Geology 659 - Quantitative Methods

Calculating and interpreting the Amplitude Spectrum

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For Discussion

Some data sets you may remember working with earlier when we were working with autocorrelation and cross correlation methods.

Figure 1
Displaying your data in frequency and period.

Figure 2
Drop line displays emphasize the digital nature of the spectral data. You can also better appreciate that while amplitude spectra have constant frequency sample interval, their reciprocal or corresponding period is not spaced at equal intervals.

Figure 3
The two components we extracted using the autocorrelation are easily observed in the amplitude spectrum. Their frequency is easily measured.
We will spend a little time today reviewing the computations we went through in class on Tuesday. Make sure you understand the simulation activity, and representation of the simulated behavior in spectral form.
Interpretation of your data may be assisted by considering the spectral behavior of individual orbital effects. The amplitude spectrum of orbital eccentricity is show at right for the period of time extending from the present back 800,000 years.
At right, the variations in obliquity or tilt are depicted for the past 800,000 year time period.

The corresponding amplitude spectrum is show below.
Precess.dat

Precession and its spectrum are also shown. Note that precessional variations do not occur at a single or constant frequency.
You’ll be calculating these spectra in class today, and we will talk about their interpretation. Try labeling the periods associated with prominent peaks in each of these spectra.
Further study of the oxygen isotope data we will analyze in class throughout the world could include the analysis of insolation variation predicted from the combined influences of eccentricity, tilt and precession. While you will not be asked to make comparisons of your results to insolation effects, these data have been provided to you for your consideration.