



$$\begin{aligned}
 y_i &\sim \text{NegBinom}(\mu, \phi) \\
 \phi &\sim \text{half-Cauchy}(2.5) \\
 h_i &\sim \text{MultiNormal}(0, \Sigma_p) \\
 \Sigma_p &= \sigma_p^2 \mathbf{V}_{phy} \\
 \sigma_p &\sim \text{half-Cauchy}(2.5) \\
 \beta &\sim \text{Normal}(0, 10)
 \end{aligned}$$