MDS & PCA ordinations

The Basic MVA wizard next produces non-metric MDS (*n*MDS) plots in 2-d and 3-d, together with their associated Shepard diagrams, which show how well (or badly) these distances among samples in the low-d ordination plots approximate the high-d resemblances. If the stress (Section 8) is not too large (it is only 0.10 here), *n*MDS plots give a powerful representation of the sample patterns.

The wizard is here running (again on the resemblance matrix) **Analyse>MDS>Non-metric MDS (nMDS)** under default conditions, but taking this directly, there are options to choose higher-d solutions and, more entertainingly, to watch the iterative process of trying to obtain the lowest stress 2-d solution (say) from different restarts of sample points thrown randomly into 2-d, which you can activate – and even record as an *.mp4 file – by (✓Animate) on the dialog (Section 8). There are other recordable animations possible also, of spinning 3-d ordination plots and showing a dynamic trajectory of, for example, a time series of samples on an MDS or other ordination plot.

Where the data matrix is environmental and (usually) variables normalised, there is a choice of ordination by PCA (**Analyse>PCA** run on the normalised data sheet) or *n*MDS on the Euclidean distance resemblances. These are both offered by the wizard but, running directly, a third option is **Analyse>MDS>Metric MDS (mMDS)**, which fits a straight line to the Shepard diagram of MDS (low-d) distances *vs* original (high-d) distances, and in one respect improves on PCA here, giving a more faithful preservation of the high-d distances by avoiding the PCA projection into low-d.

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