Excel SF Software

A Quick Guide

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Introduction

The SapLinx Sap Flow Sensor outputs a calibrated total tree sap flow value. In some instance, users will want to assess and analyse the raw data for their own purposes. Implexx Sense has provided a freely available Excel file to assist with the data analysis. Each file is intended to correct and analyse a single SapLinx Sap Flow Sensor.

The Excel SF Software converts heat pulse data to volumetric sap flow via the Dual Method Approach, Péclet method (DMA$_{Péclet}$) as described in detail by Forster (2020):

Forster MA (2020). The importance of conduction versus convection in heat pulse sap flow methods. *Tree Physiology*. https://doi.org/10.1093/treephys/tpaa009

For further assistance, contact your local distributor or Implexx Sense: www.implexx.io

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Overview of the Excel SF Software

The Excel SF Software consists of a series of worksheets and macros. It is important that macros are enabled for the proper functioning of the file.

The following is an overview of the worksheets in the Excel SF Software:

- IMPORTANT

    - This worksheet contains copyright detail as well as latest updates to the file.

- INSTRUCTIONS

    - An overview of how to use the worksheet including information contained in this manual.

- RAW DATA

    - Copy and paste the raw data downloaded from the data logger.

- VARIABLES

    - Enter user-defined variables, such as trunk diameter, into this worksheet. Do not change the variables highlighted in red.

- HEAT VELOCITY CORRECTED

    - Heat velocity, in outer and inner sapwood, calculated via $DMA_{Péclet}$ method (Forster 2020).

- SAP FLUX DENSITY

    - Heat velocity converted to sap flux density via methods described by Barrett et al (1995).

- TOTAL SAP FLOW

    - Total tree or stem volumetric sap flow.

Step 1: Read and Study the Literature!

Implexx Sense has made the conversion of raw data to total tree volumetric sap flow as easy as possible in the Excel SF Software. However, an understanding of the calculations, as well as the data, will only be complete if the user takes time to study a few key papers from the literature. Before proceeding with any analysis, Implexx Sense strongly recommends a thorough understanding and comprehension of the following publication:

Forster MA (2020). The importance of conduction versus convection in heat pulse sap flow methods. *Tree Physiology*. https://doi.org/10.1093/treephys/tpaa009

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Step 2: Download Data from a Data Logger

You will need the raw data collected from your data logger. See the manual for How to Download Data for more information.

Step 3: Copy and Paste Raw Data

Copy the data from the file downloaded from the data logger and paste into the RAW DATA worksheet in the following order:

Start at Row 5.

- COLUMN A: Date and time stamp

- COLUMN B: alpha_outer

- COLUMN C: alpha_inner

- COLUMN D: beta_outer

- COLUMN E: beta_inner

- COLUMN F: tMaxT_outer

- COLUMN G: tMaxT_inner

Step 4: Enter User-Defined Variables

In the VARIABLES worksheet, enter the user-defined variables in Column C between rows 3 and 10.

DO NOT CHANGE ANY OF THE PARAMETERS OR CELLS HIGHLIGHTED IN RED.

For detailed information on each variable and their definition, see Installation of SapLinx sensor manual and guide.

Important Notes:

- WOUND DIAMETER: note that this must be 2-decimal place only.

- Note the units of measurement in Column D. It is critical that each value is entered in the correct unit of measurement. An incorrect unit of measurement will result in calculation errors.

Step 5: Calculations

Following the input of variables, all subsequent calculations are automatically completed. Data in the HEAT VELOCITY, SAP FLUX DENSITY, and TOTAL SAP FLOW worksheets are calculated based on the parameters entered in the VARIABLES worksheet.

Step 6: Check the Data

Implexx Sense has carefully checked the parameters and calculations in the Excel SF Software.

However, Implexx Sense strongly encourages you to double check your data for outliers or mistakes. These may have been caused by the raw data or a mistake in the calculation.

Implexx Sense does not assume, or presume, accuracy with the data. It is the User's ultimate responsibility to ensure the data are correct and of high quality.

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