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

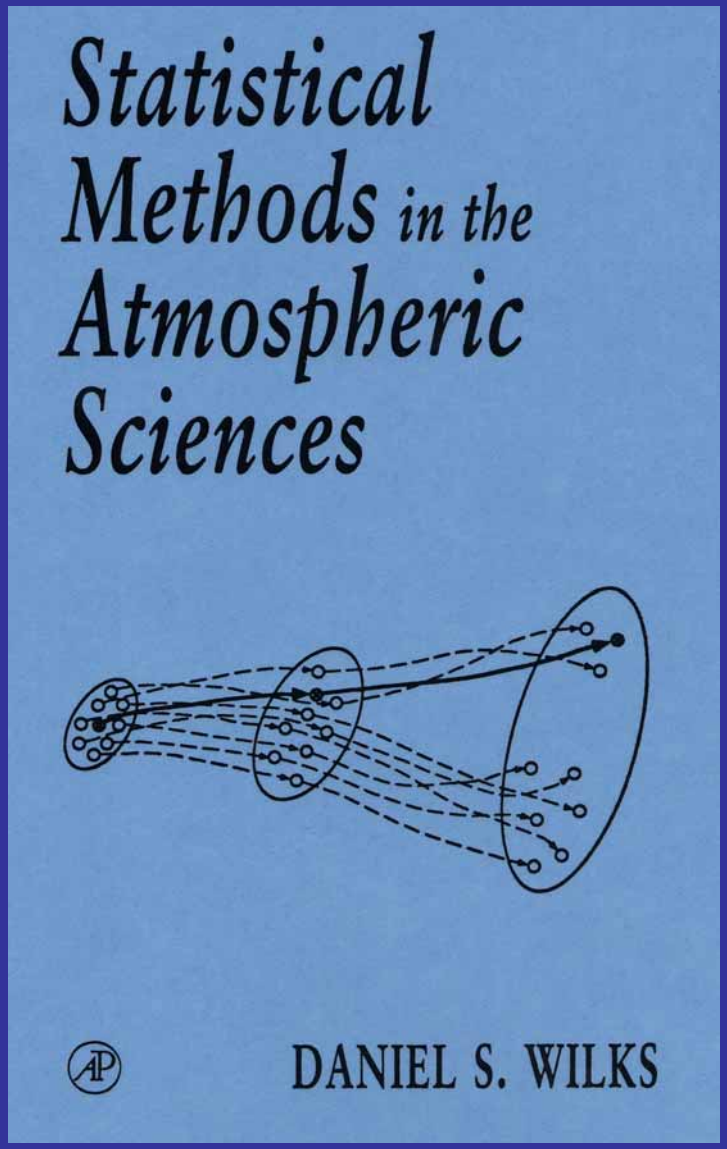
HANS A. PANOFSKY

Evan Pugh Research Professor of Atmospheric Sciences
The Pennsylvania State University

and

GLENN W. BRIER

Chief, Meteorology Statistics Section
U. S. Weather Bureau



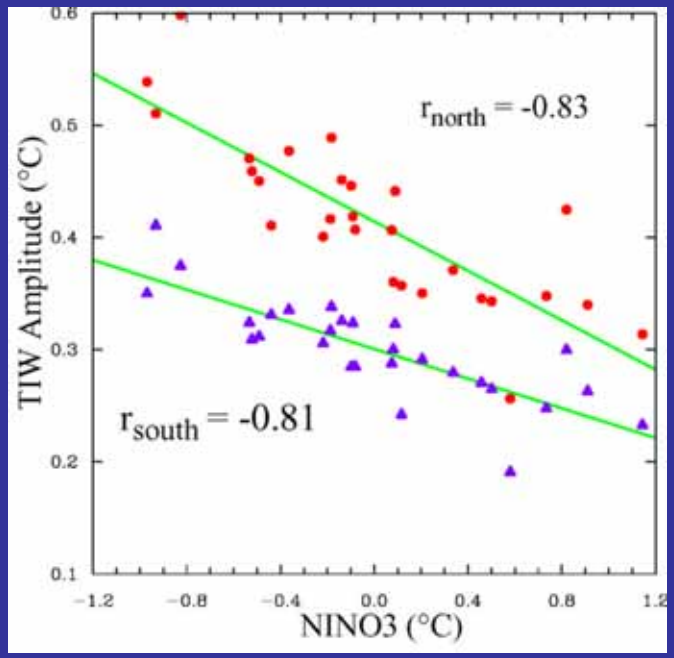
ESS210B
Prof. Jin-Yi Yu

Course Description

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?*

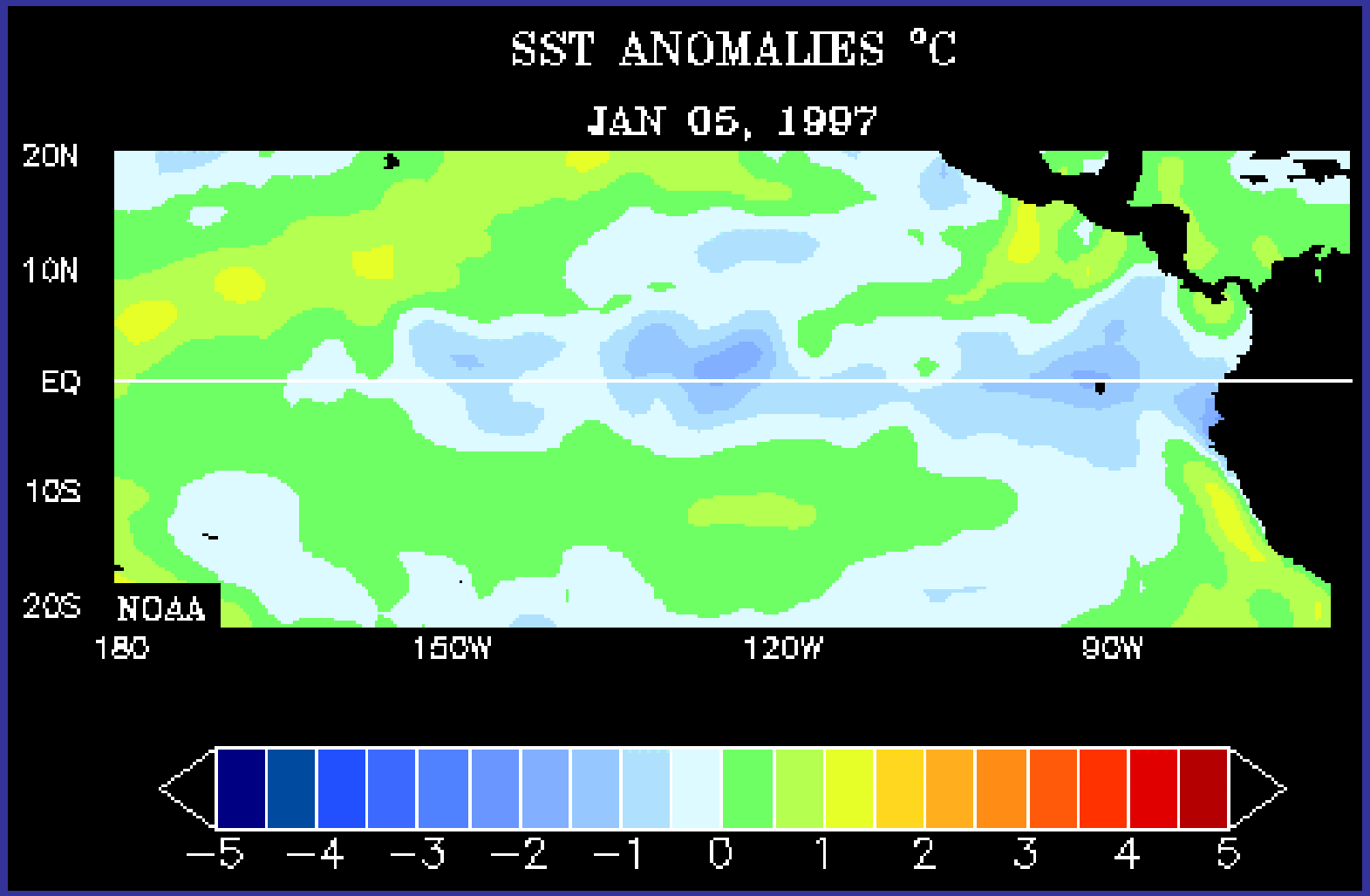
What Can You Say?



$$Y = a X + b$$

Predictand **Predictor**

What Can You See?



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.

Computer Accounts

- Computers

  Department Linux Machine: system.ess.uci.edu (Linux) and esmf.ess.uci.edu (IBM)

- Software Packages

  Matlab on system.ess.uci.edu and esmf.ess.uci.edu

- Graph packages

  Matlab on department machines

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 *****