

## **The terrestrial phosphorus cycle in JSBACH**

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Carbon (C) storage by many terrestrial ecosystems can be limited by nutrients, predominantly nitrogen (N) and phosphorus (P). The availability of nutrients has been affected by human alteration of the C cycle as well as human land use for at least the last 200 years. Only very few studies consider both N and P availability to evaluate terrestrial C cycling. To evaluate the influence of P and N availability on the C cycle from the year 800 to 2100 a scheme for terrestrial P cycling is introduced to ECHAM6's land surface scheme JSBACH.

This extended JSBACH version has, in addition to the already existing N and C cycles, 8 organic and 3 inorganic P pools to represent terrestrial P storage. The P pools are connected by fluxes, which are calculated according to the known C/N/P stoichiometry of the organic pools. Soil inorganic P dynamics are based on the work of Wang et al. (2009). The nutrient cycles are able to slow down the C cycle by nutrient limitation determined by availability of N and P. External inorganic P losses, namely leaching and erosion, are computed dynamically assuming a dependency on removable material and runoff. P deposition (Mahowald et al. 2008) as well as land use change reconstructions (Pongratz et al. 2009) are used as an input. The model is in the final phase of development.

### References:

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