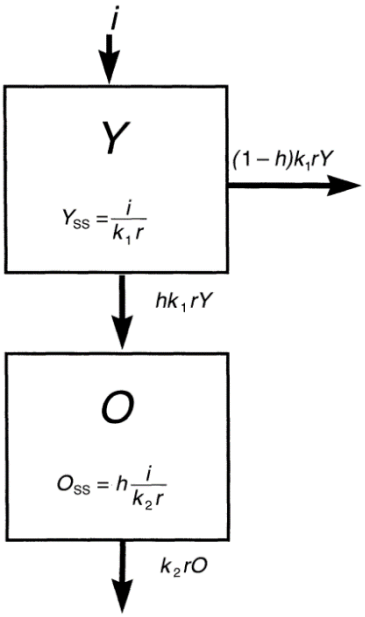
$$\frac{dx(t)}{dt} = \dot{x(t)} = I(t) \cdot b + x(t) \cdot re(t) \cdot A$$



pool concept of ICBM (from Andrén and Kätterer, 1997)

Name

ICBM

Important publication

Andrén et al., 2004;

Andren and Katterer, 1997;

Karlsson et al., 2011;

Poeplau et al., 2015

Special features

- All SOM is just one pool (O: Old)
- All FOM is originally treated the same (Y:Young)
- The environmental response is averaged from daily data and built around a simple water bucket model

Input distribution: b

All FOM enters the Y pool. Later publications however (i.e. Poeplau et al., 2015) differ between two or three type specific Y pools and their humification coefficients h.

Initialisation: x(t_0)

The initial size of Y is estimated to be in equilibrium to an average input amount and an average environmental response. The rest of SOC_{t0} is assigned to O.

Environmental response: re(t)

The environmental response re(t) is usually calculated on a daily basis and then averaged over the whole year. The shown rW(t) is from (Karlsson et al., 2011). θ_s and θ_{wp} are derived by pedo-transfer functions, α,γ and r_s are usually set to 0.5, β is 1.3 and θ is calculated by a simple water-bucket model.
re(t) = rT(t) * rW(t)

rT(t): $\frac{(T-(-3.8))^2}{(30-(-3.8))^2}$

rW(t): $\begin{cases} 0, & \theta < \alpha\theta_{wp} \\ \left(\frac{\theta-\theta_s}{\gamma\theta_s-\alpha\theta_{wp}}\right)\beta, & \alpha\theta_{wp} \leq \theta \leq \gamma\theta_s \\ 1+(1-r_s)\left(\frac{\theta-\gamma\theta_s}{\gamma\theta_s-\theta_s}\right), & \theta > \theta_s \end{cases}$

Mass Flow Matrix: A

Flow rates are in [a^{-1}]. Rows are flows into each pool; columns are flows from each pool.

	CO_2	Y*	O
CO_2		0.696	0.007
Y		-0.8	
O		0.104	**-0.007**

* Different FOM types can have a different humification coefficient h, which would change the flow rates

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