

Transposing the datasheet

The **Clyde environment** sheet has samples as rows and variables as columns. This is the opposite of the ecological matrices typically seen so far, such as **Clyde macrofauna biomass**, in which rows are the variables (species). The environment matrix is displayed according to the convention in classic multivariate statistics (samples as rows) but ecologists, for good reason, have long chosen to use the transposed form. This is because they often have p (species) $>$ n (samples), whereas classical (normality-based) multivariate methods require $n \gg p$, and it is generally neater to put the larger set of labels into rows (this also suits lengthy species names). It makes no difference to PRIMER which way round the matrices are held, the only important specification being which axis holds the samples (rows or columns?). That is changed by (Samples as•Columns) or (Samples as•Rows) on the **Edit>Properties** menu and not by transposing the array (so that columns turn to rows and rows to columns). However, a **Tools>Transpose** operation may sometimes be helpful in displaying a sheet in PRIMER or, more likely, before saving the data to an external file, when another software application needs a particular orientation. Take **Tools>Transpose** on **Clyde environment** and note that the Samples/Variables designation also switches.

The image shows two windows from the PRIMER software. The left window, titled 'Clyde environment', displays a data table with 'Samples - Sites' as rows and 'Variables' as columns. The right window, titled 'Data6', displays the same data table but with 'Variables' as rows and 'Samples - Sites' as columns. A 'Tools' menu is open over the left window, with the 'Transpose' option highlighted.

	Cu	Mn	Co	Ni	Zn	Cd	Pb
S1	26	2470	14	34	160	0	7
S2	30	1170	15	32	156	0.2	5
S3	37	394	12	38	182	0.2	8
S4	74	349	12	41	227	0.5	9
S5	115	317	10	37	329	2.2	13
S6	344	221	10	37	652	5.7	31
S7	194	257	11	34	425	3.7	17
S8	127	246	10	33	292	2.2	13
S9	36	194	6	16	89	0.4	4
S10	30	326	11	26	108	0.1	4
S11	24	439	12	34	119	0.1	5
S12	22	801	12	33	118	0	5

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
Cu	26	30	37	74	115	344	194	127	36	30	24	22
Mn	2470	1170	394	349	317	221	257	246	194	326	439	801
Co	14	15	12	12	10	10	11	10	6	11	12	12
Ni	34	32	38	41	37	37	34	33	16	26	34	33
Zn	160	156	182	227	329	652	425	292	89	108	119	118
Cd	0	0.2	0.2	0.5	2.2	5.7	3.7	2.2	0.4	0.1	0.1	0
Pb	70	59	81	97	137	319	175	130	42	44	58	52
Cr	53	15	77	113	177	314	227	182	57	52	36	51
Dep	144	152	140	106	112	82	74	70	64	80	83	83
%C	3	3	2.9	3.7	5.6	11.2	7.1	6.8	1.9	3.2	2.1	2.3
%N	0.53	0.46	0.36	0.46	0.69	1.07	0.72	0.58	0.29	0.38	0.35	0.45

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