The Wonderful Research and Grad Life of...

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About Me

- Incoming grad student. Advisor: Scott Denning
- Interests



- Activities

My Research: Problem

- Carbon!
  - Fluxes
    - Gross Photosynthetic Production
    - Respiration
    - Net Ecosystem Exchange

- Models
  - Generic forest representation
  - 8-11 vegetation types
    - Very simplified

Problem: Do our current biosphere models capture the short and long term variations?

- Diurnial
- Inter-seasonal
- Annual

My Research: Method

- Currently: Use model and observational flux data to derive model coefficients called "betas" for GPP, Re, and NEE to see if they vary on the timescales of interest
  - Observational Flux = (Beta + 1)*Model Flux

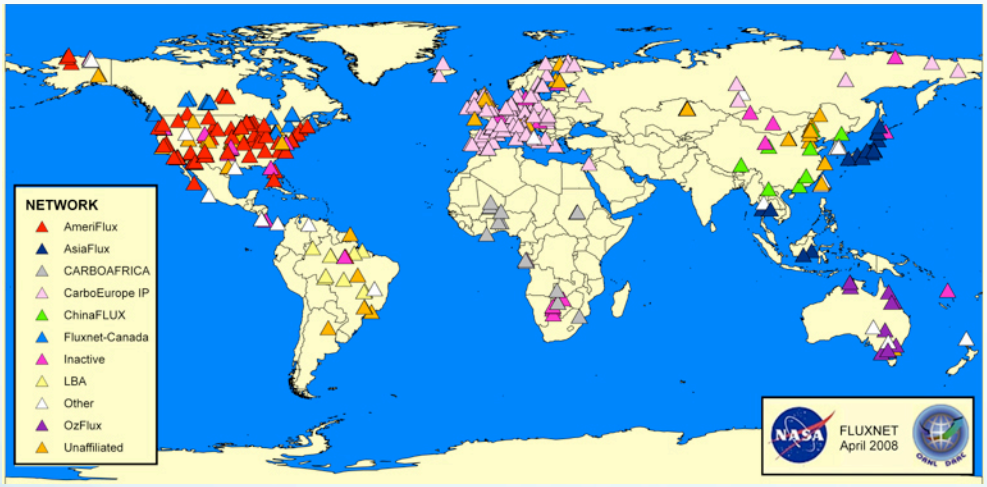


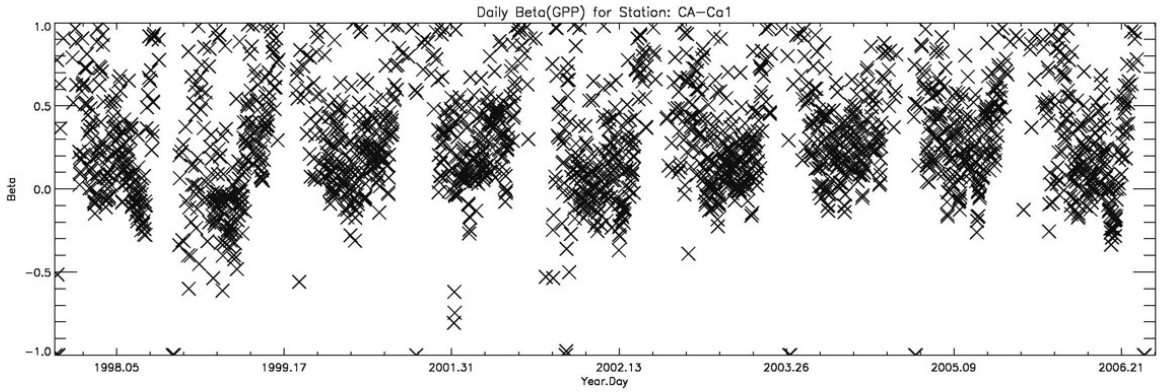
Image: Courtesy of Wikipedia (Fluxnet page)

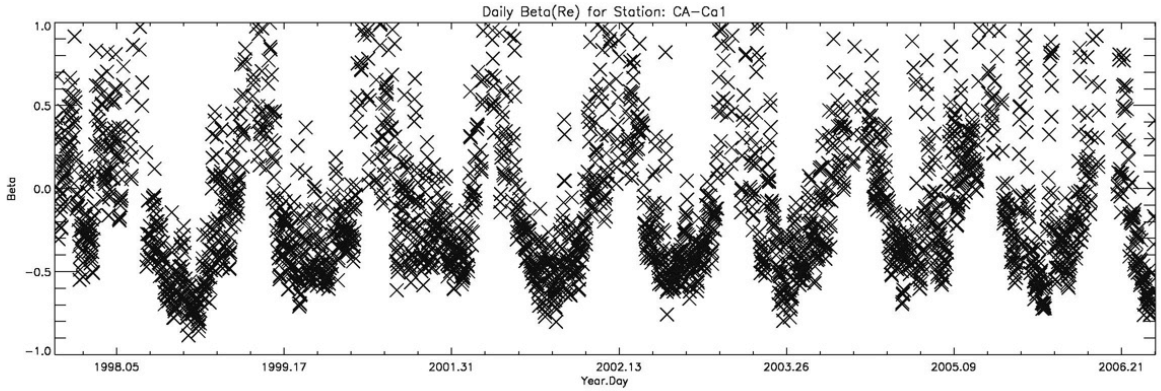
- Data
  - Data from 1990-2008
  - Observational Data
    - FLUXNET
    - Canada FLUX
  - Model Data
    - Simple Biosphere Model (SiB)

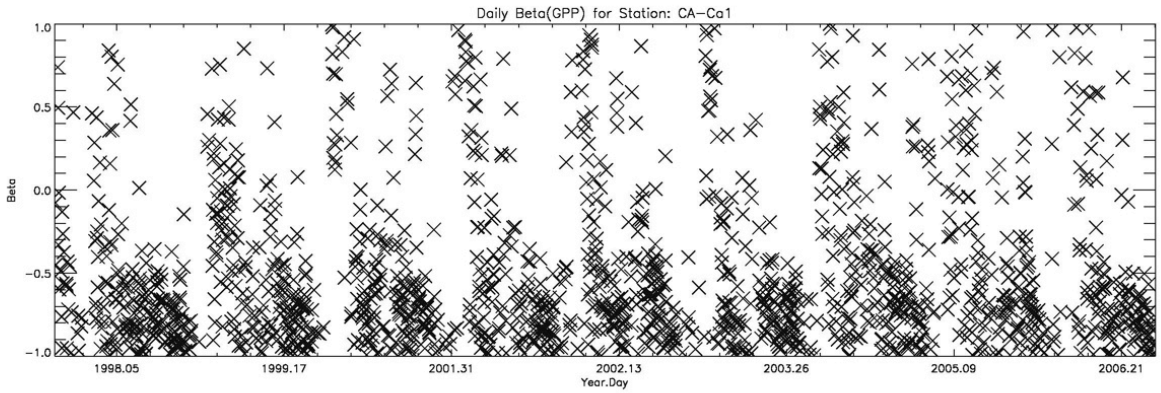
- Issues
  - Most of the observational datasets have incomplete flux gaps
  - The number of sites is very low for the overall number of ecosystem types and continent representation

My Research: Prelim Results

- Daily
  - Station (CA-Ca1)
  - Type: Mixed Forest
  - Good seasonal cycle
  - All fluxes seem to match well with what is expected

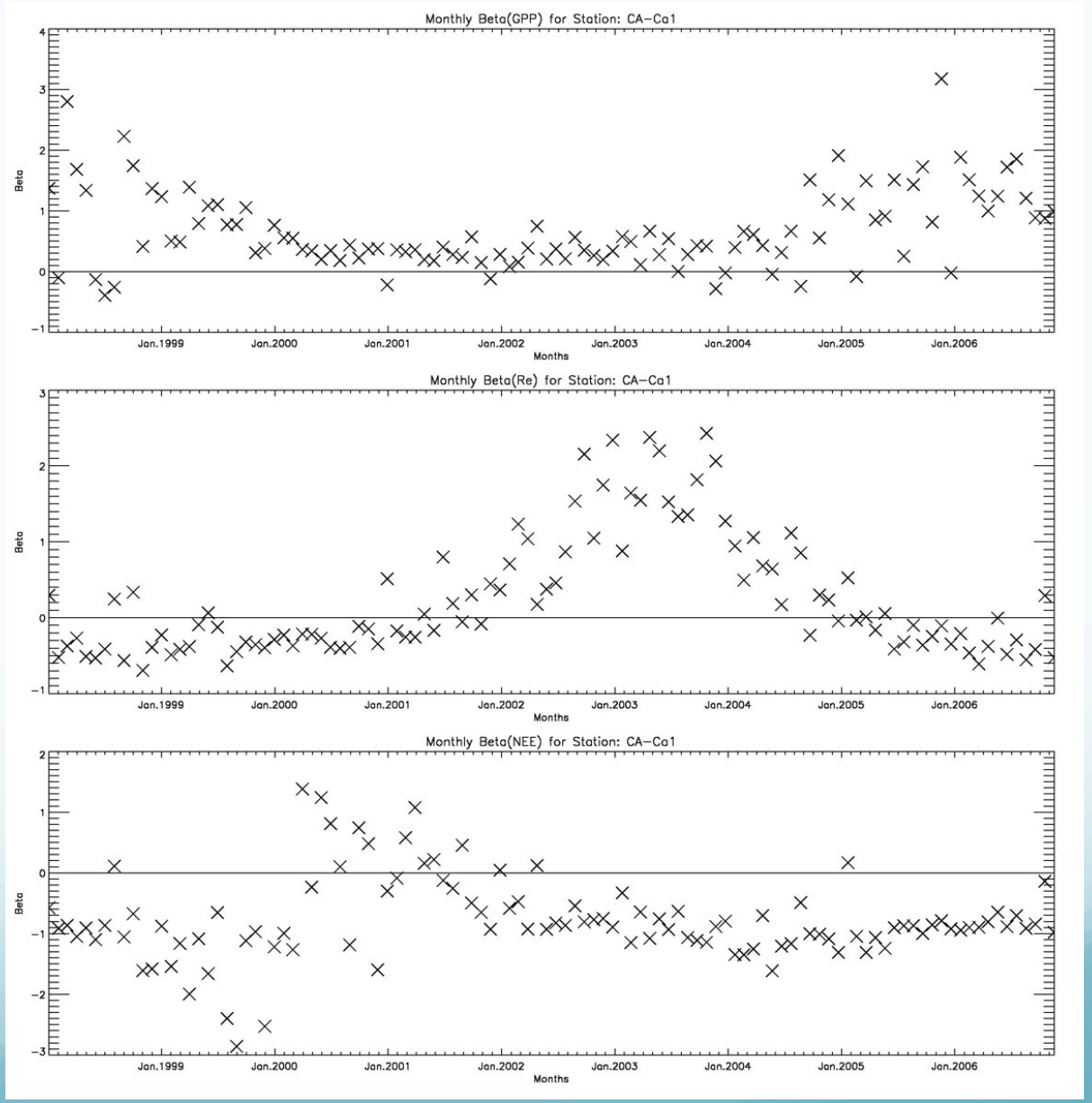






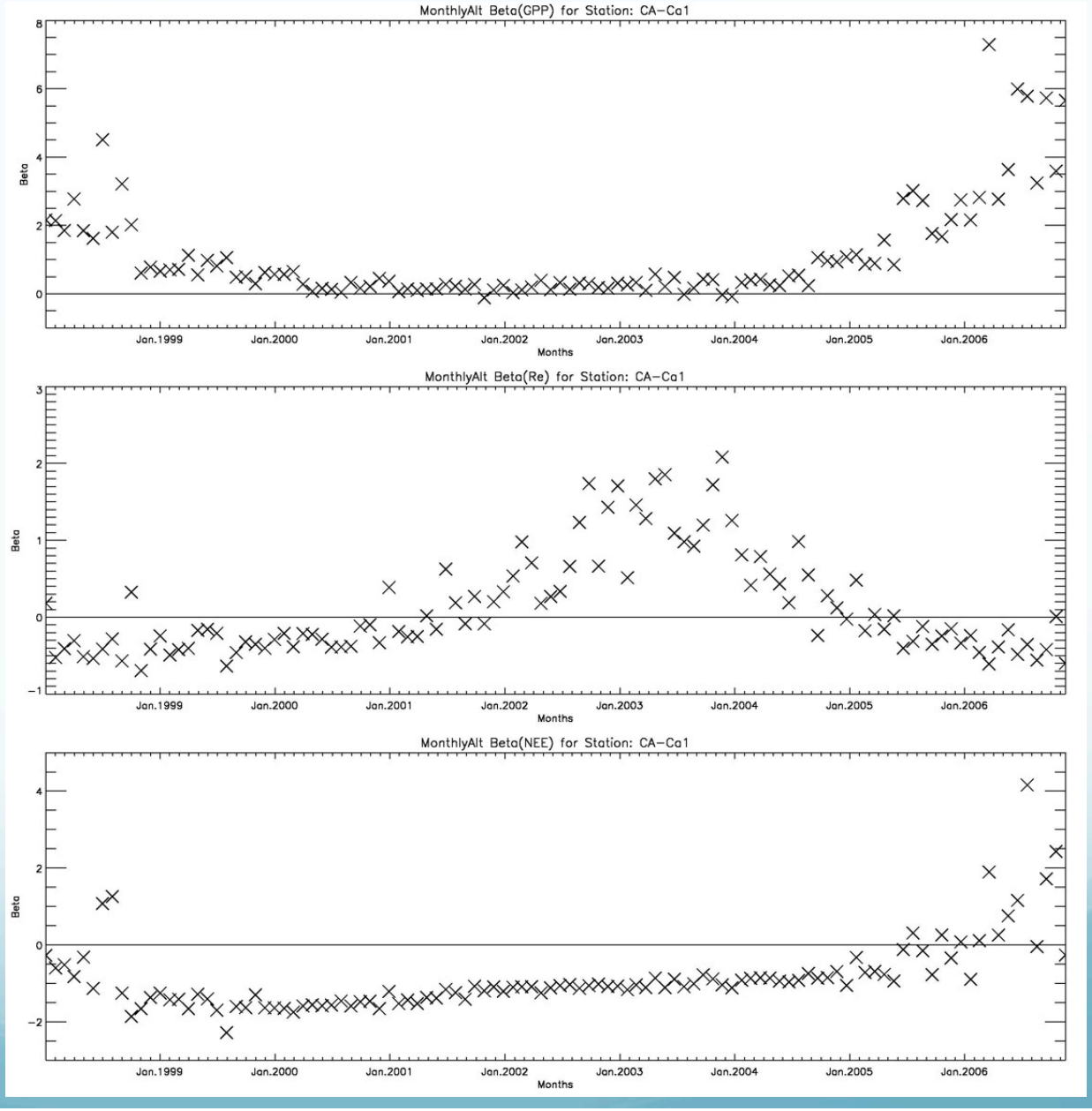
My Research: Prelim Results

- Monthly Average
  - GPP: Dips toward zero. Steady. Spread but increasing later
  - Re: Low and near zero, but maximizes near the midpoint of the data set.
  - NEE: Does not match Re and GPP variations



My Research: Prelim Results

- Monthly Average Alt.
  - GPP: Similar to original averaging, but more cohesive. Exhibits same trend
  - Re: Similar to original averaging and exhibits the same trend
  - NEE: Averages out the spread from mid-1999 to 2002 and makes a much more cohesive measurement. BUT, still no trend with GPP or Re!



Future Work

- Increase the amount of data processed
  - Use more sites from all over the globe
- Use more models
  - North American Carbon Program (NACP) Synthesis Data
- Use a smaller timeframe
  - Hourly to half-hourly preferred for carbon flux
- Perform more advanced statistics to identify the exact trends in the datasets
  - Fast Fourier Transforms (FFTs) and Auto-correlation