Standardising species

Pre-treatment>Standardise can also be used to standardise the matrix on the variables axis, e.g. to ensure that each species is given equal weight in any ensuing similarity calculation by making their totals across samples all add to 100, with (Standardise•Variables) & (By•Total). There is an alternative option, (By•Maximum), to scale each species so that its maximum value across samples is always 100. Similar species standardisations are already built into some resemblance measures, e.g. the Gower coefficient S_{15} (see Section 5) scales all species to have the same maximum, in effect, because it divides each variable through by its range (and for most species the minimum value across all samples is usually 0). For analysis of community samples, however, such species standardisation (by totals or maxima) is usually undesirable because it gives rare and very low abundance species as much weight (usually more weight in practice) than common and abundant ones. Variable standardisation, over samples, occasionally has a role with non-assemblage data which is still in the form of positive 'quantities', taking values down to zero but on non-comparable scales. Generally more useful though, for environmental-type matrices (where measurement scales differ, zero may play no special role at all, and values can be negative, especially after transformation) is what PRIMER refers to as normalisation – removing both scale and location differences amongst the variables (see below). The major use of variable standardisation is for the multivariate analysis of species rather than samples. To avoid the problems of standardising rare species, this first requires reduction to the 'most important' species, using the techniques of the last section. Then species standardisation is an important step in determining groups of species that display a *coherent* response across the set of samples; see Section 10 and Chapter 7 of the CiMC manual. **File>Save Workspace** the current form of the WA fish ws, for further use later, and close it.

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