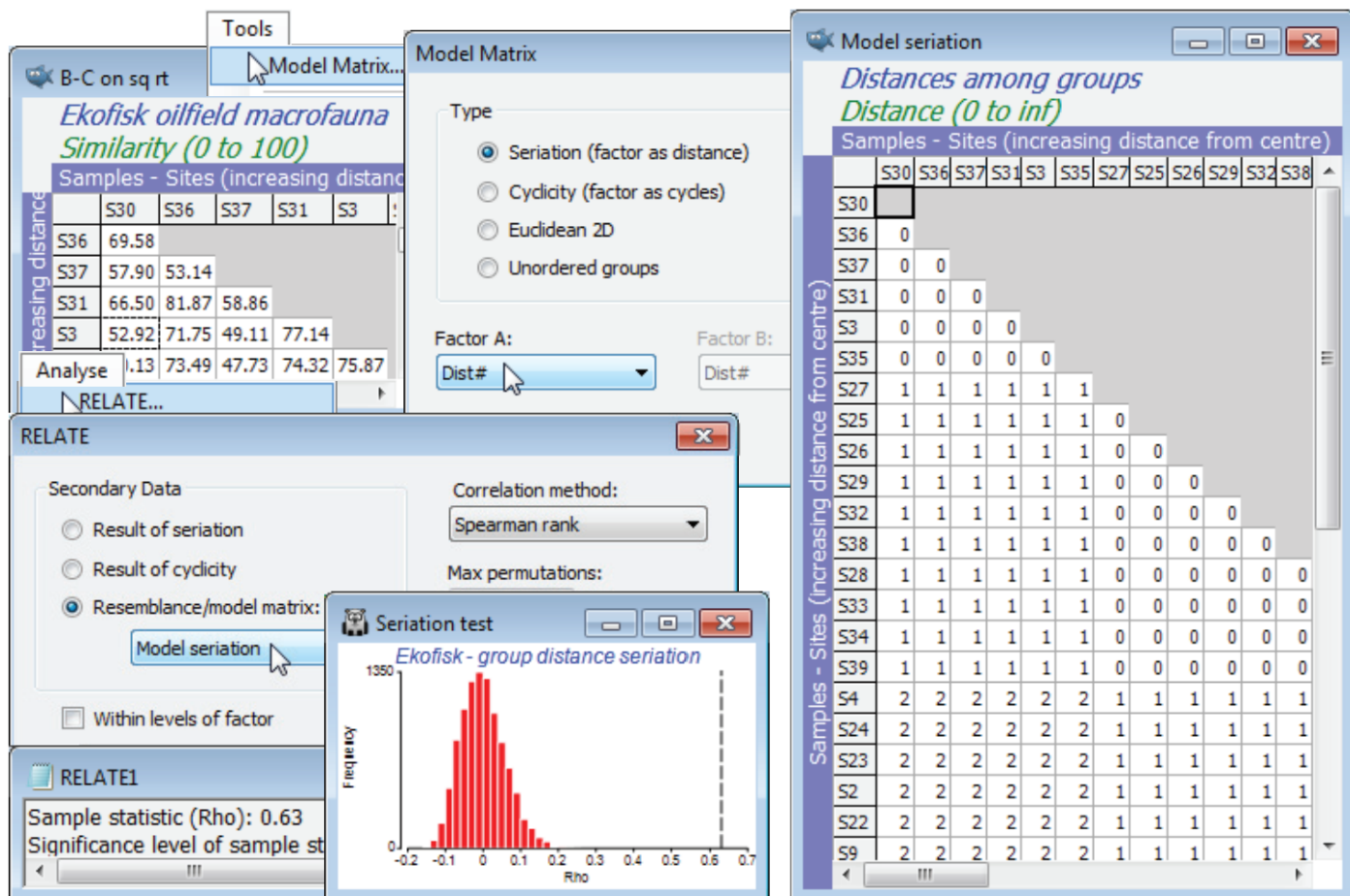


# Seriation with replication

Return to the macrofaunal data set from the Ekofisk oilfield, with workspace **Ekofisk ws** last saved in C:\ Examples v7\Ekofisk macrofauna in Section 9, following an ordered 1-way ANOSIM test (with replication) on the similarity matrix **B-C on sq rt** from data **Ekofisk macrofauna counts**. This used factor **Dist#**, which is the numeric form of the four groups of sites at different distances from the oilfield,  $1 \equiv D: < 250\text{m}$ ;  $2 \equiv C: 250\text{m}-1\text{km}$ ;  $3 \equiv B: 1-3.5\text{km}$ ;  $4 \equiv A: > 3.5\text{km}$ . The rationale for an ordered test here was discussed in Section 9 (and Somerfield PJ, Clarke KR, Olsford F 2002, *J Anim Ecol* 71:581-593), namely the improved power but more limited generality in testing the null  $H_{0}$ : *no differences* against an ordered alternative  $H_{1}$ :  $A \rightarrow B \rightarrow C \rightarrow D$ , rather than the unordered alternative  $H_{1}$ : *A, B, C, D differ* (in ways unspecified). Those authors, and previous versions of PRIMER, did not use the generalised (ordered) ANOSIM statistic – which is new to PRIMER 7 – but used the analogous RELATE statistic  $\rho$  between the biotic resemblances and a model matrix for *seriation with replication*. This is a model matrix which **Analyse>RELATE** does not handle internally in the (•Result of seriation) option – that is restricted to simple seriation with no replication – but which can be simply constructed from the active matrix **B-C on sq rt**, using **Tools>Model Matrix>(Type•Seriation (factor as distance)) & (Factor A: Dist#)**. [The factor **Dist**, splitting the sites into alphabetic levels D, C, B, A, will not work here because distances cannot be calculated between names]. A model matrix is generated – rename this **Model seriation** – having blocks of 0's down the diagonal (sites within a distance group are considered 0 distance apart), then off-diagonal blocks of 1's then 2's then 3's (sites in groups 1 and 2 are 1 unit apart, in groups 1 and 3 are 2 units apart etc.). Again with **B-C on sq rt** active, run **Analyse>RELATE>(Secondary data• Resemblance/model matrix: Model seriation)**, giving  $\rho = 0.63$  ( $p < 0.01\%$ ), providing clear evidence of group differences, with large  $\rho$  confirming the strongly ordered gradient away from the oilfield.



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