

Importing data from Excel

Step 1. Ensure your data are in a format suitable for import into PRIMER

Suppose we have a dataset in Excel that is already in a suitable format for import into PRIMER. The environmental data from the Fal estuary provides an example of this. These data are found in the file 'Fal_environment.xls' and consist of values for each of 12 environmental variables measured from sediments collected from 27 sites across 5 tidal creeks in the Fal Estuary (available in the folder called 'Fal_benthic_fauna' inside 'Examples_P8', obtained by clicking **Help > Get Examples...**, as seen in the last section).

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1	Fal estuary environmental variables														
2		R1	R2	R3	R4	R5	R6	R7	M1	M2	M3	M4	M5	P1	P2
3	% silt/clay	87	76	71	73	45	70	61	97	92	93	97	97	94	
4	% organic carbon	6.8	6.5	5.7	5.7	3.9	8.7	6.5	8.5	9	8.5	8.5	8.1	8.8	
5	Ag	4.94	4.91	3.27	3.04	3.09	3.43	2.73	2.34	2.2	2.48	2.23	2.38	1.49	
6	Cd	3.75	4.45	2.49	2.61	1.44	2.59	1.91	1.57	1.48	1.46	1.19	1.63	1.74	
7	Co	27.4	27.2	21.5	18.7	17.3	22.2	18.8	13.3	12.8	12.2	12.8	13.3	11.4	
8	Cr	45.4	43.8	37.9	32.4	34	41.3	36.4	66.3	56.5	63	54.4	58.2	41.4	
9	Cu	3302	3373	2387	2176	2040	2452	1997	1354	1246	1274	1188	1300	690	
10	Fe	67862	68098	53118	49505	47250	55256	49826	42261	41326	41584	38693	39978	32023	
11	Mn	611	586	521	521	507	539	488	405	411	392	373	394	279	
12	Ni	37.3	35.9	28.1	26.5	27.6	29.2	25.3	33.8	31.7	32.6	31.9	33.8	25.9	
13	Pb	271	265	192	180	165	206	185	196	179	186	186	194	134	
14	Zn	5279	5873	3583	3328	2252	3475	2900	1460	1357	1481	1379	1479	1085	
15															
16	Creek	R	R	R	R	R	R	R	M	M	M	M	M	P	P
17	Creek name	Restrongu	Restrongu	Restrongu	Restrongu	Restrongu	Restrongu	Restrongu	Mylor	Mylor	Mylor	Mylor	Mylor	Pill	Pi
18	Position	1	2	3	4	5	6	7	1	2	3	4	5	1	
19															
20															
21															

Important things to note about this file:

- There is a *title* for the dataset ('Fal estuary environmental variables') in the very first (upper left-hand) cell (A1). This title is optional, but handy as a naming convention.
- The cell immediately under the title (cell A2) is *empty*.
- There are *column labels* ('R1', 'R2', ...) in row 2. These are unique labels for the sampling units (Sites in this case).
- There are *row labels* ('%silt/clay', '% organic carbon', ...) in column A. These are unique names associated with each variable.

- The entries for every cell in the matrix of data itself (beginning with cell B3) all contain *numerical values only*. There are no non-numeric characters. This means that you may not use 'NaN' or 'NAN' to denote missing values. If data are missing from a cell, then it should be left **blank**. In addition, symbols such as '<' or '>' (for 'less than' or 'greater than') are similarly not permitted or accepted as valid data values within the data matrix.
- In this example, the variables are rows and the sampling units (sites) are columns. It is perfectly ok to have this formatted the other way around, with variables as columns and sampling units as rows. You will specify the orientation of your data matrix explicitly when you import your Excel file into PRIMER.

This format must be adhered to precisely, with no extra blank rows or columns, or extra headers, otherwise PRIMER will not be able to open it successfully.

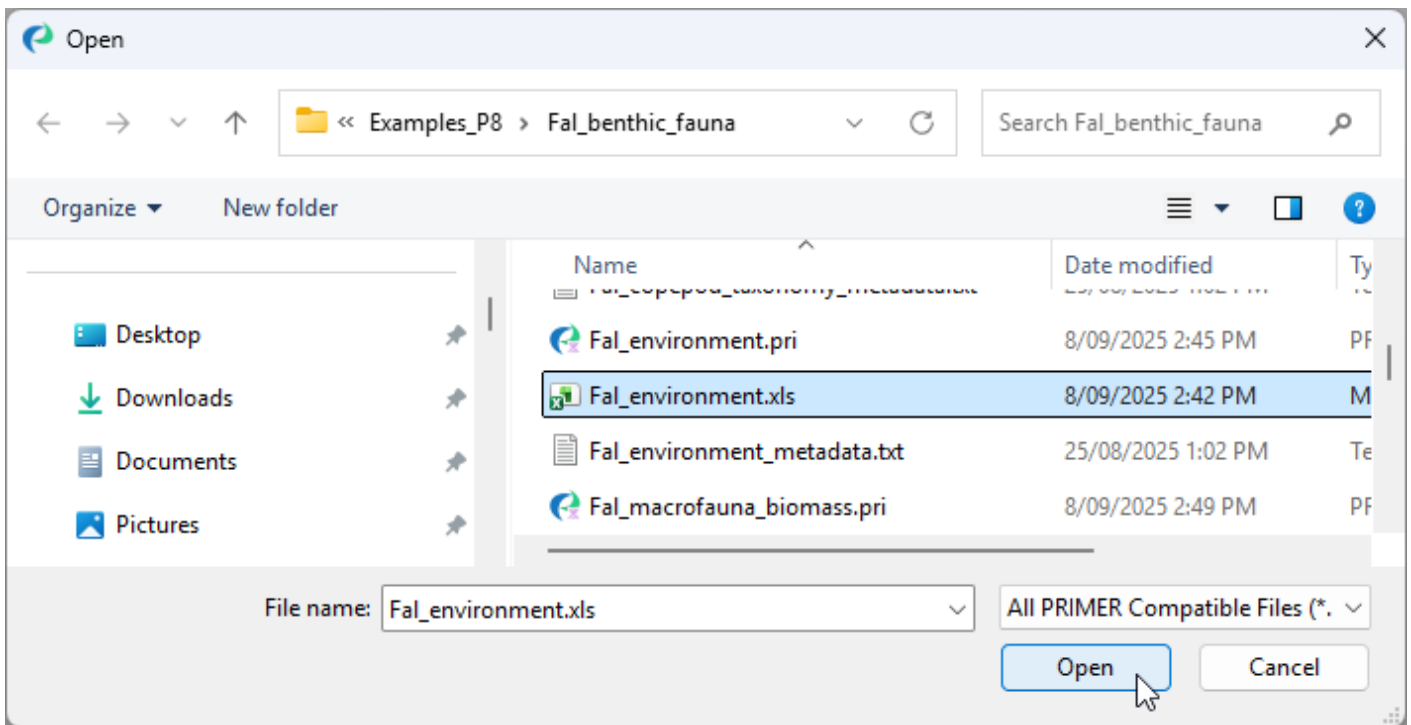
Other things to note:

- **Factors:** You can label the sampling units as belonging to a level of one (or more) factors by **skipping a line** at the bottom of the matrix and placing this 'factor information' there. In the above image you can see that there are three factors: 'Creek' (row 16), 'Creek name' (row 17) and 'Position' (row 18).
- **Indicators:** You can similarly label variables as belonging to particular groups in the same manner; this is done along the *other* margin of the data matrix (e.g., after skipping a column, for this example). This might be useful for doing analyses on subsets of variables belonging to different types, such as physical vs chemical variables. In a case where variables are species, one might want to consider subsets of variables corresponding to families, functional groups, etc.

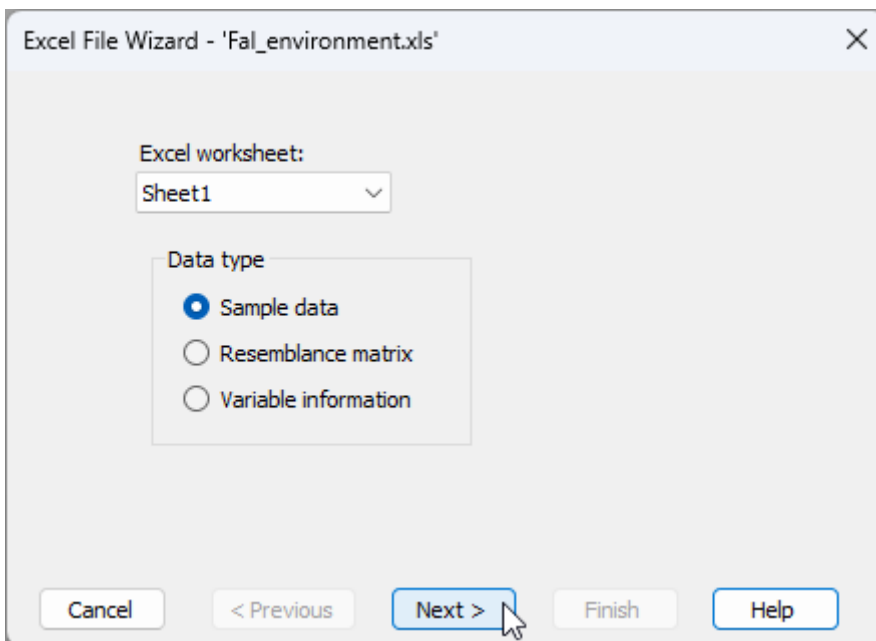
Inclusion of one (or more) *factors* (to specify groups of samples) or *indicators* (to specify groups of variables) is optional. If you have more than one factor, then these are given one after the next (in adjacent rows); do not put blank rows between multiple factors. Similarly, if you have more than one indicator, these would be given one after the next (in adjacent columns, for this orientation). The initial single blank row (or column) is there simply to demarcate the difference between the data matrix itself and additional information about the data matrix upon import.

Step 2. Open PRIMER and import the data from Excel

1. Once your Excel file is ready, open up PRIMER and choose **File > Open**, then click on the name of your Excel file in the browser (here it is 'Fal environment.xls'), then click **Open**.



- This will initiate PRIMER's Excel File data-import Wizard. Choose the name of the specific sheet within your Excel file that contains your data and the type of data you are importing. Here, we have (Excel worksheet: **Sheet1**) & (Data type **Sample data**), then click **Next >**.



- Choose the correct orientation, type of data and the meaning of blank entries (if any). For this example, we have (Orientation **Samples are columns**) & (Data type **Environmental**) & (Blank = **Missing value**), then click **Finish**.

Excel File Wizard - 'Fal_environment.xls'

☒ Title
☒ Row labels

Orientation
☒ Samples as columns
☐ Samples as rows

Data type
☐ Abundance
☐ Biomass
☒ Environmental
☐ Unknown/other

Blank =
☒ Missing value
☐ Zero

Cancel < Previous Next > Finish Help

4. You will now see your data file has been imported and is nicely displayed in the PRIMER workspace. It appears in its own window, and its name also appears in the 'Explorer tree'-type window shown on the left-hand side of the PRIMER desktop.

PRIMER

File Edit Select View Wizards Pre-treatment Analyse Plots PERMANOVA+ Tools Window Help

Workspace

Fal_environment

Fal_environment

Fal estuary environmental variables
Environmental

	Samples							
	R1	R2	R3	R4	R5	R6	R7	M
% silt/clay	87	76	71	73	45	70	61	
% organic carbon	6.8	6.5	5.7	5.7	3.9	8.7	6.5	
Ag	4.94	4.91	3.27	3.04	3.09	3.43	2.73	
Cd	3.75	4.45	2.49	2.61	1.44	2.59	1.91	
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Cu	3302	3373	2387	2176	2040	2452	1997	
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Mn	611	586	521	521	507	539	488	
Ni	37.3	35.9	28.1	26.5	27.6	29.2	25.3	
Pb	271	265	192	180	165	206	185	
Zn	5279	5873	3583	3328	2252	3475	2900	

Now that the data are in PRIMER, it is a good idea to do some post-import data checks.

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