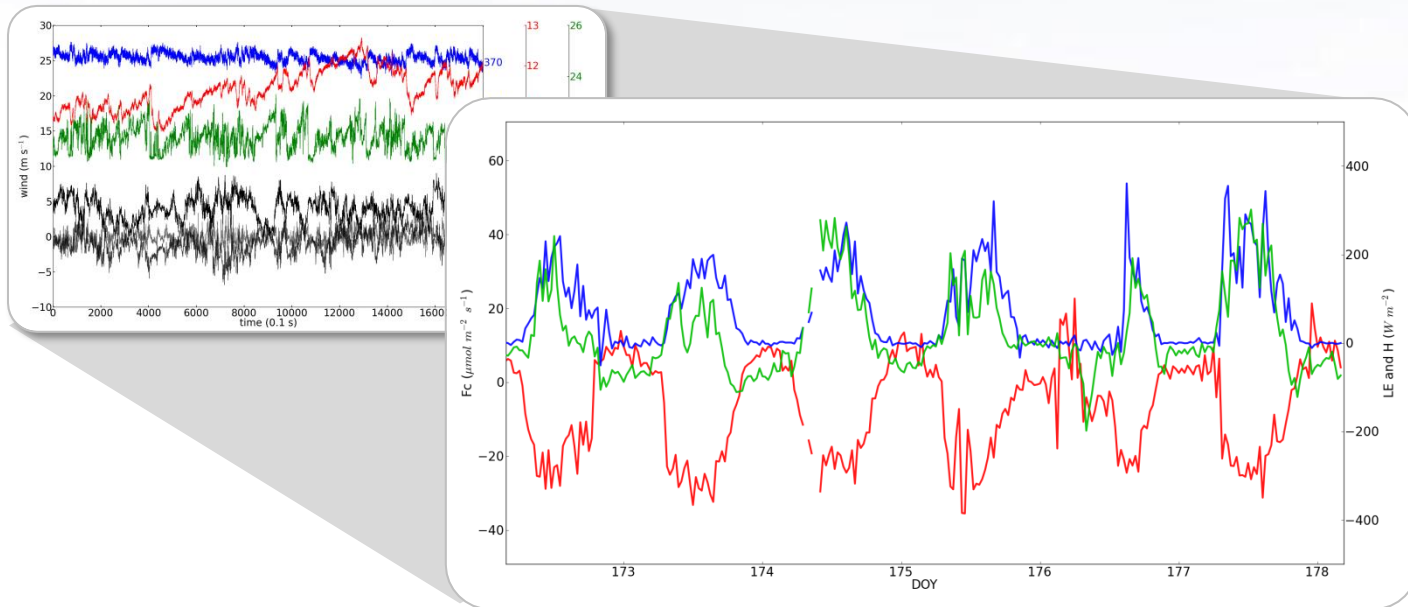


Eddy Covariance Data Processing with EddyPro

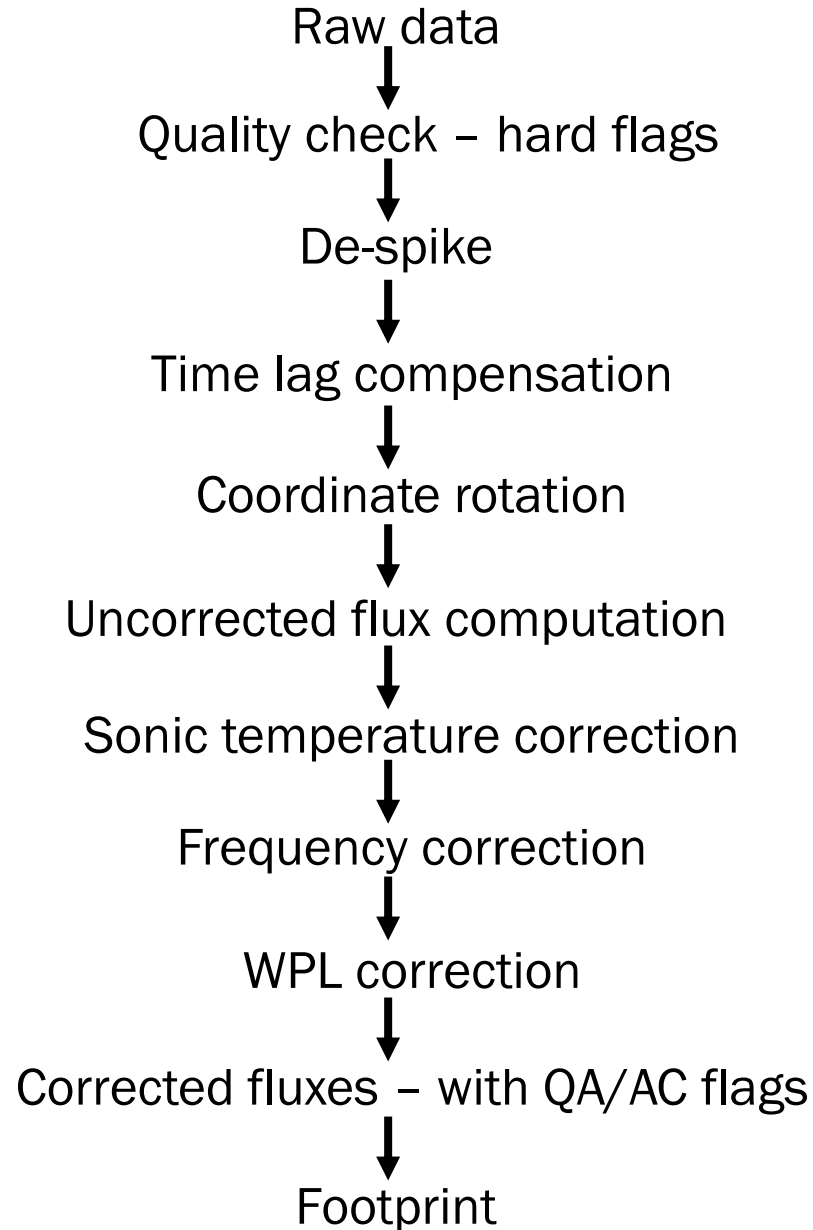
Jiahong Li



Outline

- Overview of data processing
- Live EddyPro data processing demonstration
- Explanation on EddyPro and SmartFlux outputs

Basic Data Processing Procedures



More Information on Data Processing

- **EddyPro manual** (<https://www.licor.com/env/support/EddyPro/manuals.html>)

Section 5.

Calculation reference

This section describes the steps executed by EddyPro when it processes a dataset.

Raw Data Formats

GHG files - .ghg

- High frequency data + metadata
- Biological and meteorological (Biomet) data + metadata
- Li - Cor EC systems

TOA5 - .txt

- Table Oriented ASCII Format 5
- Derived from other data formats
- PC logging

TOB1 - .dat

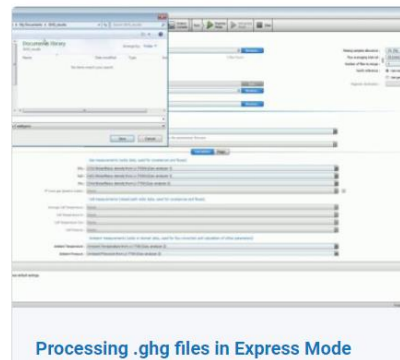
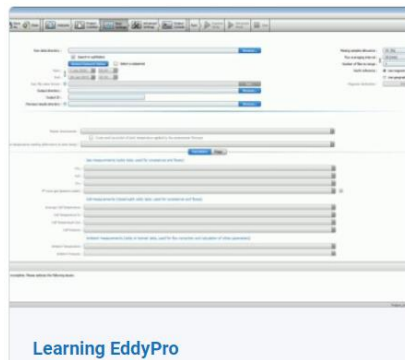
- Table Oriented Binary Format 1
- Campbell datalogger

Steps to Process Raw Flux Data with EddyPro

GHG files: <https://www.licor.com/env/support/EddyPro/videos.html>

Videos

The following video tutorials will help familiarize you with EddyPro.



ASCII and TOB1 files: <https://www.licor.com/env/support/EddyPro/topics/processing-ascii-and-tob1-files.html>



EddyPro[®] 7 Software








What do you want help with?

Processing ASCII and TOB1 raw data files

EddyPro gets timestamps information from the names of raw flux data files. The file names should have year, month, day, hour, and minute and this should be consistent across all the files. The second is not needed in the file names:













EddyPro 7 Outputs

Express Mode

-  eddypro_stats
-  eddypro_user_stats
-  eddypro_Exp_biomet_2019-03-29T094307_exp.csv
-  eddypro_Exp_fluxnet_2019-03-29T094307_exp.csv
-  eddypro_Exp_full_output_2019-03-29T094307_exp.csv
-  eddypro_Exp_metadata_2019-03-29T094307_exp.csv
-  processing_2019-03-29T094307_exp.eddypro

Advanced Mode

1. More output files

-  eddypro_binned_cospectra
-  eddypro_binned_ogives
-  eddypro_full_cospectra
-  eddypro_spectral_analysis
-  eddypro_stats
-  eddypro_user_stats
-  eddypro_Adv_biomet_2019-03-29T095752_adv.csv
-  eddypro_Adv_fluxnet_2019-03-29T100126_adv.csv
-  eddypro_Adv_full_output_2019-03-29T100126_adv.csv
-  eddypro_Adv_metadata_2019-03-29T100126_adv.csv
-  eddypro_Adv_qc_details_2019-03-29T095752_adv.csv
-  processing_2019-03-29T100126_adv.eddypro

2. Able to choose output files

EddyPro Output File Formats

- Eddypro_output ID_biomet_yyyy_mm_ddTHHMMSS.csv
(Mean biomet values of flux averaging period)
- Eddypro_output ID_Fluxet_yyyy_mm_ddTHHMMSS.csv
(Output file in Fluxnet format)
- **Eddypro_output ID_full_yyyy_mm_ddTHHMMSS.csv**
(Final results file from raw data processing)
- Eddypro_output ID_metadata_yyyy_mm_ddTHHMMSS.csv
(All the metadata used for flux calculations)
- Processing_yyyy_mm_ddTHHMMSS.eddypro
(EddyPro project settings)

More Information on EddyPro Output

➤ **EddyPro manual** (<https://www.licor.com/env/support/EddyPro/manuals.html>)

Section 3.

EddyPro output files

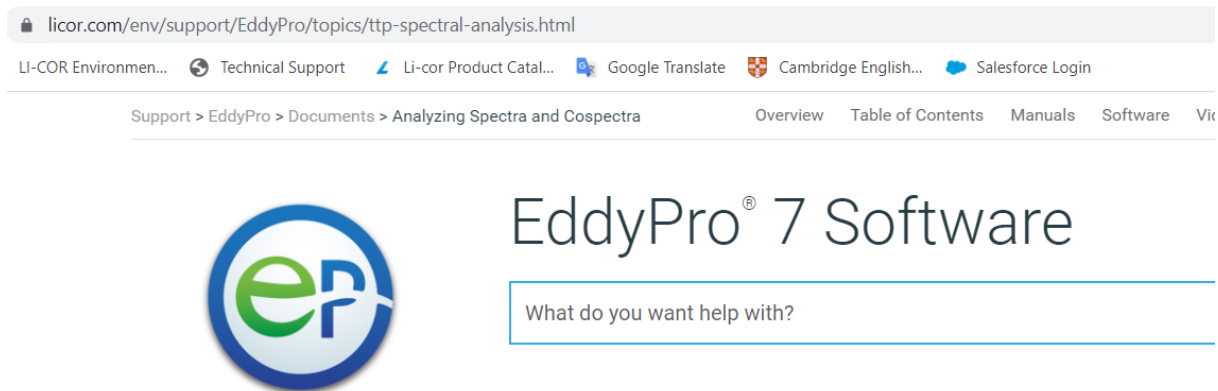
Table 3-2. Shorthand for variables in output files from EddyPro.

Label	Units, Format, or Range	Description
filename	-	Name of the raw file (or the first of a set) from which the dataset for the current averaging interval was extracted
date	yyyy-mm-dd	Date of the end of the averaging period
time	HH:MM	Time of the end of the averaging period
file_records	#	Number of valid records found in the raw file (or set of raw files)

Spectral and Cospectral Results in EddyPro Output

➤ Web link:

<https://www.licor.com/env/support/EddyPro/topics/ttp-spectral-analysis.html>



Analyzing Spectra and Cospectra in EddyPro

Spectral analysis determines how variance or covariance distributes over frequency for a finite time series data set. Eddy covariance (EC) spectral analysis can reveal insights that would otherwise not be obvious by looking at data in the time-domain only. Spectral analysis allows you to assess whether the instruments have enough resolution, if a sampling rate is fast enough, and if a flux averaging period is adequate, among other things. Here are the basic steps for doing spectral analysis using EddyPro:

1. Choose EddyPro Advanced Mode to process your raw data.

There are two data processing modes in EddyPro: Express and Advanced. Only the Advanced Mode outputs

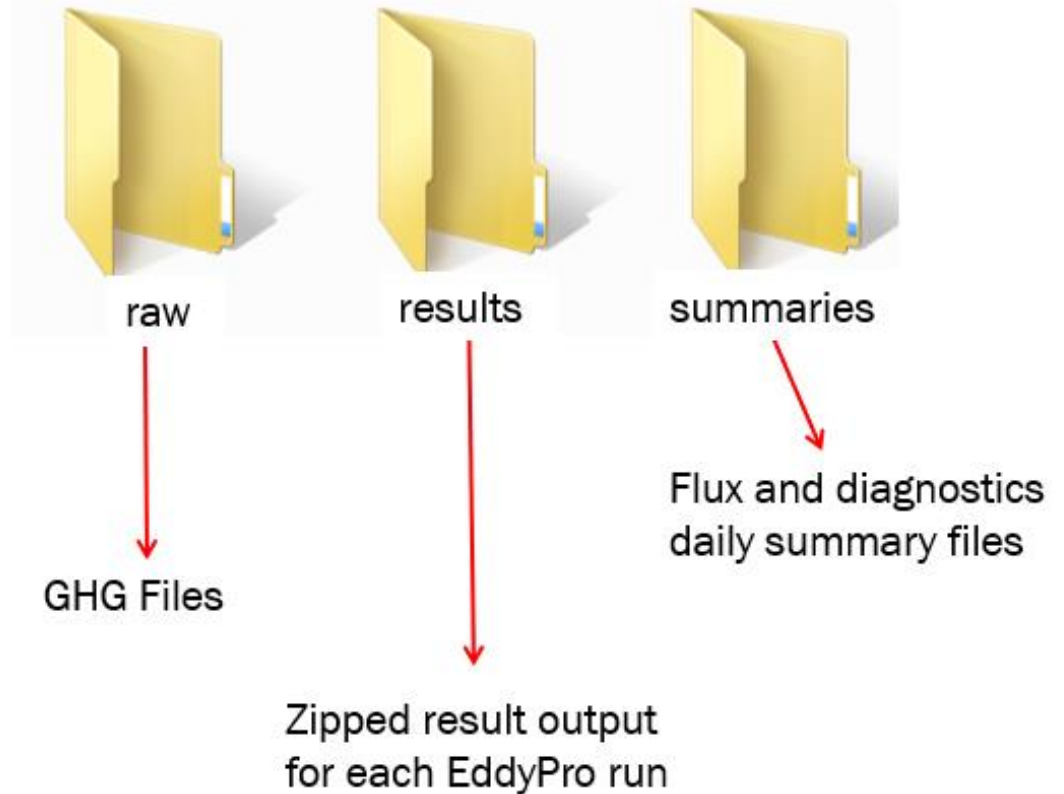
SmartFlux Outputs

SmartFlux 1, 2, or 3
with EddyPro embedded

SmartFlux 1



SmartFlux 2 or 3








SmartFlux Daily Summary Files



Flux Summary

- Final fluxes for each half hour of the day

/home/licor/data/summaries/*.*

Name	Size	Changed
		3/1/2022 12:30:00 PM
 2022-02-18_AIU-0737_EP-Summary.txt	74 KB	2/18/2022 11:33:36 PM
 2022-02-19_AIU-0737_EP-Summary.txt	75 KB	2/19/2022 11:32:56 PM
 2022-02-20_AIU-0737_EP-Summary.txt	75 KB	2/20/2022 11:33:04 PM
 2022-02-21_AIU-0737_EP-Summary.txt	74 KB	2/21/2022 11:33:34 PM

Live Demonstrations

- Data processing from EddyPro
- How to understand EddyPro and SmartFlux outputs