

State dependent timescale adjustment (per specie),

$$\alpha(t) = g_0 \sinh\left(\frac{r_0 + r_u G_u(t) + r_T T(t) + r_a G_a(t)}{g_1}\right)$$

Emissions (per specie),

$$E(t)$$

Concentrations (per specie),

$$C(t) = C_0 + \sum_{i=1}^N R_i(t)$$

Radiative Forcing,

$$F(t) = \sum_{\text{agents}} \left\{ f_1 \ln\left[\frac{C(t)}{C_0}\right] + f_2 [C(t) - C_0] + f_3 [\sqrt{C(t)} - \sqrt{C_0}] \right\} + F_{\text{ext}}(t)$$

Temperature,

$$T = \sum_{k=1}^M S_k(t)$$

Gas pools (per specie),

$$\frac{dR_i(t)}{dt} = a_i E(t) - \frac{R_i(t)}{\alpha(t)\tau_i}$$

Thermal boxes,

$$\frac{dS_k(t)}{dt} = \frac{q_k F(t) - S_k(t)}{d_k}$$

