

# CASS DB Manager User Manual

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## Quick Start

This section will guide you through the entire workflow—from setting up the database to uploading raw data and running a full analysis.

### 1. Download and Installation:

- Download:

Visit the [GitHub Repository](#) to obtain the software package.

- Installation:

Unpack the downloaded archive to your desired location. Run the run.py script, which automatically creates a virtual environment and launches the application.

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

### 2. Initial Setup – Configuring the Database:

- Upon first launch, navigate to the **Configuration** menu.
- Select **DB Install** to create and configure your database file.
- For non-standard setups, use **Data Config** and **DB Config** to update file paths in your native text editor (advanced users only).
- Finally, run **Test DB Connection** to ensure your database is correctly configured.

### 3. Uploading Raw Data:

- Navigate to the **Upload Data** menu.

- Use the **Data Folder** option to check the designated folder for raw data.
- Place your AE33 and TCA raw data files into their respective subfolders.
- Choose from the upload options:
- **AE33:** Upload AE33 raw data.
- **TCA:** Upload TCA raw data.
- **Both:** Upload both data types subsequently.

The tool will automatically detect and skip duplicate records.

#### 4. **Running an Analysis:**

- Open the **Analysis** menu.
- Select a date range for your analysis.
- When prompted, specify:
  - **Time Range for Analysis:** the start and end date of the range that will be analyzed.
  - **Time Resolution for Averaging:** The interval at which you'd like the raw data to be averaged.

**Tip:** It is best to choose the same or a higher time resolution than the TCA data, though any of the provided intervals can be used.

- The analysis process will generate an Excel report with averaged variables and calculated values, and it will create output folders for plots:
  - **Plots:** Contains R-squared plots based on the selected time delta.
  - **Rsquared:** Includes a time-series plot and a diurnal plot.

#### 5. **Navigating the Interface:**

- The CASS DB Manager is terminal-based. Use the arrow keys to navigate the menus.
- The active window is indicated in the bottom left of the header.

## 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.

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# System Requirements

## Hardware Requirements

- Standard desktop or server hardware.
- Minimum recommended: 4GB RAM and a dual-core processor.

## Software Requirements

- Operating System: Windows, Linux, or Mac (specify supported platforms).
  - Database Software: SQLite.
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# Installation

## Step 1: Downloading the Software

- Obtain the software package from the [GitHub Repository](#) or your designated distribution channel.

## Step 2: Installation Process

### For All Systems:

- Unpack the archive to your chosen installation location.
- Run the run.py script, which sets up a virtual environment and starts the application.

**Note:** It is not recommended to manually build an environment prior to running run.py.

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# Usage Instructions

## Starting the Application

- After the initial setup, always launch the application via the terminal using `run.py`.

This script checks if it's a new installation, activates the proper environment, and then runs the necessary scripts. Although individual scripts can be executed for troubleshooting, launching through `run.py` is preferred.

## Navigating the User Interface

- The CASS DB Manager is terminal-based and entirely keyboard-driven.
- The current active window is displayed in the bottom left of the header.
- Use the arrow keys to navigate through menus.

## Main Menu Options

- **Analysis**
- **Upload Data**
- **Audit**
- **Configuration**
- **Exit**

## Configuration Menu

- **DB Install:**

Creates and configures your database file—essential for initial setup.

- **Advanced Configuration:**

Use **Data Config** and **DB Config** to update file paths if needed. These options open your native text editor (advanced users only).

- **Test DB Connection:**

Verify that your database is properly configured and ready to receive data.

## Upload Data Menu

- **Data Folder:**

Displays the folder where raw data should be placed. Ensure AE33 and TCA data files are stored in their respective subfolders.

- **AE33:** Upload AE33 data.

- **TCA:** Upload TCA data.
- **Both:** Upload both AE33 and TCA data.

The system intelligently detects duplicates and only processes new records.

## Audits Menu

- **Purpose:**

Provides tools to check database integrity.

- **Functionality:**

- Audits the database for time gaps by comparing average intervals between records.
- Exports audit results in CSV format for further examination.

- **Access:**

Audit reports are saved in the designated **Audits Folder**, which can be opened with your native file manager.

## Analysis Menu

- **Folder:**

Opens the folder where analysis outputs will be stored.

- **Update Constants:**

Opens an editable configuration file for modifying analysis constants.

**Note:** Changes are persistent and must be manually reverted to default if desired.

- **Run Analysis:**

After selecting a date range, you will be prompted to specify:

- The **time resolution** at which to average the raw data.
- The **current data storage interval**.

**Note:** It is recommended to use the same or a higher interval than the TCA data, though any interval can be used.

The tool will then generate:

- An Excel report with averaged values and calculated data.

- A **Plots** folder containing a time-series plot and a diurnal plot.
- An **Rsquared** folder with R-squared plots based on the selected time delta.