Betsy Cowdery
Peer Review : Angela Rigden

The goal of the project is to model surface conductance as a function of environmental conditions. Surface conductance cannot be measured and thus it is calculated from latent energy, air temperature, incoming solar radiation, vapor pressure deficit and soil moisture content, all of which which can be measured.

The process model is based off the the Jarvis-Stewart conductance model. It involves four constraining functions around the four variables Ta, R, VPD and SMC. These functions not defined in literature and so one of the tasks is to try different functions, conditions and combinations of variables to find a good fit to the data. We discussed the fact that the current constraining function for Ta is probably wrong and something more like f(Ta) = 1-(2*Ta-1)^2 would be more appropriate. Though this would result in there being an “optimal” temperature and I personally don’t know if that’s biologically correct.

We discussed different possible priors for parameters that must be larger than 0. It may be the case that the truncated normal distribution won’t be the best choice and I suggested trying a lognormal distribution. However, I realized that we never discussed whether or not these parameters actually can be equal to 0 - this will significantly change which priors should be used.

Informed prior values were chosen from the literature and hopefully this means they are appropriate. We talked a bit about additional sources that might be helpful in cross-validating these values.

Right now the model is not converging well, the posterior distributions are bimodal and multiple estimates of parameters may predict the same results.
However, we are aware of these issues and we talked about possible flaws - such as choice of prior distributions and constraining functions.

At this point, the output of the model may not be particularly meaningful but given the fact that the first part of the model is from literature and there are specific conditions that the constraint functions need to meet, I think finding a model with a good fit to the data isn't too far off. Overall, I think this study will be a great example of how the choice of prior distributions and constraining functions can significantly change the results of a model.
I definitely think the plots of posterior distributions with the mean and confidence interval around the mean should be included - they're actually in the code and just commented out. I'd also like to see plots for the constraint functions (like the one shown for air temperature. Ultimately, I don't think one needs the autocorrelation plots when describing the burnin and thinning used. Perhaps those belong in supplemental material?

The markup file has great organization and walks you through the steps from setting up the data to creating and implementing the model. The code itself has lots of comments which are very helpful. Every time I asked about something in the code, I realized that I had just missed the answer in the comments.