3.8 Meteorological, Ozone, and Aerosol Data (MOA)

The CERES archival product Meteorological, Ozone, and Aerosol Data (MOA) is produced by the CERES Regrid MOA Subsystem. Each MOA file contains meteorological, ozone, and aerosol data for one hour, and is used by several of the CERES subsystems. Data on the MOA file are derived from several data sources external to the CERES system, such as the European Centre for Medium Range Weather Forecasting (ECMWF), Data Assimilation Office (DAO), NOAA, and various other meteorological satellites. These data have various horizontal and temporal resolutions. The Regrid MOA Subsystem interpolates the aerosol and ozone data horizontally to conform with the horizontal resolution of the meteorological data. An index number is assigned to each of the possible meteorological horizontal grids. The number of global regions, records and file sizes also change accordingly. Profile data are interpolated vertically to conform with CERES requirements. The MOA file also contains column precipitable water data measured by the Special Sensor Microwave/Imager (SSM/I) on their native grid (0.5 x 0.5). For certain primary meteorological data sources, the MOA file also contains the input skin temperature data on their native grid. All data are temporally interpolated to provide data to the CERES processing system on either every hour or every six hours, depending on the primary meteorological data source.

The MOA contains the pressure, geopotential height, skin temperature, and u-vector and v-vector wind speed at the surface; vertical profiles of temperature and humidity for 58 atmospheric levels; vertical profiles for 18 atmospheric levels below the tropopause of u-vector and v-vector wind speed data; the tropopause height; air mass index; column precipitable water based on humidity profiles column precipitable water based on microwave measurements; column averaged relative humidity; vertical profile of ozone mixing ratios for 58 atmospheric levels; column ozone; aerosol optical depth.

A complete listing of parameters for this data product can be found in Table 3.8-1 and Table 3.8-2. The sizes of the MOA files and of the parameters they contain are given in Table 3.8-3.

Level: 3
Frequency: 1/Hour or 1 every 6 Hours
Configuration Code: 009010 and greater

Time Interval Covered
File: 1 hour
Record: 1 hour

Portion of Globe Covered
File: Global
Record: One region

Portion of Atmosphere Covered
File: Surface to TOA

Table 3.8-1. Meteorological, Ozone, and Aerosol (MOA) Header

Description	Parameter Number	Units	Range	Elements/ Record	Data Type
Header					
Date and Hour		N/A	ASCII string	27	Character
MOA Processing Date		N/A	ASCII string	19	Character
Byte Buffer for Compiler Compatibilities		N/A	ASCII string	2	Character
MOA Grid Index		N/A	1 .. 7	1	32-bit Integer
Number of MOA Regions		N/A	13104 .. 44012	1	32-bit Integer
Temperature, Humidity, and Ozone Profile Fixed Pressure Levels		hPa	0 .. 1100	58	32-bit Real
Wind Speed Profile Pressure levels		hPa	0 .. 1100	18	32-bit Real

Table 3.8-2. MOA Regional Record

Description	Parameter Number	Units	Range	Elements/ Record	Data Type
MOA Regional Record					
MOA Region Number	1	N/A	1 .. 44012	1	32-bit Integer
Surface Pressure	2	hPa	0 .. 1100	1	32-bit Real
Surface Geopotential Height	3	m	-100 .. 10000	1	32-bit Real
Surface Skin Temperature	4	K	175 .. 375	1	32-bit Real
Surface Wind Speed, U-Vector	5	m sec^{-1}	-100 .. 100	1	32-bit Real
Surface Wind Speed, V-Vector	6	m sec^{-1}	-100 .. 100	1	32-bit Real
Flag, Sea Surface State	7	N/A	0 .. 9	1	32-bit Integer
Flag, Source Surface Data	8	N/A	0 .. 4	1	32-bit Integer
Temperature Profiles	9	K	175 .. 375	58	32-bit Real
Specific Humidity Profiles	10	g g^{-1}	0.00001 .. .03	58	32-bit Real
Wind Speed Profile, U-Vector	11	m sec^{-1}	-100 .. 100	18	32-bit Real
Wind Speed Profile, V-Vector	12	m sec^{-1}	-100 .. 100	18	32-bit Real
Flag, Source Meteorological Profiles	13	N/A	0 .. 4	1	32-bit Integer
Tropopause Height	14	hPa	50 .. 450	1	32-bit Real
Air Mass Index	15	N/A	0 .. 10	1	32-bit Integer
Column Precipitable Water	16	cm	0.001 .. 10.000	1	32-bit Real
Column Averaged Relative Humidity	17	N/A	0 .. 100	1	32-bit Real
Microwave Precipitable Water	18	g cm^{-2}	0.001 .. 10.000	1	32-bit Real
Microwave Precipitable Water, std	19	g cm^{-2}	TBD	1	32-bit Real
Flag, Source Microwave Column Precipitable Water	20	N/A	0 .. 6	1	32-bit Integer

Table 3.8-2. MOA Regional Record

Description	Parameter Number	Units	Range	Elements/ Record	Data Type
Ozone Mass Mixing Ratio Profiles	21	$g\ g^{-1}$	0.0 .. 0.00005	58	32-bit Real
Flag, Source Ozone Profile Data	22	N/A	0 .. 3	1	32-bit Integer
Column Ozone	23	DU	0 .. 1000	1	32-bit Real
Flag, Source Column Ozone	24	N/A	0 .. 3	1	32-bit Integer
Optical Depth, Total Column	25	N/A	0 .. 2	1	32-bit Real
Flag, Source Optical Depth, Total Column	26	N/A	0 .. 1	1	32-bit Integer
SSM/I Regional Water Vapor Data					
Microwave Precipitable Water for SSM/I Region		$g\ cm^{-2}$	0.001 .. 10.000	200	32-bit Real
Skin Temperature Data					
Surface Temperature Data for GEOS3 or ECMWF Region		K	175 .. 375	180 or 200	32-bit Real

Table 3.8-3. MOA File and Parameter Sizes for Primary Data Sources

	DAO-GEOS2	DAO-GEOS3	ECMWF
Total Meta Megabytes/File	0.00034	0.00034	0.00034
Total Data Megabytes/MOA Regional Record	0.00088	0.00088	0.00088
Total MOA Regional Records/File	13104	44012	44012
Total MOA Regional Record Megabytes/File	12.1	40.7	40.7
Total Megabytes/SSM/I Record	0.00088	0.00088	0.00088
Total SSM/I Records	1296	1296	1296
Total SSM/I Data Megabytes/File	1.2	1.2	1.2
Total Megabytes/Skin Temperature Record	0	0.00088	0.00088
Total Skin Temperature Records	0	724	2048
Total Skin Temperature Megabytes/File	0	0.6	1.9
Total Megabytes/File	**13.3**	**42.5**	**43.8**
Total Files/Day	24	4	4
Total Megabytes/Day	319.2	170	175.2
Total Megabytes/Month	**9895.2**	**5270**	**5431.2**
Total Gigabytes/Month	9.9	5.3	5.4

Note: The MOA sizes shown in the Internal Products Summary, Table 1.0-4, are based on the sizes shown above in the ECMWF column.

MOA Revision Record

The product Revision Record contains information pertaining to approved section changes. The table lists the date the Software Configuration Change Request (SCCR) was approved, the Release and Version Number, the SCCR number, a short description of the revision, and the revised sections. The authors are listed on the document cover.

MOA Revision Record

SCCR Approval Date	Release/ Version Number	SCCR Number	Description of Revision	Section(s) Affected
N/A	R3V1	N/A	• Updated format to comply with standards.	All
03/01/06	R3V2	615	• Updated Table 3.8-2 to correct units and ranges for specific humidity profiles and values for ozone source flags.	Table 3.8-2
			• Changed Range of Column Ozone parameter.	Table 3.8-2
			• Updated format to comply with standards.	All
			• The EOSDIS Product Code line was removed from the document. (6/17/2008)	Sec. 3.8
			• Section numbering was changed because of the SYNI and TSI Data Product Catalog additions. (6/23/2008)	All
			• Some links were not working. They have now been modified. (12/09/2010)	All