Problem Set 7: MAE 127

due Friday, May 27, 2005

1. Compute frequency spectra for the Alpine daily minimum temperatures that you used in problem set 4. Divide the year-long record into 12 30-day long segments (ignoring the last 6 days of the year), so that you can compute spectra with error bars. Compute your spectrum with and without a Hanning window. (For a Hanning window to make sense, you'll need to subtract the mean from the data. You can do this separately for each segment.) Show your method, and plot your spectra with error bars. How would you describe these spectra?

2. Using the Alpine minimum temperature data, verify Parseval's theorem (discussed in class on May 16.)

3. Compute the coherence between the Alpine and San Miguel daily minimum temperature records. At what frequencies are the records most coherent? What are the statistical error bars for your coherence estimates? What is the phase of the coherence?