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.

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, Linux, or Mac (specify supported platforms).
• Database Software: SQLite.

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.

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.