$$Depth \sim NB(mu, size)$$

$$\#methylated \sim Binom(Depth, \theta)$$

$$\theta \sim Beta(\alpha, \beta)$$

$$\alpha = \frac{-\mu\left(\mu^2 - \mu + \sigma^2\right)}{\sigma^2}$$

$$\beta = \frac{(\mu - 1)\left(\mu^2 - \mu + \sigma^2\right)}{\sigma^2}$$