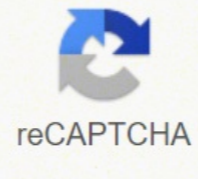
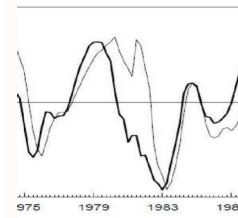




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	Mean ( $\phi$ )	Sorting( $\sigma$ )	Skewness (Ski)
Max.	1.78	0.95	0.42
Min.	0.65	0.57	0.03
Ave.±	1.411±0.33	0.72±0.129	0.11±0.11
Max.	1.8	0.92	0.46
Min.	0.85	0.59	-0.1
Ave.±	1.351±0.3	0.681±0.094	0.12±0.14
Max.	2.01	0.83	0.59
Min.	1.32	0.59	-0.17
Ave.±	1.707±0.24	0.703±0.081	0.116±0.2
Max.	2.08	0.83	0.15
Min.	1.13	0.42	-0.14
Ave.±	1.62±0.28	0.515±0.105	0.045±0.09
Max.	2.11	0.59	0.51
Min.	1.12	0.41	-0.02
Ave.±	1.441±0.27	0.525±0.061	0.195±0.18

Mathematical Geology, Vol. 30, No. 1, 1998

### Importance of Skewness and Kurtosis Statistical Tests for Outlier Detection and Elimination in Evaluation of Geochemical Reference Materials<sup>1</sup>

Fernando Velasco<sup>2,3</sup> and Surendra P. Verma<sup>3</sup>

*A common characteristic of concentration data compilations for geochemical reference materials (GRM) is a skewed frequency distribution because of aberrant analytical data. Rejection of outlying results usually is required to obtain a better estimate of mean concentration values. The present work describes the application of an approach, based on skewness and kurtosis statistical tests, to establish reliable concentration values in study of rare-earth element compilations for GRM. Frequency histograms of initial concentrations for these elements differ significantly from a normal distribution, as deduced from their skewness and kurtosis coefficients. The statistical procedure shows that rejection of outliers yields normal distributions which can be used to provide mean concentrations with smaller standard deviations for a large number of cases, although for many elements our %RSD are similar (within 5%) to literature values. This procedure has been applied to derive new concentration data for rare-earth elements in 26 GRM, which are compared with earlier compilations to show that the statistical procedure proposed here provides mean values with greater "quality value." Although most present mean concentrations are similar (within 5%) to those reported in previous literature, some of them are significantly different (with differences of up to 40%) in a few GRM.*

**KEY WORDS:** REE compilation, outlier statistical tests, geochemical database management, normal distribution, skewed distribution.

#### INTRODUCTION

A geochemical reference material (GRM) has been defined as a finely ground and homogeneous sample of accurately known composition for all its constituents of interest (Abbey, 1992). Such materials have been employed extensively

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M	SD	Statistic	Std. error	ξ
.43	1.06	0.31	0.10	
.52	1.05	-0.45	0.10	
.72	1.09	-0.27	0.10	
.16	0.85	0.01	0.10	
.53	0.83	-0.18	0.10	
.36	0.88	-0.61	0.10	
.06	0.74	-1.39 <sup>a</sup>	0.10	

What does skewness and kurtosis show. What are skewness and kurtosis. What is the difference between skewness and kurtosis. Importance of skewness and kurtosis in statistics. Importance of skewness and kurtosis pdf. How to evaluate skewness and kurtosis.

Caution: n: The D'Agostino-Pearson test tends to err on the rejection side of normality, particularly with small samples. Look at the two grapes below. Start with the sample size and the mean of the sample. Class Mark, xFrequency, f x̄ = Σ(x<sub>i</sub> · f<sub>i</sub>) / Σf<sub>i</sub> = 615-6,458 653.84 6418-3,452 550.05 6742-0,451.72 70 272,551 141.63 7385.557 590.35 19 937.60 199.3760 Finally, kurtosis is a 4 = m<sub>4</sub> / (m<sub>2</sub><sup>2</sup>) = 199.3760/8.5275<sup>2</sup> = 2.7418 and the excess kurtosis is g<sub>2</sub> = 2.7418 - 3 = -0.2582 But this is a sample, not the population calculated, as you have to the excess of sample kurtosis: G<sub>2</sub> = [99 / (98 · 97)] [101 / (100 · 2582) + 6] = 0.2091 This sample is slightly platykurtic: its peak is slightly lower than the peak of a normal distribution. As with variance, deviation<sup>2</sup> and asymmetry, the above is the final calculation of kurtosis if data are available for the entire population. n = 1998. = 100. = 67.45 inches, and variance = 8.5275 This page uses material from my old Skewness and Kurtosis in TI-83/84, which was created on January 12, 2008 and replaced on December 7, 2008 by part 1 of the MATH200B program; but there are new examples and images and a lot of new or rewritten material. Located on Archive.org in 2006, as it is no longer available in its original. The size of the sample was = 100 and therefore the error of asymmetry is SES = 1 / (n · 100) = 0.01. Beta (A = 4.5, A = 2) asymmetric = +0.5370 1.3846 A = 0 Beta (A = 4.5, A = 2) asymmetric = +0.5370 The first is moderately skewed to the left: the left tail is longer and most of the distribution is to the right. The second is moderately skewed to the right: the right tail is longer and most of the distribution is to the left. Visualizing Kurtosis is unfortunately more difficult to imagine than asymmetry, but these illustrations, suggested by Wikipedia, should help. (This is a two-tailed test for excess kurtosis with a significance level approximately 0.05) If G<sub>2</sub> < 2, the population very likely has negative excess kurtosis (kurtosis

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