Bayesian Statistics - Homework 2

Gabry et al., *Visualization in Bayesian workflow* (2018)

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Visualization in Bayesian workflow

A pipeline for our work

Visualization is an invaluable way of justifying and criticize a statistical model.
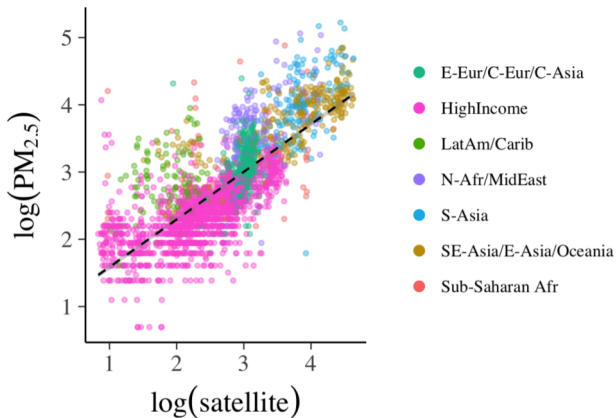
Phases of statistical workflow:

- ▶ Set up an initial model
- ▶ Model check
- ▶ Computational checks for the inference algorithm
- ▶ Posterior predictive checks
- ▶ Model comparison

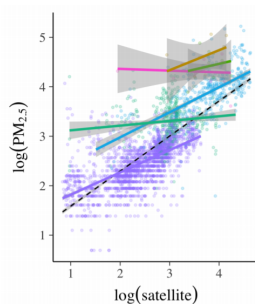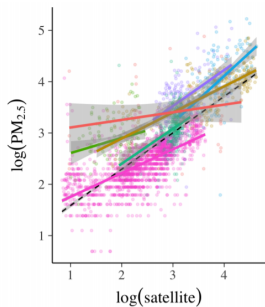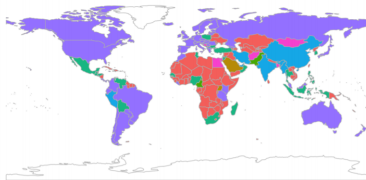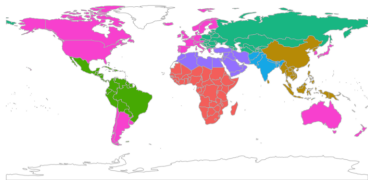**Example**: Estimate global $PM_{2.5}$ concentration

Exploratory data analysis

More than just plotting the data

Exploratory data analysis

More than just plotting the data

Exploratory data analysis
More than just plotting the data

- ▶ **Model 1**: simple linear regression,

- ▶ **Model 2**: multilevel model where observations are stratified by WHO super-regions,

- ▶ **Model 3**: multilevel model where observations are stratified by clustered super-region.

Prior predictive checking

Fake data can be almost as valuable as real data

MCMC diagnostics

Moving beyond trace plots

contenuto…

Posterior predictive checks
How did we do?

contenuto...

Model comparison

Looking *when* and *where* a model is better than another

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