Supplementary Information for "Challenges in scaling up greenhouse gas fluxes: experience from the UK Greenhouse Gas Emissions and Feedbacks Programme" for JGR: Biogeosciences. Temporal upscaling of N_2O fluxes to annual scale.

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JAGS code

The JAGS code for fitting the parameters of the lognormal model to flux data described in the paper is shown below. The first version is for chamber-only data, the second combines both chamber and eddy covariance data.

```
model {
  for( i in 1:length(t_ch)) {
    mu_s[i] <- dlnorm(t_ch[i], delta, 1/k^2) * alpha
    m_log[i]  <- log(mu_s[i]) - s_log^2/2
    F_ch[i] ~ dlnorm(m_log[i], 1/s_log^2)
  }
  # constants
  secsPerHour <- 3600
  secsPerDay  <- secsPerHour * 24
```

```
  # priors
  delta  ~ dnorm(11.85, 1/3^2)
  k      ~ dnorm(0.674, 1/0.2^2)
  s_log  ~ dnorm(1.5, 1.0) T(0,)
  omega  ~ dlnorm(-4.86, 1/1.54^2)

  # scaling factor
  alpha  <- Ninput * omega
}

model {
  for( i in 1:length(t_ch)) {
    mu_s[i] <- dlnorm(t_ch[i], delta, 1/k^2) * alpha
    m_log[i]  <- log(mu_s[i]) - s_log^2/2
    F_ch[i] ~ dlnorm(m_log[i], 1/s_log^2)
  }
  for( i in 1:length(t_ec)) {
    mu_sp[i] <- dlnorm(t_ec[i], delta, 1/k^2) * alpha
    F_ec[i] ~ dnorm(mu_sp[i], 1/s_ec^2)
  }
  # constants
  secsPerHour <- 3600
  secsPerDay  <- secsPerHour * 24

  # priors
  delta  ~ dnorm(11.85, 1/3^2)
  k      ~ dnorm(0.674, 1/0.2^2)
  s_log  ~ dnorm(1.5, 1.0) T(0,)
```

```
  omega  ~ dlnorm(-4.86, 1/1.54^2)
  s_ec   ~ dnorm(0.5, 1.0)

  # scaling factor
  alpha  <- Ninput * omega
}
```