CASS DB MANAGER

User Manual

V1.

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Introduction

Overview

The CASS DB Manager is a Python-based tool designed to store, manage, and analyze raw data from the AE33 Aethalometer. It supports real-time monitoring and detailed speciation of Aerosol Black Carbon, providing researchers and technicians with a powerful resource for air quality and environmental monitoring.

Purpose

This manual provides detailed instructions for installing, configuring, and operating the CASS DB Manager, ensuring users can efficiently utilize all its capabilities.

System Requirements

Hardware Requirements

• Standard desktop or server hardware.

• Minimum recommended: 4GB RAM and a dual-core processor.

Software Requirements

• Operating System: Windows 10+, Linux 20.04+, or MacOS 12+

• Database Software: SQLite.

Quick Start Guide

This section will guide users through the simplest version of the CASS DB Manager workflow—from setting up the database to uploading raw data and running an analysis. more in-depth custom configurations and use cases are explored in further sections of this manual.

Download and Installation:

a. Visit the GitHub Repository to obtain the software package.
b. Unpack the downloaded archive to desired location. Run the run.py script, using “python3 ./run.py” which automatically creates a virtual environment and launches the application. Subsequent launches should use the

generated “DB CASS Manager.bat” (windows), .command (Mac) or .desktop (Linux)

Note: *Do not pre-build or manually activate an environment before running run.py.*

Configuring the Database:

c. Upon first launch, use the terminal-based menu to navigate to the **Configuration** menu (4 [enter]).
d. Select **DB Install** (4 [enter]) to create database file.
e. Finally, run **Test DB Connection** (1 [enter]) to ensure database is correctly configured.

Note: *this quick start method will use the default “MyFirstCassDB.db” database name. swapping databases and using custom named database files are outlined Here.*

Uploading Raw Data:

f. From the main menu navigate to the **Upload Data** menu. (2 [enter])
g. Use the **Data Folder** (4 [enter]) option to open the raw data upload folder with the system’s default file explorer.
h. Place AE33 and TCA raw data files into their respective subfolders.
i. Choose from the upload options:
    i. **AE33:** Upload data only stored in the AE33 subfolder.
    ii. **TCA:** Upload data only stored in the TCA subfolder.
    iii. **Both:** Upload both data types (AE33 & TCA) subsequently.

Note: *The raw data upload folders can also be customized in the configuration menu. Allowing the user to set upload data folder to be the same folder location as their CASS instrument output folder to further simplify and automate the upload process. Such custom configurations are outlined Here.*

Running an Analysis:

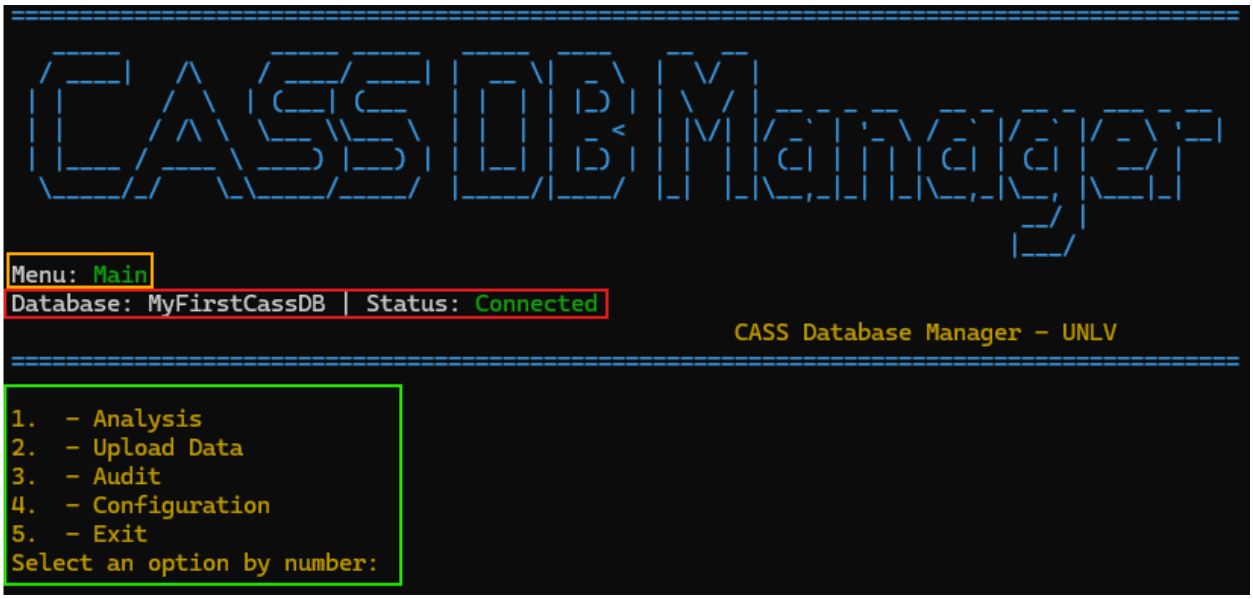
a. From the main menu navigate to the **Analysis** menu (1 [enter]).
b. **(Optional)** From the menu, choose **Update Constants** (2 [enter]) to open the constants.conf file in the system’s default text editor. This file comes pre-populated

with the values reported by Ivančič et al. (2022), but users are free to adjust values to fit specific use cases (save file after edits).

c. Select option one **Run Analysis** (1 [enter])
d. Follow the prompt to select a start and end data for analysis within the dates provided by the combined overlap range.
e. Select the averaging interval to be used in prerequisite down sampling in analysis.
f. After analysis is completed, press enter to return to the analysis menu.
g. Select **Folder** (3 [enter]) to open the analysis output folder with the system's default file manager. Analysis is saved in folders named with the date and time the analysis was run.
h. Within the folder is CASSOutput.xlsx as well as plots and R-Squared folders. This output can be copied or moved without any issue to the CASS DB Manager.

Navigating the Software

Users navigate CASS DB Manager windows with keyboard commands and on-screen menu selections. The interface header displays dynamic information to make interactions more intuitive.



The yellow highlight area marks the active menu, helping users quickly see where they are. The red highlight area shows the configured database file's status—displaying "Connected" in green or "No Connection" in red to indicate whether the software can locate the database file. The green highlight area lists the actions available in the current menu. To choose one, simply type its number and press Enter.

Custom Configurations

In the **Configuration** menu, users can define custom settings by opening and editing the relevant .conf files. Select a file to launch it in the system's default text editor, then modifying system variables—such as file paths—to suit workflow. Any line beginning with a hash (#) is treated as a comment and ignored by the software, so users can safely override settings by prefixing them with # and adding new entries below. This approach preserves the original configuration and lets users experiment without risking system breakage.

Unedited	`### The full or relative path to the SQLite .db file` `dbPath=../data/SQLlite/MyFirstCassDB.db`

Edited	`### The full or relative path to the SQLite .db file`
	`#dbPath=../data/SQLlite/MyFirstCassDB.db`
	`dbPath=../data/SQLlite/MyNewDatabase.db`

Note: *A leading ../ in a file path instructs the software to locate the data folder relative to its current working directory. To reference a folder elsewhere on the system, use an absolute path—for example, on Windows: (C:\Users\AlecB\myData\MyNewDatabase.db)*

The CASS DB Manager supports custom configurations via two files—data.conf and db.conf—and the sections below provide a detailed description of every setting available in each.

Data.conf

Option 2 ("Data Config") in the Configuration menu opens data.conf in the system's default text editor. The file is divided into AE33 and TCA sections, each containing settings for the corresponding data type.

TCA_ and AE33_data_Location Setting:

These settings specify where raw data files are located. Modifying them directs the system to search outside the project's directory—enabling custom paths such as shared network drives or instrument output folders—to streamline the upload process.

TCA and AE33_FilePrefix Setting:

These prefixes define the starting characters of each raw data filename. During upload, the system scans the configured directory for files whose names begin with those prefixes. This approach allows AE33 and TCA files to coexist in a single folder and accommodates future instrument models that may use different filename conventions.

DB.conf

Selecting option 3 (“DB Config”) in the Configuration menu opens db.conf in the system’s default text editor, where all database-specific settings can be adjusted.

dbPath

The dbpath setting defines the file path and name of the database used for both data uploads and analysis. When **DB Install** is selected, the system checks this path and creates a new database if none exists. Multiple databases can be managed by listing each path in db.conf and commenting out inactive entries with #. To work with an existing database stored elsewhere, set dbpath to its full path and filename.

TCA and AE33_Table

The raw-data table naming option specifies custom names for the AE33 and TCA tables in the database. By assigning unique table names, multiple data sources can be uploaded into the same database—upload one source, rename its tables, then upload another—without overwriting existing data. This is an advanced configuration and may require familiarity with database table management.

Auditing Databases

The Auditing menu, accessible from the Main Menu, runs time-gap audits on both AE33 and TCA data within the connected database. These audits are identical to those produced by the Analysis window and included in the Excel output but invoking them here provides a quick overview of any gaps before analysis and allows exporting the audit reports as CSV files for further review.