$$Y_{ij} \sim \mathcal{B}eta(\mu\delta, (1-\mu)\delta)$$

$$\text{logit}(\mu) = \log(\frac{\mu}{1-\mu}) = \alpha + X_{ij}\beta + \theta_j$$

$Y$ is the response (forest cover), $X$ is the covariate (precipitation), for the $i$th observation in the $j$th site.

$\theta_j$ are site-level deviations from the overall intercept. These are drawn from a normal distribution with variance $\tau$.

$$\theta_j \sim \mathcal{N}ormal(0, 1000)$$

$\alpha$ is the intercept, $\beta$ is the slope (all on the logit scale). $\delta$ is a parameter controlling the dispersion (variance) around the mean. These (and $\tau$) are all parameters which have vague priors, and are estimated by MCMC.

$$\alpha \sim \mathcal{N}ormal(0, 1000)$$

$$\beta \sim \mathcal{N}ormal(0, 1000)$$

$$\tau \sim \mathcal{G}amma(0.01, 0.01)$$

$$\delta \sim \mathcal{G}amma(0.01, 0.01)$$