

## Geoscience Data Analysis (ESS210B)

- Course Time

Lectures: Mon, Wed, 11:00-12:20

Discussion: 1011 Croul Hall

- Text Book

*Data Analysis in the Earth Sciences Using Matlab*, by G. V. Middleton, Prentice Hall

*Some Applications of Statistics to Meteorology*, by H. A. Panofsky and G. W. Brier; PenState University Press

*Statistical Methods in the Atmospheric Sciences*, by D. Wilks, Academic Press

- Grade

Homework (50%), Final (50%)

- Homework

Issued and due every Wednesday

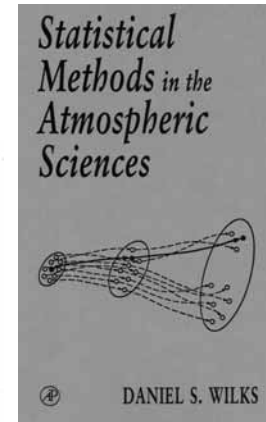


## Text Books

### Some Applications of Statistics to Meteorology

by  
HANS A. PANOFSKY  
Evan Pugh Research Professor of Atmospheric Sciences  
The Pennsylvania State University

and  
GLENN W. BRIER  
Chief, Meteorology Statistics Section  
U. S. Weather Bureau



## Course Description

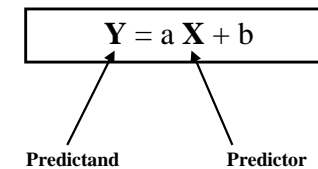
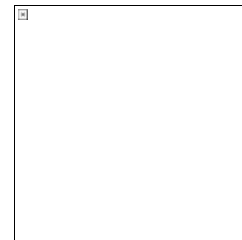
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An introduction to the applications of objective analysis methods to geoscience data.

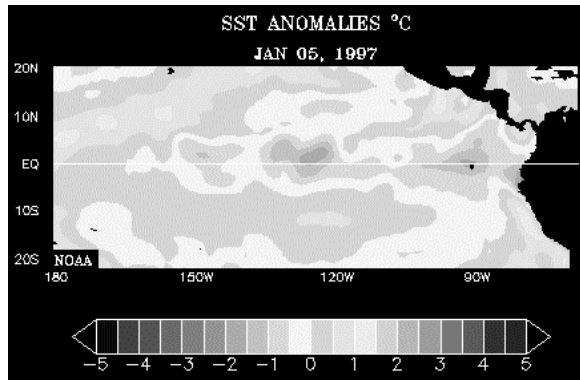
- *What can we say based on the data?*
  - *What can we see from the data?*
- 



## What Can You Say?



## What Can You See?



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## Formats of Instruction

- Explain Why we need a particular objective analysis (statistical) method.
- What is the mathematical (theoretical) background behind this objective analysis (statistical) method?
- Demonstrate this method with examples.

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## Computer Accounts

- Computers  
Department Linux Machine: [system.ess.uci.edu](http://system.ess.uci.edu)  
(Linux) and [esmf.ess.uci.edu](http://esmf.ess.uci.edu) (IBM)
- Software Packages  
Matlab on [system.ess.uci.edu](http://system.ess.uci.edu) and [esmf.ess.uci.edu](http://esmf.ess.uci.edu)
- Graph packages  
Matlab on department machines

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## Syllabus

### Week 1: Probability and Sampling

Review of Basic Statistics  
Theoretical Probability Distributions  
Small Sampling Theory  
Confidence Level  
Hypothesis Testing

### Week 2: Regression Analysis

Linear Regression  
Scattering  
Theory of Correlation  
Multiple Regression

### Week 3: Time Series Analysis I

Autocorrelation Functions  
Harmonic Analysis  
Power Spectrum Analysis

### Week 4: Time Series Analysis II

Space-Time Spectral Analysis  
Filtering of Time Series

### Week 5 - Principal Component Analysis

Empirical Orthogonal Function (EOF)  
Rotate EOF

\*\*\* FINAL \*\*\*

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