PCA plot options

Many of the options for manipulating PCA configurations are exactly the same as for MDS plots, covered extensively in Section 8, so will not be repeated – only features that differ will be shown. General rotation is not allowed in a PCA: directions have defined meanings as the axis of greatest variation, then the axis perpendicular to that with the greatest variation of that unaccounted for by the first axis, etc. However, any axis can be reflected (flipped) without affecting the interpretation in any way. Which direction the algorithm chooses to plot an axis – to the right or left, up or down, in or out etc. – is arbitrary (though repeatable). In fact, in order visually to match up the PCA plot for environmental data with the *m*MDS for the same data, and the biomass (or abundance) *n*MDS ordinations, seen in the previous section, it might be necessary to run **Flip X** or **Flip Y** (or, in a 3-d plot, also **Flip Z**) either from the **Graph** or floating right-click menu. Note that when you do this, both the points and the vectors will (naturally) reverse. This does mean, however, that information already written to the results window is now slightly incorrect: the signs of the eigenvector for the axis that has been reversed need to be mentally switched (+ to – and – to +). The current location of points (PC scores) after flipping will, however, always be output correctly by **File>Save Graph Values As**, just as they are for current MDS or CLUSTER rotation states. Mention of *m*MDS raises the question as to how it differs from PCA, if both use the same metric Euclidean distances? So, now visually compare the PCA with the *m*MDS under the Ranked variables heading of Section 11.

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