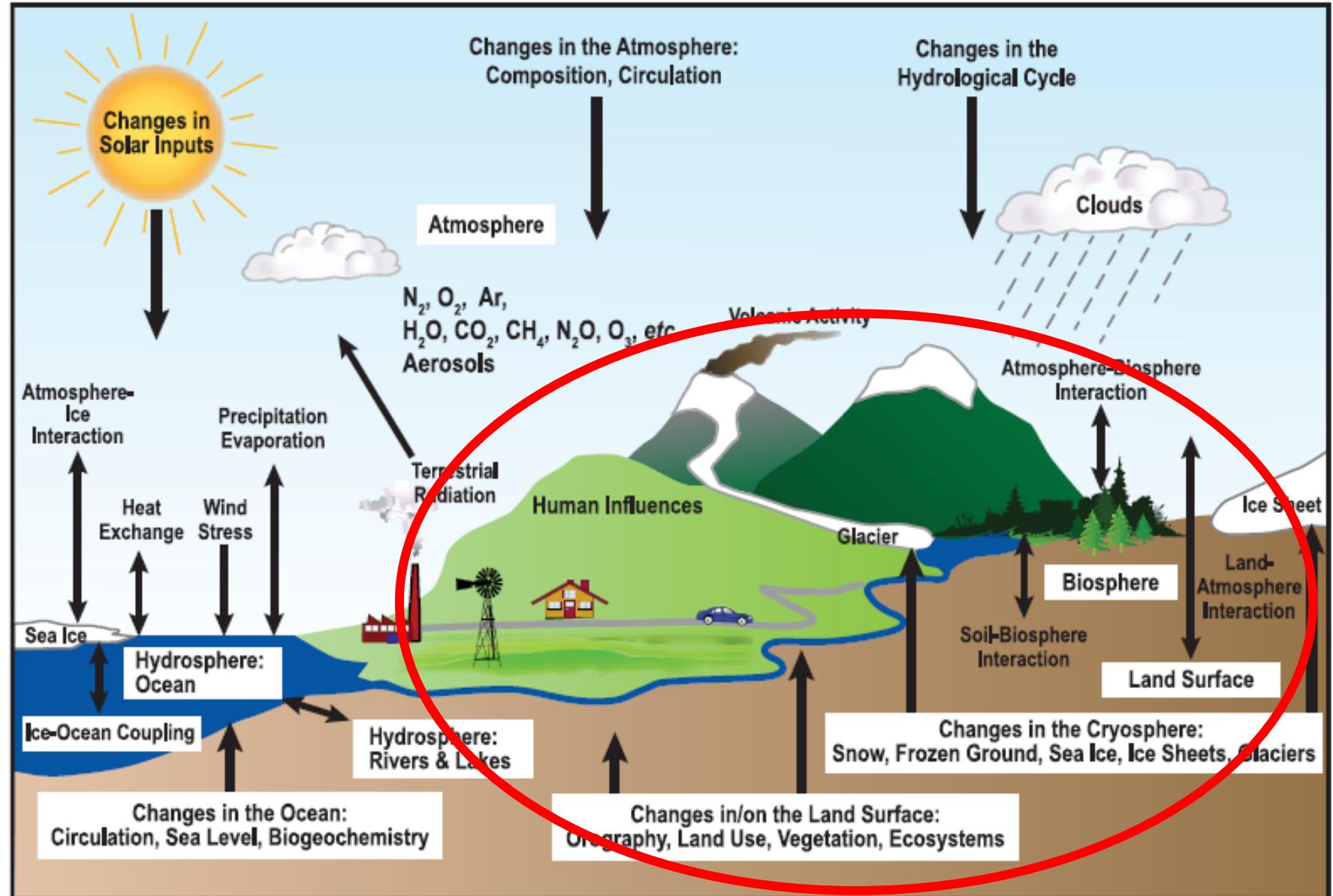
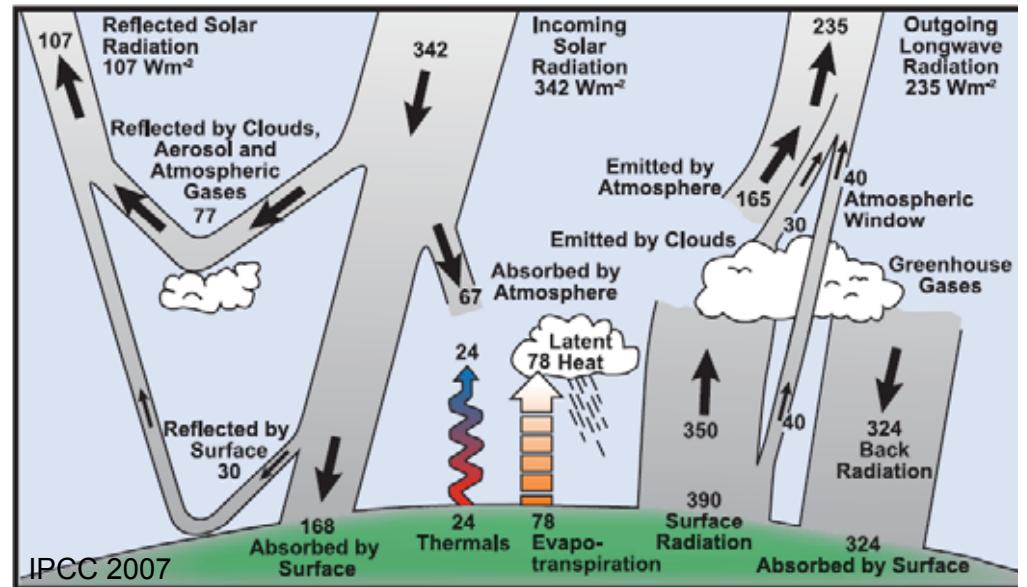
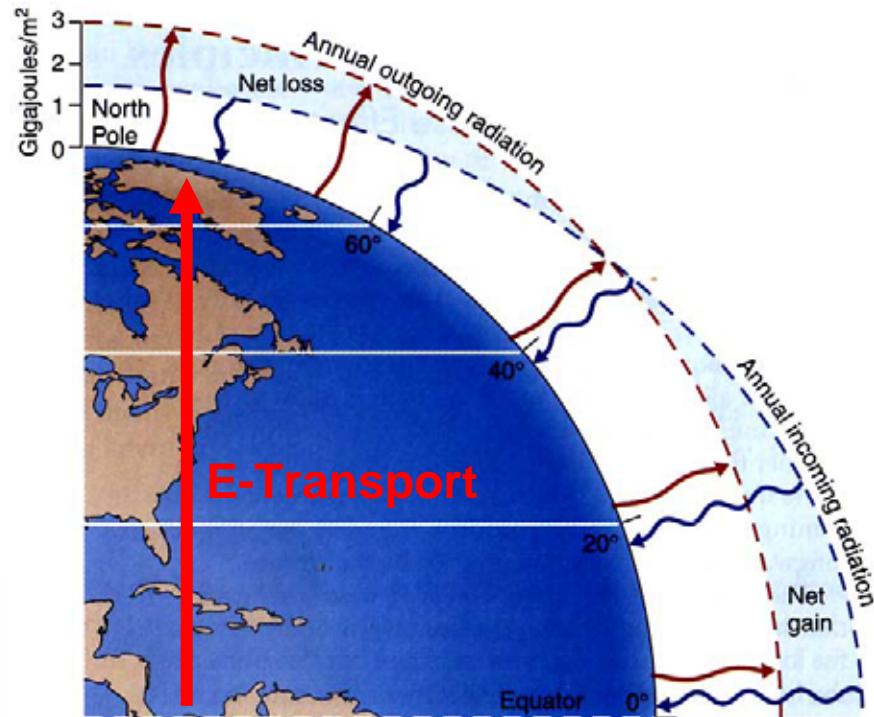


Die Biosphäre im Klimasystem

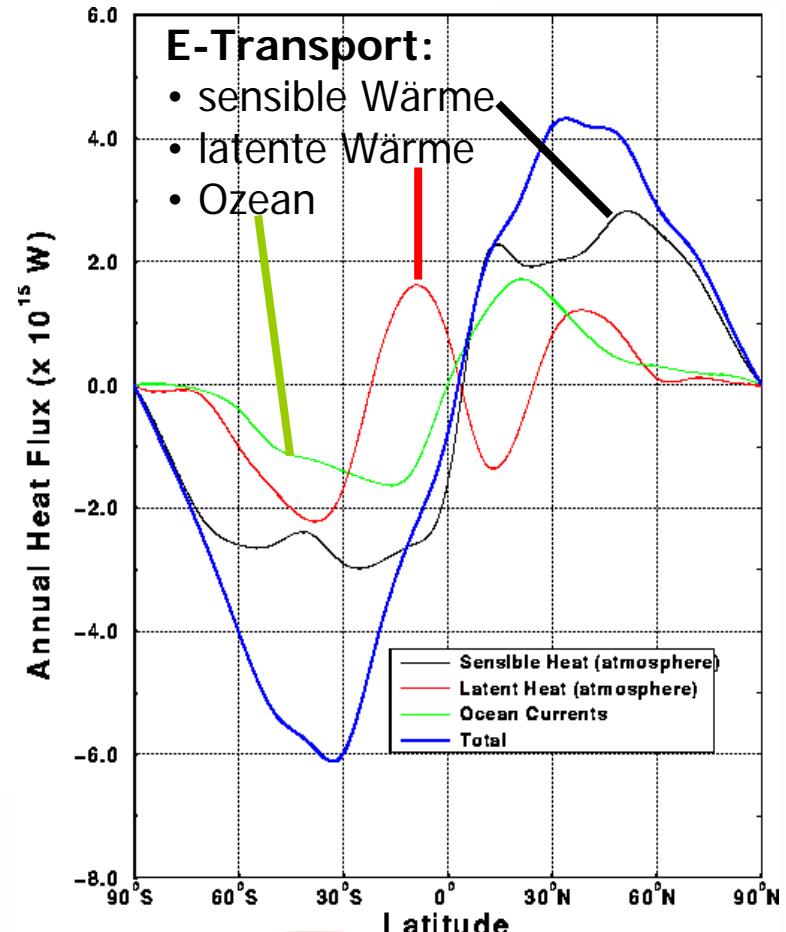
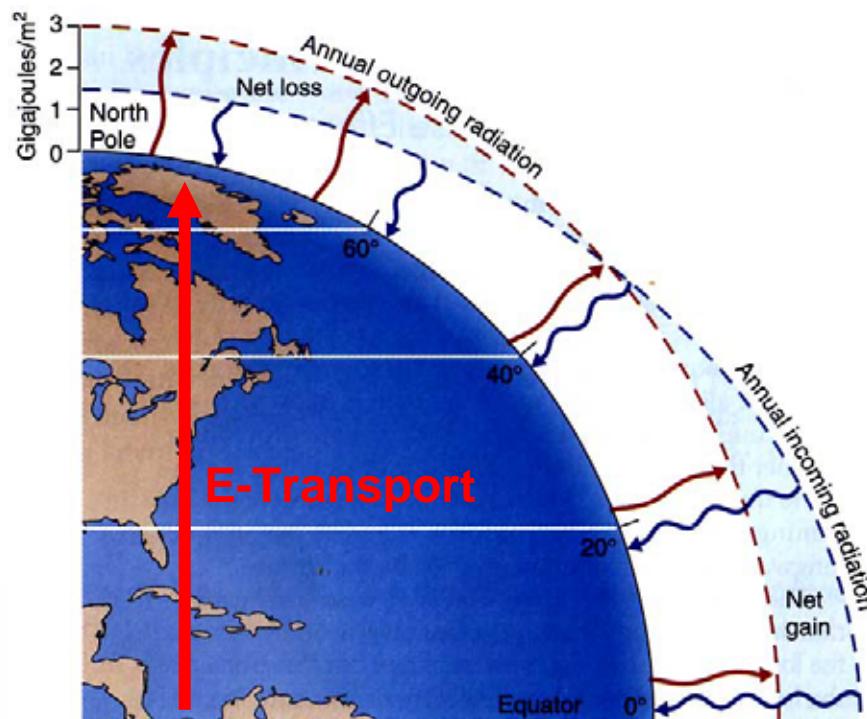
Volker Mosbrugger, Frankfurt



Klimawandel und Biosphäre



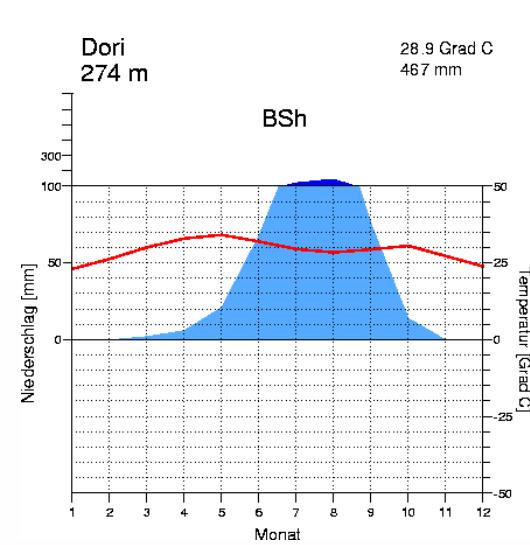
Klimawandel und Biosphäre



Klimawandel durch:

Δ Einstrahlung, Δ Atmosphäre, Δ Oberfläche, Δ E-Transport

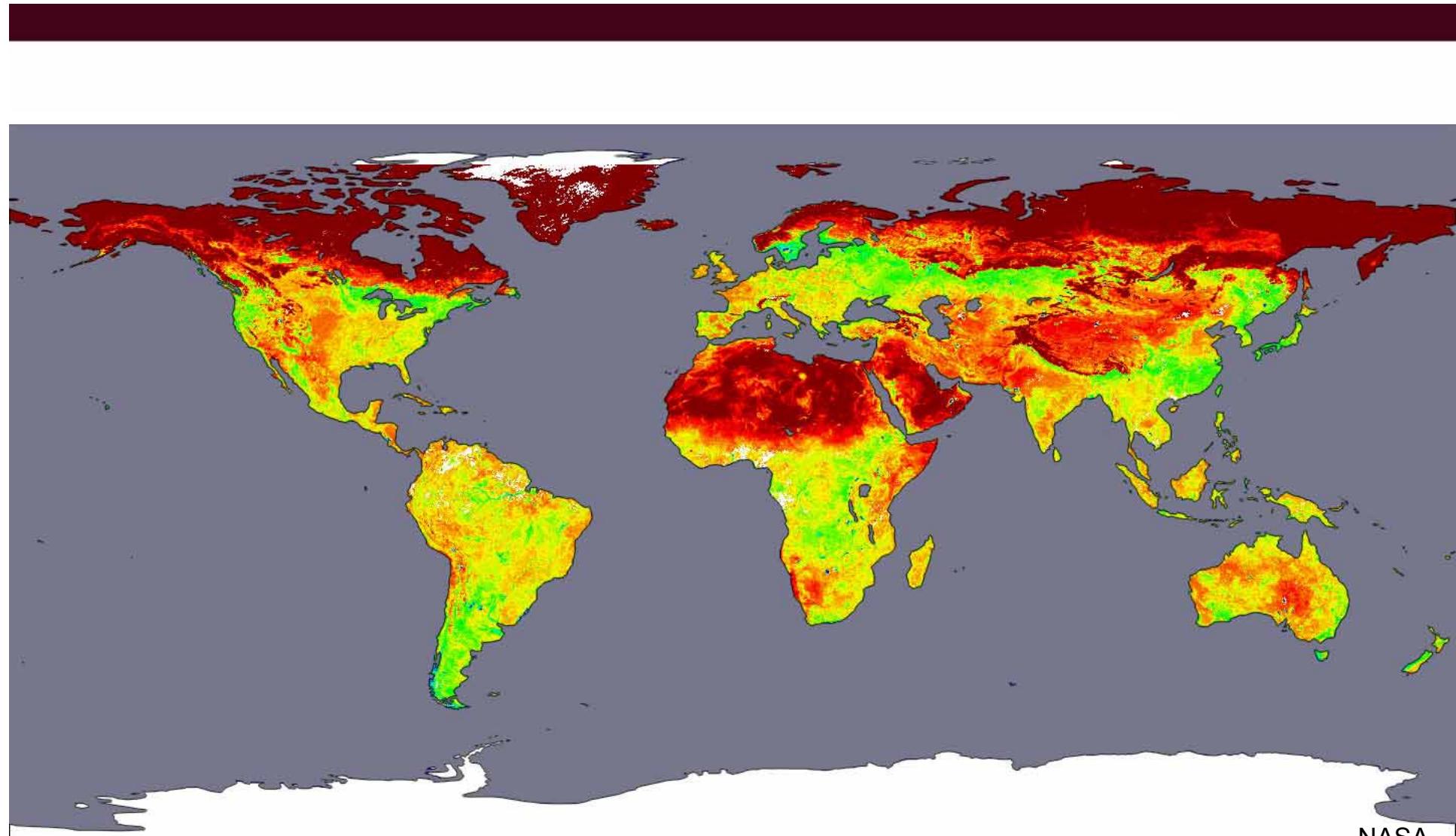
Klima



Biosphäre

Energieaustausch
Impulsaustausch
Biogeochem. Kreisl.
Massen-Transport
Aerosole
Etc.





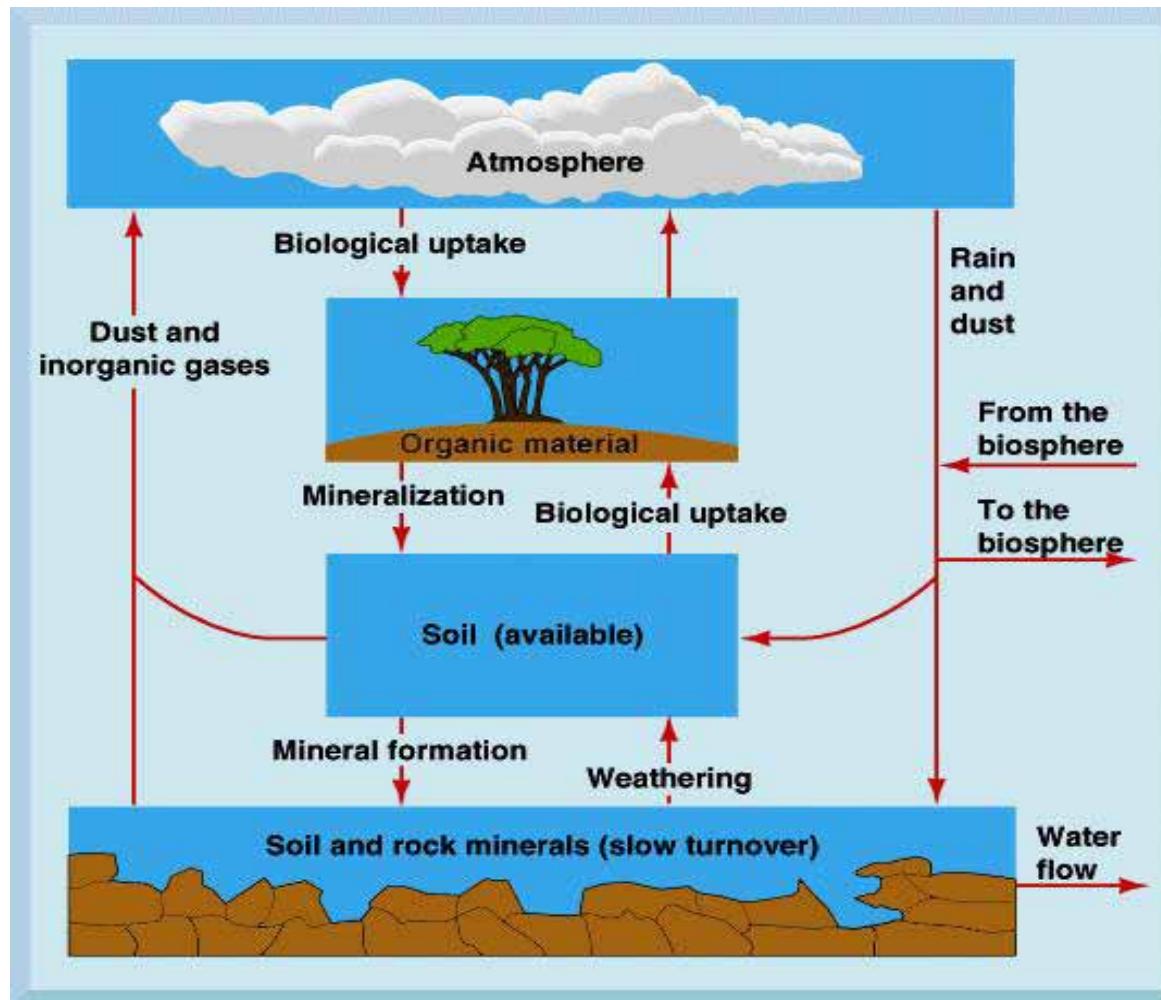
Albedo

0 0.1 0.2 0.3 0.4

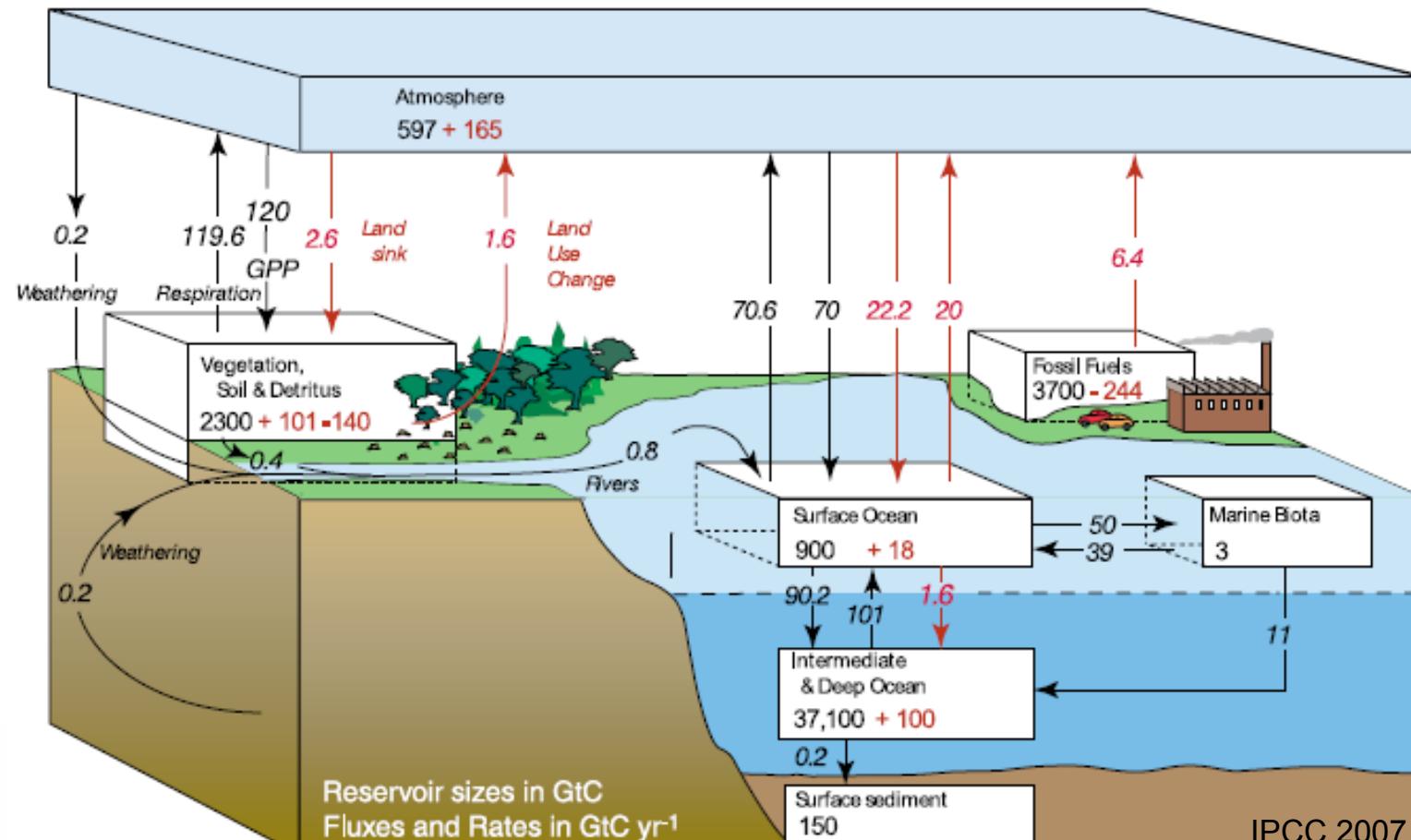


Stoffkreisläufe und Biosphäre

C
N
P
S
DMS
 H_2O
etc.



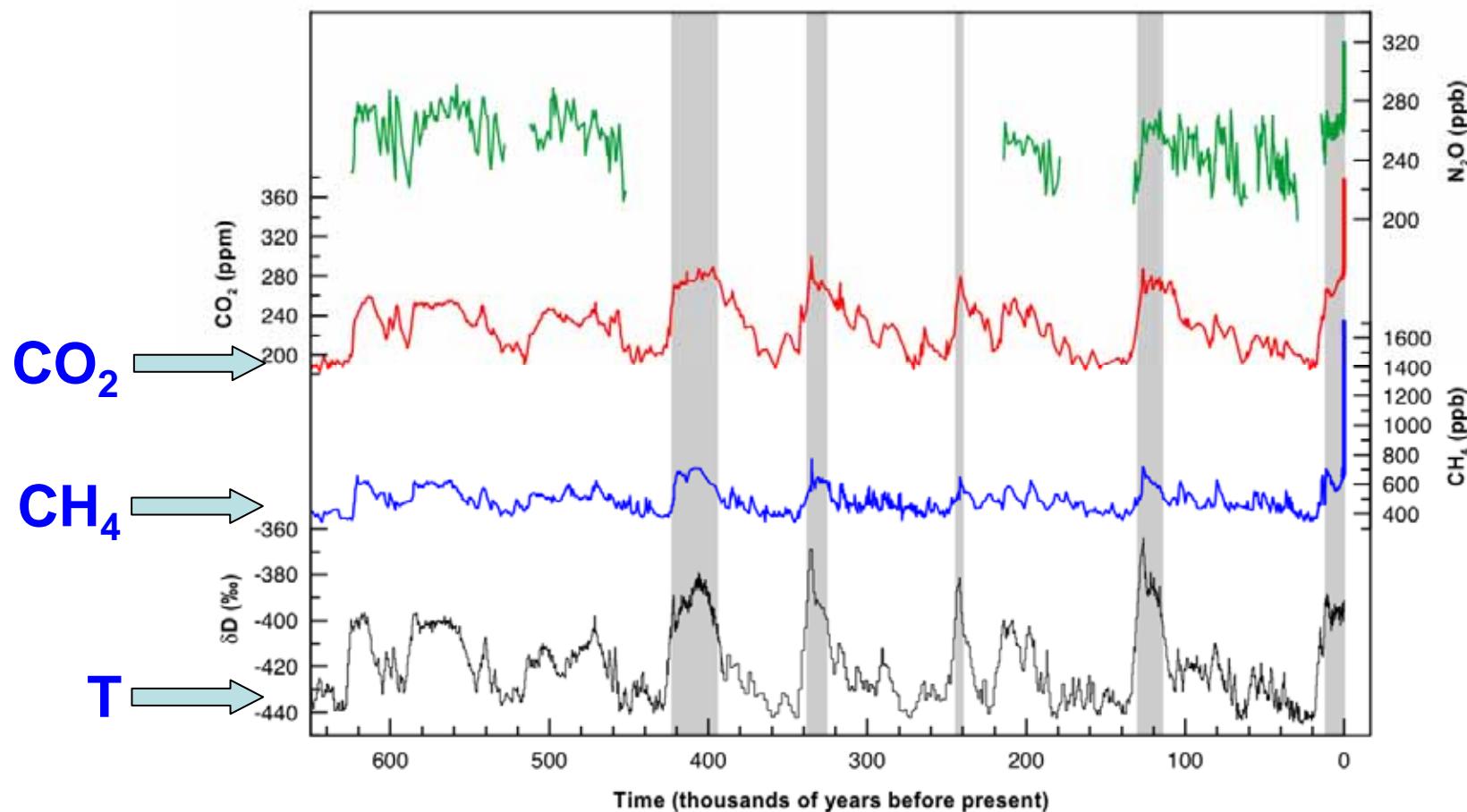
C-Kreislauf

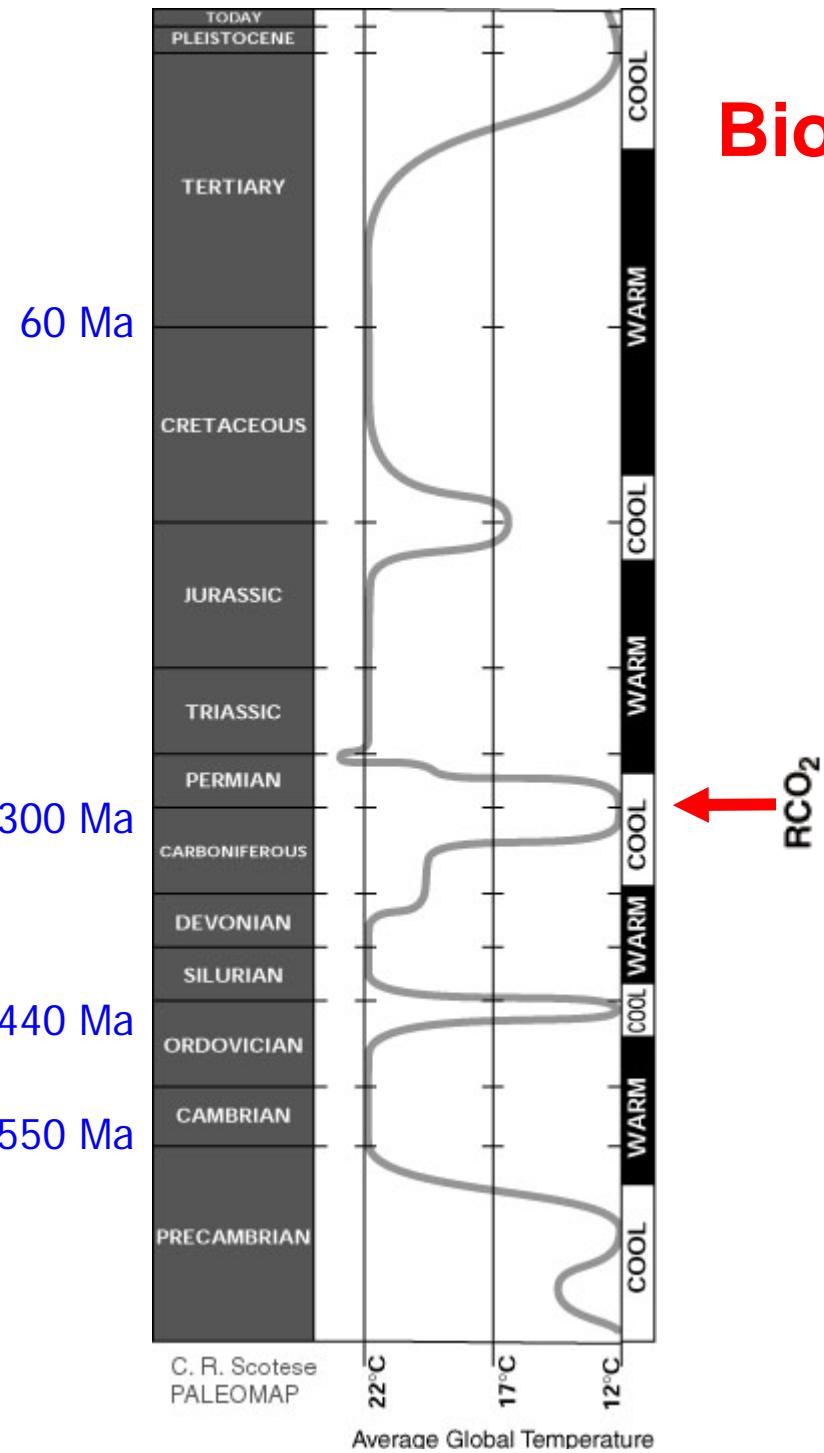


Input: 8 Gt C/a

Atmosphäre: + 3.2 Gt C/a
Ozean: + 2.2 Gt C/a
Land: + 2.6 Gt C/a

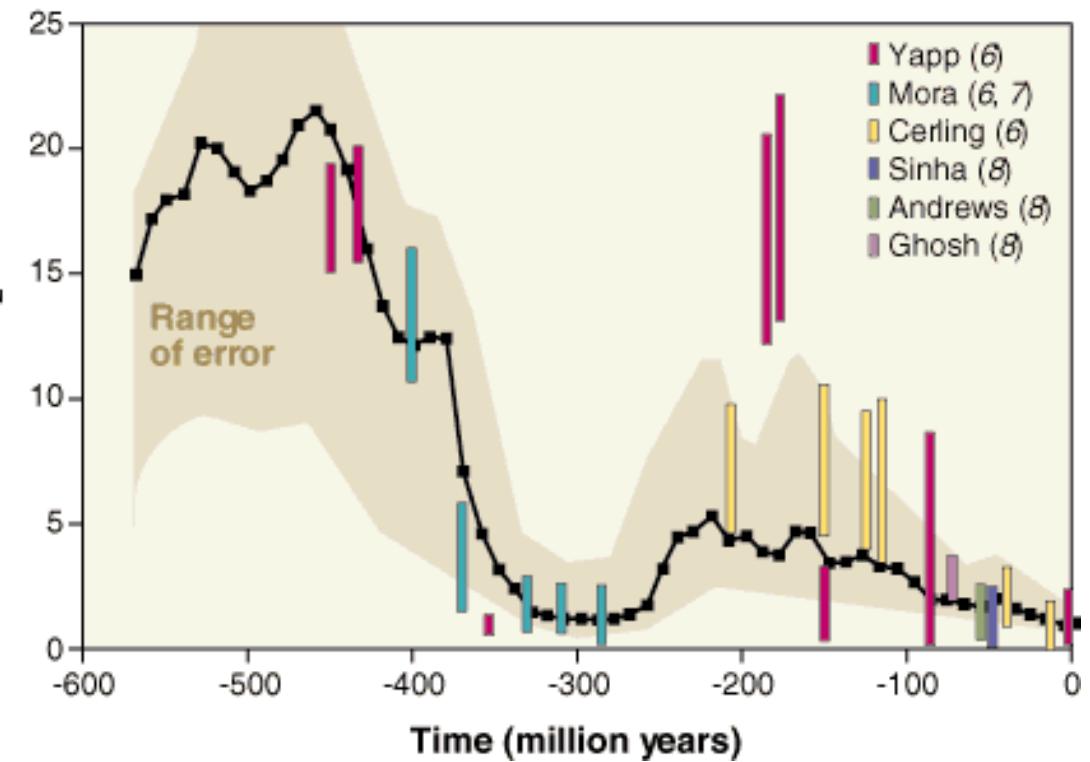
Glacial-Interglacial Ice Core Data





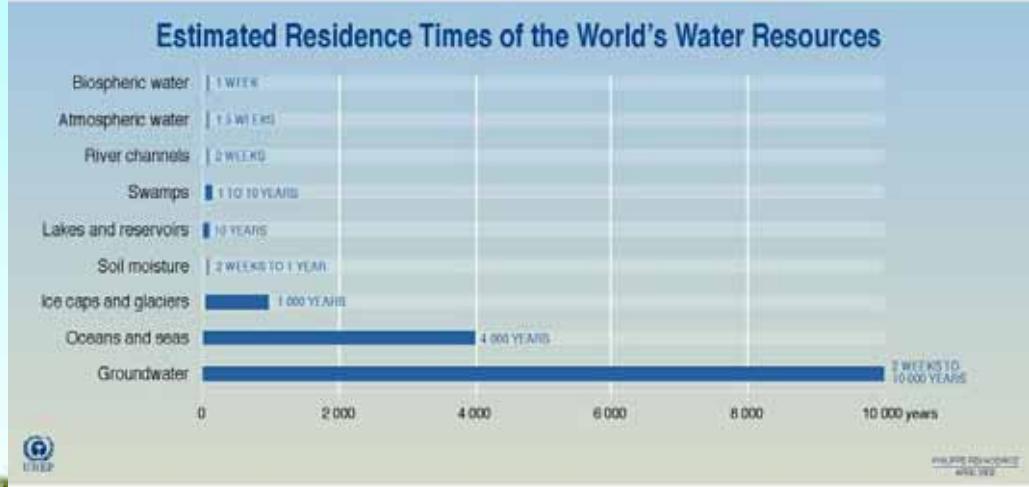
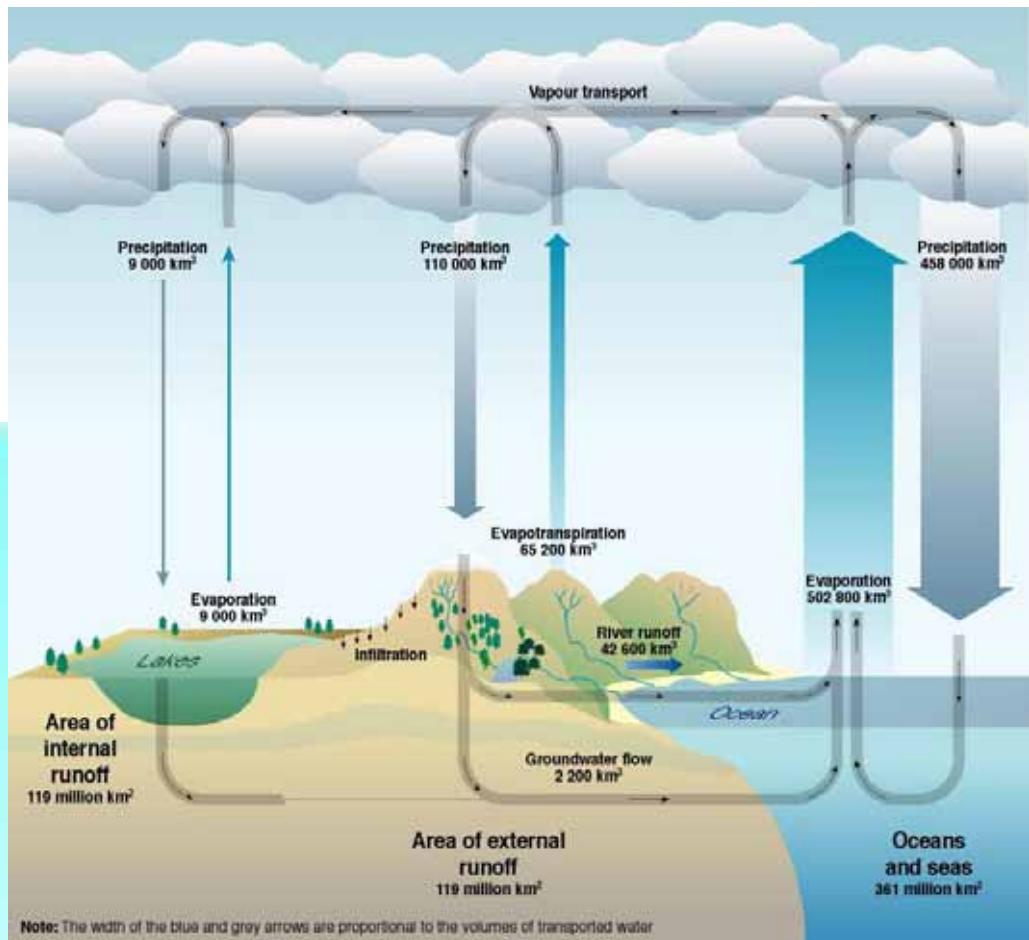
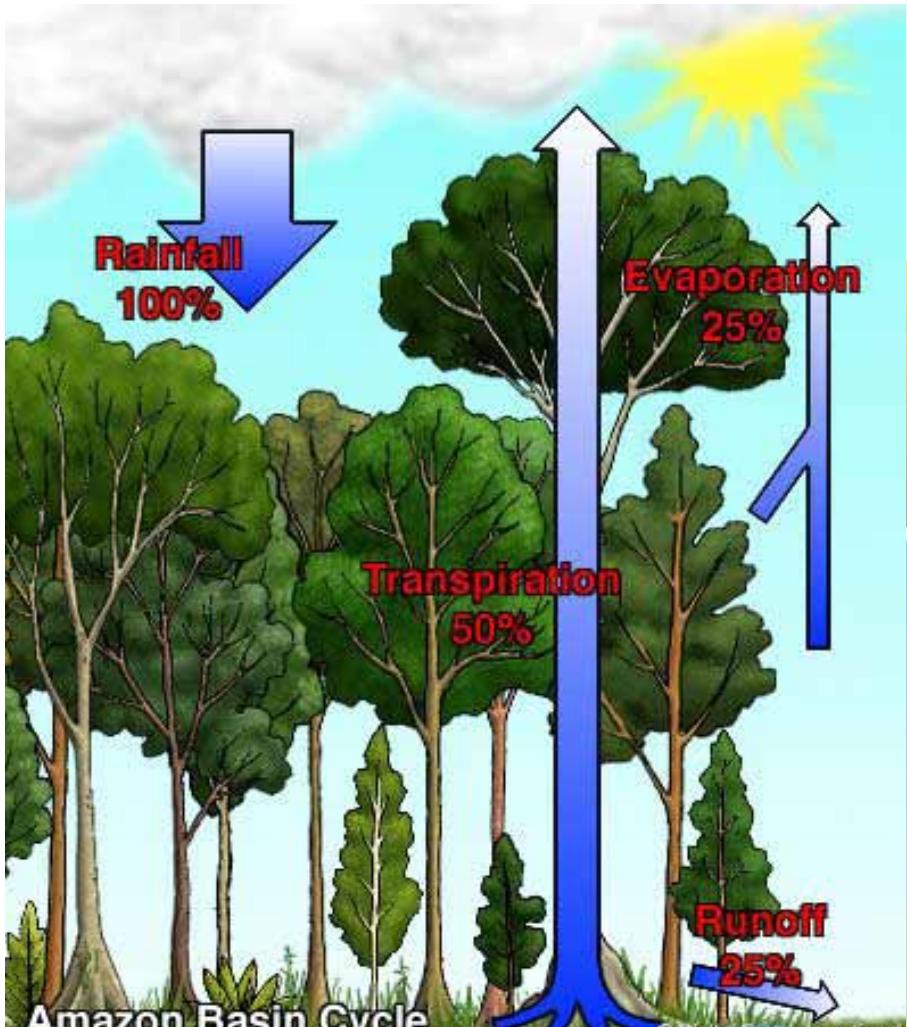
Biosphere matters!

Permo-carboniferous Glaciation

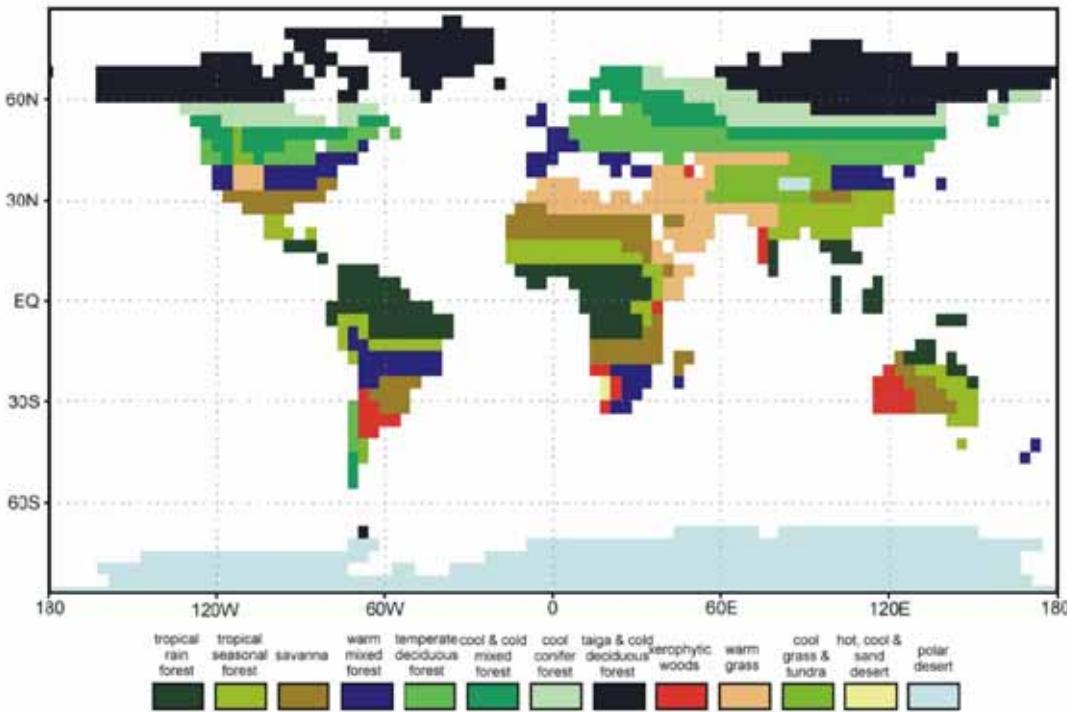


(Berner 1997, 2001)

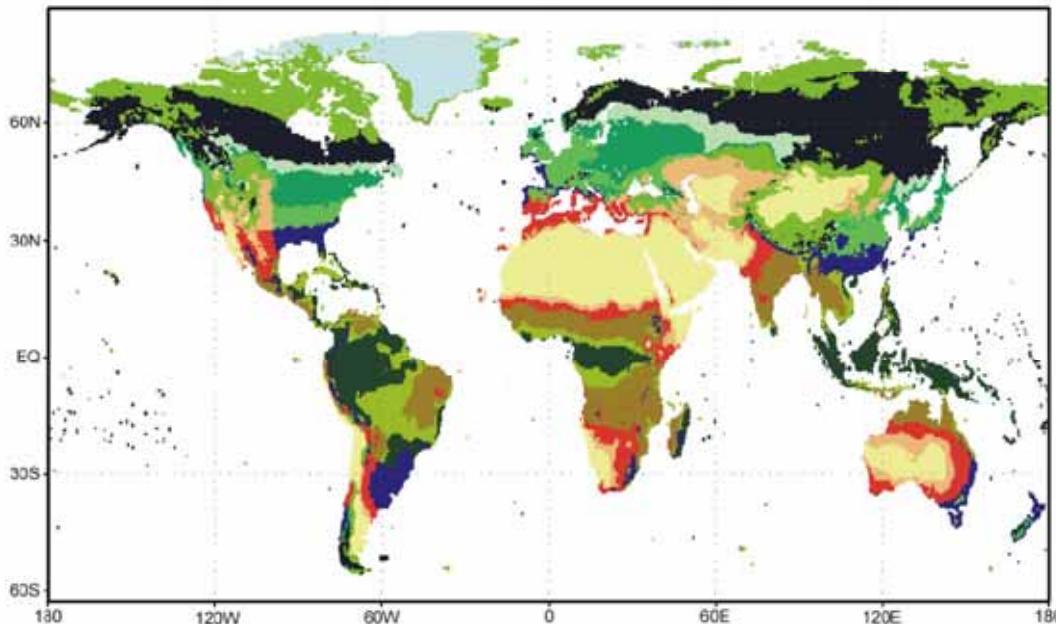
Wasser-Kreislauf



a)



b)



Tortonian (8 Ma)
(palaeobotanical reconstruction)

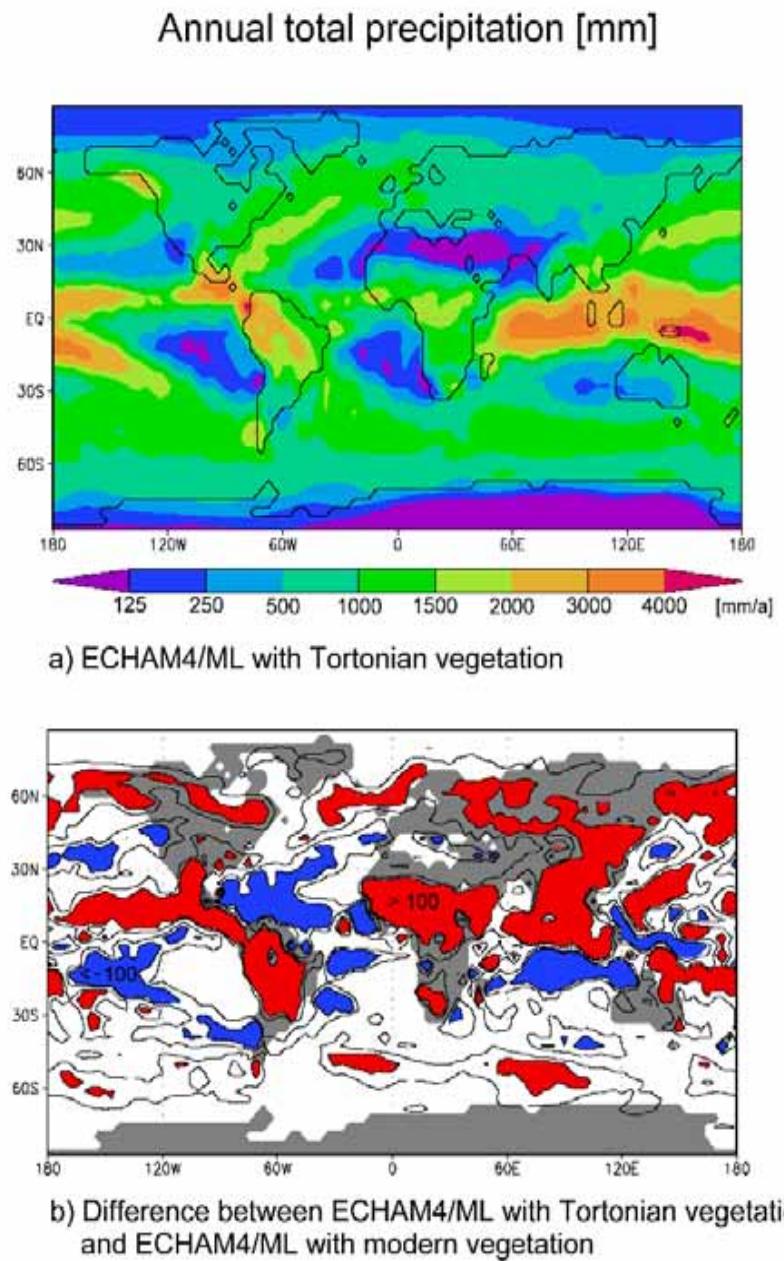
25% more forests
than today

Vegetation

Present

(calculated from IPCC observation
data of the years 1961-1990)

Micheels et al. (2007.)



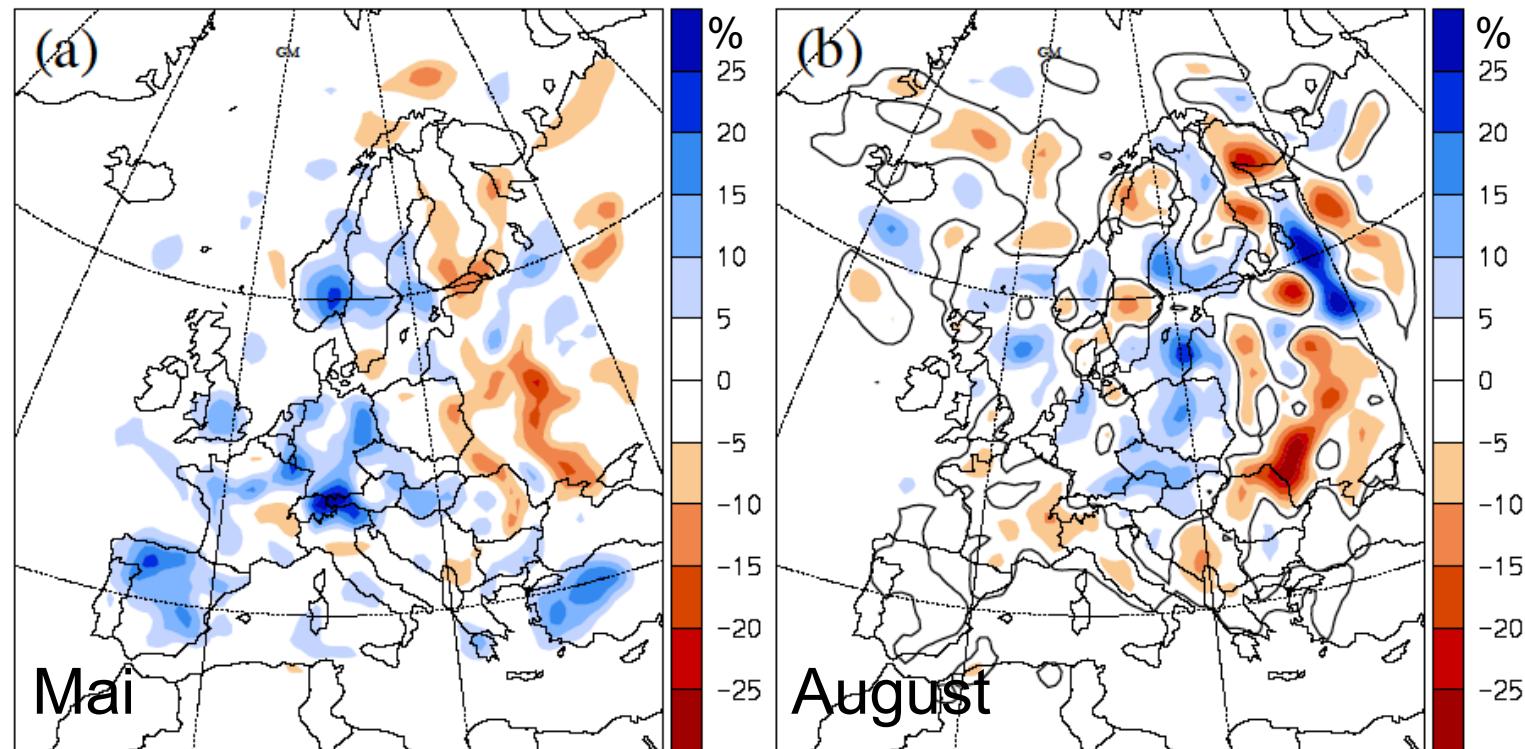
Climate Modelling for the Upper Miocene

Effects of palaeovegetation
(25% more forests than today)

Results (T2 - T1):

- MAT global: + 0.9°C
- MAT NH: + 1.2°C
- Decrease in seasonality
- MAP global: + 35 mm/a
- Increase in latent heat transport

Vegetation → Climate

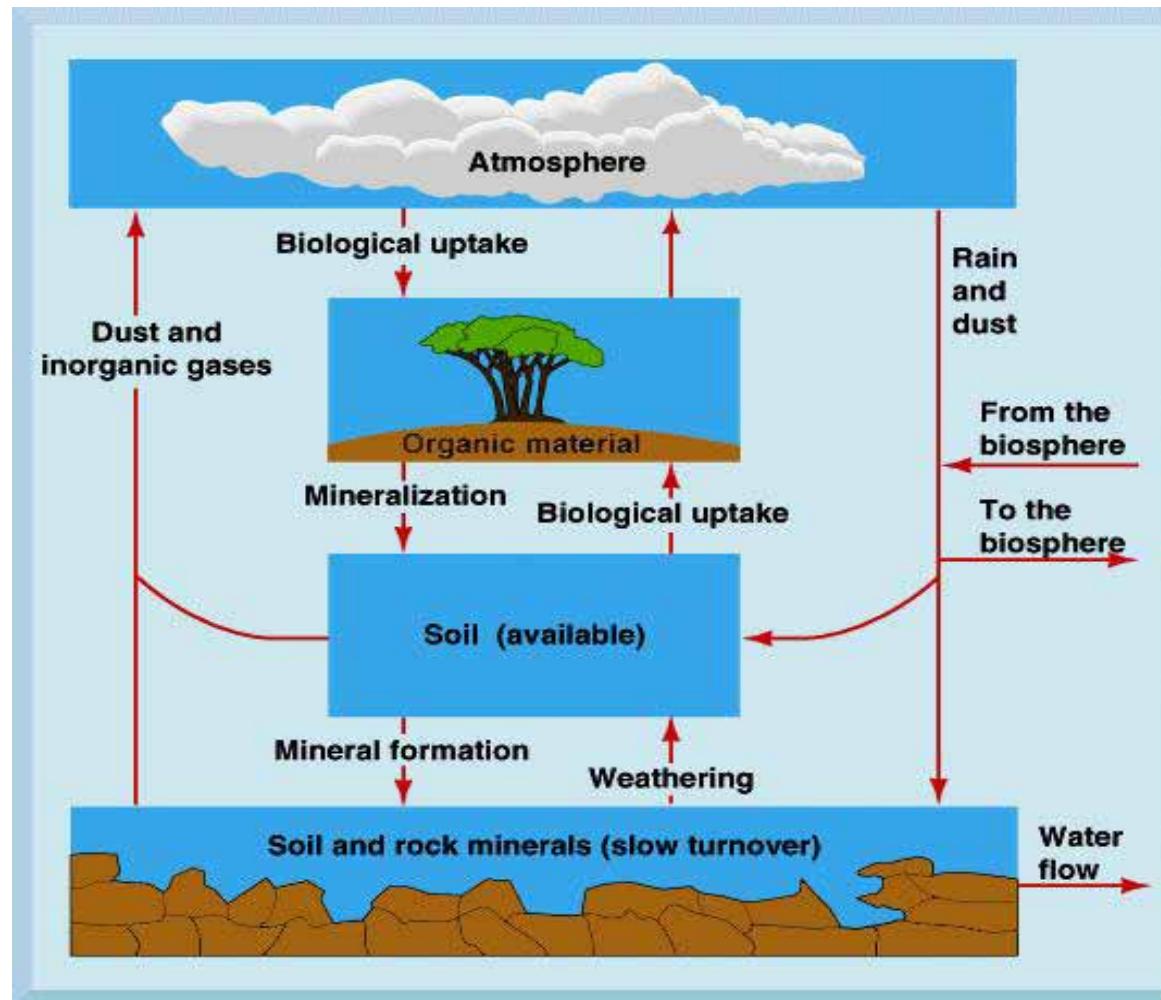


Change in precipitation due to potential (BIOME3) instead of real (anthropogenic) vegetation

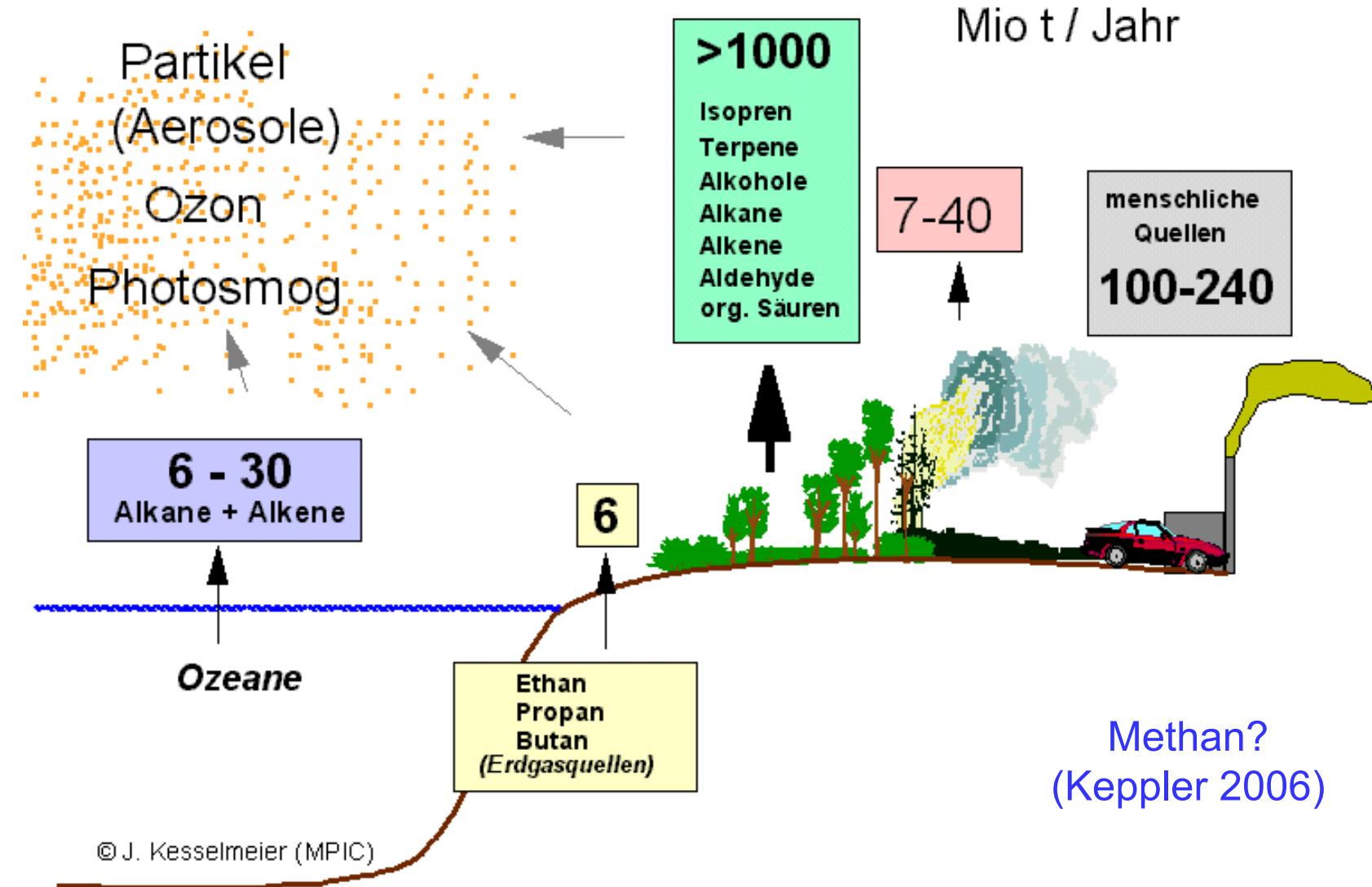
Heck et al. (2001)

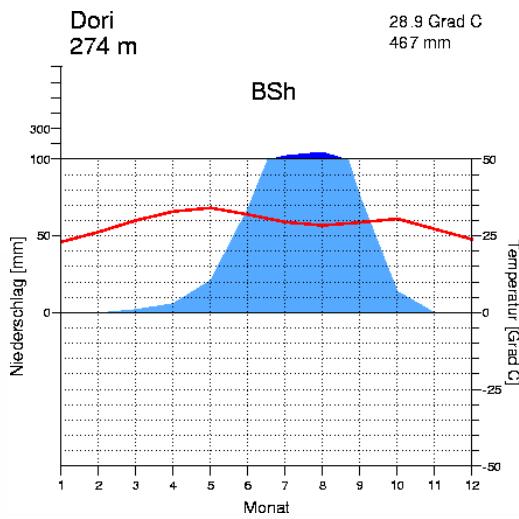
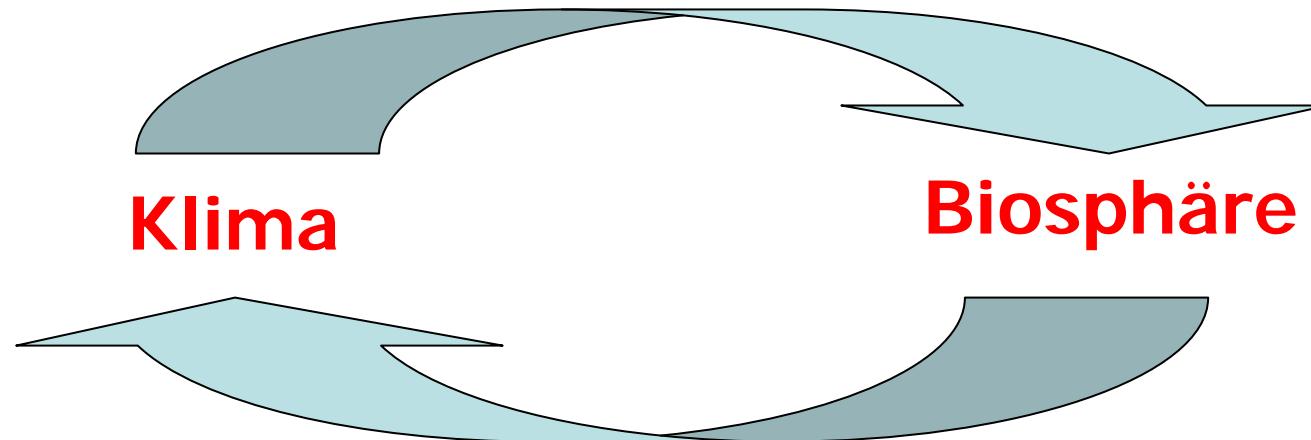
Stoffkreisläufe und Klima

C
N
P
S
DMS
 H_2O
etc.



Emissionen der Biosphäre





Energieaustausch
Impulsaustausch
Biogeochem. Kreisl.
Massentransport
Aerosole
Etc.

Unverstanden!

