

Step 1

 $\hat{\theta}_m, \Sigma_{\hat{\theta}_m}$ : frequentist view $\theta_m$ : bayesian view

Step 2

 $\theta_*$ : multi-model synthesis

Step 3

Constraint by observations

Climate model  $m = 1$ 

$$\hat{\theta}_1, \Sigma_{\hat{\theta}_1}$$

Climate model  $m = 1$ 

$$\theta_1 \sim \mathcal{N}(\hat{\theta}_1, \Sigma_{\hat{\theta}_1})$$

Climate model  $m = 2$ 

$$\hat{\theta}_2, \Sigma_{\hat{\theta}_2}$$

Climate model  $m = 2$ 

$$\theta_2 \sim \mathcal{N}(\hat{\theta}_2, \Sigma_{\hat{\theta}_2})$$

⋮

⋮

Climate model  $m = N_M - 1$ 

$$\hat{\theta}_{N_M-1}, \Sigma_{\hat{\theta}_{N_M-1}}$$

Climate model  $m = N_M - 1$ 

$$\theta_{N_M-1} \sim \mathcal{N}(\hat{\theta}_{N_M-1}, \Sigma_{\hat{\theta}_{N_M-1}})$$

Climate model  $m = N_M$ 

$$\hat{\theta}_{N_M}, \Sigma_{\hat{\theta}_{N_M}}$$

Climate model  $m = N_M$ 

$$\theta_{N_M} \sim \mathcal{N}(\hat{\theta}_{N_M}, \Sigma_{\hat{\theta}_{N_M}})$$

Prior

$$\theta_* \sim \mathcal{N}(\hat{\theta}_*, \Sigma_{\hat{\theta}_*})$$

Posterior

$$(\theta_* | X_t^{o,R}, X_t^{o,G}, T_t^o)$$