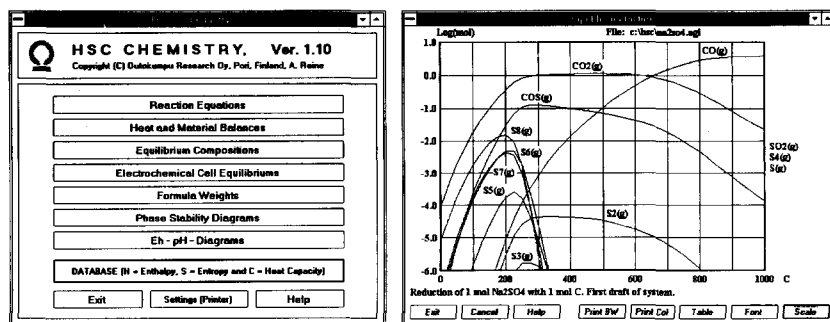


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tual spectra of the first group of soil samples—those obtained near the road. The test spectra were formed simply by increasing the scale of the calibration spectra in hyperspace by a certain amount (a multiplicative factor of 2, 3, 5, or 10) at 19 wavelengths. The center of the test spectra was the same as the calibration spectra in hyperspace; thus, no location change occurred (both groups had the same average spectrum). The algorithm is thus quite sensitive to changes in spectral group scale, independent of any location change (which would indicate a change in the average spectrum).

Figure 5 shows how ρ from Equation 1 drops as the test sample spectral cluster decreases in scale with respect to the calibration cluster. As in Figure 4, the calibration spectra were the actual spectra of the group of soil samples obtained near the road. The test spectra were formed by dividing the scale of the calibration spectra in hyperspace by a certain amount (a factor of 2, 3, 5, or 10) at 19 wavelengths. The center of the test spectra was the same as the calibration spectra in hyperspace, so no location change occurred (both groups had the same average spectrum).

The algorithm is therefore extremely sensitive to a reduction in the scale of the test spectra—even more sensitive than it is to an increase in the scale of the test spectra. The difference in sensitivity of the algorithm to size relationships is the reason the algorithm calculates a distance in SDs of ρ in the two ways shown in Table I. Using the largest group of spectra as the theoretical cumulative distribution function (TCDF) in the empirical QQ plot puts the bends in the line in the center of the plot instead of at the ends, producing a greater effect on the correlation coefficient ρ (3). When the calibration spectra and the test spectra have nearly the same scale in hyperspace, both distances in SDs are approximately equal. However, when the two spectral groups have dramatically different scales, as in the case of the road and creek samples in Table I, the two distances in SDs are extremely different.

One final case, the Haygood investigation, exemplifies the significance of this method. Mary Jane Haygood left for school one September morning with her sister and her boyfriend, setting in motion events that would lead to the discovery of her death only days later (4).

Her mother had forbidden the re-

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