Identifying the setting dependency of geo-climatic controls on soil CN cycling at global scales

(project in development)

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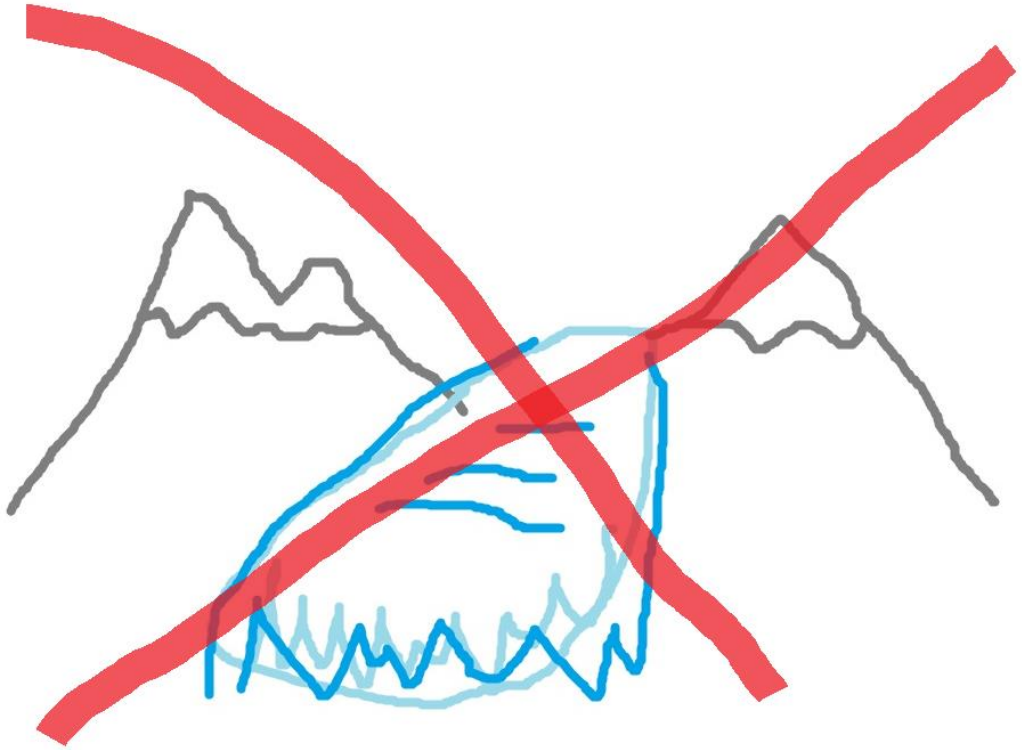

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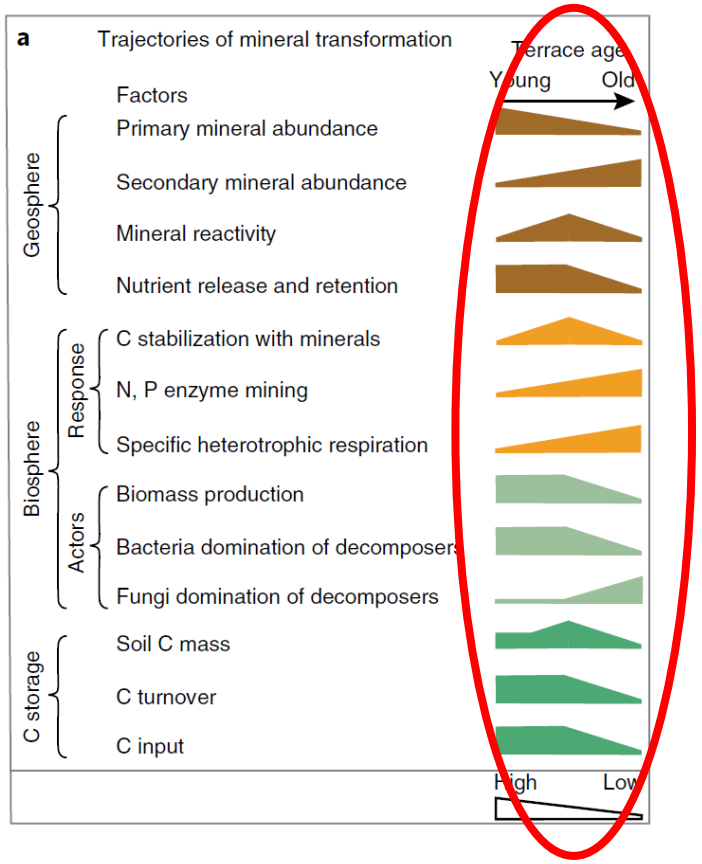
I) motivation

Spatial variation of geochemical and physical parameters



Conceptional overview: changes of soil Parameters with mineral transformation (chemical age)

Doetterl *et al.* 2015

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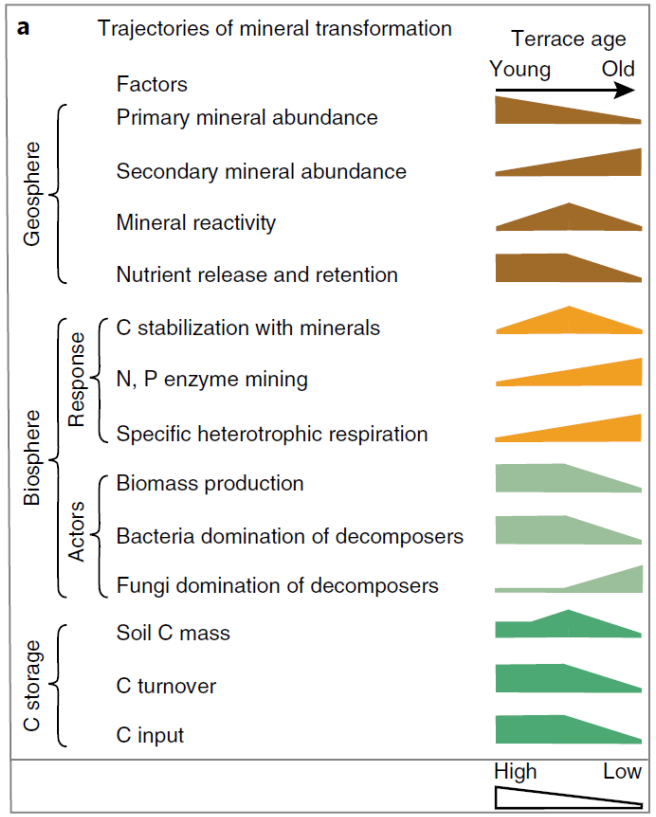
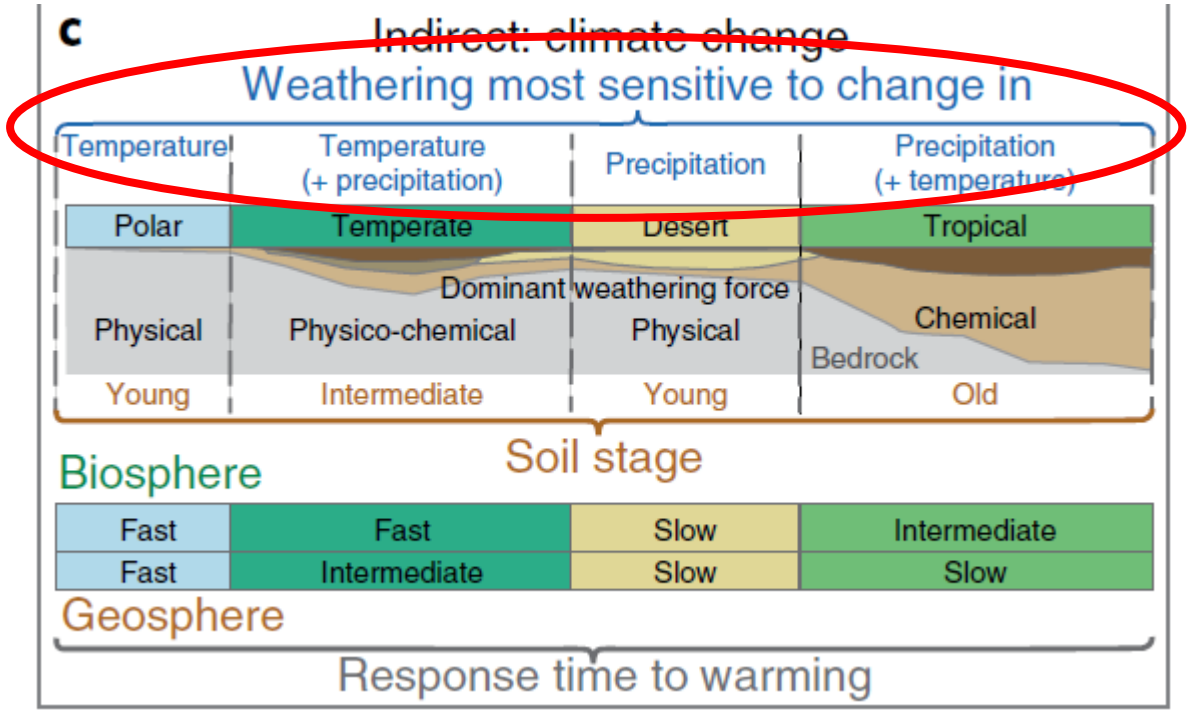


Conceptional overview: changes of soil Parameters with mineral transformation (chemical age)

Spatial variation of processes-sensitivity to individual controls



Conceptional overview: spatially variable sensitivity of processes to different controls

Doetterl *et al.* 2015

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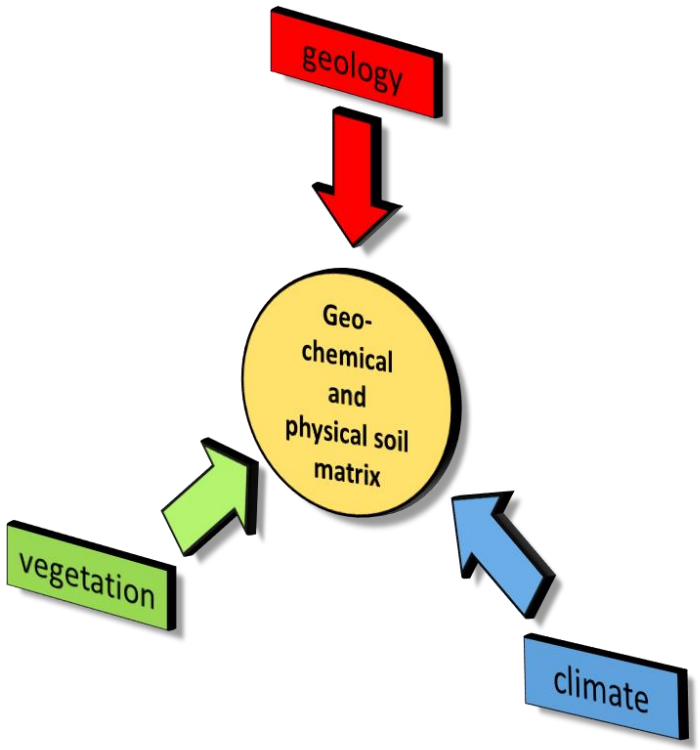

Relevance of climatic, soil geochemical and physical parameters …

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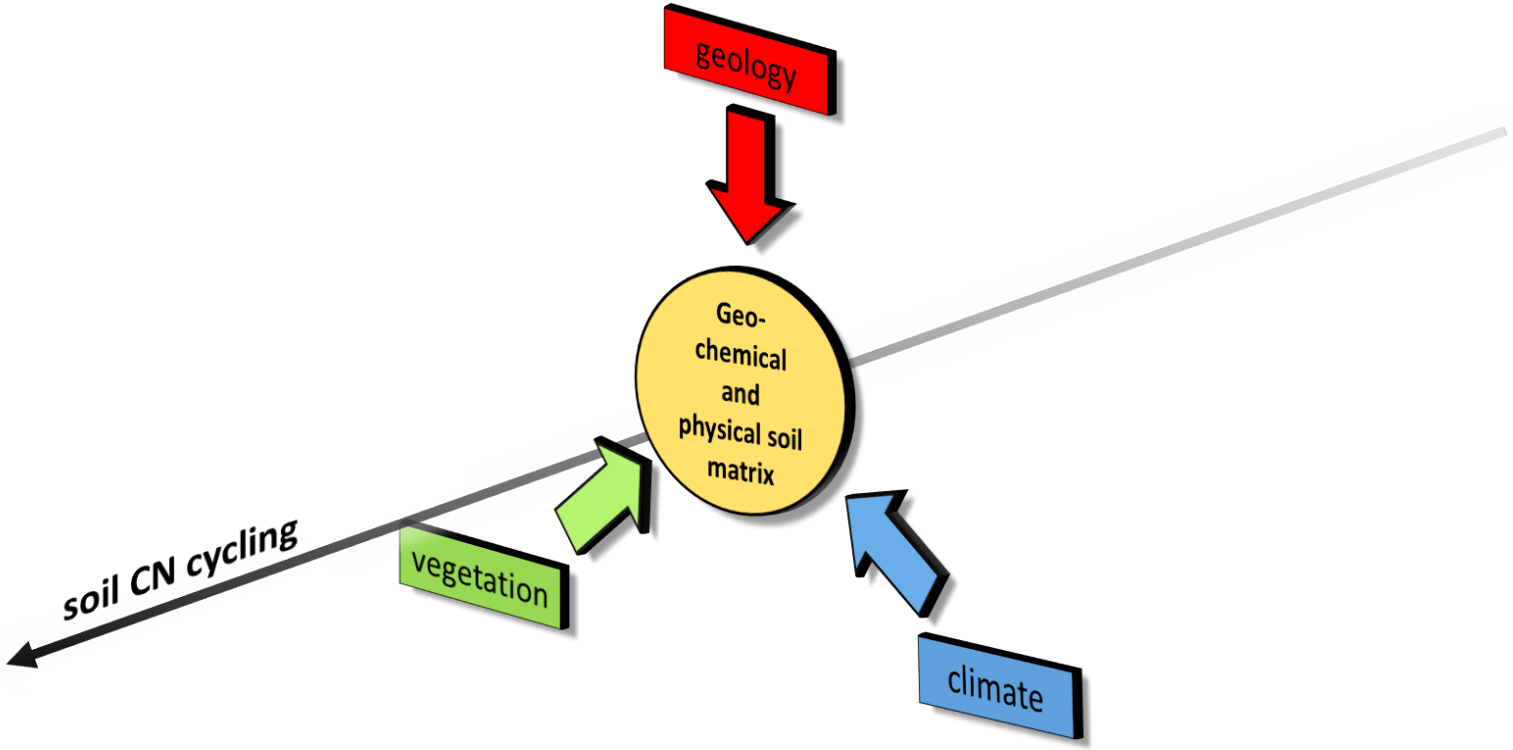

Relevance of climatic, soil geochemical and physical parameters …

as controls on

… soil CN cycling and related microbial activity …

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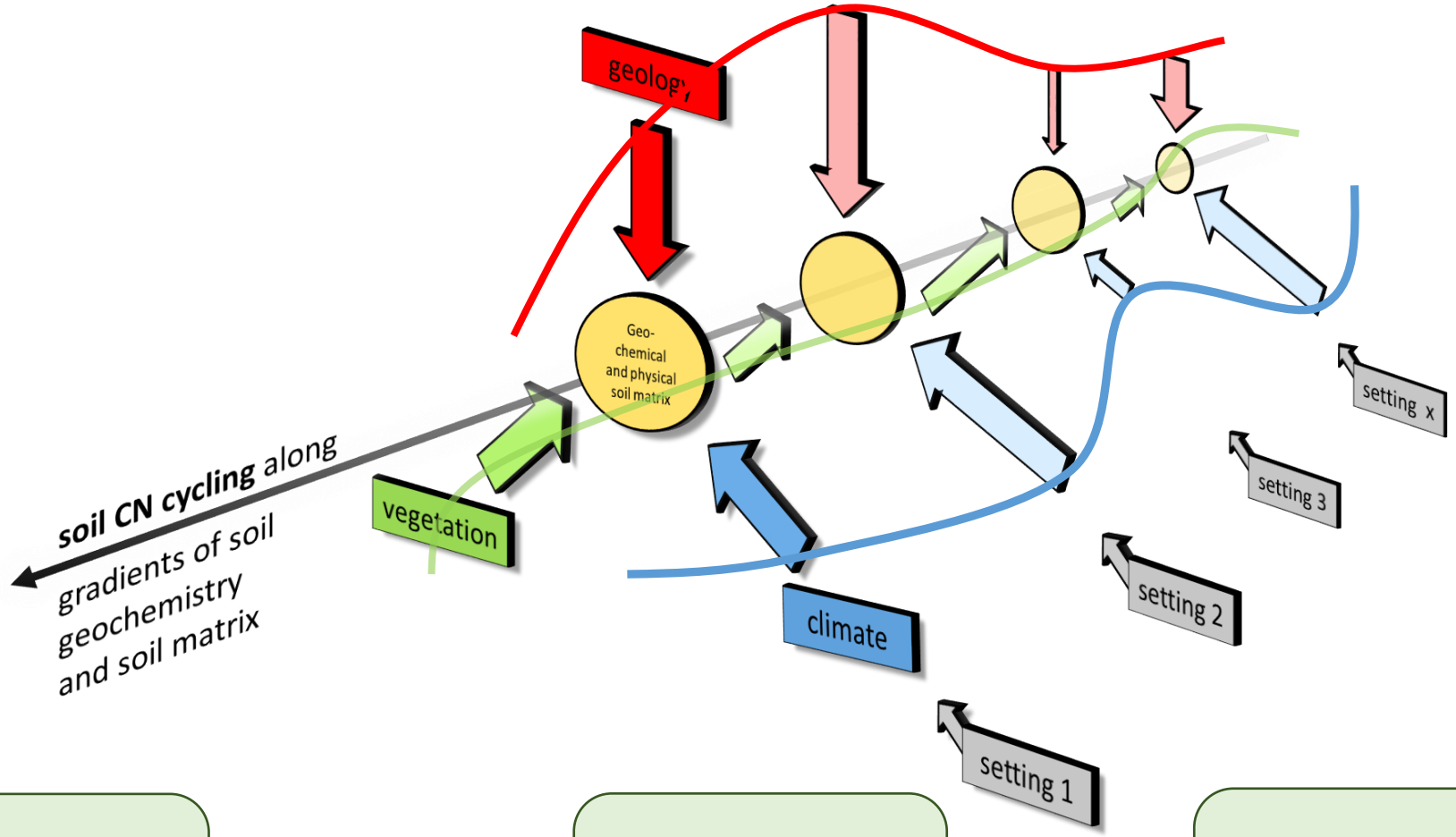

Relevance of climatic, soil geochemical and physical parameters …

as controls on

… soil CN cycling and related microbial activity …

across

… gradients in climate, geology, and weathering age

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II) aim

Understanding: **in which settings** do key **soil properties actually predict CN** status & cycling

→

Spatially-explicitly tune CN responses to these controls in **global models**

→

Move to approach **with interaction of controls**

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III) Work approach

Sampling across gradients in south america

- 6 climatic zones
- 4 geologies
- weathering age
- 2 – 3 soil layers

Soil characterization
CN pools / geochemistry / mineralogy / weathering stage / microbial parameters / OM fractions
(fresh measurements in mobile lab)

- microbial activity patterns via 13C incorporation into PLFAs
- OM stabilization and utilization (13C/14C) patterns

Experimental manipulations
(partly in mobile lab)

- temperature
- soil moisture
- C, N
- P, K

- labile CN pools
- soil resp. / N min.
- CUE / NUE
- mic. biomass CNP
- mic. community structure (PLFA)
- enzymatic strategies

Statistical analysis
Correlative / partial dependence / rel. importance / classification and regression trees

Incorporation into **models**
Soilgen / orchidee ?