CASCADING COUNTS OF NANNOFOSSIL ABUNDANCE

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Introduction

The following article has been posted on the 'coccolith.list' on a couple of occasions. It was originally written at the request of Brian O'Neill, my boss, so he could distribute it to the Industry Coordinators group. Since it was posted, I have received several positive responses from folks who have modified it to their own uses. On at least one occasion it has been cited as a personal communication. Since it has proved to be so useful, it was decided that it would be best to publish it.

Methodology

Statistical data for nannofossils is usually obtained by counting individuals of each taxon in a very limited number of fields of view (sometimes as low as 5-10). We have found that such a small sample-size yields unreliable results, especially in sparser samples. Using the following procedure, all statistics are based on the number of individuals of a given taxon observed in a full traverse comprising 120 250μm fields of view (fov). A cascading counting method is used to achieve a statistically significant sampling without being overly time-consuming.

The abundance categories are as follows:

Rare (R)... 1-5
Rare to Frequent (RF)...................................... 6-15
Frequent (F)... 16-35
Frequent to Common (FC).............................. 36-75
Common (C)... 76-150
Common to Abundant (CA)............................. 51-300
Abundant (A)... 301-600
Very Abundant (VA)....................................... 601-1000
Very Very Abundant (VVA)............................. 1001-2000
Extra Abundant (XA)...................................... 2001-9999
Extra Extra Abundant (XXA)............................ >9999

Procedure

To use the cascading counting method, one moves from one whole fov to the next for a full traverse across the width of the coverslip. During the first quarter-traverse, one counts the number of fov examined. The number of individuals for each taxon are counted until 10 fov are examined. At this point, the number of individuals in any taxon with a double digit or greater count is multiplied by 12 (to relate to the full traverse) and the corresponding relative abundance is assigned.

At 15 fov, any double-digit count of the remaining taxa is multiplied by 8 to get a relative abundance. This procedure is repeated until the quarter-traverse is completed. After a quarter-traverse, all but the taxa with the lowest abundances have been assigned a relative abundance. At this point, the remaining taxa can be counted for the rest of the traverse without accumulating unduly high counts. In exceptionally rich samples, the cascade can be started at a lower number of fov (taxa in the higher abundance categories can usually be estimated from one or two fov). Relative abundances obtained using this method, when compared with counts of a full traverse, have been found to be extremely accurate.

This takes longer to explain than to put into practice!

Equipment used: microscope - Zeiss Axioscope; objective - x63 Ph3 Planapochromat; oculars - x16. Slides are prepared with polymer-treated samples, 30mm coverslip affixed with Pyccolyte.