Bayesian Forecasting

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Overview

- Discussion of the problem and the proposed solution

- Our work toward the solution

- Results

- Plans for future work
Weather on Earth

http://weblogs.marylandweather.com/hurricane_fran_nasa.jpg
Models of Weather
Models of Weather
Models of Weather
Models of Weather
Models of Weather
Good Models of Weather
Models of Weather
Models of Weather Simplified
Models of Weather Simplified
Bayesian Statistics
Bayesian Statistics
Wang-Sheeley-Arge Model

Images courtesy of Sarah McGregor
Wang-Sheeley-Arge Model

\[ v(f_s, \theta_b) = 265 + \frac{1.5}{(1 + f_s)^{2/3}} \left( 5.8 - 1.6 \exp \left[ 1 - \left( \frac{\theta_b}{7.5} \right)^3 \right]^{3.5} \right) \]

\[ f_s = \left( \frac{R_s}{R_{ss}} \right)^2 \left( \frac{B(R_s)}{B(R_{ss})} \right) \]

Images courtesy of Sarah McGregor
Magnetograms – Model Input
Magnetograms – Model Input
Magnetograms – Model Input
“Left Longitude” Perturbation
“Middle Longitude” Perturbation
“Right Longitude” Perturbation
“Top Half” Perturbation
“Bottom Half” Perturbation
Model Perturbation
Model Perturbation
Model Perturbation
Model Perturbation
Model Perturbation
Model Perturbation
Results

Projected Solar Wind Perturbations - 11/11/06

Mean Wind +/- One Standard Deviation - 11/11/06

Solar Wind Speed (km/s)

Modified Julian Date
Future Work

- Compare model results with observations
- Determine model covariance matrix
- Determine covariance matrix for observed data
- Produce a Bayesian weather model