Syllabus for MPO 524 - Applied Data Analysis

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Course motivation:
The tools of contemporary ocean-atmosphere data analysis are reviewed in lectures and computer exercises (on student’s own computer, there is no dedicated instructional computer lab). These include

- Basic statistics as used in our applications. Correlatation, covariance, regression, fitting. Fourier analysis of data series. Matrix algebra as applied to covariance matrices in multivariate analyses.
- Programming basics in Matlab, IDL, Python, R, or other fourth-generation (integrated computing+display) language of the student’s choice.
- Graphical issues in data communication.
- Scientific inference, with figures expressing data as evidence.

Prerequisites: MPO 503 or 551 or equivalent (Introductory oceanic, atmospheric sciences), or permission of instructor.

Book: Environmental Data Analysis with MatLab by William and Joshua Menke, Elsevier, 2011. We also use their powerpoints and exercises: http://www.ldeo.columbia.edu/users/menke/edawm/index.htm

Required supplies: Students must have access to a computer and appropriate software. Ideally students will bring a dataset of personal interest to the course for use in their project. Matlab student licenses are reasonably priced, or free software options exist (albeit with less support). Most research-track graduate students (toward whom the course is oriented) will have computer and Matlab access.

Format: Each class will consist of a lecture, followed by homework or project discussion: Assignment of a new activity, demonstration of technique, review of previous assignment and solutions, or project presentations by students.

Grading

Homeworks and participation 40%
Midterm 30%
Project 30%