospheric density information is used to correct for refraction effects. This information is derived from temperature profiles interpolated to the location and time of each SAGE III event from global gridded meteorological analyses provided

by the National Oceanic and Atmospheric Administration's (NOAA's) National Center for Environmental Prediction (NCEP). These data extend from the surface to a pressure-altitude of 0.4 hPa (~55 km). Above this altitude, climatological temperature data are used from the Global Reference Atmospheric Model - 1995 (GRAM95, NASA Technical Memorandum 4715). The composite temperature profile information is included in the Level 1B data product.

Note that the NCEP temperature product is also used to correct for molecular scattering in the Level 2 retrieval algorithm. The retrieval of temperature directly from the SAGE III solar measurements occurs later, downstream in the data

processing flow, and is reported in the Level 2 products.

Level 2 Solar Species Products

The Level 2 Solar Species products are produced from the Level 1B Transmission profiles by using algorithms described in the ATBD. A description of the Level 2 Solar Species format is provided in Appendices C and D. This section discusses the content of the Level 2 Solar Species organized by species. Each species includes information on its relative uncertainty. Species are reported in profiles on a geometric altitude coordinate system with a vertical resolution of 0.5 km. Because of unexpected artifacts in the measured signal, a 1-2-1 smoothing algorithm has been applied to the slant path optical depth profiles for each species. Diurnal corrections are not applied to the retrieved constituent values.

Aerosol

Profiles of aerosol extinction are provided at 9 wavelengths (385, 448, 521, 596, 676, 754, 868, 1019, and \sim 1550 nm) from the surface or opaque cloud top to an altitude of 40 km, where the contribution due to aerosols becomes negligible at all wavelengths. In practice, the lower altitude of an aerosol extinction profile may be limited by the dynamic range of the detector and a high, integrated slant path optical depth. This detection limit occurs near a slant path optical depth of about 8, which translates to a column optical depth of approximately 0.02.

Two additional aerosol products are provided in this list: stratospheric aerosol optical depth and the ratio of aerosol extinction to the contribution caused by molecular scattering at a wavelength of 1019 nm. Stratospheric optical depth values are only provided for profiles that extend below the altitude of the tropopause. Aerosol extinction profiles are derived as a residual following the clearing of previously determined contributions of molecular scattering and absorption due to the presence of ozone and nitrogen dioxide. The ATBD contains a full discussion of this process.

Water Vapor

Profiles of water vapor are provided in units of concentration from the surface to an altitude of 50 km. A temperature profile retrieved from SAGE III measurements or from a gridded analysis will facilitate computation of relative humidity. The water vapor products are retrieved by using a nonlinear least-squares approach from the solar occultation measurements of slant path absorption.

Nitrogen Dioxide

Profiles of nitrogen dioxide are provided in units of concentration from the tropopause to an altitude of 50 km. These profile measurements are derived from the multiple linear regression retrieval algorithm as described in the ATBD.

Ozone

Four different profiles of ozone are provided in units of concentration over the altitude range 6 to 85 km. One profile is based upon measurements made at short wavelengths in the Hartley-Huggins band (denoted Mesospheric Ozone), a second profile is based upon measurements made at visible wavelengths in the Chappius band (denoted Multiple Linear Regression Ozone) and a third profile is obtained using a similar approach utilized to process SAGE II data (denoted Least Squares Ozone). The fourth product consists of a composite profile constructed of data from the Chappius band at lower altitudes (below about 30 km) and is blended with data from the SAGE II-like Ozone retrieval (\sim 30 to \sim 47 km) and with measurements from the Hartley-Huggins band at higher altitudes (above approximately 47 km). Details on the exact interpolation altitude are provided in the SAGE III Data Version Description Documents. For each of the different ozone products slant-path column density profiles are also included.

Temperature and Pressure

The retrieved profiles of temperature and pressure are new products provided by the



SAGE III mission. Besides providing a valuable scientific measurement, these data will permit a self-consistent determination of molecular scattering along the limb view, which is needed for accurate retrievals of ozone and other species. These observations are derived from radiance measurements over the oxygen A-band feature centered near 762 nm, as described in the ATBD. This product is not to be confused with the temperature and pressure profiles obtained from the NCEP gridded analysis that is used in the construction of Level 1B Transmission profiles.

Level 2 Cloud Product (from solar data)

The SAGE III instrument detects subvisible and opaque clouds by using measurements of aerosol extinction and their uncertainties at nominal wavelengths of 525, 1020, and 1550 nm (See the SAGE III ATBD for Cloud Data Products for a more detailed discussion). By definition, opaque clouds block sunlight to the instrument. In events where the lower altitude of a SAGE III profile is the same at all three aerosol wavelengths listed above, and occurs above the earth's surface, this altitude is taken to be that of an opaque cloud layer. During periods of heavy aerosol loading, however, there is no unambiguous way to determine the difference between termination of the profile by cloud and by aerosol. Opaque aerosols causing such profile termination may arise from recent volcanic activity or may be lofted from the earth's surface. Subvisible clouds have extinction coefficients that are larger than that of the background aerosol but still lie within the SAGE III measurement range and so do not cause the profiles to terminate. Cloud is distinguished from aerosol in these cases by examining the variation of the extinction with wavelength. As in the case of opaque clouds, contamination by large aerosols that may have optical properties similar to cloud particles is possible under certain circumstances. During postprocessing, information is placed in the comment fields attached to the Level 2 Cloud Products (in record 1 as well as the comment fields for each event) to warn the user of possible contamination of the cloud product by aerosols. The event comment field may also contain other information derived during postprocessing such as

likely incorrect cloud identification or the presence of a polar stratospheric cloud.

The basic cloud product consists of three vertical products extending from 0 to 30 km (presently, useful data is only present from 6 to 30 km) that contain information on the presence of clouds. The first profile indicates the presence of cloud or otherwise and the second provides information about uncertainties in the observation and the origins of these uncertainties. A third profile gives guidance concerning the magnitude and significance of the uncertainties. The user is referred to the Cloud ATBD for the derivation and interpretation of these profiles, which are defined below. Unlike the other Level 2 Data Products, a granule of the cloud product contains a collection of data for one calendar month.

The cloud presence information is given by an index at each altitude whose value is set as follows:

- 0 insufficient input data (i.e., data missing for at least one aerosol wavelength)
- 1 no cloud present – representative of background upper tropospheric or stratospheric aerosol
- 2 no cloud present – representative of volcanically enhanced aerosol
- 3 no cloud present – representative of large upper tropospheric aerosols.
- 4 cloud present

Some ambiguity exists between these classes, which must be regarded as representative rather than definitive.

The uncertainty information is given by indices as follows:

- 0 insufficient input data
- 1 The limits of error attached to the aerosol extinction values used in the algorithm are such that the determination of the cloud presence index value can be made with confidence.



- 2 The limits of error attached to the aerosol extinction values used in the algorithm are such that the determination of the cloud presence index value cannot be made with confidence.
- 3 Data location on the profile (e.g., a data point located below a strong but not opaque cloud layer) is such that the determination of cloud presence cannot be made with confidence.
- 4 Atmospheric conditions are such (e.g., volcanic aerosol present) that the known wavelength extinction characteristics of the aerosol may be too close to that of cloud for the algorithm to work satisfactorily. This index may also be assigned during postprocessing to indicate other data ambiguities or qualifications. If an uncertainty index of 4 is assigned, an associated note will be placed in the comment field.

The cloud area index is a four digit number that shows the regions of the plot (as in Figs. 3.2.6 and 3.6.2 in the Cloud ATBD) over which the error ellipse extends. An index of 0230 signifies that the ellipse extends over regions 2 and 3 of these plots, an index of 1200 signifies that the ellipse extends over regions 1 and 2. The index is assigned for all non-zero values of the cloud uncertainty flag, it takes a value of 0000 if there is insufficient or non-physical input data.

Level 2 Lunar Species Products

The retrieval of constituent profiles from irradiance measurements acquired during lunar occultation events is a new capability for the SAGE III experiment. These retrievals are more complex than those employed for solar events because they account for the spatial and spectral non-uniformity of the surface albedo of the moon and the much lower measurement signal. One important difference between the solar and lunar retrieval techniques is the absence of a Level 1B slant path transmission profile product for lunar

occultation retrievals, a consequence of not being able to determine limb-darkening curves with sufficient accuracy to calibrate each SAGE III lunar occultation event. The inaccuracies in the registration of the limb-darkening curve arise from small uncertainties in the pointing knowledge of the instrument in the presence of large variations of the surface albedo across the lunar surface.

As a result of these issues, the reduction and retrieval of the lunar Level 2 products use a different approach that requires the separation of the broadband spectral characteristics of the lunar albedo. Next, a multiple linear regression retrieval technique is employed on the residual high-frequency component of the spectra to produce the Level 2 products. Details of the data reduction and inversion techniques are provided in the ATBD. A description of the lunar data product format and content is provided in the tables listed in Appendix D.

Due to the increased instrument integration time for this mode of operation, the resulting single-scan vertical resolution of the lunar Level 2 products is 1 km. The chemical species concentration data from multiple scans are bin-averaged and reported on a geometric coordinate system with a vertical resolution of 0.5 km to maintain grid spacing compatibility with the solar Level 2 products. The tangent height registration of data for lunar profiles is accomplished by two methods, an ephemeris-based calculation and a comparison to a forward model of the oxygen A-band. The offset between the two methods is reported in the product.

A description of the content of these products is provided below and organized by species. Each product includes information on its relative uncertainty and a data quality assurance flag set. Diurnal corrections are not applied to the retrieved constituent values.

Chlorine Dioxide

Profiles of chlorine dioxide are provided in units of concentration for an altitude range of 15 - 25 km. These profile measurements are



derived from the multiple linear regression retrieval algorithm described in the ATBD.

Nitrogen Dioxide

Profiles of nitrogen dioxide are provided in units of concentration from 20 to 50 km. These profile measurements are derived from the multiple linear regression retrieval algorithm described in the ATBD.

Nitrogen Trioxide

Profiles of nitrogen trioxide are provided in units of concentration for the altitude range of 20 - 55 km. These profile measurements are derived from the multiple linear regression retrieval algorithm described in the ATBD.

Ozone

Profiles of ozone based upon measurements made at visible wavelengths in the Chappius band are provided in units of concentration from 16 to 35 km.

File-Naming Convention

Following is a list of products and the file-naming convention for each product that shall be generated by SAGE III SCF processing.

- **L1B Solar Transmission Binary Products:**
g3a.tb.{xxxxxxXXvzz.zz}
g3a.tbm.{xxxxxxXXvzz.zz}
- **L1B Solar Transmission HDF Products:**
g3a.t.{xxxxxxXXvzz.zz}
g3a.tm.{xxxxxxXXvzz.zz}
- **Level 2 Solar Binary Products:**
g3a.sspb.{xxxxxxXXvzz.zz}
g3a.ssppm.{xxxxxxXXvzz.zz}
- **Level 2 Solar HDF Products:**
g3a.ssp.{xxxxxxXXvzz.zz}
g3a.ssppm.{xxxxxxXXvzz.zz}
- **Level 2 Lunar Binary Products:**
g3a.lspb.{xxxxxxXXvzz.zz}
g3a.lspbm.{xxxxxxXXvzz.zz}

- **Level 2 Lunar HDF Products:**

g3a.lsp.{xxxxxxXXvzz.zz}
g3a.lspbm.{xxxxxxXXvzz.zz}

- **Level 2 Cloud Binary Products:**

g3a.cldb.{xxxxxxXXvzz.zz}
g3a.cldbm.{xxxxxxXXvzz.zz}

- **Level 2 Cloud HDF Products:**

g3a.cld.{xxxxxxXXvzz.zz}
g3a.cldm.{xxxxxxXXvzz.zz}

where:

b	binary
m	metadata
t	Level 1B transmission profiles
ssp	Level 2 Solar species profiles
lsp	Level 2 Lunar species profiles
cld	Level 2 Cloud product
{xxxxxxXX}	Event ID (6 digit orbit number, 2 digit event type: where 10 = sunrise, 20 = sunset, 30 = moonrise, 40 = moonset)
{vzz.zz}	Data Product Version number

Example: g3a.tb.00191820v00.92

Refers to a transmission binary file for SAGE III Meteor-3M captured during a sunset for orbit 1918 and released as a product of SCF Data Product Version 00.92.

Example: g3a.ssp.00185110v00.92

Refers to a solar hdf file for SAGE III Meteor-3M captured during a sunrise for orbit 1851 and released as a product of SCF Data Product Version 00.92.

Example: g3a.lspbm.00187730v00.92

Refers to a lunar binary metadata file for SAGE III Meteor-3M captured during a moonrise for orbit 1877 and released as a product of SCF Data Product Version 00.92.

Example: g3a.cld.199901v00.92

Refers to a cloud hdf file for SAGE III Meteor-3M for January 1999 and released as a product of SCF Data Product Version 00.92.



Quality Assurance Bit Flags

SAGE III Data Products are reviewed prior to their release. Profiles have values reported only for those species and altitudes where there is confidence in the ability of the algorithms to produce representative products. Each file contains bit flags that convey information about processing decisions to the user.

Event Status Bit Flag

The lowest three bits of the Event Status Bit Flag form an integer value encoding the ephemeris source for the event. These codes are defined as follows:

- 0** - Ephemeris based on LIDAR measurement of satellite position.
- 1** - Ephemeris based on RADAR tracking data received from the Russian Mission Control Center
- 2** - Ephemeris based on RADAR tracking data received from Goddard Space Flight Center.
- 3-7** Spare.

Retrieved Profile Bit Flags

The profile bit flags associated with the three retrieved ozone profiles, the retrieved nitrogen dioxide profile, and the nine retrieved aerosol extinction profiles are all defined in the same way. The lowest four bits (0-3) form an integer value indicating the smoothing kernel used for that shell, and the values are defined as follows:

- 0** - No smoothing.
- 1** - 1-2-1 smoothing.
- 2** - 1-2-3-2-1 smoothing.
- 3** - 5pt boxcar average.
- 4** - 7pt boxcar average.
- 5** - 9pt boxcar average.
- 6** - 11pt boxcar average.
- 7-15** Spare.

Bit 4 being set indicates that the retrieved slant-path profile value was negative.

Bit 5 being set indicates that the retrieved slant-path profile value contained ‘fill’ data.

Bit 6 indicates that the shell was given the ‘fill’ value in the smoothing process because the shell was outside of the altitude window selected for smoothing. The module selects the largest block of acceptable points in the profile for smoothing, then places ‘fill’ in the remaining shells.



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Appendix A

Appendix A. SAGE III Nominal CCD Pixel Assignments



Table A1.1. Nominal CCD Assignments for Solar Data Collection
(2/27/2002 – 12/20/2002 orbit 5130)

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
001	31	287.539	36	293.160	290.349	Mesospheric O ₃	
002	132	382.204	136	386.893	384.548	Aerosol Ch. 1/Rayleigh Ext.	5-pixel average
003	186	432.848	186	433.786	433.317	NO ₂ Gas	
004	187	433.786	187	434.724	434.255	NO ₂ Gas	
005	188	434.724	188	435.662	435.193	NO ₂ Gas	
006	189	435.662	189	436.601	436.132	NO ₂ Gas	
007	190	436.601	190	437.539	437.070	NO ₂ Gas	
008	191	437.539	191	438.477	438.008	NO ₂ Gas	
009	192	438.477	192	439.415	438.946	NO ₂ Gas	
010	193	439.415	193	440.353	439.884	NO ₂ Gas	
011	194	440.353	194	441.291	440.822	NO ₂ Gas	
012	195	441.291	195	442.229	441.760	NO ₂ Gas	
013	196	442.229	196	443.167	442.698	NO ₂ Gas	
014	197	443.167	197	444.105	443.636	NO ₂ Gas	
015	198	444.105	198	445.044	444.575	NO ₂ Gas	
016	199	445.044	199	445.982	445.51	NO ₂ Gas	
017	200	445.982	200	446.920	446.451	NO ₂ Gas	
018	201	446.920	201	447.858	447.389	Aerosol Channel 2/ NO ₂ Gas	Science pixel numbers 18, 19, 20 and 21 are averaged together to form Aerosol Channel 2.
019	202	447.858	202	448.796	448.327	Aerosol Channel 2/ NO ₂ Gas	
020	203	448.796	203	449.734	449.265	Aerosol Channel 2/ NO ₂ Gas	
021	204	449.734	204	450.673	450.204	Aerosol Channel 2/ NO ₂ Gas	
022	277	518.242	281	522.936	520.589	Aerosol Channel 3	5-pixel average
023						Engineering	
024						Engineering	
025	322	560.492	324	563.322	561.907	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
026	329	567.094	331	569.924	568.509	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
027	336	573.697	338	576.524	575.110	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
028	343	580.297	345	583.125	581.711	O ₃ Gas	3-pixel sum (Alternate AerCh.4)

Table A1.1. Continued (2/27/2002 – 12/20/2002 orbit 5130)

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
029	350	586.896	352	589.723	588.309	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
030	357	593.493	359	596.320	594.906	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
031	364	600.089	366	602.916	601.503	Aerosol Channel 4/ O ₃ Gas	3-pixel sum (Primary AerChannel4)
032	371	606.684	373	609.510	608.097	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
033	378	613.277	380	616.103	614.690	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
034	385	619.870	387	622.694	621.282	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
035	442	673.499	446	678.199	675.849	Aerosol Channel 5	5-pixel average
036	527	753.306	531	757.995	755.650	Aerosol Channel 6	5-pixel average
037	532	757.995	532	758.932	758.463	O ₂ A-Band	
038	533	758.932	533	759.870	759.401	O ₂ A-Band	
039	534	759.870	534	760.807	760.339	O ₂ A-Band	
040	535	760.807	535	761.725	761.276	O ₂ A-Band	
041	536	761.725	536	762.644	762.175	O ₂ A-Band	
042	537	762.644	537	763.581	763.113	O ₂ A-Band	
043	538	763.581	538	764.519	764.050	O ₂ A-Band	
044	539	764.519	539	765.456	764.988	O ₂ A-Band	
045	540	765.456	540	766.393	765.925	O ₂ A-Band	
046	541	766.393	541	767.331	766.862	O ₂ A-Band	
047	542	767.331	542	768.268	767.800	O ₂ A-Band	
048	543	768.268	543	769.206	768.737	O ₂ A-Band	
049	544	769.206	544	770.143	769.674	O ₂ A-Band	
050	545	770.143	545	771.079	770.611	O ₂ A-Band	
051	649	867.273	653	871.927	869.600	Aerosol Channel 7	5-pixel average
052	720	933.215	720	934.141	933.678	Water Vapor	
053	721	934.141	721	935.068	934.605	Water Vapor	
054	722	935.068	722	935.995	935.532	Water Vapor	
055	723	935.995	723	936.922	936.458	Water Vapor	
056	724	936.922	724	937.848	937.385	Water Vapor	

Table A1.1. Concluded (2/27/2002 – 12/20/2002 orbit 5130)

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
057	725	937.848	725	938.774	938.311	Water Vapor	
058	726	938.774	726	939.700	939.237	Water Vapor	
059	727	939.700	727	940.627	940.163	Water Vapor	
060	728	940.627	728	941.553	941.090	Water Vapor	
061	729	941.553	729	942.479	942.016	Water Vapor	
062	730	942.479	730	943.405	942.942	Water Vapor	
063	731	943.405	731	944.331	943.868	Water Vapor	
064	732	944.331	732	945.257	944.794	Water Vapor	
065	733	945.257	733	946.183	945.720	Water Vapor	
066	734	946.183	734	947.109	946.646	Water Vapor	
067	735	947.109	735	948.034	947.571	Water Vapor	
068	736	948.034	736	948.960	948.497	Water Vapor	
069	737	948.960	737	949.885	949.423	Water Vapor	
070	738	949.885	738	950.811	950.348	Water Vapor	
071	739	950.811	739	951.737	951.274	Water Vapor	
072	740	951.737	740	952.662	952.200	Water Vapor	
073	741	952.662	741	953.588	953.125	Water Vapor	
074	742	953.588	742	954.513	954.050	Water Vapor	
075	743	954.513	743	955.438	954.976	Water Vapor	
076	744	955.438	744	956.364	955.901	Water Vapor	
077	745	956.364	745	957.288	956.826	Water Vapor	
078	746	957.288	746	958.214	957.751	Water Vapor	
079	747	958.214	747	959.139	958.676	Water Vapor	
080	748	959.139	748	960.063	959.601	Water Vapor	
081	803	1019.143	803	1020.065	1019.604	Aerosol Channel 8	
082	804	1020.065	804	1020.987	1020.526	Aerosol Channel 8	
083	805	1020.987	805	1021.907	1021.447	Aerosol Channel 8	
084	806	1021.907	806	1022.828	1022.368	Aerosol Channel 8	
085	807	1022.828	807	1023.750	1023.289	Aerosol Channel 8	
086	808	1023.750	808	1024.670	1024.210	Aerosol Channel 8	Science pixel numbers 81, 82, 83, 84, 85 and 86 are averaged together to form Aerosol Channel 8.

Table A1.2. Nominal CCD Assignments for Solar Data Collection

(12/20/2002 orbit 5131-2/26/2003 orbit 6060)

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
001	007	287.26	012	292.88	290.07	Mesospheric O ₃	
002	108	381.92	112	386.61	384.27	Aerosol Ch. 1/Rayleigh Ext.	5-pixel average
003	162	432.57	162	433.51	433.04	NO ₂ Gas	
004	163	433.51	163	434.45	433.98	NO ₂ Gas	
005	164	434.45	164	435.38	434.92	NO ₂ Gas	
006	165	435.38	165	436.62	435.85	NO ₂ Gas	
007	166	436.32	166	437.26	436.79	NO ₂ Gas	
008	167	437.26	167	438.20	437.73	NO ₂ Gas	
009	168	438.20	168	439.14	438.67	NO ₂ Gas	
010	169	439.14	169	440.07	439.61	NO ₂ Gas	
011	170	440.07	170	441.01	440.54	NO ₂ Gas	
012	171	441.01	171	441.95	441.48	NO ₂ Gas	
013	172	441.95	172	442.89	442.42	NO ₂ Gas	
014	173	442.89	173	443.83	443.36	NO ₂ Gas	
015	174	443.83	174	444.77	444.30	NO ₂ Gas	
016	175	444.77	175	445.70	445.24	NO ₂ Gas	
017	176	445.70	176	446.64	446.17	NO ₂ Gas	
018	177	446.64	177	447.58	447.11	Aerosol Channel 2/ NO ₂ Gas	Science pixel numbers 18, 19, 20 and 21 are averaged together to form Aerosol Channel 2.
019	178	447.58	178	448.52	448.05	Aerosol Channel 2/ NO ₂ Gas	
020	179	448.52	179	449.46	448.99	Aerosol Channel 2/ NO ₂ Gas	
021	180	449.46	180	450.39	449.93	Aerosol Channel 2/ NO ₂ Gas	
022	253	517.97	257	522.66	520.32	Aerosol Channel 3	5-pixel average
023						Engineering	
024						Engineering	
025	298	560.22	300	563.06	561.64	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
026	305	566.83	307	569.66	568.25	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
027	312	573.43	314	576.26	574.85	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
028	319	580.03	321	582.86	581.45	O ₃ Gas	3-pixel sum (Alternate AerCh.4)

Table A1.2. Continued (12/20/2002 orbit 5131 - 2/26/2003 orbit 6060)

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
029	326	586.63	328	589.46	588.05	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
030	333	593.23	335	596.05	594.64	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
031	340	599.82	342	602.65	601.24	Aerosol Channel 4/ O ₃ Gas	3-pixel sum (Primary AerChannel4)
032	347	606.42	349	609.24	607.83	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
033	354	613.01	356	615.84	614.43	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
034	361	619.61	363	622.42	621.02	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
035	418	673.23	422	677.93	675.58	Aerosol Channel 5	5-pixel average
036	503	753.03	507	757.72	755.38	Aerosol Channel 6	5-pixel average
037	508	757.72	508	758.66	758.19	O ₂ A-Band	
038	509	758.66	509	759.60	759.13	O ₂ A-Band	
039	510	759.60	510	760.54	760.07	O ₂ A-Band	
040	511	760.54	511	761.45	761.01	O ₂ A-Band	
041	512	761.45	512	762.37	761.92	O ₂ A-Band	
042	513	762.37	513	763.31	762.84	O ₂ A-Band	
043	514	763.31	514	764.25	763.78	O ₂ A-Band	
044	515	764.25	515	765.18	764.72	O ₂ A-Band	
045	516	765.18	516	766.12	765.65	O ₂ A-Band	
046	517	766.12	517	767.06	766.59	O ₂ A-Band	
047	518	767.06	518	768.00	767.53	O ₂ A-Band	
048	519	768.00	519	768.93	768.47	O ₂ A-Band	
049	520	768.93	520	769.87	769.40	O ₂ A-Band	
050	521	769.87	521	770.81	770.34	O ₂ A-Band	
051	625	867.00	629	871.66	869.33	Aerosol Channel 7	5-pixel average
052	682	919.97	682	920.89	920.43	Water Vapor	
053	696	932.95	696	933.87	933.41	Water Vapor	
054	697	933.87	697	934.80	934.34	Water Vapor	
055	698	934.80	698	935.73	935.27	Water Vapor	
056	699	935.73	699	936.65	936.19	Water Vapor	

Table A1.2. Concluded (12/20/2002 orbit 5131 - 2/26/2003 orbit 6060)

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
057	700	936.65	700	937.58	937.12	Water Vapor	
058	701	937.58	701	938.51	938.05	Water Vapor	
059	701	938.51	702	939.43	938.97	Water Vapor	
060	703	939.43	703	940.36	939.89	Water Vapor	
061	704	940.36	704	941.28	940.82	Water Vapor	
062	705	941.28	705	943.21	941.75	Water Vapor	
063	706	942.21	706	943.14	942.76	Water Vapor	
064	707	943.14	707	944.06	943.60	Water Vapor	
065	708	944.06	708	944.99	944.52	Water Vapor	
066	709	944.99	709	945.91	945.45	Water Vapor	
067	710	945.91	710	946.84	946.37	Water Vapor	
068	711	946.84	711	947.77	947.30	Water Vapor	
069	712	947.77	712	948.69	948.23	Water Vapor	
070	713	948.69	713	949.62	949.15	Water Vapor	
071	714	949.62	714	950.54	950.08	Water Vapor	
072	715	950.54	715	951.47	951.00	Water Vapor	
073	716	951.47	716	952.39	951.93	Water Vapor	
074	717	952.39	717	953.32	952.85	Water Vapor	
075	718	953.32	718	954.24	953.78	Water Vapor	
076	719	954.24	719	955.17	954.70	Water Vapor	
077	720	955.17	720	956.10	955.64	Water Vapor	
078	721	956.10	721	957.02	956.56	Water Vapor	
079	722	957.02	722	957.95	947.49	Water Vapor	
080	737	1018.88	737	971.82	971.36	Water Vapor	
081	789	1019.80	78	1019.80	1019.34	Aerosol Channel 8	
082	790	1020.72	790	1020.72	1020.26	Aerosol Channel 8	
083	791	1021.64	791	1021.64	1021.18	Aerosol Channel 8	Science pixel numbers 81, 82, 83, 84, 85 and 86 are averaged together to form Aerosol Channel 8.
084	792	1022.56	792	1022.56	1022.10	Aerosol Channel 8	
085	793	1023.48	793	1023.48	1023.02	Aerosol Channel 8	
086	794	1530.13	794	1024.40	1023.94	Aerosol Channel 8	

Table A1.3. Nominal CCD Assignments for Solar Data Collection

(2/26/2003 orbit 6061)

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
001	001	281.636	006	287.257	284.447	Mesospheric O ₃	6-pixel sum
002	007	287.257	012	292.879	290.068	Mesospheric O ₃	6-pixel sum
003	013	292.879	019	299.438	296.158	Mesospheric O ₃	7-pixel sum
004	108	381.924	112	386.613	384.269	Aerosol Ch. 1/Rayleigh Ext.	5-pixel average
005	162	432.569	162	433.507	433.038	NO ₂ Gas	
006	163	433.507	163	434.446	433.977	NO ₂ Gas	
007	164	434.446	164	435.384	434.915	NO ₂ Gas	
008	165	435.384	165	436.323	435.853	NO ₂ Gas	
009	166	436.323	166	437.261	436.792	NO ₂ Gas	
010	167	437.261	167	438.199	437.730	NO ₂ Gas	
011	168	438.199	168	439.137	438.668	NO ₂ Gas	
012	169	439.137	169	440.075	439.606	NO ₂ Gas	
013	170	440.075	170	441.013	440.544	NO ₂ Gas	
014	171	441.013	171	441.951	441.482	NO ₂ Gas	
015	172	441.951	172	442.887	442.420	NO ₂ Gas	
016	173	442.889	173	443.827	443.358	NO ₂ Gas	
017	174	443.827	174	444.766	444.296	NO ₂ Gas	
018	175	444.766	175	445.704	445.235	NO ₂ Gas	
019	176	445.704	176	446.642	446.173	NO ₂ Gas	
020	177	446.642	177	447.580	447.111	Aerosol Channel 2/ NO ₂ Gas	Science pixel numbers 20, 21, 22 and 23 are averaged together to form Aerosol Channel 2.
021	178	447.580	178	448.518	448.049	Aerosol Channel 2/ NO ₂ Gas	
022	179	448.518	179	449.456	448.987	Aerosol Channel 2/ NO ₂ Gas	
023	180	449.456	180	450.395	449.926	Aerosol Channel 2/ NO ₂ Gas	
024	253	517.965	257	522.659	520.312	Aerosol Channel 3	5-pixel average
025	298	560.222	300	563.056	561.639	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
026	305	566.829	307	569.658	568.243	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
027	312	573.431	314	576.259	574.845	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
028	319	580.031	321	582.859	581.445	O ₃ Gas	3-pixel sum (Alternate AerCh.4)

Table A1.3. Continued (2/26/2003 orbit 6061)

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
029	326	586.630	328	589.458	588.044	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
030	333	593.228	335	596.055	594.641	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
031	340	599.824	342	602.651	601.238	Aerosol Channel 4/ O ₃ Gas	3-pixel sum (Primary AerChannel4)
032	347	606.419	349	609.245	607.832	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
033	354	613.013	356	615.838	614.425	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
034	361	619.605	363	622.425	621.015	O ₃ Gas	3-pixel sum (Alternate AerCh.4)
035	418	673.225	422	677.925	675.575	Aerosol Channel 5	5-pixel average
036	503	753.034	507	757.723	755.378	Aerosol Channel 6	5-pixel average
037	508	757.723	508	758.660	758.191	O ₂ A-Band	
038	509	758.660	509	759.598	759.129	O ₂ A-Band	
039	510	759.598	510	760.536	760.069	O ₂ A-Band	
040	511	760.536	511	761.454	760.995	O ₂ A-Band	
041	512	761.455	512	762.372	761.913	O ₂ A-Band	
042	513	762.372	513	763.310	762.841	O ₂ A-Band	
043	514	763.310	514	764.247	763.778	O ₂ A-Band	
044	515	764.247	515	765.185	764.716	O ₂ A-Band	
045	516	765.185	516	766.122	765.653	O ₂ A-Band	
046	517	766.122	517	767.059	766.590	O ₂ A-Band	
047	518	767.060	518	767.997	767.528	O ₂ A-Band	
048	519	768.000	519	768.934	768.465	O ₂ A-Band	
049	520	768.934	520	769.871	769.402	O ₂ A-Band	
050	521	769.871	521	770.808	770.339	O ₂ A-Band	
051	625	867.004	629	871.658	869.331	Aerosol Channel 7	5-pixel average
052	682	919.967	682	920.895	920.431	Water Vapor	
053	696	932.947	696	933.873	933.410	Water Vapor	
054	697	933.873	697	934.800	934.337	Water Vapor	
055	698	934.800	698	935.727	935.263	Water Vapor	
056	699	935.727	699	936.653	936.199	Water Vapor	

Table A1.3. Concluded (2/26/2003 orbit 6061)

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
057	700	936.653	700	937.580	937.116	Water Vapor	
058	701	937.580	701	938.506	938.043	Water Vapor	
059	702	938.506	702	939.432	939.969	Water Vapor	
060	703	939.432	703	940.358	939.895	Water Vapor	
061	704	940.358	704	941.285	940.821	Water Vapor	
062	705	941.285	705	942.211	941.748	Water Vapor	
063	706	942.211	706	943.137	942.674	Water Vapor	
064	707	943.137	707	944.063	943.600	Water Vapor	
065	708	944.063	708	944.989	944.526	Water Vapor	
066	709	944.989	709	945.915	945.452	Water Vapor	
067	710	945.915	710	946.840	946.378	Water Vapor	
068	711	946.840	711	947.766	947.303	Water Vapor	
069	712	947.766	712	948.692	948.229	Water Vapor	
070	713	948.692	713	949.617	949.155	Water Vapor	
071	714	949.617	714	950.543	950.080	Water Vapor	
072	715	950.543	715	951.469	951.006	Water Vapor	
073	716	951.469	716	952.394	951.932	Water Vapor	
074	717	952.965	717	953.319	952.857	Water Vapor	
075	718	953.320	718	954.245	953.782	Water Vapor	
076	719	954.245	719	955.171	954.708	Water Vapor	
077	720	955.171	720	956.096	955.633	Water Vapor	
078	721	956.096	721	957.021	956.558	Water Vapor	
079	722	957.021	722	957.946	957.483	Water Vapor	
080	737	970.892	737	971.816	971.354	Water Vapor	
081	789	1018.876	789	1019.798	1019.337	Aerosol Channel 8	Science pixel numbers 81, 82, 83, 84, 85 and 86 are averaged together to form Aerosol Channel 8.
082	790	1019.798	790	1020.719	1020.259	Aerosol Channel 8	
083	791	1020.719	791	1021.641	1021.180	Aerosol Channel 8	
084	792	1021.641	792	1022.562	1022.101	Aerosol Channel 8	
085	793	1022.562	793	1023.482	1023.022	Aerosol Channel 8	
086	794	1023.482	794	1024.404	1023.943	Aerosol Channel 8	

Table A2. Nominal CCD Assignments for Lunar Data Collection

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
001	106	380.05	106	380.99	380.52	O ₃ , NO ₂ , NO ₃ , and OCIO are measured using science pixel 1 through science pixel 91.	Science pixel 1 through science pixel 294 contain single CCD pixels.
002	107	380.99	107	381.92	381.46		
003	108	381.92	108	382.86	382.39		
004	109	382.86	109	383.80	383.33		
005	110	383.80	110	384.74	384.27		
006	111	384.74	111	385.68	385.21		
007	112	385.68	112	386.61	386.15		
008	113	386.61	113	387.55	387.08		
009	114	387.55	114	388.49	388.02		
010	115	388.49	115	389.43	388.96		
011	116	389.43	116	390.36	389.90		
012	117	390.36	117	391.30	390.83		
013	118	391.30	118	392.24	391.77		
014	119	392.24	119	393.18	392.71		
015	120	393.18	120	394.11	393.65		
016	121	394.11	121	395.05	394.58		
017	122	395.05	122	395.99	395.52		
018	123	395.99	123	396.93	396.46		
019	124	396.93	124	397.87	397.40		
020	125	397.87	125	398.80	398.34		
021	126	398.80	126	399.74	399.27		
022	127	399.74	127	400.68	400.21		
023	128	400.68	128	401.62	401.15		
024	129	401.62	129	402.55	402.09		
025	130	402.55	130	403.49	403.02		
026	131	403.49	131	404.43	403.96		
027	132	404.43	132	405.37	404.90		
028	133	405.37	133	406.31	405.84		

Table A2. Continued

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
029	134	406.31	134	407.24	406.78	O ₃ , NO ₂ , NO ₃ , and OCIO are measured using science pixel 1 through science pixel 91.	Science pixel 1 through science pixel 294 contain single CCD pixels.
030	145	416.62	145	417.56	417.09		
031	146	417.56	146	418.50	418.03		
032	147	418.50	147	419.44	418.97		
033	148	419.44	148	420.38	419.91		
034	149	420.38	149	421.31	420.85		
035	150	421.31	150	422.25	421.78		
036	151	422.25	151	423.19	422.72		
037	152	423.19	152	424.13	423.66		
038	153	424.13	153	425.07	424.60		
039	154	425.07	154	426.00	425.54		
040	155	426.00	155	426.94	426.47		
041	156	426.94	156	427.88	427.41		
042	157	427.88	157	428.82	428.35		
043	158	428.82	158	429.76	429.29		
044	159	429.76	159	430.69	430.23		
045	160	430.69	160	431.63	431.16		
046	161	431.63	161	432.57	432.10		
047	162	432.57	162	433.51	433.04		
048	163	433.51	163	434.45	433.98		
049	164	434.45	164	435.38	434.92		
050	165	435.38	165	436.32	435.85		
051	166	436.32	166	437.26	436.79		
052	167	437.26	167	438.20	437.73		
053	168	438.20	168	439.14	438.67		
054	169	439.14	169	440.07	439.61		
055	170	440.07	170	441.01	440.54		
056	171	441.01	171	441.95	441.48		



Table A2. Continued

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
057	172	441.95	172	442.89	442.42	O ₃ , NO ₂ , NO ₃ , and OCIO are measured using science pixel 1 through science pixel 91.	Science pixel 1 through science pixel 294 contain single CCD pixels.
058	173	442.89	173	443.83	443.36		
059	174	443.83	174	444.77	444.30		
060	175	444.77	175	445.70	445.24		
061	176	445.70	176	446.64	446.17		
062	177	446.64	177	447.58	447.11		
063	178	447.58	178	448.52	448.05		
064	179	448.52	179	449.46	448.99		
065	180	449.46	180	450.39	449.93		
066	181	450.39	181	451.33	450.86		
067	182	451.33	182	452.27	451.80		
068	183	452.27	183	453.21	452.74		
069	184	453.21	184	454.15	453.68		
070	185	454.15	185	455.09	454.62		
071	186	455.09	186	456.02	455.56		
072	187	456.02	187	456.96	456.49		
073	188	456.96	188	457.90	457.43		
074	189	457.90	189	458.84	458.37		
075	190	458.84	190	459.78	459.31		
076	191	459.78	191	460.71	460.25		
077	192	460.71	192	461.65	461.18		
078	193	461.65	193	462.59	462.12		
079	194	462.59	194	463.53	463.06		
080	195	463.53	195	464.47	464.00		
081	196	464.47	196	465.41	464.94		
082	197	465.41	197	466.35	465.88		
083	198	466.35	198	467.28	466.82		
084	199	467.28	199	468.22	467.75		

Table A2. Continued

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
085	200	468.22	200	469.16	468.69	O ₃ , NO ₂ , NO ₃ , and OCIO are measured using science pixel 1 through science pixel 91.	Science pixel 1 through science pixel 294 contains single CCD pixels.
086	201	469.16	201	470.10	469.63		
087	202	470.10	202	471.04	470.57		
088	203	471.04	203	471.98	471.51		
089	204	471.98	204	472.91	472.45		
090	205	472.91	205	473.85	473.38		
091	206	473.85	206	474.79	474.32		
092	207	474.79	207	475.73	475.26	O ₃ , NO ₂ , and NO ₃ , are measured using science pixel 92 through science pixel 294.	
093	208	475.73	208	476.67	476.20		
094	209	476.67	209	477.61	477.14		
095	210	477.61	210	478.54	478.08		
096	211	478.54	211	479.48	479.01		
097	212	479.48	212	480.42	479.95		
098	213	480.42	213	481.36	480.89		
099	214	481.36	214	482.30	481.83		
100	215	482.30	215	483.24	482.77		
101	216	483.24	216	484.17	483.71		
102	217	484.17	217	485.11	484.64		
103	218	485.11	218	486.05	485.58		
104	219	486.05	219	486.99	486.52		
105	220	486.99	220	487.93	487.46		
106	221	487.93	221	488.87	488.40		
107	222	488.87	222	489.81	489.34		
108	223	489.81	223	490.74	490.28		
109	234	500.13	234	501.07	500.60		
110	235	501.07	235	502.01	501.54		
111	236	502.01	236	502.95	502.48		
112	237	502.95	237	503.88	503.42		



Table A2. Continued

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
113	238	503.88	238	504.82	504.35	O ₃ , NO ₂ , and NO ₃ , are measured using science pixel 92 through science pixel 294.	Science pixel 1 through science pixel 294 contains single CCD pixels.
114	239	504.82	239	505.76	505.29		
115	240	505.76	240	506.70	506.23		
116	241	506.70	241	507.64	507.17		
117	242	507.64	242	508.58	508.11		
118	243	508.58	243	509.52	509.05		
119	244	509.52	244	510.46	509.99		
120	245	510.46	245	511.39	510.93		
121	246	511.39	246	512.33	511.86		
122	247	512.33	247	513.27	512.80		
123	248	513.27	248	514.21	513.74		
124	249	514.21	249	515.15	514.68		
125	250	515.15	250	516.09	515.62		
126	251	516.09	251	517.03	516.56		
127	252	517.03	252	517.97	517.50		
128	253	517.97	253	518.90	518.44		
129	254	518.90	254	519.84	519.37		
130	255	519.84	255	520.78	520.31		
131	256	520.78	256	521.72	521.25		
132	257	521.72	257	522.66	522.19		
133	258	522.66	258	523.60	523.13		
134	259	523.60	259	524.54	524.07		
135	260	524.54	260	525.48	525.01		
136	261	525.48	261	526.41	525.95		
137	262	526.41	262	527.35	526.88		
138	263	527.35	263	528.29	527.82		
139	264	528.29	264	529.23	528.76		
140	265	529.23	265	530.17	529.70		



Table A2. Continued

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
141	266	530.17	266	531.11	530.64	O ₃ , NO ₂ , and NO ₃ , are measured using science pixel 92 through science pixel 294.	Science pixel 1 through science pixel 294 contain single CCD pixels.
142	267	531.11	267	532.05	531.58		
143	268	532.05	268	532.99	532.52		
144	269	532.99	269	533.92	533.46		
145	270	533.92	270	534.86	534.39		
146	271	534.86	271	535.80	535.33		
147	272	535.80	272	536.74	536.27		
148	273	536.74	273	537.68	537.21		
149	274	537.68	274	538.62	538.15		
150	275	538.62	275	539.56	539.09		
151	276	539.56	276	540.50	540.03		
152	277	540.50	277	541.44	540.97		
153	278	541.44	278	542.38	541.91		
154	279	542.38	279	543.31	542.85		
155	280	543.31	280	544.25	543.78		
156	251	544.25	251	545.19	544.72		
157	282	545.19	282	546.13	545.66		
158	283	546.13	283	547.07	546.60		
159	284	547.07	284	548.01	547.54		
160	285	548.01	285	548.95	548.48		
161	286	548.95	286	549.89	549.42		
162	291	553.64	291	554.58	554.11		
163	292	554.58	292	555.52	555.05		
164	293	555.52	293	556.46	555.99		
165	294	556.46	294	557.40	556.93		
166	295	557.40	295	558.34	557.87		
167	296	558.34	296	559.28	558.81		
168	297	559.28	297	560.23	559.75		

Table A2. Continued

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
169	298	560.22	298	561.17	560.70	O ₃ , NO ₂ , and NO ₃ , are measured using science pixel 92 through science pixel 294.	Science pixel 1 through science pixel 294 contain single CCD pixels.
170	299	561.17	299	562.11	561.64		
171	300	562.11	300	563.06	562.59		
172	301	563.06	301	564.00	563.53		
173	302	564.00	302	564.94	564.47		
174	303	564.94	303	565.89	565.42		
175	304	565.89	304	566.83	566.36		
176	305	566.83	305	567.77	567.30		
177	306	567.77	306	568.71	568.24		
178	307	568.71	307	569.66	569.19		
179	308	569.66	308	570.60	570.13		
180	309	570.60	309	571.54	571.07		
181	310	571.54	310	572.49	572.02		
182	311	572.49	311	573.43	572.96		
183	312	573.43	312	574.37	573.90		
184	313	574.37	313	575.32	574.85		
185	314	575.32	314	576.26	575.79		
186	315	576.26	315	577.20	576.73		
187	316	577.20	316	578.14	577.67		
188	317	578.14	317	579.09	578.62		
189	318	579.09	318	580.03	579.56		
190	319	580.03	319	580.97	580.50		
191	320	580.97	320	581.92	581.45		
192	321	581.92	321	582.86	582.39		
193	322	582.86	322	583.80	583.33		
194	323	583.80	323	584.74	584.27		
195	324	584.74	324	585.69	585.22		
196	325	585.69	325	586.63	586.16		



Table A2. Continued

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
197	326	586.63	326	587.57	587.10	O ₃ , NO ₂ , and NO ₃ , are measured using science pixel 92 through science pixel 294.	Science pixel 1 through science pixel 294 contain single CCD pixels.
198	327	587.57	327	588.52	588.05		
199	328	588.52	328	589.46	588.99		
200	329	589.46	329	590.40	589.93		
201	330	590.40	330	591.34	590.87		
202	331	591.34	331	592.29	591.82		
203	332	592.29	332	593.23	592.76		
204	333	593.23	333	594.17	593.70		
205	334	594.17	334	595.11	594.64		
206	335	595.11	335	596.05	595.58		
207	336	596.05	336	597.00	596.53		
208	337	597.00	337	597.94	597.47		
209	338	597.94	338	598.88	598.41		
210	339	598.88	339	599.82	599.35		
211	340	599.82	340	600.77	600.30		
212	341	600.77	341	601.71	601.24		
213	342	601.71	342	602.65	602.18		
214	343	602.65	343	603.59	603.12		
215	344	603.59	344	604.53	604.06		
216	345	604.53	345	605.48	605.01		
217	346	605.48	346	606.42	605.95		
218	347	606.42	347	607.36	606.89		
219	348	607.36	348	608.30	607.83		
220	349	608.30	349	609.24	608.77		
221	350	609.24	350	610.19	609.72		
222	351	610.19	351	611.13	610.66		
223	352	611.13	352	612.07	611.60		
224	353	612.07	353	613.01	612.54		



Table A2. Continued

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
225	354	613.01	354	613.95	613.48	O ₃ , NO ₂ , and NO ₃ , are measured using science pixel 92 through science pixel 294.	Science pixel 1 through science pixel 294 contain single CCD pixels.
226	355	613.95	355	614.90	614.43		
227	356	614.90	356	615.84	615.37		
228	357	615.84	357	616.78	616.31		
229	358	616.78	358	617.72	617.25		
230	359	617.72	359	618.66	618.19		
231	360	618.66	360	619.61	619.14		
232	361	619.61	361	620.55	620.08		
233	362	620.55	362	621.49	621.02		
234	363	621.49	363	622.42	621.96		
235	364	622.42	364	623.36	622.89		
236	365	623.36	365	624.30	623.83		
237	366	624.30	366	625.24	624.77		
238	367	625.24	367	626.19	625.72		
239	368	626.19	368	627.13	626.66		
240	369	627.13	369	628.07	627.60		
241	370	628.07	370	629.01	628.54		
242	371	629.01	371	629.95	629.48		
243	372	629.95	372	630.89	630.42		
244	373	630.89	373	631.83	631.36		
245	374	631.83	374	632.78	632.31		
246	375	632.78	375	633.72	633.25		
247	376	633.72	376	634.66	634.19		
248	377	634.66	377	635.60	635.13		
249	378	635.60	378	636.54	636.07		
250	379	636.54	379	637.48	637.01		
251	380	637.48	380	638.42	637.95		
252	381	638.42	381	639.36	638.89		

Table A2. Continued

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
253	382	639.36	382	640.31	639.84	O ₃ , NO ₂ , and NO ₃ , are measured using science pixel 92 through science pixel 294.	Science pixel 1 through science pixel 294 contain single CCD pixels.
254	383	640.31	383	641.25	640.78		
255	384	641.25	384	642.19	641.72		
256	385	642.19	385	643.13	642.66		
257	386	643.13	386	644.07	643.60		
258	387	644.07	387	645.01	644.54		
259	388	645.01	388	645.95	645.48		
260	389	645.95	389	646.89	646.42		
261	390	646.89	390	647.83	647.36		
262	391	647.83	391	648.77	648.30		
263	392	648.77	392	649.71	649.24		
264	393	649.71	393	650.65	650.18		
265	394	650.65	394	651.60	651.13		
266	395	651.60	395	652.54	652.07		
267	396	652.54	396	653.48	653.01		
268	397	653.48	397	654.42	653.95		
269	398	654.42	398	655.36	654.89		
270	399	655.36	399	656.30	655.83		
271	400	656.30	400	657.24	656.77		
272	401	657.24	401	658.18	657.71		
273	402	658.18	402	659.12	658.65		
274	403	659.12	403	660.06	659.59		
275	404	660.06	404	661.00	660.53		
276	405	661.00	405	661.94	661.47		
277	406	661.94	406	662.88	662.41		
278	407	662.88	407	663.82	663.35		
279	408	663.82	408	664.76	664.29		
280	409	664.76	409	665.70	665.23		



Table A2. Continued

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
281	410	665.70	410	666.64	666.17	O ₃ , NO ₂ , and NO ₃ , are measured using science pixel 92 through science pixel 294.	Science pixel 1 through science pixel 294 contain single CCD pixels.
282	411	666.64	411	667.58	667.11		
283	412	667.58	412	668.52	668.05		
284	413	668.52	413	669.46	668.99		
285	414	669.46	414	670.40	669.93		
286	415	670.40	415	671.34	670.87		
287	416	671.34	416	672.28	671.81		
288	417	672.28	417	673.23	672.76		
289	418	673.23	418	674.17	673.70		
290	419	674.17	419	675.11	674.64		
291	420	675.11	420	676.05	675.58		
292	421	676.05	421	676.99	676.52		
293	422	676.99	422	677.93	677.46		
294	423	677.93	423	678.87	678.40		
295	424	678.87	424	679.80	679.34	O ₂ B-band science pixels 295 through 313 are not currently utilized.	1-pixel average
296	425	679.80	425	680.74	680.27		1-pixel average
297	426	680.74	426	681.68	681.21		1-pixel average
298	427	681.68	427	682.62	682.15		1-pixel average
299	428	682.62	428	683.56	683.09		1-pixel average
300	429	683.56	429	684.50	684.03		1-pixel average
301	430	684.50	430	685.44	684.97		1-pixel average
302	431	685.44	431	686.38	685.91		1-pixel average
303	432	686.38	432	687.32	686.85		1-pixel average
304	433	687.32	433	688.26	687.79		1-pixel average
305	434	688.26	434	689.20	688.73		1-pixel average
306	435	689.20	435	690.14	689.67		1-pixel average
307	436	690.14	436	691.08	690.61		1-pixel average
308	437	691.08	437	692.02	691.55		1-pixel average

Table A2. Concluded

Science Pixel Group	CCD Start Pixel	Start Wavelength (nm)	CCD End Pixel	End Wavelength (nm)	Centerline Wavelength	Measured Parameter	Comment
309	438	692.02	438	692.96	692.49	O_2 B-band science pixels 295 through 313 are not currently utilized.	1-pixel average
310	439	692.96	439	693.90	693.43		1-pixel average
311	440	693.90	440	694.84	694.37		1-pixel average
312	441	694.84	441	695.78	695.31		
313	442	695.78	442	696.72	696.25		
314	504	753.97	504	755.85	754.91	O_2 A-band science pixels 314 through 338 are used for altitude registration.	2-pixel average
315	506	755.85	506	757.72	756.79		2-pixel average
316	508	757.72	508	758.66	758.19		1-pixel average
317	509	758.66	509	759.60	759.13		1-pixel average
318	510	759.60	510	760.54	760.07		1-pixel average
319	511	760.54	511	761.45	761.00		1-pixel average
320	512	761.45	512	762.37	761.91		1-pixel average
321	513	762.37	513	763.31	762.84		1-pixel average
322	514	763.31	514	764.25	763.78		1-pixel average
323	515	764.25	515	765.18	764.72		1-pixel average
324	516	765.18	516	766.12	765.65		1-pixel average
325	517	766.12	517	767.06	766.59		1-pixel average
326	518	767.06	518	768.00	767.53		1-pixel average
327	519	768.00	519	768.93	768.47		1-pixel average
328	520	768.93	520	769.87	769.40		1-pixel average
329	521	769.87	521	770.81	770.34		1-pixel average
330	522	770.81	522	771.74	771.28		1-pixel average
331	523	771.74	523	772.68	772.21		1-pixel average
332	524	772.68	524	773.62	773.15		1-pixel average
333	525	773.62	525	774.56	774.09		1-pixel average
334	526	774.56	526	775.49	775.03		1-pixel average
335	527	775.49	527	776.43	775.96		1-pixel average
336	528	776.43	528	777.37	776.90		1-pixel average
337	529	777.37	529	778.30	777.84		1-pixel average
338	530	778.30	530	779.24	778.77		1-pixel average



Appendix B

Appendix B. SAGE III Level 1B Solar Transmission Products



Table B1.1. Binary File Format Sheet SAGE III Level 1B Solar Transmission Product

(2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
00001	00001	1	I4	0	3	Event Identification Tag (orbit-event code composite number)	File Header
00002	00002	1	I4	4	7	Year-Day Tag (yyyyddd)	
00003	00003	1	R4	8	11	Instrument Elapsed Time in On Station (dddd.frac)	
00004	00004	1	I4	12	15	"Data Fill/Invalid" Value for this Record (Integer Field)	
00005	00005	1	R4	16	19	"Data Fill/Invalid" Value for this Record (Floating Point Field)	
00006	00006	1	I4	20	23	Mission Identification (1 = Meteor-3M)	
00007	00007	1	R4	24	27	Version: Definitive Orbit Processing	Version Tracking
00008	00008	1	R4	28	31	Version: Level 0 Processing	
00009	00009	1	R4	32	35	Version: Director Processing	
00010	00010	1	R4	36	39	Version: Solar Processing	
00011	00011	1	R4	40	43	Version: Spectroscopy	
00012	00012	1	R4	44	47	Version: GRAM 95	
00013	00013	1	R4	48	51	Version: Meteorological	
00014	00014	1	R4	52	55	Transmission Profile Grid Spacing	File Description
00015	00015	1	I4	56	59	Transmission Profile Count	
00016	00016	1	I4	60	63	Number of Ground Track Values	
00017	00017	1	I4	64	67	Meteorological Profile Array Size	
00018	00018	1	I4	68	71	CCD Pixel Group Count	
00019	00019	1	I4	72	75	Altitude-Based Array Size	
00020	00020	1	I4	76	79	Spacecraft-Referenced Event Type (1 = sunrise; 2 = sunset)	Event Type
00021	00021	1	I4	80	83	Earth-Referenced Event Type (1 = sunrise; 2 = sunset)	
00022	00022	1	R4	84	87	Event Beta Angle (0.0 ± 61.0)	
00023	00023	1	I4	88	91	Data Capture Start Date (yyyymmdd)	Data Capture Start Information
00024	00024	1	I4	92	95	Data Capture Start Time (hhmmss)	
00025	00025	1	R4	96	99	Subtangent Latitude (0.0 ± 90.0)	
00026	00026	1	R4	100	103	Subtangent Longitude (0.0 ± 180.0)	
00027	00027	1	R4	104	107	Subtangent Altitude	



Table B1.1. Continued (2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
00028	00028	1	I4	108	111	Data Capture End Date (yyyymmdd)	Data Capture End Information
00029	00029	1	I4	112	115	Data Capture End Time (hhmmss)	
00030	00030	1	R4	116	119	Subtangent Latitude (0.0 ± 90.0)	
00031	00031	1	R4	120	123	Subtangent Longitude (0.0 ± 180.0)	
00032	00032	1	R4	124	127	Subtangent Altitude	
00033	00043	11	I4	128	171	Date (yyyymmdd)	Ground Track Data For This Event
00044	00054	11	I4	172	215	Time (hhmmss)	
00055	00065	11	R4	216	259	Subtangent Latitude (0.0 ± 90.0)	
00066	00076	11	R4	260	303	Subtangent Longitude (0.0 ± 180.0)	
00077	00087	11	R4	304	347	Ray Path Direction at Subtangent Point (0.0 – 359.99...)	
00088	00088	1	R4	348	351	Tropopause Temperature	Pressure Surface-based Data for This Event
00089	00089	1	R4	352	355	Tropopause Geometric Altitude	
00090	00107	18	R4	356	427	Pressure	
00108	00125	18	R4	428	499	Temperature	
00126	00143	18	R4	500	571	Temperature Uncertainty	
00144	00161	18	R4	572	643	Geometric Altitude	K km hPa
00162	00162	1	I4	644	647	Data Source Indicator (1 = DAO*; 2 = NCEP; 3 = None)	
00163	00248	86	I4	648	991	Starting CCD Pixel Number of Pixel Group n	CCD Pixel Assignments
00249	00334	86	I4	992	1335	Ending CCD Pixel Number of Pixel Group n	
00335	00420	86	R4	1336	1679	Central Wavelength of Pixel Group n	
00421	00506	86	R4	1680	2023	Half-Bandwidth of Pixel Group n	
00507	00706	200	R4	2024	2823	Geometric Altitude	Altitude-based Profiles
00707	00906	200	R4	2824	3623	Pressure	
00907	01106	200	R4	3624	4423	Temperature	
01107	01306	200	R4	4424	5223	Temperature Uncertainty	
01307	01506	200	I4	5224	6023	Pressure/Temperature Array Source Flags	

*Data Assimilation Office (DAO): source of research-quality assimilated global data sets (including temperature and geo-potential height).

Table B1.1. Continued (2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
01507	01706	200	R4	6024	6823	Pixel Group 0 Transmission Profile (PIN Diode) (Aerosol-Ch 9) Transmission Profiles	
01707	01906	200	R4	6824	7623	Pixel Group 0 Transmission Profile Standard Deviation	
01907	02106	200	I4	7624	8423	Pixel Group 0 Profile Bit Flags (PIN Diode)	
02107	02306	200	R4	8424	9223	Pixel Group 1 Transmission Profile (Mesospheric Ozone)	
02307	02506	200	R4	9224	10023	Pixel Group 1 Transmission Profile Standard Deviation	
02507	02706	200	I4	10024	10823	Pixel Group 1 Profile Bit Flags	
02707	02906	200	R4	10824	11623	Pixel Group 2 Transmission Profile (Aerosol-Ch 1 & Rayleigh)	
02907	03106	200	R4	11624	12423	Pixel Group 2 Transmission Profile Standard Deviation	
03107	03306	200	I4	12424	13223	Pixel Group 2 Profile Bit Flags	
03307	03506	200	R4	13224	14023	Pixel Group 3 Transmission Profile (NO2 Gas)	
03507	03706	200	R4	14024	14823	Pixel Group 3 Transmission Profile Standard Deviation	
03707	03906	200	I4	14824	15623	Pixel Group 3 Profile Bit Flags	
03907	04106	200	R4	15624	16423	Pixel Group 4 Transmission Profile (NO2 Gas)	
04107	04306	200	R4	16424	17223	Pixel Group 4 Transmission Profile Standard Deviation	
04307	04506	200	I4	17224	18023	Pixel Group 4 Profile Bit Flags	
04507	04706	200	R4	18024	18823	Pixel Group 5 Transmission Profile (NO2 Gas)	
04707	04906	200	R4	18824	19623	Pixel Group 5 Transmission Profile Standard Deviation	
04907	05106	200	I4	19624	20423	Pixel Group 5 Profile Bit Flags	
05107	05306	200	R4	20424	21223	Pixel Group 6 Transmission Profile (NO2 Gas)	
05307	05506	200	R4	21224	22023	Pixel Group 6 Transmission Profile Standard Deviation	
05507	05706	200	I4	22024	22823	Pixel Group 6 Profile Bit Flags	
05707	05906	200	R4	22824	23623	Pixel Group 7 Transmission Profile (NO2 Gas)	
05907	06106	200	R4	23624	24423	Pixel Group 7 Transmission Profile Standard Deviation	
06107	06306	200	I4	24424	25223	Pixel Group 7 Profile Bit Flags	
06307	06506	200	R4	25224	26023	Pixel Group 8 Transmission Profile (NO2 Gas)	
06507	06706	200	R4	26024	26823	Pixel Group 8 Transmission Profile Standard Deviation	
06707	06906	200	I4	26824	27623	Pixel Group 8 Profile Bit Flags	
06907	07106	200	R4	27624	28423	Pixel Group 9 Transmission Profile (NO2 Gas)	
07107	07306	200	R4	28424	29223	Pixel Group 9 Transmission Profile Standard Deviation	
07307	07506	200	I4	29224	30023	Pixel Group 9 Profile Bit Flags	

Table B1.1. Continued (2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
07507	07706	200	R4	30024	30823	Pixel Group 10 Transmission Profile (NO2 Gas)	
07707	07906	200	R4	30824	31623	Pixel Group 10 Transmission Profile Standard Deviation	
07907	08106	200	I4	31624	32423	Pixel Group 10 Profile Bit Flags	
08107	08306	200	R4	32424	33223	Pixel Group 11 Transmission Profile (NO2 Gas)	
08307	08506	200	R4	33224	34023	Pixel Group 11 Transmission Profile Standard Deviation	
08507	08706	200	I4	34024	34823	Pixel Group 11 Profile Bit Flags	
08707	08906	200	R4	34824	35623	Pixel Group 12 Transmission Profile (NO2 Gas)	
08907	09106	200	R4	35624	36423	Pixel Group 12 Transmission Profile Standard Deviation	
09107	09306	200	I4	36424	37223	Pixel Group 12 Profile Bit Flags	
09307	09506	200	R4	37224	38023	Pixel Group 13 Transmission Profile (NO2 Gas)	
09507	09706	200	R4	38024	38823	Pixel Group 13 Transmission Profile Standard Deviation	
09707	09906	200	I4	38824	39623	Pixel Group 13 Profile Bit Flags	
09907	10106	200	R4	39624	40423	Pixel Group 14 Transmission Profile (NO2 Gas)	
10107	10306	200	R4	40424	41223	Pixel Group 14 Transmission Profile Standard Deviation	
10307	10506	200	I4	41224	42023	Pixel Group 14 Profile Bit Flags	
10507	10706	200	R4	42024	42823	Pixel Group 15 Transmission Profile (NO2 Gas)	
10707	10906	200	R4	42824	43623	Pixel Group 15 Transmission Profile Standard Deviation	
10907	11106	200	I4	43624	44423	Pixel Group 15 Profile Bit Flags	
11107	11306	200	R4	44424	45223	Pixel Group 16 Transmission Profile (NO2 Gas)	
11307	11506	200	R4	45224	46023	Pixel Group 16 Transmission Profile Standard Deviation	
11507	11706	200	I4	46024	46823	Pixel Group 16 Profile Bit Flags	
11707	11906	200	R4	46824	47623	Pixel Group 17 Transmission Profile (NO2 Gas)	
11907	12106	200	R4	47624	48423	Pixel Group 17 Transmission Profile Standard Deviation	
12107	12306	200	I4	48424	49223	Pixel Group 17 Profile Bit Flags	
12307	12506	200	R4	49224	50023	Pixel Group 18 Transmission Profile (Aerosol-Ch2 & NO2 Gas)	
12507	12706	200	R4	50024	50823	Pixel Group 18 Transmission Profile Standard Deviation	
12707	12906	200	I4	50824	51623	Pixel Group 18 Profile Bit Flags	
12907	13106	200	R4	51624	52423	Pixel Group 19 Transmission Profile (Aerosol-Ch2 & NO2 Gas)	
13107	13306	200	R4	52424	53223	Pixel Group 19 Transmission Profile Standard Deviation	
13307	13506	200	I4	53224	54023	Pixel Group 19 Profile Bit Flags	

Table B1.1. Continued (2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
13507	13706	200	R4	54024	54823	Pixel Group 20 Transmission Profile (Aerosol-Ch2 & NO2 Gas)	
13707	13906	200	R4	54824	55623	Pixel Group 20 Transmission Profile Standard Deviation	
13907	14106	200	I4	55624	56423	Pixel Group 20 Profile Bit Flags	
14107	14306	200	R4	56424	57223	Pixel Group 21 Transmission Profile (Aerosol-Ch2 & NO2 Gas)	
14307	14506	200	R4	57224	58023	Pixel Group 21 Transmission Profile Standard Deviation	
14507	14706	200	I4	58024	58823	Pixel Group 21 Profile Bit Flags	
14707	14906	200	R4	58824	59623	Pixel Group 22 Transmission Profile (Aerosol-Ch3)	
14907	15106	200	R4	59624	60423	Pixel Group 22 Transmission Profile Standard Deviation	
15107	15306	200	I4	60424	61223	Pixel Group 22 Profile Bit Flags	
15307	15506	200	R4	61224	62023	Pixel Group 23 Not Used (VBP)	
15507	15706	200	R4	62024	62823	Pixel Group 23 Not Used (VBP)	
15707	15906	200	I4	62824	63623	Pixel Group 23 Not Used (VBP)	
15907	16106	200	R4	63624	64423	Pixel Group 24 Not Used (VRP)	
16107	16306	200	R4	64424	65223	Pixel Group 24 Not Used (VRP)	
16307	16506	200	I4	65224	66023	Pixel Group 24 Not Used (VRP)	
16507	16706	200	R4	66024	66823	Pixel Group 25 Transmission Profile (O3 Gas)	
16707	16906	200	R4	66824	67623	Pixel Group 25 Transmission Profile Standard Deviation	
16907	17106	200	I4	67624	68423	Pixel Group 25 Profile Bit Flags	
17107	17306	200	R4	68424	69223	Pixel Group 26 Transmission Profile (O3 Gas)	
17307	17506	200	R4	69224	70023	Pixel Group 26 Transmission Profile Standard Deviation	
17507	17706	200	I4	70024	70823	Pixel Group 26 Profile Bit Flags	
17707	17906	200	R4	70824	71623	Pixel Group 27 Transmission Profile (O3 Gas)	
17907	18106	200	R4	71624	72423	Pixel Group 27 Transmission Profile Standard Deviation	
18107	18306	200	I4	72424	73223	Pixel Group 27 Profile Bit Flags	
18307	18506	200	R4	73224	74023	Pixel Group 28 Transmission Profile (O3 Gas)	
18507	18706	200	R4	74024	74823	Pixel Group 28 Transmission Profile Standard Deviation	
18707	18906	200	I4	74824	75623	Pixel Group 28 Profile Bit Flags	



Table B1.1. Continued (2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
18907	19106	200	R4	75624	76423	Pixel Group 29 Transmission Profile (O3 Gas)	
19107	19306	200	R4	76424	77223	Pixel Group 29 Transmission Profile Standard Deviation	
19307	19506	200	I4	77224	78023	Pixel Group 29 Profile Bit Flags	
19507	19706	200	R4	78024	78823	Pixel Group 30 Transmission Profile (O3 Gas)	
19707	19906	200	R4	78824	79623	Pixel Group 30 Transmission Profile Standard Deviation	
19907	20106	200	I4	79624	80423	Pixel Group 30 Profile Bit Flags	
20107	20306	200	R4	80424	81223	Pixel Group 31 Transmission Profile (Aerosol-Ch4 & O3 Gas)	
20307	20506	200	R4	81224	82023	Pixel Group 31 Transmission Profile Standard Deviation	
20507	20706	200	I4	82024	82823	Pixel Group 31 Profile Bit Flags	
20707	20906	200	R4	82824	83623	Pixel Group 32 Transmission Profile (O3 Gas)	
20907	21106	200	R4	83624	84423	Pixel Group 32 Transmission Profile Standard Deviation	
21107	21306	200	I4	84424	85223	Pixel Group 32 Profile Bit Flags	
21307	21506	200	R4	85224	86023	Pixel Group 33 Transmission Profile (O3 Gas)	
21507	21706	200	R4	86024	86823	Pixel Group 33 Transmission Profile Standard Deviation	
21707	21906	200	I4	86824	87623	Pixel Group 33 Profile Bit Flags	
21907	22106	200	R4	87624	88423	Pixel Group 34 Transmission Profile (O3 Gas)	
22107	22306	200	R4	88424	89223	Pixel Group 34 Transmission Profile Standard Deviation	
22307	22506	200	I4	89224	90023	Pixel Group 34 Profile Bit Flags	
22507	22706	200	R4	90024	90823	Pixel Group 35 Transmission Profile (Aerosol-Ch5)	
22707	22906	200	R4	90824	91623	Pixel Group 35 Transmission Profile Standard Deviation	
22907	23106	200	I4	91624	92423	Pixel Group 35 Profile Bit Flags	
23107	23306	200	R4	92424	93223	Pixel Group 36 Transmission Profile (Aerosol-Ch6)	
23307	23506	200	R4	93224	94023	Pixel Group 36 Transmission Profile Standard Deviation	
23507	23706	200	I4	94024	94823	Pixel Group 36 Profile Bit Flags	
23707	23906	200	R4	94824	95623	Pixel Group 37 Transmission Profile (O2 A-Band)	
23907	24106	200	R4	95624	96423	Pixel Group 37 Transmission Profile Standard Deviation	
24107	24306	200	I4	96424	97223	Pixel Group 37 Profile Bit Flags	
24307	24506	200	R4	97224	98023	Pixel Group 38 Transmission Profile (O2 A-Band)	
24507	24706	200	R4	98024	98823	Pixel Group 38 Transmission Profile Standard Deviation	
24707	24906	200	I4	98824	99623	Pixel Group 38 Profile Bit Flags	



Table B1.1. Continued (2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
24907	25106	200	R4	99624	100423	Pixel Group 39 Transmission Profile (O2 A-Band)	
25107	25306	200	R4	100424	101223	Pixel Group 39 Transmission Profile Standard Deviation	
25307	25506	200	I4	101224	102023	Pixel Group 39 Profile Bit Flags	
25507	25706	200	R4	102024	102823	Pixel Group 40 Transmission Profile (O2 A-Band)	
25707	25906	200	R4	102824	103623	Pixel Group 40 Transmission Profile Standard Deviation	
25907	26106	200	I4	103624	104423	Pixel Group 40 Profile Bit Flags	
26107	26306	200	R4	104424	105223	Pixel Group 41 Transmission Profile (O2 A-Band)	
26307	26506	200	R4	105224	106023	Pixel Group 41 Transmission Profile Standard Deviation	
26507	26706	200	I4	106024	106823	Pixel Group 41 Profile Bit Flags	
26707	26906	200	R4	106824	107623	Pixel Group 42 Transmission Profile (O2 A-Band)	
26907	27106	200	R4	107624	108423	Pixel Group 42 Transmission Profile Standard Deviation	
27107	27306	200	I4	108424	109223	Pixel Group 42 Profile Bit Flags	
27307	27506	200	R4	109224	110023	Pixel Group 43 Transmission Profile (O2 A-Band)	
27507	27706	200	R4	110024	110823	Pixel Group 43 Transmission Profile Standard Deviation	
27707	27906	200	I4	110824	111623	Pixel Group 43 Profile Bit Flags	
27907	28106	200	R4	111624	112423	Pixel Group 44 Transmission Profile (O2 A-Band)	
28107	28306	200	R4	112424	113223	Pixel Group 44 Transmission Profile Standard Deviation	
28307	28506	200	I4	113224	114023	Pixel Group 44 Profile Bit Flags	
28507	28706	200	R4	114024	114823	Pixel Group 45 Transmission Profile (O2 A-Band)	
28707	28906	200	R4	114824	115623	Pixel Group 45 Transmission Profile Standard Deviation	
28907	29106	200	I4	115624	116423	Pixel Group 45 Profile Bit Flags	
29107	29306	200	R4	116424	117223	Pixel Group 46 Transmission Profile (O2 A-Band)	
29307	29506	200	R4	117224	118023	Pixel Group 46 Transmission Profile Standard Deviation	
29507	29706	200	I4	118024	118823	Pixel Group 46 Profile Bit Flags	
29707	29906	200	R4	118824	119623	Pixel Group 47 Transmission Profile (O2 A-Band)	
29907	30106	200	R4	119624	120423	Pixel Group 47 Transmission Profile Standard Deviation	
30107	30306	200	I4	120424	121223	Pixel Group 47 Profile Bit Flags	



Table B1.1. Continued (2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
30307	30506	200	R4	121224	122023	Pixel Group 48 Transmission Profile (O2 A-Band)	
30507	30706	200	R4	122024	122823	Pixel Group 48 Transmission Profile Standard Deviation	
30707	30906	200	I4	122824	123623	Pixel Group 48 Profile Bit Flags	
30907	31106	200	R4	123624	124423	Pixel Group 49 Transmission Profile (O2 A-Band)	
31107	31306	200	R4	124424	125223	Pixel Group 49 Transmission Profile Standard Deviation	
31307	31506	200	I4	125224	126023	Pixel Group 49 Profile Bit Flags	
31507	31706	200	R4	126024	126823	Pixel Group 50 Transmission Profile (O2 A-Band)	
31707	31906	200	R4	126824	127623	Pixel Group 50 Transmission Profile Standard Deviation	
31907	32106	200	I4	127624	128423	Pixel Group 50 Profile Bit Flags	
32107	32306	200	R4	128424	129223	Pixel Group 51 Transmission Profile (Aerosol-Ch7)	
32307	32506	200	R4	129224	130023	Pixel Group 51 Transmission Profile Standard Deviation	
32507	32706	200	I4	130024	130823	Pixel Group 51 Profile Bit Flags	
32707	32906	200	R4	130824	131623	Pixel Group 52 Transmission Profile (Water Vapor)	
32907	33106	200	R4	131624	132423	Pixel Group 52 Transmission Profile Standard Deviation	
33107	33306	200	I4	132424	133223	Pixel Group 52 Profile Bit Flags	
33307	33506	200	R4	133224	134023	Pixel Group 53 Transmission Profile (Water Vapor)	
33507	33706	200	R4	134024	134823	Pixel Group 53 Transmission Profile Standard Deviation	
33707	33906	200	I4	134824	135623	Pixel Group 53 Profile Bit Flags	
33907	34106	200	R4	135624	136423	Pixel Group 54 Transmission Profile (Water Vapor)	
34107	34306	200	R4	136424	137223	Pixel Group 54 Transmission Profile Standard Deviation	
34307	34506	200	I4	137224	138023	Pixel Group 54 Profile Bit Flags	
34507	34706	200	R4	138024	138823	Pixel Group 55 Transmission Profile (Water Vapor)	
34707	34906	200	R4	138824	139623	Pixel Group 55 Transmission Profile Standard Deviation	
34907	35106	200	I4	139624	140423	Pixel Group 55 Profile Bit Flags	
35107	35306	200	R4	140424	141223	Pixel Group 56 Transmission Profile (Water Vapor)	
35307	35506	200	R4	141224	142023	Pixel Group 56 Transmission Profile Standard Deviation	
35507	35706	200	I4	142024	142823	Pixel Group 56 Profile Bit Flags	



Table B1.1. Continued (2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
35707	35906	200	R4	142824	143623	Pixel Group 57 Transmission Profile (Water Vapor)	
35907	36106	200	R4	143624	144423	Pixel Group 57 Transmission Profile Standard Deviation	
36107	36306	200	I4	144424	145223	Pixel Group 57 Profile Bit Flags	
36307	36506	200	R4	145224	146023	Pixel Group 58 Transmission Profile (Water Vapor)	
36507	36706	200	R4	146024	146823	Pixel Group 58 Transmission Profile Standard Deviation	
36707	36906	200	I4	146824	147623	Pixel Group 58 Profile Bit Flags	
36907	37106	200	R4	147624	148423	Pixel Group 59 Transmission Profile (Water Vapor)	
37107	37306	200	R4	148424	149223	Pixel Group 59 Transmission Profile Standard Deviation	
37307	37506	200	I4	149224	150023	Pixel Group 59 Profile Bit Flags	
37507	37706	200	R4	150024	150823	Pixel Group 60 Transmission Profile (Water Vapor)	
37707	37906	200	R4	150824	151623	Pixel Group 60 Transmission Profile Standard Deviation	
37907	38106	200	I4	151624	152423	Pixel Group 60 Profile Bit Flags	
38107	38306	200	R4	152424	153223	Pixel Group 61 Transmission Profile (Water Vapor)	
38307	38506	200	R4	153224	154023	Pixel Group 61 Transmission Profile Standard Deviation	
38507	38706	200	I4	154024	154823	Pixel Group 61 Profile Bit Flags	
38707	38906	200	R4	154824	155623	Pixel Group 62 Transmission Profile (Water Vapor)	
38907	39106	200	R4	155624	156423	Pixel Group 62 Transmission Profile Standard Deviation	
39107	39306	200	I4	156424	157223	Pixel Group 62 Profile Bit Flags	
39307	39506	200	R4	157224	158023	Pixel Group 63 Transmission Profile (Water Vapor)	
39507	39706	200	R4	158024	158823	Pixel Group 63 Transmission Profile Standard Deviation	
39707	39906	200	I4	158824	159623	Pixel Group 63 Profile Bit Flags	
39907	40106	200	R4	159624	160423	Pixel Group 64 Transmission Profile (Water Vapor)	
40107	40306	200	R4	160424	161223	Pixel Group 64 Transmission Profile Standard Deviation	
40307	40506	200	I4	161224	162023	Pixel Group 64 Profile Bit Flags	
40507	40706	200	R4	162024	162823	Pixel Group 65 Transmission Profile (Water Vapor)	
40707	40906	200	R4	162824	163623	Pixel Group 65 Transmission Profile Standard Deviation	
40907	41106	200	I4	163624	164423	Pixel Group 65 Profile Bit Flags	



Table B1.1. Continued (2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
41107	41306	200	R4	164424	165223	Pixel Group 66 Transmission Profile (Water Vapor)	
41307	41506	200	R4	165224	166023	Pixel Group 66 Transmission Profile Standard Deviation	
41507	41706	200	I4	166024	166823	Pixel Group 66 Profile Bit Flags	
41707	41906	200	R4	166824	167623	Pixel Group 67 Transmission Profile (Water Vapor)	
41907	42106	200	R4	167624	168423	Pixel Group 67 Transmission Profile Standard Deviation	
42107	42306	200	I4	168424	169223	Pixel Group 67 Profile Bit Flags	
42307	42506	200	R4	169224	170023	Pixel Group 68 Transmission Profile (Water Vapor)	
42507	42706	200	R4	170024	170823	Pixel Group 68 Transmission Profile Standard Deviation	
42707	42906	200	I4	170824	171623	Pixel Group 68 Profile Bit Flags	
42907	43106	200	R4	171624	172423	Pixel Group 69 Transmission Profile (Water Vapor)	
43107	43306	200	R4	172424	173223	Pixel Group 69 Transmission Profile Standard Deviation	
43307	43506	200	I4	173224	174023	Pixel Group 69 Profile Bit Flags	
43507	43706	200	R4	174024	174823	Pixel Group 70 Transmission Profile (Water Vapor)	
43707	43906	200	R4	174824	175623	Pixel Group 70 Transmission Profile Standard Deviation	
43907	44106	200	I4	175624	176423	Pixel Group 70 Profile Bit Flags	
44107	44306	200	R4	176424	177223	Pixel Group 71 Transmission Profile (Water Vapor)	
44307	44506	200	R4	177224	178023	Pixel Group 71 Transmission Profile Standard Deviation	
44507	44706	200	I4	178024	178823	Pixel Group 71 Profile Bit Flags	
44707	44906	200	R4	178824	179623	Pixel Group 72 Transmission Profile (Water Vapor)	
44907	45106	200	R4	179624	180423	Pixel Group 72 Transmission Profile Standard Deviation	
45107	45306	200	I4	180424	181223	Pixel Group 72 Profile Bit Flags	
45307	45506	200	R4	181224	182023	Pixel Group 73 Transmission Profile (Water Vapor)	
45507	45706	200	R4	182024	182823	Pixel Group 73 Transmission Profile Standard Deviation	
45707	45906	200	I4	182824	183623	Pixel Group 73 Profile Bit Flags	
45907	46106	200	R4	183624	184423	Pixel Group 74 Transmission Profile (Water Vapor)	
46107	46306	200	R4	184424	185223	Pixel Group 74 Transmission Profile Standard Deviation	
46307	46506	200	I4	185224	186023	Pixel Group 74 Profile Bit Flags	
46507	46706	200	R4	186024	186823	Pixel Group 75 Transmission Profile (Water Vapor)	
46707	46906	200	R4	186824	187623	Pixel Group 75 Transmission Profile Standard Deviation	
46907	47106	200	I4	187624	188423	Pixel Group 75 Profile Bit Flags	



Table B1.1. Continued (2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
47107	47306	200	R4	188424	189223	Pixel Group 76 Transmission Profile (Water Vapor)	
47307	47506	200	R4	189224	190023	Pixel Group 76 Transmission Profile Standard Deviation	
47507	47706	200	I4	190024	190823	Pixel Group 76 Profile Bit Flags	
47707	47906	200	R4	190824	191623	Pixel Group 77 Transmission Profile (Water Vapor)	
47907	48106	200	R4	191624	192423	Pixel Group 77 Transmission Profile Standard Deviation	
48107	48306	200	I4	192424	193223	Pixel Group 77 Profile Bit Flags	
48307	48506	200	R4	193224	194023	Pixel Group 78 Transmission Profile (Water Vapor)	
48507	48706	200	R4	194024	194823	Pixel Group 78 Transmission Profile Standard Deviation	
48707	48906	200	I4	194824	195623	Pixel Group 78 Profile Bit Flags	
48907	49106	200	R4	195624	196423	Pixel Group 79 Transmission Profile (Water Vapor)	
49107	49306	200	R4	196424	197223	Pixel Group 79 Transmission Profile Standard Deviation	
49307	49506	200	I4	197224	198023	Pixel Group 79 Profile Bit Flags	
49507	49706	200	R4	198024	198823	Pixel Group 80 Transmission Profile (Water Vapor)	
49707	49906	200	R4	198824	199623	Pixel Group 80 Transmission Profile Standard Deviation	
49907	50106	200	I4	199624	200423	Pixel Group 80 Profile Bit Flags	
50107	50306	200	R4	200424	201223	Pixel Group 81 Transmission Profile (Aerosol-Ch8)	
50307	50506	200	R4	201224	202023	Pixel Group 81 Transmission Profile Standard Deviation	
50507	50706	200	I4	202024	202823	Pixel Group 81 Profile Bit Flags	
50707	50906	200	R4	202824	203623	Pixel Group 82 Transmission Profile (Aerosol-Ch8)	
50907	51106	200	R4	203624	204423	Pixel Group 82 Transmission Profile Standard Deviation	
51107	51306	200	I4	204424	205223	Pixel Group 82 Profile Bit Flags	
51307	51506	200	R4	205224	206023	Pixel Group 83 Transmission Profile (Aerosol-Ch8)	
51507	51706	200	R4	206024	206823	Pixel Group 83 Transmission Profile Standard Deviation	
51707	51906	200	I4	206824	207623	Pixel Group 83 Profile Bit Flags	
51907	52106	200	R4	207624	208423	Pixel Group 84 Transmission Profile (Aerosol-Ch8)	
52107	52306	200	R4	208424	209223	Pixel Group 84 Transmission Profile Standard Deviation	
52307	52506	200	I4	209224	210023	Pixel Group 84 Profile Bit Flags	



Table B1.1. Concluded (2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
52507	52706	200	R4	210024	210823	Pixel Group 85 Transmission Profile (Aerosol-Ch8)	
52707	52906	200	R4	210824	211623	Pixel Group 85 Transmission Profile Standard Deviation	
52907	53106	200	I4	211624	212423	Pixel Group 85 Profile Bit Flags	
53107	53306	200	R4	212424	213223	Pixel Group 86 Transmission Profile (Aerosol-Ch8)	
53307	53506	200	R4	213224	214023	Pixel Group 86 Transmission Profile Standard Deviation	
53507	53706	200	I4	214024	214823	Pixel Group 86 Profile Bit Flags	



Table B1.2. Binary File Format Sheet SAGE III Level 1B Solar Transmission Product (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
00001	00001	1	I4	0	3	Event Identification Tag (orbit-event code composite number)	File Header
00002	00002	1	I4	4	7	Year-Day Tag (yyyyddd)	
00003	00003	1	R4	8	11	Instrument Elapsed Time in On Station (dddd.frac)	
00004	00004	1	I4	12	15	"Data Fill/Invalid" Value for this Record (Integer Field)	
00005	00005	1	R4	16	19	"Data Fill/Invalid" Value for this Record (Floating Point Field)	
00006	00006	1	I4	20	23	Mission Identification (1 = Meteor-3M)	
00007	00007	1	R4	24	27	Version: Definitive Orbit Processing	Version Tracking
00008	00008	1	R4	28	31	Version: Level 0 Processing	
00009	00009	1	R4	32	35	Version: Software Processing	
00010	00010	1	R4	36	39	Version: Data Product	
00011	00011	1	R4	40	43	Version: Spectroscopy	
00012	00012	1	R4	44	47	Version: GRAM 95	
00013	00013	1	R4	48	51	Version: Meteorological	
00014	00014	1	R4	52	55	Transmission Profile Grid Spacing	File Description
00015	00015	1	I4	56	59	Transmission Profile Count	
00016	00016	1	I4	60	63	Number of Ground Track Values	
00017	00017	1	I4	64	67	Meteorological Profile Array Size	
00018	00018	1	I4	68	71	CCD Pixel Group Count	
00019	00019	1	I4	72	75	Altitude-Based Array Size	
00020	00020	1	I4	76	79	Spacecraft-Referenced Event Type (1 = sunrise; 2 = sunset)	Event Type
00021	00021	1	I4	80	83	Earth-Referenced Event Type (1 = sunrise; 2 = sunset)	
00022	00022	1	R4	84	87	Event Beta Angle (0.0 ± 61.0)	
00023	00023	1	I4	88	91	Data Capture Start Date (yyyymmdd)	Data Capture Start Information
00024	00024	1	I4	92	95	Data Capture Start Time (hhmmss)	
00025	00025	1	R4	96	99	Subtangent Latitude (0.0 ± 90.0)	
00026	00026	1	R4	100	103	Subtangent Longitude (0.0 ± 180.0)	
00027	00027	1	R4	104	107	Subtangent Altitude	



Table B1.2. Continued (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
00028	00028	1	I4	108	111	Data Capture End Date (yyyymmdd)	Data Capture End Information
00029	00029	1	I4	112	115	Data Capture End Time (hhmmss)	
00030	00030	1	R4	116	119	Subtangent Latitude (0.0 ± 90.0)	
00031	00031	1	R4	120	123	Subtangent Longitude (0.0 ± 180.0)	
00032	00032	1	R4	124	127	Subtangent Altitude	
00033	00043	11	I4	128	171	Date (yyyymmdd)	Ground Track Data*
00044	00054	11	I4	172	215	Time (hhmmss)	
00055	00065	11	R4	216	259	Subtangent Latitude (0.0 ± 90.0)	
00066	00076	11	R4	260	303	Subtangent Longitude (0.0 ± 180.0)	
00077	00087	11	R4	304	347	Ray Path Direction at Subtangent Point (0.0 – 359.99...)	
00088	00088	1	R4	348	351	Tropopause Temperature	Pressure Surface-based Met Data
00089	00089	1	R4	352	355	Tropopause Geometric Altitude	
00090	00107	18	R4	356	427	Pressure	
00108	00125	18	R4	428	499	Temperature	
00126	00143	18	R4	500	571	Temperature Uncertainty	
00144	00161	18	R4	572	643	Geometric Altitude	
00162	00162	1	I4	644	647	Data Source Indicator (1 = DAO**; 2 = NCEP; 3 = None)	
00163	00248	86	I4	648	991	Starting CCD Pixel Number of Pixel Group n	CCD Pixel Information
00249	00334	86	I4	992	1335	Ending CCD Pixel Number of Pixel Group n	
00335	00420	86	R4	1336	1679	Central Wavelength of Pixel Group n	
00421	00506	86	R4	1680	2023	Half-Bandwidth of Pixel Group n	
00507	00706	200	R4	2024	2823	Geometric Altitude	Altitude-based Profiles
00707	00906	200	R4	2824	3623	Pressure	
00907	01106	200	R4	3624	4423	Temperature	
01107	01306	200	R4	4424	5223	Temperature Uncertainty	
01307	01506	200	I4	5224	6023	Pressure/Temperature Array Source Flags	

*Ground Track Data reported in 10km increments for 0 –100km.

**Data Assimilation Office (DAO): source of research-quality assimilated global data sets (including temperature and geo-potential height).



Table B1.2. Continued (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
01507	01706	200	R4	6024	6823	Pixel Group 0 Transmission Profile (PIN Diode) (Aerosol-Ch 9) Transmission Profiles	
01707	01906	200	R4	6824	7623	Pixel Group 0 Transmission Profile Standard Deviation	
01907	02106	200	I4	7624	8423	Pixel Group 0 Profile Bit Flags (PIN Diode)	
02107	02306	200	R4	8424	9223	Pixel Group 1 Transmission Profile (Mesospheric Ozone)	
02307	02506	200	R4	9224	10023	Pixel Group 1 Transmission Profile Standard Deviation	
02507	02706	200	I4	10024	10823	Pixel Group 1 Profile Bit Flags	
02707	02906	200	R4	10824	11623	Pixel Group 2 Transmission Profile (Mesospheric Ozone)	
02907	03106	200	R4	11624	12423	Pixel Group 2 Transmission Profile Standard Deviation	
03107	03306	200	I4	12424	13223	Pixel Group 2 Profile Bit Flags	
03307	03506	200	R4	13224	14023	Pixel Group 3 Transmission Profile (Mesospheric Ozone)	
03507	03706	200	R4	14024	14823	Pixel Group 3 Transmission Profile Standard Deviation	
03707	03906	200	I4	14824	15623	Pixel Group 3 Profile Bit Flags	
03907	04106	200	R4	15624	16423	Pixel Group 4 Transmission Profile (Aerosol-Ch 1 & Rayleigh)	
04107	04306	200	R4	16424	17223	Pixel Group 4 Transmission Profile Standard Deviation	
04307	04506	200	I4	17224	18023	Pixel Group 4 Profile Bit Flags	
04507	04706	200	R4	18024	18823	Pixel Group 5 Transmission Profile (NO2 Gas)	
04707	04906	200	R4	18824	19623	Pixel Group 5 Transmission Profile Standard Deviation	
04907	05106	200	I4	19624	20423	Pixel Group 5 Profile Bit Flags	
05107	05306	200	R4	20424	21223	Pixel Group 6 Transmission Profile (NO2 Gas)	
05307	05506	200	R4	21224	22023	Pixel Group 6 Transmission Profile Standard Deviation	
05507	05706	200	I4	22024	22823	Pixel Group 6 Profile Bit Flags	
05707	05906	200	R4	22824	23623	Pixel Group 7 Transmission Profile (NO2 Gas)	
05907	06106	200	R4	23624	24423	Pixel Group 7 Transmission Profile Standard Deviation	
06107	06306	200	I4	24424	25223	Pixel Group 7 Profile Bit Flags	
06307	06506	200	R4	25224	26023	Pixel Group 8 Transmission Profile (NO2 Gas)	
06507	06706	200	R4	26024	26823	Pixel Group 8 Transmission Profile Standard Deviation	
06707	06906	200	I4	26824	27623	Pixel Group 8 Profile Bit Flags	
06907	07106	200	R4	27624	28423	Pixel Group 9 Transmission Profile (NO2 Gas)	
07107	07306	200	R4	28424	29223	Pixel Group 9 Transmission Profile Standard Deviation	
07307	07506	200	I4	29224	30023	Pixel Group 9 Profile Bit Flags	

Table B1.2. Continued (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
07507	07706	200	R4	30024	30823	Pixel Group 10 Transmission Profile (NO ₂ Gas)	
07707	07906	200	R4	30824	31623	Pixel Group 10 Transmission Profile Standard Deviation	
07907	08106	200	I4	31624	32423	Pixel Group 10 Profile Bit Flags	
08107	08306	200	R4	32424	33223	Pixel Group 11 Transmission Profile (NO ₂ Gas)	
08307	08506	200	R4	33224	34023	Pixel Group 11 Transmission Profile Standard Deviation	
08507	08706	200	I4	34024	34823	Pixel Group 11 Profile Bit Flags	
08707	08906	200	R4	34824	35623	Pixel Group 12 Transmission Profile (NO ₂ Gas)	
08907	09106	200	R4	35624	36423	Pixel Group 12 Transmission Profile Standard Deviation	
09107	09306	200	I4	36424	37223	Pixel Group 12 Profile Bit Flags	
09307	09506	200	R4	37224	38023	Pixel Group 13 Transmission Profile (NO ₂ Gas)	
09507	09706	200	R4	38024	38823	Pixel Group 13 Transmission Profile Standard Deviation	
09707	09906	200	I4	38824	39623	Pixel Group 13 Profile Bit Flags	
09907	10106	200	R4	39624	40423	Pixel Group 14 Transmission Profile (NO ₂ Gas)	
10107	10306	200	R4	40424	41223	Pixel Group 14 Transmission Profile Standard Deviation	
10307	10506	200	I4	41224	42023	Pixel Group 14 Profile Bit Flags	
10507	10706	200	R4	42024	42823	Pixel Group 15 Transmission Profile (NO ₂ Gas)	
10707	10906	200	R4	42824	43623	Pixel Group 15 Transmission Profile Standard Deviation	
10907	11106	200	I4	43624	44423	Pixel Group 15 Profile Bit Flags	
11107	11306	200	R4	44424	45223	Pixel Group 16 Transmission Profile (NO ₂ Gas)	
11307	11506	200	R4	45224	46023	Pixel Group 16 Transmission Profile Standard Deviation	
11507	11706	200	I4	46024	46823	Pixel Group 16 Profile Bit Flags	
11707	11906	200	R4	46824	47623	Pixel Group 17 Transmission Profile (NO ₂ Gas)	
11907	12106	200	R4	47624	48423	Pixel Group 17 Transmission Profile Standard Deviation	
12107	12306	200	I4	48424	49223	Pixel Group 17 Profile Bit Flags	
12307	12506	200	R4	49224	50023	Pixel Group 18 Transmission Profile (NO ₂ Gas)	
12507	12706	200	R4	50024	50823	Pixel Group 18 Transmission Profile Standard Deviation	
12707	12906	200	I4	50824	51623	Pixel Group 18 Profile Bit Flags	
12907	13106	200	R4	51624	52423	Pixel Group 19 Transmission Profile (NO ₂ Gas)	
13107	13306	200	R4	52424	53223	Pixel Group 19 Transmission Profile Standard Deviation	
13307	13506	200	I4	53224	54023	Pixel Group 19 Profile Bit Flags	

Table B1.2. Continued (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
13507	13706	200	R4	54024	54823	Pixel Group 20 Transmission Profile (Aerosol-Ch2 & NO2 Gas)	
13707	13906	200	R4	54824	55623	Pixel Group 20 Transmission Profile Standard Deviation	
13907	14106	200	I4	55624	56423	Pixel Group 20 Profile Bit Flags	
14107	14306	200	R4	56424	57223	Pixel Group 21 Transmission Profile (Aerosol-Ch2 & NO2 Gas)	
14307	14506	200	R4	57224	58023	Pixel Group 21 Transmission Profile Standard Deviation	
14507	14706	200	I4	58024	58823	Pixel Group 21 Profile Bit Flags	
14707	14906	200	R4	58824	59623	Pixel Group 22 Transmission Profile (Aerosol-Ch2 & NO2 Gas)	
14907	15106	200	R4	59624	60423	Pixel Group 22 Transmission Profile Standard Deviation	
15107	15306	200	I4	60424	61223	Pixel Group 22 Profile Bit Flags	
15307	15506	200	R4	61224	62023	Pixel Group 23 Transmission Profile (Aerosol-Ch2 & NO2 Gas)	
15507	15706	200	R4	62024	62823	Pixel Group 23 Transmission Profile Standard Deviation	
15707	15906	200	I4	62824	63623	Pixel Group 23 Profile Bit Flags	
15907	16106	200	R4	63624	64423	Pixel Group 24 Transmission Profile (Aerosol-Ch3)	
16107	16306	200	R4	64424	65223	Pixel Group 24 Transmission Profile Standard Deviation	
16307	16506	200	I4	65224	66023	Pixel Group 24 Profile Bit Flags	
16507	16706	200	R4	66024	66823	Pixel Group 25 Transmission Profile (O3 Gas)	
16707	16906	200	R4	66824	67623	Pixel Group 25 Transmission Profile Standard Deviation	
16907	17106	200	I4	67624	68423	Pixel Group 25 Profile Bit Flags	
17107	17306	200	R4	68424	69223	Pixel Group 26 Transmission Profile (O3 Gas)	
17307	17506	200	R4	69224	70023	Pixel Group 26 Transmission Profile Standard Deviation	
17507	17706	200	I4	70024	70823	Pixel Group 26 Profile Bit Flags	
17707	17906	200	R4	70824	71623	Pixel Group 27 Transmission Profile (O3 Gas)	
17907	18106	200	R4	71624	72423	Pixel Group 27 Transmission Profile Standard Deviation	
18107	18306	200	I4	72424	73223	Pixel Group 27 Profile Bit Flags	
18307	18506	200	R4	73224	74023	Pixel Group 28 Transmission Profile (O3 Gas)	
18507	18706	200	R4	74024	74823	Pixel Group 28 Transmission Profile Standard Deviation	
18707	18906	200	I4	74824	75623	Pixel Group 28 Profile Bit Flags	



Table B1.2. Continued (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
18907	19106	200	R4	75624	76423	Pixel Group 29 Transmission Profile (O3 Gas)	
19107	19306	200	R4	76424	77223	Pixel Group 29 Transmission Profile Standard Deviation	
19307	19506	200	I4	77224	78023	Pixel Group 29 Profile Bit Flags	
19507	19706	200	R4	78024	78823	Pixel Group 30 Transmission Profile (O3 Gas)	
19707	19906	200	R4	78824	79623	Pixel Group 30 Transmission Profile Standard Deviation	
19907	20106	200	I4	79624	80423	Pixel Group 30 Profile Bit Flags	
20107	20306	200	R4	80424	81223	Pixel Group 31 Transmission Profile (Aerosol-Ch4 & O3 Gas)	
20307	20506	200	R4	81224	82023	Pixel Group 31 Transmission Profile Standard Deviation	
20507	20706	200	I4	82024	82823	Pixel Group 31 Profile Bit Flags	
20707	20906	200	R4	82824	83623	Pixel Group 32 Transmission Profile (O3 Gas)	
20907	21106	200	R4	83624	84423	Pixel Group 32 Transmission Profile Standard Deviation	
21107	21306	200	I4	84424	85223	Pixel Group 32 Profile Bit Flags	
21307	21506	200	R4	85224	86023	Pixel Group 33 Transmission Profile (O3 Gas)	
21507	21706	200	R4	86024	86823	Pixel Group 33 Transmission Profile Standard Deviation	
21707	21906	200	I4	86824	87623	Pixel Group 33 Profile Bit Flags	
21907	22106	200	R4	87624	88423	Pixel Group 34 Transmission Profile (O3 Gas)	
22107	22306	200	R4	88424	89223	Pixel Group 34 Transmission Profile Standard Deviation	
22307	22506	200	I4	89224	90023	Pixel Group 34 Profile Bit Flags	
22507	22706	200	R4	90024	90823	Pixel Group 35 Transmission Profile (Aerosol-Ch5)	
22707	22906	200	R4	90824	91623	Pixel Group 35 Transmission Profile Standard Deviation	
22907	23106	200	I4	91624	92423	Pixel Group 35 Profile Bit Flags	
23107	23306	200	R4	92424	93223	Pixel Group 36 Transmission Profile (Aerosol-Ch6)	
23307	23506	200	R4	93224	94023	Pixel Group 36 Transmission Profile Standard Deviation	
23507	23706	200	I4	94024	94823	Pixel Group 36 Profile Bit Flags	
23707	23906	200	R4	94824	95623	Pixel Group 37 Transmission Profile (O2 A-Band)	
23907	24106	200	R4	95624	96423	Pixel Group 37 Transmission Profile Standard Deviation	
24107	24306	200	I4	96424	97223	Pixel Group 37 Profile Bit Flags	
24307	24506	200	R4	97224	98023	Pixel Group 38 Transmission Profile (O2 A-Band)	
24507	24706	200	R4	98024	98823	Pixel Group 38 Transmission Profile Standard Deviation	
24707	24906	200	I4	98824	99623	Pixel Group 38 Profile Bit Flags	



Table B1.2. Continued (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
24907	25106	200	R4	99624	100423	Pixel Group 39 Transmission Profile (O2 A-Band)	
25107	25306	200	R4	100424	101223	Pixel Group 39 Transmission Profile Standard Deviation	
25307	25506	200	I4	101224	102023	Pixel Group 39 Profile Bit Flags	
25507	25706	200	R4	102024	102823	Pixel Group 40 Transmission Profile (O2 A-Band)	
25707	25906	200	R4	102824	103623	Pixel Group 40 Transmission Profile Standard Deviation	
25907	26106	200	I4	103624	104423	Pixel Group 40 Profile Bit Flags	
26107	26306	200	R4	104424	105223	Pixel Group 41 Transmission Profile (O2 A-Band)	
26307	26506	200	R4	105224	106023	Pixel Group 41 Transmission Profile Standard Deviation	
26507	26706	200	I4	106024	106823	Pixel Group 41 Profile Bit Flags	
26707	26906	200	R4	106824	107623	Pixel Group 42 Transmission Profile (O2 A-Band)	
26907	27106	200	R4	107624	108423	Pixel Group 42 Transmission Profile Standard Deviation	
27107	27306	200	I4	108424	109223	Pixel Group 42 Profile Bit Flags	
27307	27506	200	R4	109224	110023	Pixel Group 43 Transmission Profile (O2 A-Band)	
27507	27706	200	R4	110024	110823	Pixel Group 43 Transmission Profile Standard Deviation	
27707	27906	200	I4	110824	111623	Pixel Group 43 Profile Bit Flags	
27907	28106	200	R4	111624	112423	Pixel Group 44 Transmission Profile (O2 A-Band)	
28107	28306	200	R4	112424	113223	Pixel Group 44 Transmission Profile Standard Deviation	
28307	28506	200	I4	113224	114023	Pixel Group 44 Profile Bit Flags	
28507	28706	200	R4	114024	114823	Pixel Group 45 Transmission Profile (O2 A-Band)	
28707	28906	200	R4	114824	115623	Pixel Group 45 Transmission Profile Standard Deviation	
28907	29106	200	I4	115624	116423	Pixel Group 45 Profile Bit Flags	
29107	29306	200	R4	116424	117223	Pixel Group 46 Transmission Profile (O2 A-Band)	
29307	29506	200	R4	117224	118023	Pixel Group 46 Transmission Profile Standard Deviation	
29507	29706	200	I4	118024	118823	Pixel Group 46 Profile Bit Flags	
29707	29906	200	R4	118824	119623	Pixel Group 47 Transmission Profile (O2 A-Band)	
29907	30106	200	R4	119624	120423	Pixel Group 47 Transmission Profile Standard Deviation	
30107	30306	200	I4	120424	121223	Pixel Group 47 Profile Bit Flags	



Table B1.2. Continued (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
30307	30506	200	R4	121224	122023	Pixel Group 48 Transmission Profile (O2 A-Band)	
30507	30706	200	R4	122024	122823	Pixel Group 48 Transmission Profile Standard Deviation	
30707	30906	200	I4	122824	123623	Pixel Group 48 Profile Bit Flags	
30907	31106	200	R4	123624	124423	Pixel Group 49 Transmission Profile (O2 A-Band)	
31107	31306	200	R4	124424	125223	Pixel Group 49 Transmission Profile Standard Deviation	
31307	31506	200	I4	125224	126023	Pixel Group 49 Profile Bit Flags	
31507	31706	200	R4	126024	126823	Pixel Group 50 Transmission Profile (O2 A-Band)	
31707	31906	200	R4	126824	127623	Pixel Group 50 Transmission Profile Standard Deviation	
31907	32106	200	I4	127624	128423	Pixel Group 50 Profile Bit Flags	
32107	32306	200	R4	128424	129223	Pixel Group 51 Transmission Profile (Aerosol-Ch7)	
32307	32506	200	R4	129224	130023	Pixel Group 51 Transmission Profile Standard Deviation	
32507	32706	200	I4	130024	130823	Pixel Group 51 Profile Bit Flags	
32707	32906	200	R4	130824	131623	Pixel Group 52 Transmission Profile (Water Vapor)	
32907	33106	200	R4	131624	132423	Pixel Group 52 Transmission Profile Standard Deviation	
33107	33306	200	I4	132424	133223	Pixel Group 52 Profile Bit Flags	
33307	33506	200	R4	133224	134023	Pixel Group 53 Transmission Profile (Water Vapor)	
33507	33706	200	R4	134024	134823	Pixel Group 53 Transmission Profile Standard Deviation	
33707	33906	200	I4	134824	135623	Pixel Group 53 Profile Bit Flags	
33907	34106	200	R4	135624	136423	Pixel Group 54 Transmission Profile (Water Vapor)	
34107	34306	200	R4	136424	137223	Pixel Group 54 Transmission Profile Standard Deviation	
34307	34506	200	I4	137224	138023	Pixel Group 54 Profile Bit Flags	
34507	34706	200	R4	138024	138823	Pixel Group 55 Transmission Profile (Water Vapor)	
34707	34906	200	R4	138824	139623	Pixel Group 55 Transmission Profile Standard Deviation	
34907	35106	200	I4	139624	140423	Pixel Group 55 Profile Bit Flags	
35107	35306	200	R4	140424	141223	Pixel Group 56 Transmission Profile (Water Vapor)	
35307	35506	200	R4	141224	142023	Pixel Group 56 Transmission Profile Standard Deviation	
35507	35706	200	I4	142024	142823	Pixel Group 56 Profile Bit Flags	



Table B1.2. Continued (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
35707	35906	200	R4	142824	143623	Pixel Group 57 Transmission Profile (Water Vapor)	
35907	36106	200	R4	143624	144423	Pixel Group 57 Transmission Profile Standard Deviation	
36107	36306	200	I4	144424	145223	Pixel Group 57 Profile Bit Flags	
36307	36506	200	R4	145224	146023	Pixel Group 58 Transmission Profile (Water Vapor)	
36507	36706	200	R4	146024	146823	Pixel Group 58 Transmission Profile Standard Deviation	
36707	36906	200	I4	146824	147623	Pixel Group 58 Profile Bit Flags	
36907	37106	200	R4	147624	148423	Pixel Group 59 Transmission Profile (Water Vapor)	
37107	37306	200	R4	148424	149223	Pixel Group 59 Transmission Profile Standard Deviation	
37307	37506	200	I4	149224	150023	Pixel Group 59 Profile Bit Flags	
37507	37706	200	R4	150024	150823	Pixel Group 60 Transmission Profile (Water Vapor)	
37707	37906	200	R4	150824	151623	Pixel Group 60 Transmission Profile Standard Deviation	
37907	38106	200	I4	151624	152423	Pixel Group 60 Profile Bit Flags	
38107	38306	200	R4	152424	153223	Pixel Group 61 Transmission Profile (Water Vapor)	
38307	38506	200	R4	153224	154023	Pixel Group 61 Transmission Profile Standard Deviation	
38507	38706	200	I4	154024	154823	Pixel Group 61 Profile Bit Flags	
38707	38906	200	R4	154824	155623	Pixel Group 62 Transmission Profile (Water Vapor)	
38907	39106	200	R4	155624	156423	Pixel Group 62 Transmission Profile Standard Deviation	
39107	39306	200	I4	156424	157223	Pixel Group 62 Profile Bit Flags	
39307	39506	200	R4	157224	158023	Pixel Group 63 Transmission Profile (Water Vapor)	
39507	39706	200	R4	158024	158823	Pixel Group 63 Transmission Profile Standard Deviation	
39707	39906	200	I4	158824	159623	Pixel Group 63 Profile Bit Flags	
39907	40106	200	R4	159624	160423	Pixel Group 64 Transmission Profile (Water Vapor)	
40107	40306	200	R4	160424	161223	Pixel Group 64 Transmission Profile Standard Deviation	
40307	40506	200	I4	161224	162023	Pixel Group 64 Profile Bit Flags	
40507	40706	200	R4	162024	162823	Pixel Group 65 Transmission Profile (Water Vapor)	
40707	40906	200	R4	162824	163623	Pixel Group 65 Transmission Profile Standard Deviation	
40907	41106	200	I4	163624	164423	Pixel Group 65 Profile Bit Flags	



Table B1.2. Continued (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
41107	41306	200	R4	164424	165223	Pixel Group 66 Transmission Profile (Water Vapor)	
41307	41506	200	R4	165224	166023	Pixel Group 66 Transmission Profile Standard Deviation	
41507	41706	200	I4	166024	166823	Pixel Group 66 Profile Bit Flags	
41707	41906	200	R4	166824	167623	Pixel Group 67 Transmission Profile (Water Vapor)	
41907	42106	200	R4	167624	168423	Pixel Group 67 Transmission Profile Standard Deviation	
42107	42306	200	I4	168424	169223	Pixel Group 67 Profile Bit Flags	
42307	42506	200	R4	169224	170023	Pixel Group 68 Transmission Profile (Water Vapor)	
42507	42706	200	R4	170024	170823	Pixel Group 68 Transmission Profile Standard Deviation	
42707	42906	200	I4	170824	171623	Pixel Group 68 Profile Bit Flags	
42907	43106	200	R4	171624	172423	Pixel Group 69 Transmission Profile (Water Vapor)	
43107	43306	200	R4	172424	173223	Pixel Group 69 Transmission Profile Standard Deviation	
43307	43506	200	I4	173224	174023	Pixel Group 69 Profile Bit Flags	
43507	43706	200	R4	174024	174823	Pixel Group 70 Transmission Profile (Water Vapor)	
43707	43906	200	R4	174824	175623	Pixel Group 70 Transmission Profile Standard Deviation	
43907	44106	200	I4	175624	176423	Pixel Group 70 Profile Bit Flags	
44107	44306	200	R4	176424	177223	Pixel Group 71 Transmission Profile (Water Vapor)	
44307	44506	200	R4	177224	178023	Pixel Group 71 Transmission Profile Standard Deviation	
44507	44706	200	I4	178024	178823	Pixel Group 71 Profile Bit Flags	
44707	44906	200	R4	178824	179623	Pixel Group 72 Transmission Profile (Water Vapor)	
44907	45106	200	R4	179624	180423	Pixel Group 72 Transmission Profile Standard Deviation	
45107	45306	200	I4	180424	181223	Pixel Group 72 Profile Bit Flags	
45307	45506	200	R4	181224	182023	Pixel Group 73 Transmission Profile (Water Vapor)	
45507	45706	200	R4	182024	182823	Pixel Group 73 Transmission Profile Standard Deviation	
45707	45906	200	I4	182824	183623	Pixel Group 73 Profile Bit Flags	
45907	46106	200	R4	183624	184423	Pixel Group 74 Transmission Profile (Water Vapor)	
46107	46306	200	R4	184424	185223	Pixel Group 74 Transmission Profile Standard Deviation	
46307	46506	200	I4	185224	186023	Pixel Group 74 Profile Bit Flags	
46507	46706	200	R4	186024	186823	Pixel Group 75 Transmission Profile (Water Vapor)	
46707	46906	200	R4	186824	187623	Pixel Group 75 Transmission Profile Standard Deviation	
46907	47106	200	I4	187624	188423	Pixel Group 75 Profile Bit Flags	

Table B1.2. Continued (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
47107	47306	200	R4	188424	189223	Pixel Group 76 Transmission Profile (Water Vapor)	
47307	47506	200	R4	189224	190023	Pixel Group 76 Transmission Profile Standard Deviation	
47507	47706	200	I4	190024	190823	Pixel Group 76 Profile Bit Flags	
47707	47906	200	R4	190824	191623	Pixel Group 77 Transmission Profile (Water Vapor)	
47907	48106	200	R4	191624	192423	Pixel Group 77 Transmission Profile Standard Deviation	
48107	48306	200	I4	192424	193223	Pixel Group 77 Profile Bit Flags	
48307	48506	200	R4	193224	194023	Pixel Group 78 Transmission Profile (Water Vapor)	
48507	48706	200	R4	194024	194823	Pixel Group 78 Transmission Profile Standard Deviation	
48707	48906	200	I4	194824	195623	Pixel Group 78 Profile Bit Flags	
48907	49106	200	R4	195624	196423	Pixel Group 79 Transmission Profile (Water Vapor)	
49107	49306	200	R4	196424	197223	Pixel Group 79 Transmission Profile Standard Deviation	
49307	49506	200	I4	197224	198023	Pixel Group 79 Profile Bit Flags	
49507	49706	200	R4	198024	198823	Pixel Group 80 Transmission Profile (Water Vapor)	
49707	49906	200	R4	198824	199623	Pixel Group 80 Transmission Profile Standard Deviation	
49907	50106	200	I4	199624	200423	Pixel Group 80 Profile Bit Flags	
50107	50306	200	R4	200424	201223	Pixel Group 81 Transmission Profile (Aerosol-Ch8)	
50307	50506	200	R4	201224	202023	Pixel Group 81 Transmission Profile Standard Deviation	
50507	50706	200	I4	202024	202823	Pixel Group 81 Profile Bit Flags	
50707	50906	200	R4	202824	203623	Pixel Group 82 Transmission Profile (Aerosol-Ch8)	
50907	51106	200	R4	203624	204423	Pixel Group 82 Transmission Profile Standard Deviation	
51107	51306	200	I4	204424	205223	Pixel Group 82 Profile Bit Flags	
51307	51506	200	R4	205224	206023	Pixel Group 83 Transmission Profile (Aerosol-Ch8)	
51507	51706	200	R4	206024	206823	Pixel Group 83 Transmission Profile Standard Deviation	
51707	51906	200	I4	206824	207623	Pixel Group 83 Profile Bit Flags	
51907	52106	200	R4	207624	208423	Pixel Group 84 Transmission Profile (Aerosol-Ch8)	
52107	52306	200	R4	208424	209223	Pixel Group 84 Transmission Profile Standard Deviation	
52307	52506	200	I4	209224	210023	Pixel Group 84 Profile Bit Flags	



Table B1.2. Concluded (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
52507	52706	200	R4	210024	210823	Pixel Group 85 Transmission Profile (Aerosol-Ch8)	
52707	52906	200	R4	210824	211623	Pixel Group 85 Transmission Profile Standard Deviation	
52907	53106	200	I4	211624	212423	Pixel Group 85 Profile Bit Flags	
53107	53306	200	R4	212424	213223	Pixel Group 86 Transmission Profile (Aerosol-Ch8)	
53307	53506	200	R4	213224	214023	Pixel Group 86 Transmission Profile Standard Deviation	
53507	53706	200	I4	214024	214823	Pixel Group 86 Profile Bit Flags	



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Table B1.3. Binary File Format Sheet SAGE III Level 1B Solar Transmission Product (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
00001	00001	1	I4	0	3	Event Identification Tag (orbit-event code composite number)	File Header
00002	00002	1	I4	4	7	Year-Day Tag (yyyyddd)	
00003	00003	1	R4	8	11	Instrument Elapsed Time in On Station (dddd.frac)	
00004	00004	1	I4	12	15	"Data Fill/Invalid" Value for this Record (Integer Field)	
00005	00005	1	R4	16	19	"Data Fill/Invalid" Value for this Record (Floating Point Field)	
00006	00006	1	I4	20	23	Mission Identification (1 = Meteor-3M)	
00007	00007	1	R4	24	27	Version: Definitive Orbit Processing	Version Tracking
00008	00008	1	R4	28	31	Version: Level 0 Processing	
00009	00009	1	R4	32	35	Version: Software Processing	
00010	00010	1	R4	36	39	Version: Data Product	
00011	00011	1	R4	40	43	Version: Spectroscopy	
00012	00012	1	R4	44	47	Version: GRAM 95	
00013	00013	1	R4	48	51	Version: Meteorological	
00014	00014	1	R4	52	55	Transmission Profile Grid Spacing	File Description
00015	00015	1	I4	56	59	Transmission Profile Count	
00016	00016	1	I4	60	63	Number of Ground Track Values	
00017	00017	1	I4	64	67	Meteorological Profile Array Size	
00018	00018	1	I4	68	71	CCD Pixel Group Count	
00019	00019	1	I4	72	75	Altitude-Based Array Size	
00020	00020	1	I4	76	79	Spacecraft-Referenced Event Type (1 = sunrise; 2 = sunset)	Event Type
00021	00021	1	I4	80	83	Earth-Referenced Event Type (1 = sunrise; 2 = sunset)	
00022	00022	1	R4	84	87	Event Beta Angle (0.0 ± 61.0)	
00023	00023	1	I4	88	91	Event Status Bit Flags	
00024	00024	1	I4	92	95	Data Capture Start Date (yyyymmdd)	Data Capture Start Information
00025	00025	1	I4	96	99	Data Capture Start Time (hhmmss)	
00026	00026	1	R4	100	103	Subtangent Latitude (0.0 ± 90.0)	
00027	00027	1	R4	104	107	Subtangent Longitude (0.0 ± 180.0)	
00028	00028	1	R4	108	111	Subtangent Altitude	



Table B1.3. Continued (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
00029	00029	1	I4	112	115	Data Capture End Date (yyyymmdd)	Data Capture End Information
00030	00030	1	I4	116	119	Data Capture End Time (hhmmss)	
00031	00031	1	R4	120	123	Subtangent Latitude (0.0 ± 90.0)	
00032	00032	1	R4	124	127	Subtangent Longitude (0.0 ± 180.0)	
00033	00033	1	R4	128	131	Subtangent Altitude	
00034	00044	11	I4	132	175	Date (yyyymmdd)	Ground Track Data*
00045	00055	11	I4	176	219	Time (hhmmss)	
00056	00066	11	R4	220	263	Subtangent Latitude (0.0 ± 90.0)	
00067	00077	11	R4	264	307	Subtangent Longitude (0.0 ± 180.0)	
00078	00088	11	R4	308	351	Ray Path Direction at Subtangent Point (0.0 – 359.99...)	
00089	00089	1	R4	352	355	Tropopause Temperature	Pressure Surface-based Met Data
00090	00090	1	R4	356	359	Tropopause Geometric Altitude	
00091	00108	18	R4	360	431	Pressure	
00109	00126	18	R4	432	503	Temperature	
00127	00144	18	R4	504	575	Temperature Uncertainty	
00145	00162	18	R4	576	647	Geometric Altitude	
00163	00163	1	I4	648	651	Data Source Indicator (1 = DAO**; 2 = NCEP; 3 = None)	
00164	00249	86	I4	652	995	Starting CCD Pixel Number of Pixel Group n	CCD Pixel Information
00250	00335	86	I4	996	1339	Ending CCD Pixel Number of Pixel Group n	
00336	00421	86	R4	1340	1683	Central Wavelength of Pixel Group n	
00422	00507	86	R4	1684	2027	Half-Bandwidth of Pixel Group n	
00508	00707	200	R4	2028	2827	Geometric Altitude	Altitude-based Profiles
00708	00907	200	R4	2828	3627	Pressure	
00908	01107	200	R4	3628	4427	Temperature	
01108	01307	200	R4	4428	5227	Temperature Uncertainty	
01308	01507	200	I4	5228	6027	Pressure/Temperature Array Source Flags	

*Ground Track Data reported in 10km increments for 0 –100km.

**Data Assimilation Office (DAO): source of research-quality assimilated global data sets (including temperature and geo-potential height).



Table B1.3. Continued (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
01508	01707	200	R4	6028	6827	Pixel Group 0 Transmission Profile (PIN Diode) (Aerosol-Ch 9) Transmission Profiles	
01708	01907	200	R4	6828	7627	Pixel Group 0 Transmission Profile Standard Deviation	
01908	02107	200	I4	7628	8427	Pixel Group 0 Profile Bit Flags (PIN Diode)	
02108	02307	200	R4	8428	9227	Pixel Group 1 Transmission Profile (Mesospheric Ozone)	
02308	02507	200	R4	9228	10027	Pixel Group 1 Transmission Profile Standard Deviation	
02508	02707	200	I4	10028	10827	Pixel Group 1 Profile Bit Flags	
02708	02907	200	R4	10828	11627	Pixel Group 2 Transmission Profile (Mesospheric Ozone)	
02908	03107	200	R4	11628	12427	Pixel Group 2 Transmission Profile Standard Deviation	
03108	03307	200	I4	12428	13227	Pixel Group 2 Profile Bit Flags	
03308	03507	200	R4	13228	14027	Pixel Group 3 Transmission Profile (Mesospheric Ozone)	
03508	03707	200	R4	14028	14827	Pixel Group 3 Transmission Profile Standard Deviation	
03708	03907	200	I4	14828	15627	Pixel Group 3 Profile Bit Flags	
03908	04107	200	R4	15628	16427	Pixel Group 4 Transmission Profile (Aerosol-Ch 1 & Rayleigh)	
04108	04307	200	R4	16428	17227	Pixel Group 4 Transmission Profile Standard Deviation	
04308	04507	200	I4	17228	18027	Pixel Group 4 Profile Bit Flags	
04508	04707	200	R4	18028	18827	Pixel Group 5 Transmission Profile (NO2 Gas)	
04708	04907	200	R4	18828	19627	Pixel Group 5 Transmission Profile Standard Deviation	
04908	05107	200	I4	19628	20427	Pixel Group 5 Profile Bit Flags	
05108	05307	200	R4	20428	21227	Pixel Group 6 Transmission Profile (NO2 Gas)	
05308	05507	200	R4	21228	22027	Pixel Group 6 Transmission Profile Standard Deviation	
05508	05707	200	I4	22028	22827	Pixel Group 6 Profile Bit Flags	
05708	05907	200	R4	22828	23627	Pixel Group 7 Transmission Profile (NO2 Gas)	
05908	06107	200	R4	23628	24427	Pixel Group 7 Transmission Profile Standard Deviation	
06108	06307	200	I4	24428	25227	Pixel Group 7 Profile Bit Flags	
06308	06507	200	R4	25228	26027	Pixel Group 8 Transmission Profile (NO2 Gas)	
06508	06707	200	R4	26028	26827	Pixel Group 8 Transmission Profile Standard Deviation	
06708	06907	200	I4	26828	27627	Pixel Group 8 Profile Bit Flags	
06908	07107	200	R4	27628	28427	Pixel Group 9 Transmission Profile (NO2 Gas)	
07108	07307	200	R4	28428	29227	Pixel Group 9 Transmission Profile Standard Deviation	
07308	07507	200	I4	29228	30027	Pixel Group 9 Profile Bit Flags	

Table B1.3. Continued (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
07508	07707	200	R4	30028	30827	Pixel Group 10 Transmission Profile (NO ₂ Gas)	
07708	07907	200	R4	30828	31627	Pixel Group 10 Transmission Profile Standard Deviation	
07908	08107	200	I4	31628	32427	Pixel Group 10 Profile Bit Flags	
08108	08307	200	R4	32428	33227	Pixel Group 11 Transmission Profile (NO ₂ Gas)	
08308	08507	200	R4	33228	34027	Pixel Group 11 Transmission Profile Standard Deviation	
08508	08707	200	I4	34028	34827	Pixel Group 11 Profile Bit Flags	
08708	08907	200	R4	34828	35627	Pixel Group 12 Transmission Profile (NO ₂ Gas)	
08908	09107	200	R4	35628	36427	Pixel Group 12 Transmission Profile Standard Deviation	
09108	09307	200	I4	36428	37227	Pixel Group 12 Profile Bit Flags	
09308	09507	200	R4	37228	38027	Pixel Group 13 Transmission Profile (NO ₂ Gas)	
09508	09707	200	R4	38028	38827	Pixel Group 13 Transmission Profile Standard Deviation	
09708	09907	200	I4	38828	39627	Pixel Group 13 Profile Bit Flags	
09908	10107	200	R4	39628	40427	Pixel Group 14 Transmission Profile (NO ₂ Gas)	
10108	10307	200	R4	40428	41227	Pixel Group 14 Transmission Profile Standard Deviation	
10308	10507	200	I4	41228	42027	Pixel Group 14 Profile Bit Flags	
10508	10707	200	R4	42028	42827	Pixel Group 15 Transmission Profile (NO ₂ Gas)	
10708	10907	200	R4	42828	43627	Pixel Group 15 Transmission Profile Standard Deviation	
10908	11107	200	I4	43628	44427	Pixel Group 15 Profile Bit Flags	
11108	11307	200	R4	44428	45227	Pixel Group 16 Transmission Profile (NO ₂ Gas)	
11308	11507	200	R4	45228	46027	Pixel Group 16 Transmission Profile Standard Deviation	
11508	11707	200	I4	46028	46827	Pixel Group 16 Profile Bit Flags	
11708	11907	200	R4	46828	47627	Pixel Group 17 Transmission Profile (NO ₂ Gas)	
11908	12107	200	R4	47628	48427	Pixel Group 17 Transmission Profile Standard Deviation	
12108	12307	200	I4	48428	49227	Pixel Group 17 Profile Bit Flags	
12308	12507	200	R4	49228	50027	Pixel Group 18 Transmission Profile (NO ₂ Gas)	
12508	12707	200	R4	50028	50827	Pixel Group 18 Transmission Profile Standard Deviation	
12708	12907	200	I4	50828	51627	Pixel Group 18 Profile Bit Flags	
12908	13107	200	R4	51628	52427	Pixel Group 19 Transmission Profile (NO ₂ Gas)	
13108	13307	200	R4	52428	53227	Pixel Group 19 Transmission Profile Standard Deviation	
13308	13507	200	I4	53228	54027	Pixel Group 19 Profile Bit Flags	

Table B1.3. Continued (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
13508	13707	200	R4	54028	54827	Pixel Group 20 Transmission Profile (Aerosol-Ch2 & NO2 Gas)	
13708	13907	200	R4	54828	55627	Pixel Group 20 Transmission Profile Standard Deviation	
13908	14107	200	I4	55628	56427	Pixel Group 20 Profile Bit Flags	
14108	14307	200	R4	56428	57227	Pixel Group 21 Transmission Profile (Aerosol-Ch2 & NO2 Gas)	
14308	14507	200	R4	57228	58027	Pixel Group 21 Transmission Profile Standard Deviation	
14508	14707	200	I4	58028	58827	Pixel Group 21 Profile Bit Flags	
14708	14907	200	R4	58828	59627	Pixel Group 22 Transmission Profile (Aerosol-Ch2 & NO2 Gas)	
14908	15107	200	R4	59628	60427	Pixel Group 22 Transmission Profile Standard Deviation	
15108	15307	200	I4	60428	61227	Pixel Group 22 Profile Bit Flags	
15308	15507	200	R4	61228	62027	Pixel Group 23 Transmission Profile (Aerosol-Ch2 & NO2 Gas)	
15508	15707	200	R4	62028	62827	Pixel Group 23 Transmission Profile Standard Deviation	
15708	15907	200	I4	62828	63627	Pixel Group 23 Profile Bit Flags	
15908	16107	200	R4	63628	64427	Pixel Group 24 Transmission Profile (Aerosol-Ch3)	
16108	16307	200	R4	64428	65227	Pixel Group 24 Transmission Profile Standard Deviation	
16308	16507	200	I4	65228	66027	Pixel Group 24 Profile Bit Flags	
16508	16707	200	R4	66028	66827	Pixel Group 25 Transmission Profile (O3 Gas)	
16708	16907	200	R4	66828	67627	Pixel Group 25 Transmission Profile Standard Deviation	
16908	17107	200	I4	67628	68427	Pixel Group 25 Profile Bit Flags	
17108	17307	200	R4	68428	69227	Pixel Group 26 Transmission Profile (O3 Gas)	
17308	17507	200	R4	69228	70027	Pixel Group 26 Transmission Profile Standard Deviation	
17508	17707	200	I4	70028	70827	Pixel Group 26 Profile Bit Flags	
17708	17907	200	R4	70828	71627	Pixel Group 27 Transmission Profile (O3 Gas)	
17908	18107	200	R4	71628	72427	Pixel Group 27 Transmission Profile Standard Deviation	
18108	18307	200	I4	72428	73227	Pixel Group 27 Profile Bit Flags	
18308	18507	200	R4	73228	74027	Pixel Group 28 Transmission Profile (O3 Gas)	
18508	18707	200	R4	74028	74827	Pixel Group 28 Transmission Profile Standard Deviation	
18708	18907	200	I4	74828	75627	Pixel Group 28 Profile Bit Flags	



Table B1.3. Continued (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
18908	19107	200	R4	75628	76427	Pixel Group 29 Transmission Profile (O3 Gas)	
19108	19307	200	R4	76428	77227	Pixel Group 29 Transmission Profile Standard Deviation	
19308	19507	200	I4	77228	78027	Pixel Group 29 Profile Bit Flags	
19508	19707	200	R4	78028	78827	Pixel Group 30 Transmission Profile (O3 Gas)	
19708	19907	200	R4	78828	79627	Pixel Group 30 Transmission Profile Standard Deviation	
19908	20107	200	I4	79628	80427	Pixel Group 30 Profile Bit Flags	
20108	20307	200	R4	80428	81227	Pixel Group 31 Transmission Profile (Aerosol-Ch4 & O3 Gas)	
20308	20507	200	R4	81228	82027	Pixel Group 31 Transmission Profile Standard Deviation	
20508	20707	200	I4	82028	82827	Pixel Group 31 Profile Bit Flags	
20708	20907	200	R4	82828	83627	Pixel Group 32 Transmission Profile (O3 Gas)	
20908	21107	200	R4	83628	84427	Pixel Group 32 Transmission Profile Standard Deviation	
21108	21307	200	I4	84428	85227	Pixel Group 32 Profile Bit Flags	
21308	21507	200	R4	85228	86027	Pixel Group 33 Transmission Profile (O3 Gas)	
21508	21707	200	R4	86028	86827	Pixel Group 33 Transmission Profile Standard Deviation	
21708	21907	200	I4	86828	87627	Pixel Group 33 Profile Bit Flags	
21908	22107	200	R4	87628	88427	Pixel Group 34 Transmission Profile (O3 Gas)	
22108	22307	200	R4	88428	89227	Pixel Group 34 Transmission Profile Standard Deviation	
22308	22507	200	I4	89228	90027	Pixel Group 34 Profile Bit Flags	
22508	22707	200	R4	90028	90827	Pixel Group 35 Transmission Profile (Aerosol-Ch5)	
22708	22907	200	R4	90828	91627	Pixel Group 35 Transmission Profile Standard Deviation	
22908	23107	200	I4	91628	92427	Pixel Group 35 Profile Bit Flags	
23108	23307	200	R4	92428	93227	Pixel Group 36 Transmission Profile (Aerosol-Ch6)	
23308	23507	200	R4	93228	94027	Pixel Group 36 Transmission Profile Standard Deviation	
23508	23707	200	I4	94028	94827	Pixel Group 36 Profile Bit Flags	
23708	23907	200	R4	94828	95627	Pixel Group 37 Transmission Profile (O2 A-Band)	
23908	24107	200	R4	95628	96427	Pixel Group 37 Transmission Profile Standard Deviation	
24108	24307	200	I4	96428	97227	Pixel Group 37 Profile Bit Flags	
24308	24507	200	R4	97228	98027	Pixel Group 38 Transmission Profile (O2 A-Band)	
24508	24707	200	R4	98028	98827	Pixel Group 38 Transmission Profile Standard Deviation	
24708	24907	200	I4	98828	99627	Pixel Group 38 Profile Bit Flags	



Table B1.3. Continued (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
24908	25107	200	R4	99628	100427	Pixel Group 39 Transmission Profile (O2 A-Band)	
25108	25307	200	R4	100428	101227	Pixel Group 39 Transmission Profile Standard Deviation	
25308	25507	200	I4	101228	102027	Pixel Group 39 Profile Bit Flags	
25508	25707	200	R4	102028	102827	Pixel Group 40 Transmission Profile (O2 A-Band)	
25708	25907	200	R4	102828	103627	Pixel Group 40 Transmission Profile Standard Deviation	
25908	26107	200	I4	103628	104427	Pixel Group 40 Profile Bit Flags	
26108	26307	200	R4	104428	105227	Pixel Group 41 Transmission Profile (O2 A-Band)	
26308	26507	200	R4	105228	106027	Pixel Group 41 Transmission Profile Standard Deviation	
26508	26707	200	I4	106028	106827	Pixel Group 41 Profile Bit Flags	
26708	26907	200	R4	106828	107627	Pixel Group 42 Transmission Profile (O2 A-Band)	
26908	27107	200	R4	107628	108427	Pixel Group 42 Transmission Profile Standard Deviation	
27108	27307	200	I4	108428	109227	Pixel Group 42 Profile Bit Flags	
27308	27507	200	R4	109228	110027	Pixel Group 43 Transmission Profile (O2 A-Band)	
27508	27707	200	R4	110028	110827	Pixel Group 43 Transmission Profile Standard Deviation	
27708	27907	200	I4	110828	111627	Pixel Group 43 Profile Bit Flags	
27908	28107	200	R4	111628	112427	Pixel Group 44 Transmission Profile (O2 A-Band)	
28108	28307	200	R4	112428	113227	Pixel Group 44 Transmission Profile Standard Deviation	
28308	28507	200	I4	113228	114027	Pixel Group 44 Profile Bit Flags	
28508	28707	200	R4	114028	114827	Pixel Group 45 Transmission Profile (O2 A-Band)	
28708	28907	200	R4	114828	115627	Pixel Group 45 Transmission Profile Standard Deviation	
28908	29107	200	I4	115628	116427	Pixel Group 45 Profile Bit Flags	
29108	29307	200	R4	116428	117227	Pixel Group 46 Transmission Profile (O2 A-Band)	
29308	29507	200	R4	117228	118027	Pixel Group 46 Transmission Profile Standard Deviation	
29508	29707	200	I4	118028	118827	Pixel Group 46 Profile Bit Flags	
29708	29907	200	R4	118828	119627	Pixel Group 47 Transmission Profile (O2 A-Band)	
29908	30107	200	R4	119628	120427	Pixel Group 47 Transmission Profile Standard Deviation	
30108	30307	200	I4	120428	121227	Pixel Group 47 Profile Bit Flags	



Table B1.3. Continued (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
30308	30507	200	R4	121228	122027	Pixel Group 48 Transmission Profile (O2 A-Band)	
30508	30707	200	R4	122028	122827	Pixel Group 48 Transmission Profile Standard Deviation	
30708	30907	200	I4	122828	123627	Pixel Group 48 Profile Bit Flags	
30908	31107	200	R4	123628	124427	Pixel Group 49 Transmission Profile (O2 A-Band)	
31108	31307	200	R4	124428	125227	Pixel Group 49 Transmission Profile Standard Deviation	
31308	31507	200	I4	125228	126027	Pixel Group 49 Profile Bit Flags	
31508	31707	200	R4	126028	126827	Pixel Group 50 Transmission Profile (O2 A-Band)	
31708	31907	200	R4	126828	127627	Pixel Group 50 Transmission Profile Standard Deviation	
31908	32107	200	I4	127628	128427	Pixel Group 50 Profile Bit Flags	
32108	32307	200	R4	128428	129227	Pixel Group 51 Transmission Profile (Aerosol-Ch7)	
32308	32507	200	R4	129228	130027	Pixel Group 51 Transmission Profile Standard Deviation	
32508	32707	200	I4	130028	130827	Pixel Group 51 Profile Bit Flags	
32708	32907	200	R4	130828	131627	Pixel Group 52 Transmission Profile (Water Vapor)	
32908	33107	200	R4	131628	132427	Pixel Group 52 Transmission Profile Standard Deviation	
33108	33306	200	I4	132428	133227	Pixel Group 52 Profile Bit Flags	
33308	33507	200	R4	133228	134027	Pixel Group 53 Transmission Profile (Water Vapor)	
33508	33707	200	R4	134028	134827	Pixel Group 53 Transmission Profile Standard Deviation	
33708	33907	200	I4	134828	135627	Pixel Group 53 Profile Bit Flags	
33908	34107	200	R4	135628	136427	Pixel Group 54 Transmission Profile (Water Vapor)	
34108	34307	200	R4	136428	137227	Pixel Group 54 Transmission Profile Standard Deviation	
34308	34507	200	I4	137228	138027	Pixel Group 54 Profile Bit Flags	
34508	34707	200	R4	138028	138827	Pixel Group 55 Transmission Profile (Water Vapor)	
34708	34907	200	R4	138828	139627	Pixel Group 55 Transmission Profile Standard Deviation	
34908	35107	200	I4	139628	140427	Pixel Group 55 Profile Bit Flags	
35108	35307	200	R4	140428	141227	Pixel Group 56 Transmission Profile (Water Vapor)	
35308	35507	200	R4	141228	142027	Pixel Group 56 Transmission Profile Standard Deviation	
35508	35707	200	I4	142028	142827	Pixel Group 56 Profile Bit Flags	



Table B1.3. Continued (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
35708	35907	200	R4	142828	143627	Pixel Group 57 Transmission Profile (Water Vapor)	
35908	36107	200	R4	143628	144427	Pixel Group 57 Transmission Profile Standard Deviation	
36108	36307	200	I4	144428	145227	Pixel Group 57 Profile Bit Flags	
36308	36507	200	R4	145228	146027	Pixel Group 58 Transmission Profile (Water Vapor)	
36508	36707	200	R4	146028	146827	Pixel Group 58 Transmission Profile Standard Deviation	
36708	36907	200	I4	146828	147627	Pixel Group 58 Profile Bit Flags	
36908	37107	200	R4	147628	148427	Pixel Group 59 Transmission Profile (Water Vapor)	
37108	37307	200	R4	148428	149227	Pixel Group 59 Transmission Profile Standard Deviation	
37308	37507	200	I4	149228	150027	Pixel Group 59 Profile Bit Flags	
37508	37707	200	R4	150028	150827	Pixel Group 60 Transmission Profile (Water Vapor)	
37708	37907	200	R4	150828	151627	Pixel Group 60 Transmission Profile Standard Deviation	
37908	38107	200	I4	151628	152427	Pixel Group 60 Profile Bit Flags	
38108	38307	200	R4	152428	153227	Pixel Group 61 Transmission Profile (Water Vapor)	
38308	38507	200	R4	153228	154027	Pixel Group 61 Transmission Profile Standard Deviation	
38508	38707	200	I4	154028	154827	Pixel Group 61 Profile Bit Flags	
38708	38907	200	R4	154828	155627	Pixel Group 62 Transmission Profile (Water Vapor)	
38908	39107	200	R4	155628	156427	Pixel Group 62 Transmission Profile Standard Deviation	
39108	39307	200	I4	156428	157227	Pixel Group 62 Profile Bit Flags	
39308	39507	200	R4	157228	158027	Pixel Group 63 Transmission Profile (Water Vapor)	
39508	39707	200	R4	158028	158827	Pixel Group 63 Transmission Profile Standard Deviation	
39708	39907	200	I4	158828	159627	Pixel Group 63 Profile Bit Flags	
39908	40107	200	R4	159628	160427	Pixel Group 64 Transmission Profile (Water Vapor)	
40108	40307	200	R4	160428	161227	Pixel Group 64 Transmission Profile Standard Deviation	
40308	40507	200	I4	161228	162027	Pixel Group 64 Profile Bit Flags	
40508	40707	200	R4	162028	162827	Pixel Group 65 Transmission Profile (Water Vapor)	
40708	40907	200	R4	162828	163627	Pixel Group 65 Transmission Profile Standard Deviation	
40908	41107	200	I4	163628	164427	Pixel Group 65 Profile Bit Flags	



Table B1.3. Continued (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
41108	41307	200	R4	164428	165227	Pixel Group 66 Transmission Profile (Water Vapor)	
41308	41507	200	R4	165228	166027	Pixel Group 66 Transmission Profile Standard Deviation	
41508	41707	200	I4	166028	166827	Pixel Group 66 Profile Bit Flags	
41708	41907	200	R4	166828	167627	Pixel Group 67 Transmission Profile (Water Vapor)	
41908	42107	200	R4	167628	168427	Pixel Group 67 Transmission Profile Standard Deviation	
42108	42307	200	I4	168428	169227	Pixel Group 67 Profile Bit Flags	
42308	42507	200	R4	169228	170027	Pixel Group 68 Transmission Profile (Water Vapor)	
42508	42707	200	R4	170028	170827	Pixel Group 68 Transmission Profile Standard Deviation	
42708	42907	200	I4	170828	171627	Pixel Group 68 Profile Bit Flags	
42908	43107	200	R4	171628	172427	Pixel Group 69 Transmission Profile (Water Vapor)	
43108	43307	200	R4	172428	173227	Pixel Group 69 Transmission Profile Standard Deviation	
43308	43507	200	I4	173228	174027	Pixel Group 69 Profile Bit Flags	
43508	43707	200	R4	174028	174827	Pixel Group 70 Transmission Profile (Water Vapor)	
43708	43907	200	R4	174828	175627	Pixel Group 70 Transmission Profile Standard Deviation	
43908	44107	200	I4	175628	176427	Pixel Group 70 Profile Bit Flags	
44108	44307	200	R4	176428	177227	Pixel Group 71 Transmission Profile (Water Vapor)	
44308	44507	200	R4	177228	178027	Pixel Group 71 Transmission Profile Standard Deviation	
44508	44707	200	I4	178028	178827	Pixel Group 71 Profile Bit Flags	
44708	44907	200	R4	178828	179627	Pixel Group 72 Transmission Profile (Water Vapor)	
44908	45107	200	R4	179628	180427	Pixel Group 72 Transmission Profile Standard Deviation	
45108	45307	200	I4	180428	181227	Pixel Group 72 Profile Bit Flags	
45308	45507	200	R4	181228	182027	Pixel Group 73 Transmission Profile (Water Vapor)	
45508	45707	200	R4	182028	182827	Pixel Group 73 Transmission Profile Standard Deviation	
45708	45907	200	I4	182828	183627	Pixel Group 73 Profile Bit Flags	
45908	46107	200	R4	183628	184427	Pixel Group 74 Transmission Profile (Water Vapor)	
46108	46307	200	R4	184428	185227	Pixel Group 74 Transmission Profile Standard Deviation	
46308	46507	200	I4	185228	186027	Pixel Group 74 Profile Bit Flags	
46508	46707	200	R4	186028	186827	Pixel Group 75 Transmission Profile (Water Vapor)	
46708	46907	200	R4	186828	187627	Pixel Group 75 Transmission Profile Standard Deviation	
46908	47107	200	I4	187628	188427	Pixel Group 75 Profile Bit Flags	

Table B1.3. Continued (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
47108	47307	200	R4	188428	189227	Pixel Group 76 Transmission Profile (Water Vapor)	
47308	47507	200	R4	189228	190027	Pixel Group 76 Transmission Profile Standard Deviation	
47508	47707	200	I4	190028	190827	Pixel Group 76 Profile Bit Flags	
47708	47907	200	R4	190828	191627	Pixel Group 77 Transmission Profile (Water Vapor)	
47908	48107	200	R4	191628	192427	Pixel Group 77 Transmission Profile Standard Deviation	
48108	48307	200	I4	192428	193227	Pixel Group 77 Profile Bit Flags	
48308	48507	200	R4	193228	194027	Pixel Group 78 Transmission Profile (Water Vapor)	
48508	48707	200	R4	194028	194827	Pixel Group 78 Transmission Profile Standard Deviation	
48708	48907	200	I4	194828	195627	Pixel Group 78 Profile Bit Flags	
48908	49107	200	R4	195628	196427	Pixel Group 79 Transmission Profile (Water Vapor)	
49108	49307	200	R4	196428	197227	Pixel Group 79 Transmission Profile Standard Deviation	
49308	49507	200	I4	197228	198027	Pixel Group 79 Profile Bit Flags	
49508	49707	200	R4	198028	198827	Pixel Group 80 Transmission Profile (Water Vapor)	
49708	49907	200	R4	198828	199627	Pixel Group 80 Transmission Profile Standard Deviation	
49908	50107	200	I4	199628	200427	Pixel Group 80 Profile Bit Flags	
50108	50307	200	R4	200428	201227	Pixel Group 81 Transmission Profile (Aerosol-Ch8)	
50308	50507	200	R4	201228	202027	Pixel Group 81 Transmission Profile Standard Deviation	
50508	50707	200	I4	202028	202827	Pixel Group 81 Profile Bit Flags	
50708	50907	200	R4	202828	203627	Pixel Group 82 Transmission Profile (Aerosol-Ch8)	
50908	51107	200	R4	203628	204427	Pixel Group 82 Transmission Profile Standard Deviation	
51108	51307	200	I4	204428	205227	Pixel Group 82 Profile Bit Flags	
51308	51507	200	R4	205228	206027	Pixel Group 83 Transmission Profile (Aerosol-Ch8)	
51508	51707	200	R4	206028	206827	Pixel Group 83 Transmission Profile Standard Deviation	
51708	51907	200	I4	206828	207627	Pixel Group 83 Profile Bit Flags	
51908	52107	200	R4	207628	208427	Pixel Group 84 Transmission Profile (Aerosol-Ch8)	
52108	52307	200	R4	208428	209227	Pixel Group 84 Transmission Profile Standard Deviation	
52308	52507	200	I4	209228	210027	Pixel Group 84 Profile Bit Flags	



Table B1.3. Concluded (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
52508	52707	200	R4	210028	210827	Pixel Group 85 Transmission Profile (Aerosol-Ch8)	
52708	52907	200	R4	210828	211627	Pixel Group 85 Transmission Profile Standard Deviation	
52908	53107	200	I4	211628	212427	Pixel Group 85 Profile Bit Flags	
53108	53307	200	R4	212428	213227	Pixel Group 86 Transmission Profile (Aerosol-Ch8)	
53308	53507	200	R4	213228	214027	Pixel Group 86 Transmission Profile Standard Deviation	
53508	53707	200	I4	214028	214827	Pixel Group 86 Profile Bit Flags	



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Appendix C

Appendix C. SAGE III Level 2 Solar Species Products

Version 1.4
03/04

SAGE III Data Products User's Guide

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Table C1.1. Binary File Format Sheet Sage III Level 2 Solar Species Product
(2/27/2002 – 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
0001	0001	1	I4	0	3	Event Identification Tag (orbit-event code composite number)	File Header
0002	0002	1	I4	4	7	Year–Day Tag (yyyyddd)	
0003	0003	1	R4	8	11	Instrument Elapsed Time in Orbit (dddd.frac)	
0004	0004	1	I4	12	15	“Data Fill/Invalid” Value for this Record (Integer Field)	
0005	0005	1	R4	16	19	“Data Fill/Invalid” Value for this Record (Floating Point Field)	
0006	0006	1	I4	20	23	Mission Identification (1 = Meteor–3M)	
0007	0007	1	R4	24	27	Version: Definitive Orbit Processing	Version Tracking
0008	0008	1	R4	28	31	Version: Level 0 Processing	
0009	0009	1	R4	32	35	Version: Director Processing	
0010	0010	1	R4	36	39	Version: Solar Processing	
0011	0011	1	R4	40	43	Version: Spectroscopy	
0012	0012	1	R4	44	47	Version: GRAM 95	
0013	0013	1	R4	48	51	Version: Meteorological	
0014	0014	1	R4	52	55	Altitude–Based Grid Spacing	File Description
0015	0015	1	I4	56	59	Number of Altitude–Based Array Values	
0016	0016	1	I4	60	63	Number of Aerosol Channels	
0017	0017	1	I4	64	67	Number of Ground Track Values	
0018	0018	1	I4	68	71	Number of Aerosol Extinction Altitude Levels	
0019	0019	1	I4	72	75	Spacecraft–Referenced Event Type (1 - sunrise; 2 = sunset)	Event Type
0020	0020	1	I4	76	79	Earth–Referenced Event Type (1 - sunrise; 2 = sunset)	
0021	0021	1	R4	80	83	Event Beta Angle (0.0 ± 61.0)	
0022	0022	1	I4	84	87	Data Capture Start Date (yyyymmdd)	Data Capture Start Information
0023	0023	1	I4	88	91	Data Capture Start Time (hhmmss)	
0024	0024	1	R4	92	95	Subtangent Latitude (0.0 ± 90.0)	
0025	0025	1	R4	96	99	Subtangent Longitude (0.0 ± 180.0)	
0026	0026	1	R4	100	103	Subtangent Altitude	

Table C1.1. Continued (2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
0027	0027	1	I4	104	107	Data Capture End Date (yyyymmdd) Data Capture End Information	
0028	0028	1	I4	108	111	Data Capture End Time (hhmmss)	
0029	0029	1	R4	112	115	Subtangent Latitude (0.0 ± 90.0)	deg
0030	0030	1	R4	116	119	Subtangent Longitude (0.0 ± 180.0)	deg
0031	0031	1	R4	120	123	Subtangent Altitude	km
0032	0042	11	I4	124	167	Date (yyyymmdd) Ground Track Information	
0043	0053	11	I4	168	211	Time (hhmmss)	
0054	0064	11	R4	212	255	Subtangent Latitude (0.0 ± 90.0)	deg
0065	0075	11	R4	256	299	Subtangent Longitude (0.0 ± 180.0)	deg
0076	0086	11	R4	300	343	Ray Path Direction at Subtangent Point (0.0 to 359.9999...)	deg
0087	0286	200	I4	344	1143	Homogeneity Flags Profile Altitude Levels	
0287	0486	200	R4	1144	1943	Geometric Altitude	km
0487	0686	200	R4	1944	2743	Geopotential Altitude	km
0687	0886	200	R4	2744	3543	Temperature Input T/P for Retrievals	K
0887	1086	200	R4	3544	4343	Temperature Uncertainty	K
1087	1286	200	R4	4344	5143	Pressure	hPa
1287	1486	200	R4	5144	5943	Pressure Uncertainty	hPa
1487	1686	200	I4	5944	6743	Pressure/Temperature Array Source Flags (0=Retrieved, 1=GRAM95, 2=NCEP, 3=DAO*, 4=Source Transition Value)	
1687	1687	1	R4	6744	6747	Tropopause Temperature Derived Tropopause	K
1688	1688	1	R4	6748	6751	Tropopause Geometric Altitude	km
1689	1888	200	R4	6752	7551	Ozone Concentration Composite Ozone	cm ⁻³
1889	2088	200	R4	7552	8351	Ozone Concentration Uncertainty	cm ⁻³
2089	2288	200	R4	8352	9151	Ozone Slant Path Column Density	cm ⁻²
2289	2488	200	R4	9152	9951	Ozone Slant Path Column Density Uncertainty	cm ⁻²
2489	2688	200	I4	9952	10751	Composite Ozone QA Bit Flags	

*Data Assimilation Office (DAO): source of research-quality assimilated global data sets (including temperature and geo-potential height).



Table C1.1. Continued (2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
2689	2888	200	R4	10752	11551	Ozone Concentration	Mesospheric Ozone
2889	3088	200	R4	11552	12351	Ozone Concentration Uncertainty	cm^{-3}
3089	3288	200	R4	12352	13151	Ozone Slant Path Column Density	cm^{-2}
3289	3488	200	R4	13152	13951	Ozone Slant Path Column Density Uncertainty	cm^{-2}
3489	3688	200	I4	13952	14751	Mesospheric Ozone QA Bit Flags	cm^{-3}
3689	3888	200	R4	14752	15551	Ozone Concentration	MLR Ozone
3889	4088	200	R4	15552	16351	Ozone Concentration Uncertainty	cm^{-3}
4089	4288	200	R4	16352	17151	Ozone Slant Path Column Density	cm^{-2}
4289	4488	200	R4	17152	17951	Ozone Slant Path Column Density Uncertainty	cm^{-2}
4489	4688	200	I4	17952	18751	MLR Ozone QA Bit Flags	cm^{-3}
4689	4888	200	R4	18752	19551	Ozone Concentration	Ozone-Least Squares
4889	5088	200	R4	19552	20351	Ozone Concentration Uncertainty	cm^{-3}
5089	5288	200	R4	20352	21151	Ozone Slant Path Column Density	cm^{-2}
5289	5488	200	R4	21152	21951	Ozone Slant Path Column Density Uncertainty	cm^{-2}
5489	5688	200	I4	21952	22751	Ozone Least Squares QA Bit Flags	cm^{-3}
5689	5888	200	R4	22752	23551	Water Vapor Concentration	Water Vapor
5889	6088	200	R4	23552	24351	Water Vapor Concentration Uncertainty	cm^{-3}
6089	6288	200	I4	24352	25151	Water Vapor QA Bit Flags	cm^{-3}
6289	6488	200	R4	25152	25951	Nitrogen Dioxide Concentration	NO₂
6489	6688	200	R4	25952	26751	Nitrogen Dioxide Concentration Uncertainty	cm^{-3}
6689	6888	200	R4	26752	27551	Nitrogen Dioxide Slant Path Column Density	cm^{-2}
6889	7088	200	R4	27552	28351	Nitrogen Dioxide Slant Path Column Density Uncertainty	cm^{-2}
7089	7288	200	I4	28352	29151	Nitrogen Dioxide QA Bit Flags	cm^{-3}
7289	7488	200	R4	29152	29951	Temperature	Retrieved T/P
7489	7688	200	R4	29952	30751	Temperature Uncertainty	K
7689	7888	200	R4	30752	31551	Pressure	K
7889	8088	200	R4	31552	32351	Pressure Uncertainty	hPa
8089	8288	200	I4	32352	33151	Pressure/Temperature QA Bit Flags	hPa
8289	8297	9	R4	33152	33187	Centerline Wavelengths of Aerosol Channels	Aerosol Information
8298	8306	9	R4	33188	33223	Half-Bandwidths of Aerosol Channels	nm
8307	8315	9	R4	33224	33259	Stratospheric Optical Depth	nm
8316	8324	9	R4	33260	33295	Stratospheric Optical Depth Uncertainty	
8325	8333	9	I4	33296	33331	Stratospheric Optical Depth QA Bit Flags	



Table C1.1. Concluded (2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
8334	8423	90	R4	33332	33691	Aerosol Extinction Channel 1	Aerosol Extinction 385 nm
8424	8513	90	R4	33692	34051	Aerosol Extinction Uncertainty Channel 1	km^{-1}
8514	8603	90	I4	64052	34411	Aerosol Extinction QA Bit Flags Channel 1	km^{-1}
8604	8693	90	R4	34412	34771	Aerosol Extinction Channel 2	Aerosol Extinction 449 nm
8694	8783	90	R4	34772	35131	Aerosol Extinction Uncertainty Channel 2	km^{-1}
8784	8873	90	I4	35132	35491	Aerosol Extinction QA Bit Flags Channel 2	km^{-1}
8874	8963	90	R4	35492	35851	Aerosol Extinction Channel 3	Aerosol Extinction 521 nm
8964	9053	90	R4	35852	36211	Aerosol Extinction Uncertainty Channel 3	km^{-1}
9054	9143	90	I4	36212	36571	Aerosol Extinction QA Bit Flags Channel 3	km^{-1}
9144	9233	90	R4	36572	36931	Aerosol Extinction Channel 4	Aerosol Extinction 602 nm
9234	9323	90	R4	36932	37291	Aerosol Extinction Uncertainty Channel 4	km^{-1}
9324	9413	90	I4	37292	37651	Aerosol Extinction QA Bit Flags Channel 4	km^{-1}
9414	9503	90	R4	37652	38011	Aerosol Extinction Channel 5	Aerosol Extinction 676 nm
9504	9593	90	R4	38012	38371	Aerosol Extinction Uncertainty Channel 5	km^{-1}
9594	9683	90	I4	38372	38731	Aerosol Extinction QA Bit Flags Channel 5	km^{-1}
9684	9773	90	R4	38732	39091	Aerosol Extinction Channel 6	Aerosol Extinction 756 nm
9774	9863	90	R4	39092	69451	Aerosol Extinction Uncertainty Channel 6	km^{-1}
9864	9953	90	I4	39452	69811	Aerosol Extinction QA Bit Flags Channel 6	km^{-1}
9954	10043	90	R4	39812	40171	Aerosol Extinction Channel 7	Aerosol Extinction 869 nm
10044	10133	90	R4	40172	39361	Aerosol Extinction Uncertainty Channel 7	km^{-1}
10134	10223	90	I4	40532	40891	Aerosol Extinction QA Bit Flags Channel 7	km^{-1}
10224	10313	90	R4	40892	41251	Aerosol Extinction Channel 8	Aerosol Extinction 1020 nm
10314	10403	90	R4	41252	41611	Aerosol Extinction Uncertainty Channel 8	km^{-1}
10404	10493	90	I4	41612	41971	Aerosol Extinction QA Bit Flags Channel 8	km^{-1}
10494	10583	90	R4	41972	42331	Aerosol Extinction Channel 9	Aerosol Extinction 1550 nm
10584	10673	90	R4	42332	42691	Aerosol Extinction Uncertainty Channel 9	km^{-1}
10674	10763	90	I4	42692	43051	Aerosol Extinction QA Bit Flags Channel 9	km^{-1}
10764	10853	90	I4	43052	43411	Aerosol Spectral Dependence Flag	Aerosol Extinction Ratio
10854	10943	90	R4	43412	43771	1020nm/Rayleigh Extinction Ratio	
10944	11033	90	R4	43772	44131	1020nm/Rayleigh Extinction Ratio Uncertainty	
11034	11123	90	I4	44132	44491	1020nm/Rayleigh Extinction Ratio QA Bit Flags	

Table C1.2. Binary File Format Sheet Sage III Level 2 Solar Species Product
(2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
0001	0001	1	I4	0	3	Event Identification Tag (orbit-event code composite number)	File Header
0002	0002	1	I4	4	7	Year-Day Tag (yyyyddd)	
0003	0003	1	R4	8	11	Instrument Elapsed Time in Orbit (dddd.frac)	
0004	0004	1	I4	12	15	"Data Fill/Invalid" Value for this Record (Integer Field)	
0005	0005	1	R4	16	19	"Data Fill/Invalid" Value for this Record (Floating Point Field)	
0006	0006	1	I4	20	23	Mission Identification (1 = Meteor-3M)	
0007	0007	1	R4	24	27	Version: Definitive Orbit Processing	Version Tracking
0008	0008	1	R4	28	31	Version: Level 0 Processing	
0009	0009	1	R4	32	35	Version: Software Processing	
0010	0010	1	R4	36	39	Version: Data Product	
0011	0011	1	R4	40	43	Version: Spectroscopy	
0012	0012	1	R4	44	47	Version: GRAM 95	
0013	0013	1	R4	48	51	Version: Meteorological	
0014	0014	1	R4	52	55	Altitude-Based Grid Spacing	File Description
0015	0015	1	I4	56	59	Number of Altitude-Based Array Values	
0016	0016	1	I4	60	63	Number of Aerosol Channels	
0017	0017	1	I4	64	67	Number of Ground Track Values	
0018	0018	1	I4	68	71	Number of Aerosol Extinction Altitude Levels	
0019	0019	1	I4	72	75	Spacecraft-Referenced Event Type (1 - sunrise; 2 = sunset)	Event Type
0020	0020	1	I4	76	79	Earth-Referenced Event Type (1 - sunrise; 2 = sunset)	
0021	0021	1	R4	80	83	Event Beta Angle (0.0 ± 61.0)	
0022	0022	1	I4	84	87	Data Capture Start Date (yyyymmdd)	Data Capture Start Information
0023	0023	1	I4	88	91	Data Capture Start Time (hhmmss)	
0024	0024	1	R4	92	95	Subtangent Latitude (0.0 ± 90.0)	
0025	0025	1	R4	96	99	Subtangent Longitude (0.0 ± 180.0)	
0026	0026	1	R4	100	103	Subtangent Altitude	



Table C1.2. Continued (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
0027	0027	1	I4	104	107	Data Capture End Date (yyyymmdd) Data Capture End Information	
0028	0028	1	I4	108	111	Data Capture End Time (hhmmss)	
0029	0029	1	R4	112	115	Subtangent Latitude (0.0 ± 90.0)	deg
0030	0030	1	R4	116	119	Subtangent Longitude (0.0 ± 180.0)	deg
0031	0031	1	R4	120	123	Subtangent Altitude	km
0032	0042	11	I4	124	167	Date (yyyymmdd) Ground Track Information*	
0043	0053	11	I4	168	211	Time (hhmmss)	
0054	0064	11	R4	212	255	Subtangent Latitude (0.0 ± 90.0)	deg
0065	0075	11	R4	256	299	Subtangent Longitude (0.0 ± 180.0)	deg
0076	0086	11	R4	300	343	Ray Path Direction at Subtangent Point (0.0 to 359.9999...)	deg
0087	0286	200	I4	344	1143	Homogeneity Flags Profile Altitude Levels	
0287	0486	200	R4	1144	1943	Geometric Altitude	km
0487	0686	200	R4	1944	2743	Geopotential Altitude	km
0687	0886	200	R4	2744	3543	Temperature Input T/P for Retrievals	K
0887	1086	200	R4	3544	4343	Temperature Uncertainty	K
1087	1286	200	R4	4344	5143	Pressure	hPa
1287	1486	200	R4	5144	5943	Pressure Uncertainty	hPa
1487	1686	200	I4	5944	6743	Pressure/Temperature Array Source Flags (0=Retrieved, 1=GRAM95, 2=NCEP, 3=DAO**, 4=Source Transition Value)	
1687	1687	1	R4	6744	6747	Tropopause Temperature Derived Tropopause	K
1688	1688	1	R4	6748	6751	Tropopause Geometric Altitude	km
1689	1888	200	R4	6752	7551	Ozone Concentration Composite Ozone	cm ⁻³
1889	2088	200	R4	7552	8351	Ozone Concentration Uncertainty	cm ⁻³
2089	2288	200	R4	8352	9151	Ozone Slant Path Column Density	cm ⁻²
2289	2488	200	R4	9152	9951	Ozone Slant Path Column Density Uncertainty	cm ⁻²
2489	2688	200	I4	9952	10751	Composite Ozone QA Bit Flags	

*Ground Track Data reported in 10km increments for 0 –100km.

**Data Assimilation Office (DAO): source of research-quality assimilated global data sets (including temperature and geo-potential height).



Table C1.2. Continued (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
2689	2888	200	R4	10752	11551	Ozone Concentration	Mesospheric Ozone
2889	3088	200	R4	11552	12351	Ozone Concentration Uncertainty	cm^{-3}
3089	3288	200	R4	12352	13151	Ozone Slant Path Column Density	cm^{-2}
3289	3488	200	R4	13152	13951	Ozone Slant Path Column Density Uncertainty	cm^{-2}
3489	3688	200	I4	13952	14751	Mesospheric Ozone QA Bit Flags	cm^{-3}
3689	3888	200	R4	14752	15551	Ozone Concentration	MLR Ozone
3889	4088	200	R4	15552	16351	Ozone Concentration Uncertainty	cm^{-3}
4089	4288	200	R4	16352	17151	Ozone Slant Path Column Density	cm^{-2}
4289	4488	200	R4	17152	17951	Ozone Slant Path Column Density Uncertainty	cm^{-2}
4489	4688	200	I4	17952	18751	MLR Ozone QA Bit Flags	cm^{-3}
4689	4888	200	R4	18752	19551	Ozone Concentration	Ozone-Least Squares
4889	5088	200	R4	19552	20351	Ozone Concentration Uncertainty	cm^{-3}
5089	5288	200	R4	20352	21151	Ozone Slant Path Column Density	cm^{-2}
5289	5488	200	R4	21152	21951	Ozone Slant Path Column Density Uncertainty	cm^{-2}
5489	5688	200	I4	21952	22751	Ozone Least Squares QA Bit Flags	cm^{-3}
5689	5888	200	R4	22752	23551	Water Vapor Concentration	Water Vapor
5889	6088	200	R4	23552	24351	Water Vapor Concentration Uncertainty	cm^{-3}
6089	6288	200	I4	24352	25151	Water Vapor QA Bit Flags	cm^{-3}
6289	6488	200	R4	25152	25951	Nitrogen Dioxide Concentration	NO₂
6489	6688	200	R4	25952	26751	Nitrogen Dioxide Concentration Uncertainty	cm^{-3}
6689	6888	200	R4	26752	27551	Nitrogen Dioxide Slant Path Column Density	cm^{-2}
6889	7088	200	R4	27552	28351	Nitrogen Dioxide Slant Path Column Density Uncertainty	cm^{-2}
7089	7288	200	I4	28352	29151	Nitrogen Dioxide QA Bit Flags	cm^{-3}
7289	7488	200	R4	29152	29951	Temperature	Retrieved T/P
7489	7688	200	R4	29952	30751	Temperature Uncertainty	K
7689	7888	200	R4	30752	31551	Pressure	K
7889	8088	200	R4	31552	32351	Pressure Uncertainty	hPa
8089	8288	200	I4	32352	33151	Pressure/Temperature QA Bit Flags	hPa
8289	8297	9	R4	33152	33187	Centerline Wavelengths of Aerosol Channels	Aerosol Information
8298	8306	9	R4	33188	33223	Half-Bandwidths of Aerosol Channels	nm
8307	8315	9	R4	33224	33259	Stratospheric Optical Depth	nm
8316	8324	9	R4	33260	33295	Stratospheric Optical Depth Uncertainty	
8325	8333	9	I4	33296	33331	Stratospheric Optical Depth QA Bit Flags	

Table C1.2. Concluded (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
8334	8423	90	R4	33332	33691	Aerosol Extinction Channel 1	Aerosol Extinction 385 nm
8424	8513	90	R4	33692	34051	Aerosol Extinction Uncertainty Channel 1	km^{-1}
8514	8603	90	I4	64052	34411	Aerosol Extinction QA Bit Flags Channel 1	km^{-1}
8604	8693	90	R4	34412	34771	Aerosol Extinction Channel 2	Aerosol Extinction 449 nm
8694	8783	90	R4	34772	35131	Aerosol Extinction Uncertainty Channel 2	km^{-1}
8784	8873	90	I4	35132	35491	Aerosol Extinction QA Bit Flags Channel 2	km^{-1}
8874	8963	90	R4	35492	35851	Aerosol Extinction Channel 3	Aerosol Extinction 521 nm
8964	9053	90	R4	35852	36211	Aerosol Extinction Uncertainty Channel 3	km^{-1}
9054	9143	90	I4	36212	36571	Aerosol Extinction QA Bit Flags Channel 3	km^{-1}
9144	9233	90	R4	36572	36931	Aerosol Extinction Channel 4	Aerosol Extinction 602 nm
9234	9323	90	R4	36932	37291	Aerosol Extinction Uncertainty Channel 4	km^{-1}
9324	9413	90	I4	37292	37651	Aerosol Extinction QA Bit Flags Channel 4	km^{-1}
9414	9503	90	R4	37652	38011	Aerosol Extinction Channel 5	Aerosol Extinction 676 nm
9504	9593	90	R4	38012	38371	Aerosol Extinction Uncertainty Channel 5	km^{-1}
9594	9683	90	I4	38372	38731	Aerosol Extinction QA Bit Flags Channel 5	km^{-1}
9684	9773	90	R4	38732	39091	Aerosol Extinction Channel 6	Aerosol Extinction 756 nm
9774	9863	90	R4	39092	69451	Aerosol Extinction Uncertainty Channel 6	km^{-1}
9864	9953	90	I4	39452	69811	Aerosol Extinction QA Bit Flags Channel 6	km^{-1}
9954	10043	90	R4	39812	40171	Aerosol Extinction Channel 7	Aerosol Extinction 869 nm
10044	10133	90	R4	40172	39361	Aerosol Extinction Uncertainty Channel 7	km^{-1}
10134	10223	90	I4	40532	40891	Aerosol Extinction QA Bit Flags Channel 7	km^{-1}
10224	10313	90	R4	40892	41251	Aerosol Extinction Channel 8	Aerosol Extinction 1020 nm
10314	10403	90	R4	41252	41611	Aerosol Extinction Uncertainty Channel 8	km^{-1}
10404	10493	90	I4	41612	41971	Aerosol Extinction QA Bit Flags Channel 8	km^{-1}
10494	10583	90	R4	41972	42331	Aerosol Extinction Channel 9	Aerosol Extinction 1550 nm
10584	10673	90	R4	42332	42691	Aerosol Extinction Uncertainty Channel 9	km^{-1}
10674	10763	90	I4	42692	43051	Aerosol Extinction QA Bit Flags Channel 9	km^{-1}
10764	10853	90	I4	43052	43411	Aerosol Spectral Dependence Flag	Aerosol Extinction Ratio
10854	10943	90	R4	43412	43771	1020nm/Rayleigh Extinction Ratio	
10944	11033	90	R4	43772	44131	1020nm/Rayleigh Extinction Ratio Uncertainty	
11034	11123	90	I4	44132	44491	1020nm/Rayleigh Extinction Ratio QA Bit Flags	

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**Table C1.3. Binary File Format Sheet Sage III Level 2 Solar Species Product
(Data Version 3)**

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
0001	0001	1	I4	0	3	Event Identification Tag (orbit-event code composite number)	File Header
0002	0002	1	I4	4	7	Year-Day Tag (yyyyddd)	
0003	0003	1	R4	8	11	Instrument Elapsed Time in Orbit (dddd.frac)	
0004	0004	1	I4	12	15	"Data Fill/Invalid" Value for this Record (Integer Field)	
0005	0005	1	R4	16	19	"Data Fill/Invalid" Value for this Record (Floating Point Field)	
0006	0006	1	I4	20	23	Mission Identification (1 = Meteor-3M)	
0007	0007	1	R4	24	27	Version: Definitive Orbit Processing	Version Tracking
0008	0008	1	R4	28	31	Version: Level 0 Processing	
0009	0009	1	R4	32	35	Version: Software Processing	
0010	0010	1	R4	36	39	Version: Data Product	
0011	0011	1	R4	40	43	Version: Spectroscopy	
0012	0012	1	R4	44	47	Version: GRAM 95	
0013	0013	1	R4	48	51	Version: Meteorological	
0014	0014	1	R4	52	55	Altitude-Based Grid Spacing	File Description
0015	0015	1	I4	56	59	Number of Altitude-Based Array Values	
0016	0016	1	I4	60	63	Number of Aerosol Channels	
0017	0017	1	I4	64	67	Number of Ground Track Values	
0018	0018	1	I4	68	71	Number of Aerosol Extinction Altitude Levels	
0019	0019	1	I4	72	75	Spacecraft-Referenced Event Type (1 - sunrise; 2 = sunset)	Event Type
0020	0020	1	I4	76	79	Earth-Referenced Event Type (1 - sunrise; 2 = sunset)	
0021	0021	1	R4	80	83	Event Beta Angle (0.0 ± 61.0)	
0022	0022	1	I4	84	87	Event Status Bit Flags	
0023	0023	1	I4	88	91	Data Capture Start Date (yyyymmdd)	Data Capture Start Information
0024	0024	1	I4	92	95	Data Capture Start Time (hhmmss)	
0025	0025	1	R4	96	99	Subtangent Latitude (0.0 ± 90.0)	
0026	0026	1	R4	100	103	Subtangent Longitude (0.0 ± 180.0)	
0027	0027	1	R4	104	107	Subtangent Altitude	



Table C1.3. Continued (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
0028	0028	1	I4	108	111	Data Capture End Date (yyyymmdd) Data Capture End Information	
0029	0029	1	I4	112	115	Data Capture End Time (hhmmss)	
0030	0030	1	R4	116	119	Subtangent Latitude (0.0 ± 90.0)	deg
0031	0031	1	R4	120	123	Subtangent Longitude (0.0 ± 180.0)	deg
0032	0032	1	R4	124	127	Subtangent Altitude	km
0033	0043	11	I4	128	171	Date (yyyymmdd) Ground Track Information*	
0044	0054	11	I4	172	215	Time (hhmmss)	
0055	0065	11	R4	216	259	Subtangent Latitude (0.0 ± 90.0)	deg
0066	0076	11	R4	260	303	Subtangent Longitude (0.0 ± 180.0)	deg
0077	0087	11	R4	304	347	Ray Path Direction at Subtangent Point (0.0 to 359.9999...)	deg
0088	0287	200	I4	348	1147	Homogeneity Flags Profile Altitude Levels	
0288	0487	200	R4	1148	1947	Geometric Altitude	km
0488	0687	200	R4	1948	2747	Geopotential Altitude	km
0688	0887	200	R4	2748	3547	Temperature Input T/P for Retrievals	K
0888	1087	200	R4	3548	4347	Temperature Uncertainty	K
1088	1287	200	R4	4348	5147	Pressure	hPa
1288	1487	200	R4	5148	5947	Pressure Uncertainty	hPa
1488	1687	200	I4	5948	6747	Pressure/Temperature Array Source Flags (0=Retrieved, 1=GRAM95, 2=NCEP, 3=DAO**, 4=Source Transition Value)	
1688	1688	1	R4	6748	6751	Tropopause Temperature Derived Tropopause	K
1689	1689	1	R4	6752	6755	Tropopause Geometric Altitude	km
1690	1889	200	R4	6756	7555	Ozone Concentration Composite Ozone	cm^{-3}
1890	2089	200	R4	7556	8355	Ozone Concentration Uncertainty	cm^{-3}
2090	2289	200	R4	8356	9155	Ozone Slant Path Column Density	cm^{-2}
2290	2489	200	R4	9156	9955	Ozone Slant Path Column Density Uncertainty	cm^{-2}
2490	2689	200	I4	9956	10755	Composite Ozone QA Bit Flags	

*Ground Track Data reported in 10km increments for 0 –100km.

**Data Assimilation Office (DAO): source of research-quality assimilated global data sets (including temperature and geo-potential height).



Table C1.3. Continued (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
2690	2889	200	R4	10756	11555	Ozone Concentration Ozone Concentration Uncertainty Ozone Slant Path Column Density Ozone Slant Path Column Density Uncertainty Mesospheric Ozone QA Bit Flags	Mesospheric Ozone
2890	3089	200	R4	11556	12355		
3090	3289	200	R4	12356	13155		
3290	3489	200	R4	13156	13955		
3490	3689	200	I4	13956	14755		
3690	3889	200	R4	14756	15555	Ozone Concentration Ozone Concentration Uncertainty Ozone Slant Path Column Density Ozone Slant Path Column Density Uncertainty MLR Ozone QA Bit Flags	MLR Ozone
3890	4089	200	R4	15556	16355		
4090	4289	200	R4	16356	17155		
4290	4489	200	R4	17156	17955		
4490	4689	200	I4	17956	18755		
4690	4889	200	R4	18756	19555	Ozone Concentration Ozone Concentration Uncertainty Ozone Slant Path Column Density Ozone Slant Path Column Density Uncertainty Ozone Least Squares QA Bit Flags	Ozone-Least Squares
4890	5089	200	R4	19556	20355		
5090	5289	200	R4	20356	21155		
5290	5489	200	R4	21156	21955		
5490	5689	200	I4	21956	22755		
5690	5889	200	R4	22756	23555	Water Vapor Concentration Water Vapor Concentration Uncertainty Water Vapor QA Bit Flags	Water Vapor
5890	6089	200	R4	23556	24355		
6090	6289	200	I4	24356	25155		
6290	6489	200	R4	25156	25955	Nitrogen Dioxide Concentration Nitrogen Dioxide Concentration Uncertainty Nitrogen Dioxide Slant Path Column Density Nitrogen Dioxide Slant Path Column Density Uncertainty Nitrogen Dioxide QA Bit Flags	NO₂
6490	6689	200	R4	25956	26755		
6690	6889	200	R4	26756	27555		
6890	7089	200	R4	27556	28355		
7090	7289	200	I4	28356	29155		
7290	7489	200	R4	29156	29955	Temperature Temperature Uncertainty Pressure Pressure Uncertainty Pressure/Temperature QA Bit Flags	Retrieved T/P
7490	7689	200	R4	29956	30755		
7690	7889	200	R4	30756	31555		
7890	8089	200	R4	31556	32355		
8090	8289	200	I4	32356	33155		
8290	8298	9	R4	33156	33191	Centerline Wavelengths of Aerosol Channels Half-Bandwidths of Aerosol Channels Stratospheric Optical Depth Stratospheric Optical Depth Uncertainty Stratospheric Optical Depth QA Bit Flags	Aerosol Information
8299	8307	9	R4	33192	33227		
8308	8316	9	R4	33228	33263		
8317	8325	9	R4	33264	33299		
8326	8334	9	I4	33300	33335		

Table C1.3. Concluded (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
8335	8424	90	R4	33336	33695	Aerosol Extinction Channel 1	Aerosol Extinction 385 nm
8425	8514	90	R4	33696	34055	Aerosol Extinction Uncertainty Channel 1	km^{-1}
8515	8604	90	I4	64056	34415	Aerosol Extinction QA Bit Flags Channel 1	km^{-1}
8605	8694	90	R4	34416	34775	Aerosol Extinction Channel 2	Aerosol Extinction 449 nm
8695	8784	90	R4	34776	35135	Aerosol Extinction Uncertainty Channel 2	km^{-1}
8785	8874	90	I4	35136	35495	Aerosol Extinction QA Bit Flags Channel 2	km^{-1}
8875	8964	90	R4	35496	35855	Aerosol Extinction Channel 3	Aerosol Extinction 521 nm
8965	9054	90	R4	35856	36215	Aerosol Extinction Uncertainty Channel 3	km^{-1}
9055	9144	90	I4	36216	36575	Aerosol Extinction QA Bit Flags Channel 3	km^{-1}
9145	9234	90	R4	36576	36935	Aerosol Extinction Channel 4	Aerosol Extinction 602 nm
9235	9324	90	R4	36936	37295	Aerosol Extinction Uncertainty Channel 4	km^{-1}
9325	9414	90	I4	37296	37655	Aerosol Extinction QA Bit Flags Channel 4	km^{-1}
9415	9504	90	R4	37656	38015	Aerosol Extinction Channel 5	Aerosol Extinction 676 nm
9505	9594	90	R4	38016	38375	Aerosol Extinction Uncertainty Channel 5	km^{-1}
9595	9684	90	I4	38376	38735	Aerosol Extinction QA Bit Flags Channel 5	km^{-1}
9685	9774	90	R4	38736	39095	Aerosol Extinction Channel 6	Aerosol Extinction 756 nm
9775	9864	90	R4	39096	69455	Aerosol Extinction Uncertainty Channel 6	km^{-1}
9865	9954	90	I4	39456	69815	Aerosol Extinction QA Bit Flags Channel 6	km^{-1}
9955	10044	90	R4	39816	40175	Aerosol Extinction Channel 7	Aerosol Extinction 869 nm
10045	10134	90	R4	40176	39365	Aerosol Extinction Uncertainty Channel 7	km^{-1}
10135	10224	90	I4	40536	40895	Aerosol Extinction QA Bit Flags Channel 7	km^{-1}
10225	10314	90	R4	40896	41255	Aerosol Extinction Channel 8	Aerosol Extinction 1020 nm
10315	10404	90	R4	41256	41615	Aerosol Extinction Uncertainty Channel 8	km^{-1}
10405	10494	90	I4	41616	41975	Aerosol Extinction QA Bit Flags Channel 8	km^{-1}
10495	10584	90	R4	41976	42335	Aerosol Extinction Channel 9	Aerosol Extinction 1550 nm
10585	10674	90	R4	42336	42695	Aerosol Extinction Uncertainty Channel 9	km^{-1}
10675	10764	90	I4	42696	43055	Aerosol Extinction QA Bit Flags Channel 9	km^{-1}
10765	10854	90	I4	43056	43415	Aerosol Spectral Dependence Flag	Aerosol Extinction Ratio
10855	10944	90	R4	43416	43775	1020nm/Rayleigh Extinction Ratio	
10945	11034	90	R4	43776	44135	1020nm/Rayleigh Extinction Ratio Uncertainty	
11035	11124	90	I4	44136	44495	1020nm/Rayleigh Extinction Ratio QA Bit Flags	

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Appendix D

Appendix D. SAGE III Level 2 Lunar Species Products

Version 1.4
03/04

SAGE III Data Products User's Guide



Table D1.1. Binary File Format Sheet SAGE III Level 2 Lunar Species Product
(2/27/2000-2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
0001	0001	1	I4	0	3	Event Identification Tag (orbit-event code composite number)	File Header
0002	0002	1	I4	4	7	Year-Day Tag (yyyyddd)	
0003	0003	1	R4	8	11	Instrument Elapsed Time in On Station (dddd.frac)	
0004	0004	1	I4	12	15	"Data Fill/Invalid" Value for this Record (Integer Field)	
0005	0005	1	R4	16	19	"Data Fill/Invalid" Value for this Record (Floating Point Field)	
0006	0006	1	I4	20	23	Mission Identification (1 = Meteor-3M)	
0007	0007	1	R4	24	27	Version: Definitive Orbit Processing	Version Tracking
0008	0008	1	R4	28	31	Version: Level 0 Processing	
0009	0009	1	R4	32	35	Version: Director Processing	
0010	0010	1	R4	36	39	Version: Solar Processing	
0011	0011	1	R4	40	43	Version: Spectroscopy	
0012	0012	1	R4	44	47	Version: GRAM 95	
0013	0013	1	R4	48	51	Version: Meteorological	
0014	0014	1	R4	52	55	Version: Lunar Model	
0015	0015	1	R4	56	59	Version: Lunar Albedo	
0016	0016	1	R4	60	63	Altitude-Based Grid Spacing	File Description
0017	0017	1	I4	64	67	Number of Altitude-Based Array Values	
0018	0018	1	I4	68	71	Meteorological Profile Array Size	
0019	0019	1	I4	72	75	Number of Ground Track Values	
0020	0020	1	I4	76	79	Spacecraft-Referenced Event Type (3 = moonrise; 4 = moonset)	Event Type
0021	0021	1	I4	80	83	Earth-Referenced Event Type (3 = moonrise; 4 = moonset)	
0022	0022	1	R4	84	87	Event Beta Angle (0.0 ± 61.0)	
0023	0023	1	R4	88	91	Lunar Phase (0.0 = new moon; 1.0 = full moon)	
0024	0024	1	R4	92	95	Solar Zenith Angle	
0025	0025	1	I4	96	99	Aurora Contamination Flag (0 = not checked; 1 = not detected; 2 = detected)	
0026	0026	1	I4	100	103	Data Capture Start Date (yyyymmdd)	Data Capture Start Information
0027	0027	1	I4	104	107	Data Capture Start Time (hhmmss)	
0028	0028	1	R4	108	111	Subtangent Latitude (0.0 ± 90.0)	
0029	0029	1	R4	112	115	Subtangent Longitude (0.0 ± 180.0)	
0030	0030	1	R4	116	119	Subtangent Altitude	



Table D1.1. Continued (2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
0031	0031	1	I4	120	123	Data Capture End Date (yyyymmdd)	
0032	0032	1	I4	124	127	Data Capture End Time (hhmmss)	
0033	0033	1	R4	128	131	Subtangent Latitude (0.0 ± 90.0)	deg
0034	0034	1	R4	132	135	Subtangent Longitude (0.0 ± 180.0)	deg
0035	0035	1	R4	136	139	Subtangent Altitude	km
0036	0046	11	I4	140	183	Date (yyyymmdd)	
0047	0057	11	I4	184	227	Time (hhmmss)	
0058	0068	11	R4	228	271	Subtangent Latitude (0.0 ± 90.0)	deg
0069	0079	11	R4	272	315	Subtangent Longitude (0.0 ± 180.0)	deg
0080	0090	11	R4	316	359	Ray Path Direction at Subtangent Point (0.0 to 359.9999...)	deg
0091	0091	1	R4	360	363	Tropopause Temperature	
0092	0092	1	R4	364	367	Tropopause Altitude	
0093	0110	18	R4	368	439	Pressure	
0111	0128	18	R4	440	511	Temperature	K
0129	0146	18	R4	512	583	Temperature Uncertainty	K
0147	0164	18	R4	584	655	Geometric Altitude	km
0165	0165	1	I4	656	659	Data Source Indicator (1 = DAO; 2 = NCEP; 3 = Not Available)	
0166	0365	200	R4	660	1459	Geometric Altitude	
0366	0565	200	I4	1460	2259	Altitude Registration QA Flags	
0566	0765	200	R4	2260	3059	Geopotential Altitude	km
0766	0965	200	R4	3060	3859	Temperature Profile (Altitude-based)	
0966	1165	200	R4	3860	4659	Temperature Uncertainty	K
1166	1365	200	R4	4660	5459	Pressure	K
1366	1565	200	R4	5460	6259	Pressure Uncertainty	hPa
1566	1765	200	I4	6260	7059	Pressure/Temperature Array Source Flag (1=GRAM95, 2=NCEP 3=DAO*, 4=Source Transition Value)	hPa

*Data Assimilation Office (DAO): source of research-quality assimilated global data sets (including temperature and geo-potential height).



Table D1.1. Concluded (2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
1766	1965	200	R4	7060	7859	Ozone Concentration	Ozone cm^{-3}
1966	2165	200	R4	7860	8659	Ozone Concentration Uncertainty	cm^{-3}
2166	2365	200	I4	8660	9459	Ozone QA Bit Flags	
2366	2565	200	R4	9460	10259	Nitrogen Dioxide Concentration	$\text{NO}_2 \text{ cm}^{-3}$
2566	2765	200	R4	10260	11059	Nitrogen Dioxide Concentration Uncertainty	cm^{-3}
2766	2965	200	I4	11060	11859	Nitrogen Dioxide QA Bit Flags	
2966	3165	200	R4	11860	12659	Nitrogen Trioxide Concentration	$\text{NO}_3 \text{ cm}^{-3}$
3166	3365	200	R4	12660	13459	Nitrogen Trioxide Concentration Uncertainty	cm^{-3}
3366	3565	200	I4	13460	14259	Nitrogen Trioxide QA Bit Flags	
3566	3765	200	R4	14260	15059	OCIO Concentration	OCIO cm^{-3}
3766	3965	200	R4	15060	15859	OCIO Concentration Uncertainty	cm^{-3}
3966	4165	200	I4	15860	16659	OCIO QA Bit Flags	



Table D1.2. Binary File Format Sheet SAGE III Level 2 Lunar Species Product
(2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
0001	0001	1	I4	0	3	Event Identification Tag (orbit-event code composite number)	File Header
0002	0002	1	I4	4	7	Year-Day Tag (yyyyddd)	
0003	0003	1	R4	8	11	Instrument Elapsed Time in On Station (dddd.frac)	
0004	0004	1	I4	12	15	"Data Fill/Invalid" Value for this Record (Integer Field)	
0005	0005	1	R4	16	19	"Data Fill/Invalid" Value for this Record (Floating Point Field)	
0006	0006	1	I4	20	23	Mission Identification (1 = Meteor-3M)	
0007	0007	1	R4	24	27	Version: Definitive Orbit Processing	Version Tracking
0008	0008	1	R4	28	31	Version: Level 0 Processing	
0009	0009	1	R4	32	35	Version: Software Processing	
0010	0010	1	R4	36	39	Version: Data Product	
0011	0011	1	R4	40	43	Version: Spectroscopy	
0012	0012	1	R4	44	47	Version: GRAM 95	
0013	0013	1	R4	48	51	Version: Meteorological	
0014	0014	1	R4	52	55	Version: Lunar Model	
0015	0015	1	R4	56	59	Version: Lunar Albedo	
0016	0016	1	R4	60	63	Altitude-Based Grid Spacing	File Description
0017	0017	1	I4	64	67	Number of Altitude-Based Array Values	
0018	0018	1	I4	68	71	Meteorological Profile Array Size	
0019	0019	1	I4	72	75	Number of Ground Track Values	
0020	0020	1	I4	76	79	Spacecraft-Referenced Event Type (3 = moonrise; 4 = moonset)	Event Type
0021	0021	1	I4	80	83	Earth-Referenced Event Type (3 = moonrise; 4 = moonset)	
0022	0022	1	R4	84	87	Event Beta Angle (0.0 ± 61.0)	
0023	0023	1	R4	88	91	Lunar Phase (0.0 = new moon; 1.0 = full moon)	
0024	0024	1	R4	92	95	Solar Zenith Angle	
0025	0025	1	I4	96	99	Aurora Contamination Flag (0 = not checked; 1 = not detected; 2 = detected)	
0026	0026	1	I4	100	103	Data Capture Start Date (yyyymmdd)	Data Capture Start Information
0027	0027	1	I4	104	107	Data Capture Start Time (hhmmss)	
0028	0028	1	R4	108	111	Subtangent Latitude (0.0 ± 90.0)	
0029	0029	1	R4	112	115	Subtangent Longitude (0.0 ± 180.0)	
0030	0030	1	R4	116	119	Subtangent Altitude	



Table D1.2. Continued (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
0031	0031	1	I4	120	123	Data Capture End Date (yyyymmdd)	
0032	0032	1	I4	124	127	Data Capture End Time (hhmmss)	
0033	0033	1	R4	128	131	Subtangent Latitude (0.0 ± 90.0)	
0034	0034	1	R4	132	135	Subtangent Longitude (0.0 ± 180.0)	
0035	0035	1	R4	136	139	Subtangent Altitude	km
0036	0046	11	I4	140	183	Date (yyyymmdd)	
0047	0057	11	I4	184	227	Time (hhmmss)	
0058	0068	11	R4	228	271	Subtangent Latitude (0.0 ± 90.0)	
0069	0079	11	R4	272	315	Subtangent Longitude (0.0 ± 180.0)	
0080	0090	11	R4	316	359	Ray Path Direction at Subtangent Point (0.0 to 359.9999...)	
0091	0091	1	R4	360	363	Tropopause Temperature	
0092	0092	1	R4	364	367	Tropopause Altitude	
0093	0110	18	R4	368	439	Pressure	
0111	0128	18	R4	440	511	Temperature	K
0129	0146	18	R4	512	583	Temperature Uncertainty	K
0147	0164	18	R4	584	655	Geometric Altitude	km
0165	0165	1	I4	656	659	Data Source Indicator (1 = DAO**; 2 = NCEP; 3 = None)	
0166	0365	200	R4	660	1459	Geometric Altitude	
0366	0565	200	I4	1460	2259	Altitude Registration QA Flags	
0566	0765	200	R4	2260	3059	Geopotential Altitude	km
0766	0965	200	R4	3060	3859	Temperature Profile (Altitude-based)	
0966	1165	200	R4	3860	4659	Temperature Uncertainty	K
1166	1365	200	R4	4660	5459	Pressure	hPa
1366	1565	200	R4	5460	6259	Pressure Uncertainty	hPa
1566	1765	200	I4	6260	7059	Pressure/Temperature Array Source Flag (1=GRAM95, 2=NCEP 3=DAO**, 4=Source Transition Value)	

*Ground Track Data reported in 10km increments for 0 –100km.

**Data Assimilation Office (DAO): source of research-quality assimilated global data sets (including temperature and geo-potential height).



Table D1.2. Concluded (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
1766	1965	200	R4	7060	7859	Ozone Concentration	Ozone cm^{-3}
1966	2165	200	R4	7860	8659	Ozone Concentration Uncertainty	cm^{-3}
2166	2365	200	I4	8660	9459	Ozone QA Bit Flags	cm^{-3}
2366	2565	200	R4	9460	10259	Nitrogen Dioxide Concentration	$\text{NO}_2 \text{ cm}^{-3}$
2566	2765	200	R4	10260	11059	Nitrogen Dioxide Concentration Uncertainty	cm^{-3}
2766	2965	200	I4	11060	11859	Nitrogen Dioxide QA Bit Flags	cm^{-3}
2966	3165	200	R4	11860	12659	Nitrogen Trioxide Concentration	$\text{NO}_3 \text{ cm}^{-3}$
3166	3365	200	R4	12660	13459	Nitrogen Trioxide Concentration Uncertainty	cm^{-3}
3366	3565	200	I4	13460	14259	Nitrogen Trioxide QA Bit Flags	cm^{-3}
3566	3765	200	R4	14260	15059	OCIO Concentration	OCIO cm^{-3}
3766	3965	200	R4	15060	15859	OCIO Concentration Uncertainty	cm^{-3}
3966	4165	200	I4	15860	16659	OCIO QA Bit Flags	cm^{-3}



**Table D1.3. Binary File Format Sheet SAGE III Level 2 Lunar Species Product
(Data Version 3)**

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
0001	0001	1	I4	0	3	Event Identification Tag (orbit-event code composite number)	File Header
0002	0002	1	I4	4	7	Year-Day Tag (yyyyddd)	
0003	0003	1	R4	8	11	Instrument Elapsed Time in On Station (dddd.frac)	
0004	0004	1	I4	12	15	“Data Fill/Invalid” Value for this Record (Integer Field)	
0005	0005	1	R4	16	19	“Data Fill/Invalid” Value for this Record (Floating Point Field)	
0006	0006	1	I4	20	23	Mission Identification (1 = Meteor-3M)	
0007	0007	1	R4	24	27	Version: Definitive Orbit Processing	Version Tracking
0008	0008	1	R4	28	31	Version: Level 0 Processing	
0009	0009	1	R4	32	35	Version: Software Processing	
0010	0010	1	R4	36	39	Version: Data Product	
0011	0011	1	R4	40	43	Version: Spectroscopy	
0012	0012	1	R4	44	47	Version: GRAM 95	
0013	0013	1	R4	48	51	Version: Meteorological	
0014	0014	1	R4	52	55	Version: Lunar Model	
0015	0015	1	R4	56	59	Version: Lunar Albedo	
0016	0016	1	R4	60	63	Altitude-Based Grid Spacing	File Description
0017	0017	1	I4	64	67	Number of Altitude-Based Array Values	
0018	0018	1	I4	68	71	Meteorological Profile Array Size	
0019	0019	1	I4	72	75	Number of Ground Track Values	
0020	0020	1	I4	76	79	Spacecraft-Referenced Event Type (3 = moonrise; 4 = moonset)	Event Type
0021	0021	1	I4	80	83	Earth-Referenced Event Type (3 = moonrise; 4 = moonset)	
0022	0022	1	R4	84	87	Event Beta Angle (0.0 ± 61.0)	
0023	0023	1	R4	88	91	Lunar Phase (0.0 = new moon; 1.0 = full moon)	
0024	0024	1	R4	92	95	Solar Zenith Angle	
0025	0025	1	I4	96	99	Aurora Contamination Flag (0 = not checked; 1 = not detected; 2 = detected)	
0026	0026	1	I4	100	103	Event Status Bit Flag	
0027	0027	1	I4	104	107	Data Capture Start Date (yyyymmdd)	Data Capture Start Information
0028	0028	1	I4	108	111	Data Capture Start Time (hhmmss)	
0029	0029	1	R4	112	115	Subtangent Latitude (0.0 ± 90.0)	
0030	0030	1	R4	116	119	Subtangent Longitude (0.0 ± 180.0)	
0031	0031	1	R4	120	123	Subtangent Altitude	

Table D1.3. Continued (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
0032	0032	1	I4	124	127	Data Capture End Date (yyyymmdd)	
0033	0033	1	I4	128	131	Data Capture End Time (hhmmss)	
0034	0034	1	R4	132	135	Subtangent Latitude (0.0 ± 90.0)	
0035	0035	1	R4	136	139	Subtangent Longitude (0.0 ± 180.0)	
0036	0036	1	R4	140	143	Subtangent Altitude	km
0037	0047	11	I4	144	187	Date (yyyymmdd)	
0048	0058	11	I4	188	231	Time (hhmmss)	
0059	0069	11	R4	232	275	Subtangent Latitude (0.0 ± 90.0)	
0070	0080	11	R4	276	319	Subtangent Longitude (0.0 ± 180.0)	
0081	0091	11	R4	320	363	Ray Path Direction at Subtangent Point (0.0 to 359.9999...)	
0092	0092	1	R4	364	367	Tropopause Temperature	
0093	0093	1	R4	368	371	Tropopause Altitude	
0094	0111	18	R4	372	443	Pressure	
0112	0129	18	R4	444	515	Temperature	
0130	0147	18	R4	516	587	Temperature Uncertainty	
0148	0165	18	R4	588	659	Geometric Altitude	
0166	0166	1	I4	660	663	Data Source Indicator (1 = DAO**; 2 = NCEP; 3 = None)	
0167	0366	200	R4	664	1463	Geometric Altitude	
0367	0566	200	I4	1464	2263	Altitude Registration QA Flags	
0567	0766	200	R4	2264	3063	Geopotential Altitude	
0767	0767	1	R4	3064	3067	A-band Altitude Registration Offset from satellite ephemeris-based method	
0768	0967	200	R4	3068	3867	Temperature Profile (Altitude-based)	
0968	1167	200	R4	3868	4667	Temperature Uncertainty	
1168	1367	200	R4	4668	5467	Pressure	
1368	1567	200	R4	5468	6267	Pressure Uncertainty	
1568	1767	200	I4	6268	7067	Pressure/Temperature Array Source Flag (1=GRAM95, 2=NCEP 3=DAO**, 4=Source Transition Value)	

*Ground Track Data reported in 10km increments for 0 –100km.

**Data Assimilation Office (DAO): source of research-quality assimilated global data sets (including temperature and geo-potential height).



Table D1.3. Concluded (Data Version 3)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
1768	1967	200	R4	7068	7867	Ozone Concentration	Ozone cm^{-3}
1968	2167	200	R4	7868	8667	Ozone Concentration Uncertainty	cm^{-3}
2168	2367	200	I4	8668	9467	Ozone QA Bit Flags	
2368	2567	200	R4	9468	10267	Nitrogen Dioxide Concentration	NO₂ cm^{-3}
2568	2767	200	R4	10268	11067	Nitrogen Dioxide Concentration Uncertainty	cm^{-3}
2768	2967	200	I4	11068	11867	Nitrogen Dioxide QA Bit Flags	
2968	3167	200	R4	11868	12667	Nitrogen Trioxide Concentration	NO₃ cm^{-3}
3168	3367	200	R4	12668	13467	Nitrogen Trioxide Concentration Uncertainty	cm^{-3}
3368	3567	200	I4	13468	14267	Nitrogen Trioxide QA Bit Flags	
3568	3767	200	R4	14268	15067	OCIO Concentration	OCIO cm^{-3}
3768	3967	200	R4	15068	15867	OCIO Concentration Uncertainty	cm^{-3}
3968	4167	200	I4	15868	16667	OCIO QA Bit Flags	



Appendix E

Appendix E. SAGE III Level 2 Cloud Products

Version 1.4
03/04

SAGE III Data Products User's Guide



Table E1.1. Binary File Format Sheet SAGE III Level 2 Cloud Product

(2/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
001	001	1	I4	0	3	Event Identification Tag (orbit-event code composite number)	
002	002	1	I4	4	7	Year-Day Tag (yyyyddd)	
003	003	1	R4	8	11	Instrument Elapsed Time in Orbit (dddd.frac)	
004	004	1	I4	12	15	"Data Fill/Invalid" Value of this Record (Integer Field)	
005	005	1	R4	16	19	"Data Fill/Invalid" Value of this Record (Floating Point Field)	
006	006	1	I4	20	23	Mission Identification (1 = Meteor-3M)	
007	007	1	R4	24	27	Version: Definitive Orbit Processing	
008	008	1	R4	28	31	Version: Level 0 Processing	
009	009	1	R4	32	35	Version: Director Processing	
0010	0010	1	R4	36	39	Version: Solar Processing	
0011	0011	1	R4	40	43	Version: Spectroscopy	
0012	0012	1	R4	44	47	Version: GRAM 95	
0013	0013	1	R4	48	51	Version: Meteorological	
0014	0014	1	R4	52	55	Version: Cloud Processing	
0015	0015	1	R4	56	59	Altitude-Based Grid Spacing	
0016	0016	1	I4	60	63	Number of Altitude-Based Array Values	
0017	0017	1	I4	64	67	Number of Ground Track Values	km
0018	0018	1	I4	68	71	Spacecraft-Referenced Event Type (1 = sunrise; 2 = sunset)	
0019	0019	1	I4	72	75	Earth-Referenced Event Type (1 = sunrise; 2 = sunset)	
0020	0020	1	R4	76	79	Event Beta Angle (0.0 ± 61.0)	deg
0021	0021	1	I4	80	83	Data Capture Start Date (yyyymmdd)	
0022	0022	1	I4	84	87	Data Capture Start Time (hhmmss)	
0023	0023	1	R4	88	91	Subtangent Latitude (0.0 ± 90.0)	
0024	0024	1	R4	92	95	Subtangent Longitude (0.0 ± 180.0)	
0025	0025	1	R4	96	99	Subtangent Altitude	
0026	0026	1	I4	100	103	Data Capture End Date (yyyymmdd)	
0027	0027	1	I4	104	107	Data Capture End Time (hhmmss)	
0028	0028	1	R4	108	111	Subtangent Latitude (0.0 ± 90.0)	



Table E1.1. Concluded (/27/2002 - 2/15/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
0029	0029	1	R4	112	115	Subtangent Longitude (0.0 ± 180.0)	Data Capture
0030	0030	1	R4	116	119	Subtangent Altitude	End Information-continued
0031	0034	4	I4	120	135	Date (yyyymmdd)	Ground Track
0035	0038	4	I4	136	151	Time (hhmmss)	Information
0039	0042	4	R4	152	167	Subtangent Latitude (0.0 ± 90.0)	
0043	0046	4	R4	168	183	Subtangent Longitude (0.0 ± 180.0)	
0047	0050	4	R4	184	199	Ray Path Direction at Subtangent Point (0.0 to 359.9999...)	
0051	0110	60	I4	200	439	Cloud Presence Information (0, 1, 2, 3 or 4)	Cloud Presence
0111	0170	60	I4	440	679	Cloud Presence Uncertainty Information (0, 1, 2, 3 or 4)	& Uncertainty
0171	0230	60	I4	680	919	Cloud Areas Entered (0, 1, 2, 3, or 4)	
0231	0231	1	080	920	999	Comment Field (80 Characters)	km
<p>This format sheet represents one cloud data record of the Binary Cloud Product File. All records in the file contain the same format except Record 1 (File Header Record)</p> <p>Record 1 is 1000 bytes:</p> <ul style="list-style-type: none"> (bytes 0-3) 4-byte integer, the number of records of cloud data that follow in the cloud file. (bytes 4-9) 6 characters, the software version from which the cloud data is generated. (bytes 10-59) 50 characters, the name(s) of the cloud data reviewer. (bytes 60-999) 940 characters, comment field. 							



Table E1.2. Binary File Format Sheet SAGE III Level 2 Cloud Product
(2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
001	001	1	I4	0	3	Event Identification Tag (orbit-event code composite number)	Record Header
002	002	1	I4	4	7	Year-Day Tag (yyyyddd)	
003	003	1	R4	8	11	Instrument Elapsed Time in Orbit (dddd.frac)	
004	004	1	I4	12	15	"Data Fill/Invalid" Value of this Record (Integer Field)	
005	005	1	R4	16	19	"Data Fill/Invalid" Value of this Record (Floating Point Field)	
006	006	1	I4	20	23	Mission Identification (1 = Meteor-3M)	
007	007	1	R4	24	27	Version: Definitive Orbit Processing	Version Tracking
008	008	1	R4	28	31	Version: Level 0 Processing	
009	009	1	R4	32	35	Version: Software Processing	
0010	0010	1	R4	36	39	Version: Data Product	
0011	0011	1	R4	40	43	Version: Spectroscopy	
0012	0012	1	R4	44	47	Version: GRAM 95	
0013	0013	1	R4	48	51	Version: Meteorological	
0014	0014	1	R4	52	55	Version: Cloud Processing	
0015	0015	1	R4	56	59	Altitude-Based Grid Spacing	Record Description
0016	0016	1	I4	60	63	Number of Altitude-Based Array Values	
0017	0017	1	I4	64	67	Number of Ground Track Values	
0018	0018	1	I4	68	71	Spacecraft-Referenced Event Type (1 = sunrise; 2 = sunset)	Event Type
0019	0019	1	I4	72	75	Earth-Referenced Event Type (1 = sunrise; 2 = sunset)	
0020	0020	1	R4	76	79	Event Beta Angle (0.0 ± 61.0)	
0021	0021	1	I4	80	83	Data Capture Start Date (yyyymmdd)	Data Capture Start Information
0022	0022	1	I4	84	87	Data Capture Start Time (hhmmss)	
0023	0023	1	R4	88	91	Subtangent Latitude (0.0 ± 90.0)	
0024	0024	1	R4	92	95	Subtangent Longitude (0.0 ± 180.0)	
0025	0025	1	R4	96	99	Subtangent Altitude	
0026	0026	1	I4	100	103	Data Capture End Date (yyyymmdd)	Data Capture End Information
0027	0027	1	I4	104	107	Data Capture End Time (hhmmss)	
0028	0028	1	R4	108	111	Subtangent Latitude (0.0 ± 90.0)	



Table E1.2. Concluded (2/16/2003, Data Version 2)

Field Num. Start	Field Num. End	Num. Values	F90 Type	Start Byte	End Byte	Description	Eng. Units
0029	0029	1	R4	112	115	Subtangent Longitude (0.0 ± 180.0)	Data Capture
0030	0030	1	R4	116	119	Subtangent Altitude	End Information-continued
0031	0034	4	I4	120	135	Date (yyyymmdd)	Ground Track
0035	0038	4	I4	136	151	Time (hhmmss)	Information
0039	0042	4	R4	152	167	Subtangent Latitude (0.0 ± 90.0)	
0043	0046	4	R4	168	183	Subtangent Longitude (0.0 ± 180.0)	
0047	0050	4	R4	184	199	Ray Path Direction at Subtangent Point (0.0 to 359.9999...)	
0051	0110	60	I4	200	439	Cloud Presence Information (0, 1, 2, 3 or 4)	Cloud Presence
0111	0170	60	I4	440	679	Cloud Presence Uncertainty Information (0, 1, 2, 3 or 4)	& Uncertainty
0171	0230	60	I4	680	919	Cloud Areas Entered (0, 1, 2, 3, or 4)	
0231	0231	1	O80	920	999	Comment Field (80 Characters)	km
<p>This format sheet represents one cloud data record of the Binary Cloud Product File. All records in the file contain the same format except Record 1 (File Header Record)</p> <p>Record 1 is 1000 bytes in length and has one 4-byte integer as the first and only field (bytes 0-3). The field contains the number of records of cloud data that follow in the cloud file.</p>							

