GloSSAC Readme File

1.0 Introduction

This readme file provides information about the GloSSAC data set.

1.1 Description

The GloSSAC (global space-based stratospheric aerosol climatology) data set is gridded data of aerosol measurements taken from primarily space-based instruments and supplemented by ground and balloon based measurements. It is a zonal data set in 5-degree latitude spanning 80S to 80N pseudo-month (1/12th year) bins for the period 1979 - 2016. The entire period that the data set covers is gap-free, which is achieved mainly through interpolation in the SAGE periods and a new method of estimating measurements in the high latitudes.

The change to version 1.1 is solely to correct an error in the way the CLAES data is incorporated into the long-term data record that caused some large errors in the lower stratosphere between July 1991 and April 1993.

The version 2.0 is focused on improving the post-SAGE II era (after 2005) with the goal to mitigate elevated aerosol extinction in the lower stratosphere at mid and high latitudes noted in v1.0 as noted in Thomason et al. (2018).Changes include the use of version 7.0 OSIRIS and the recently released CALIPSO Lidar Level 3 Stratospheric Aerosol profile monthly product. Major changes that occurred to version 2.0 is for the post-SAGEII era data set where we implement a conformance process to OSIRIS and CALIPSO data that is based on SAGEII/SAGEIII-ISS overlap measurements.

Important changes to version 2.1 includes version changes to individual data sets used in the post-SAGE II era (after 2005) and a revised cloud-free method is used for SAGE III/ISS data. All individual data sets used from 2005 have undergone version changes and we use
OSIRIS version 7.1, CALIPSO Level 3 stratospheric aerosol profile monthly product that now includes a minor version change from version 1.0 to 1.01 from July 2020. Additionally, a revised cloud-screen method is implemented for SAGE III/ISS, which improves the representation of aerosols in the lower stratosphere in particular, following volcanic/PyroCb events. The revised cloud-free data for SAGE III/ISS now shows enhancement of extinction coefficient in the lower stratosphere following these events.

For version 2.2, we have extended the dataset through December 2021. A minor version change occurred for OSIRIS data as we now use the latest version (version 7.2). Additionally, we implemented a filtering algorithm for SAGE III/ISS aerosol extinction coefficients to filter out negative extinction values that occur in the vicinity of large positive extinction, particularly below 25 km.

For version 2.21, the dataset is extended through December 2022. The only change in version 2.21 is the unavailability of CALIOP data for the year 2022. For the previous versions, CALIOP data is used mostly to fill in data the higher latitude, whereas in version 2.21 we interpolated the data along time axis to fill in the data at higher latitudes for the year 2022.

1.2 Further information

For a more in depth description of the data set please see the accompanying paper at the ASDC website or using the DOI (10.5067/GloSSAC-L3-V1.0).

1.3 Science Representatives

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3.0 Dataset File Format

3.1 NetCDF

The NetCDF library is designed to read and write data that has been structured according to well-defined rules and is easily ported across various computer platforms. The netCDF interface enables the creation of self-describing datasets. The GloSSAC data set is created in the NetCDF version 3 and is compliant to the CF 1.6 convention.

For more information about the NetCDF format visit: http://www.unidata.ucar.edu/software/netcdf/docs/

For more information about the CF (Climate and Forecast) 1.6 convention visit: http://cfconventions.org/cf-conventions/v1.6.0/cf-conventions.html

3.2 Reading the netcdf file

Most languages have tools to help read netcdf files. If you are using IDL we recommend you use the procedure NCDF_BROWSER found at http://www.idlcoyote.com/programs/ncdf_browser.pro. To use the procedure type: NCDF_BROWSER,<FILENAME>. This will create an easy to read gui of the information in the dataset.

3.3 Variables in the GloSSAC file

Glossac_Aerosol_Extinction_Coefficient: this is the main dataset which contains the aerosol extinction coefficient between 80S to 80N for 1979 to 2020.

Glossac_Aerosol_Extinction_Coefficient_Std,Glossac_Aerosol_Extinction_Coefficient_median,Glossac_Aerosol_Extinction_Coefficient_flag contain ancillary data about the Measurements_extinction variable.

High_Altitude_Climatology: Climatology for the high altitudes. Altitudes: 25 - 39.5km

Stratospheric_Background: Stratospheric background

Caliop_Backscatter_Coefficient_532: Contains all calipso backscatter data at 532 nm. Ancillary data is in the rest of the variables with the Caliop_ prefix

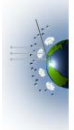
Osiris_Aerosol_Extinction_Coefficient: Contains conformed OSIRIS extinction at 525 and 1020 nm. Ancillary data is in the rest of the variables with the Osiris_Aerosol_Extinction_Coefficient_ prefix

Sageiii_ISS_Aerosol_Extinction_Coefficient: Contains all SAGEIII/ISS data. Ancillary data is in the rest of the variables with the Sageiii_ISS_Aerosol_Extinction_Coefficient_ prefix

wavelengths_caliop,wavelngths_glossac,wavelengths_osiris,wavelengths_SAGEIII,time,lat,alt,month: these are variables that correspond to the dimensions used in the variables, which give the type and values of the dimensions used in the variables. To see the names of the dimensions used for a variable use the IDL function NCDF_DIMINQ.

4.0 Instruments active in the data set

Instrument	Dates active in the data set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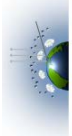
SAM II [NASA]	01/1979->09/1984
SAGE[NASA]	02/1979->11/1981
SAGE II [NASA]	10/1984->08/2005
HALOE [NASA]	10/1991->12/1993
CLAES [Lockheed]	10/1991->03/1993
OSIRIS [Canada]	10/2001->12/2022
CALIPSO [NASA]	04/2006->12/2021
SAGE III/ISS [NASA]	06/2017->12/2022

Last Updated: February 2023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