ANOSIM tests

The wizard then runs, for both biotic and abiotic data, **Analyse>ANOSIM**>(Model: One-way - A) & (Factors A: Creek)>(Type Unordered) on the respective resemblance matrices as active sheets. This tests for statistically significant differences overall among the 5 creeks in terms of their biota (or environmental data), and follows it up with pairwise tests between pairs of creeks, using the 5 (or in one case 7) locations in each creek as the replicate level. The Results window (eg *ANOSIM1*) shows the ANOSIM R statistic is large (0.82 for biota, 0.71 for environmental variables), close to its maximum value of 1, implying very good clear separation of the creeks, and highly significantly different from the null hypothesis R = 0, of no creek differences – the same is true of the pairwise tests. The associated plot (*Graph1*) is of the null hypothesis values of R under random permutations and shows that values not much more than R = 0.2 would be expected here if creeks did not differ.

ANOSIM tests can be much more extensive. PRIMER 7 introduces the idea of ordered ANOSIM tests, in which a numerical factor can be defined for the groups *a priori* (perhaps testing for simple time trend, or spatial gradient of change). Two-way crossed or nested, and three-way crossed, nested, or mixed crossed and nested, designs can be defined, with any factor ordered or unordered and analyses are then often possible without replicates as well as with them – see Section 9.

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