INCA-P model components

1. GIS interface:
subcatchment boundaries and land –use types
Input requirements:
Land use at ca. 1km2 resolution

2. Land phase hydrology
runoff, soil moisture and groundwater stores
Input requirements:
Daily precipitation
Daily temperature
Daily soil moisture deficit (derived)
soil properties and initial conditions

3. Land phase P storage
P turnover and availability in soils and groundwater
Input requirements:
Fertiliser,manure inputs
Growing season etc.
soil properties and initial conditions

4. In stream P model:
water and sediment transport;
sediment-water P exchange;
dilution and in stream P transformation;
algal, epiphyte and macrophyte P response.
Input requirements:
Base flow index
Discharge time series
Flow velocity:discharge:water level calibration
Macrophyte, epiphyte and algal

- growth response to temperature and radiation,
- michaelis menten growthconstants with respect to soluble P (or other nutrients)
- death rates
- content of P and other nutrient content

Wade, A.J., Durand, P., Beaujouan, V., Wessel, W.W., Raat, K.J., Whitehead, P.G., Butterfield, D., Rankinen, K. and Lepisto, A. A nitrogen model for European catchments: INCA, new model structure and equations, *Hydrol. Earth Sys. Sci.***6** 559-582. 2002a.

Wade, A.J., P.G. Whitehead and D. Butterfield. The integrated catchments model of phosphorus dynamics (INCA-P), a new approach for multiple source assessment in heterogeneous river systems: model structure and equations, *Hydrol. Earth Sys. Sci.* **6** 583-606. 2002b.