

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 1](#) and [Table 2](#). The sizes of the MOA files and of the parameters they contain are given in [Table 3](#).

Level: 3

Frequency: 1/Hour or 1 every 6 Hours

Configuration Code: 009010 and greater

Portion of Globe Covered

File: Global

Record: One region

Time Interval Covered

File: 1 hour

Record: 1 hour

Portion of Atmosphere Covered

File: Surface to TOA

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Table 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 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 |

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Table 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. 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 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 | <ul style="list-style-type: none"> Updated format to comply with standards. | All |
| 03/01/06 | R3V2 | 615 | <ul style="list-style-type: none"> Updated Table 3.8-2 to correct units and ranges for specific humidity profiles and values for ozone source flags. Changed Range of Column Ozone parameter. Updated format to comply with standards. The EOSDIS Product Code line was removed from the document. (6/17/2008) Section numbering was changed because of the SYNI and TSI Data Product Catalog additions. (6/23/2008) Some links were not working. They have now been modified. (12/09/2010) The ASDC footer was added to the bottom of the document. (06/06/2013) Eliminated section numbers from the Data Products Catalog. Specifically, in this document, section number 3.8 was removed. (12/18/2013) Changed Table 1.0-4 to Table 4 and accessed the .pdf file instead of the .doc Introduction section. (06/20/2014) | Table 3.8-2 Table 3.8-2 All Sec. 3.8 All All All All Table 3 |

