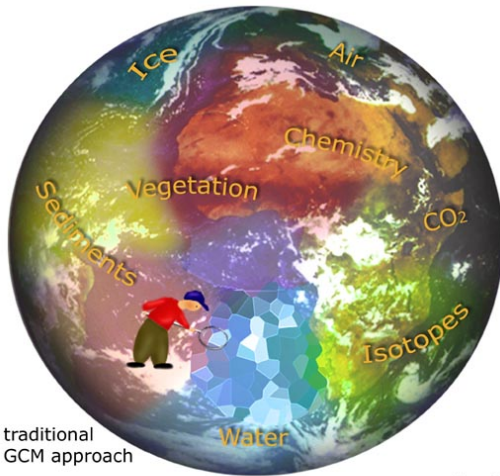


Gerrit Lohmann

14. April 2008, EGU

COSMOS

Paleo



traditional GCM approach

Holocene



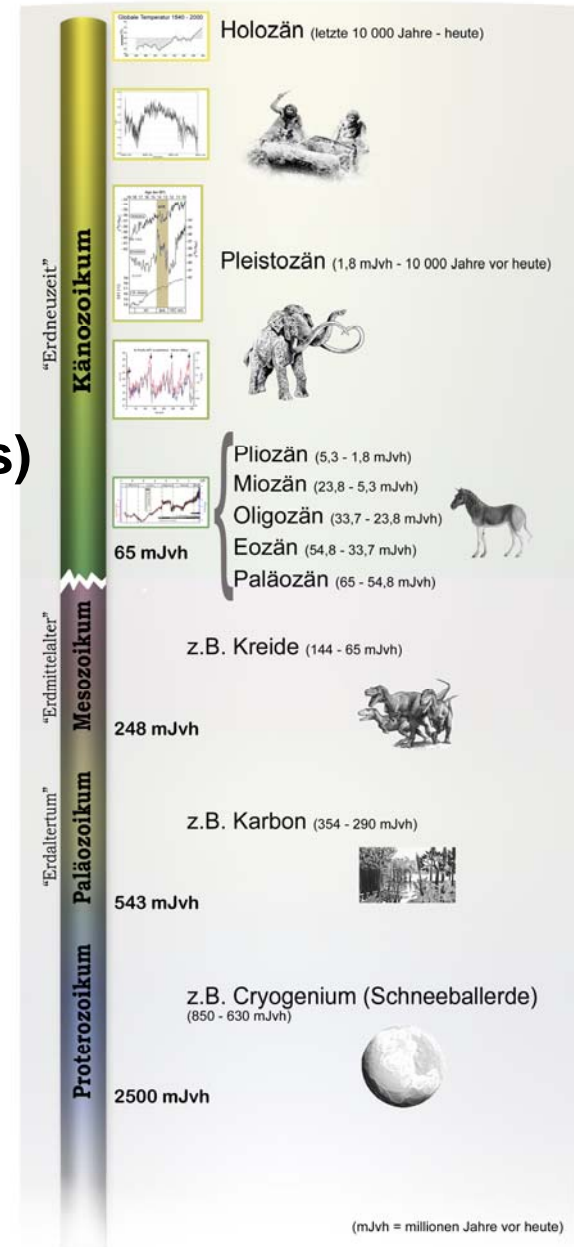
Glacial-Interglacial



Cenozoic (Gateways)



Earth System Model approach

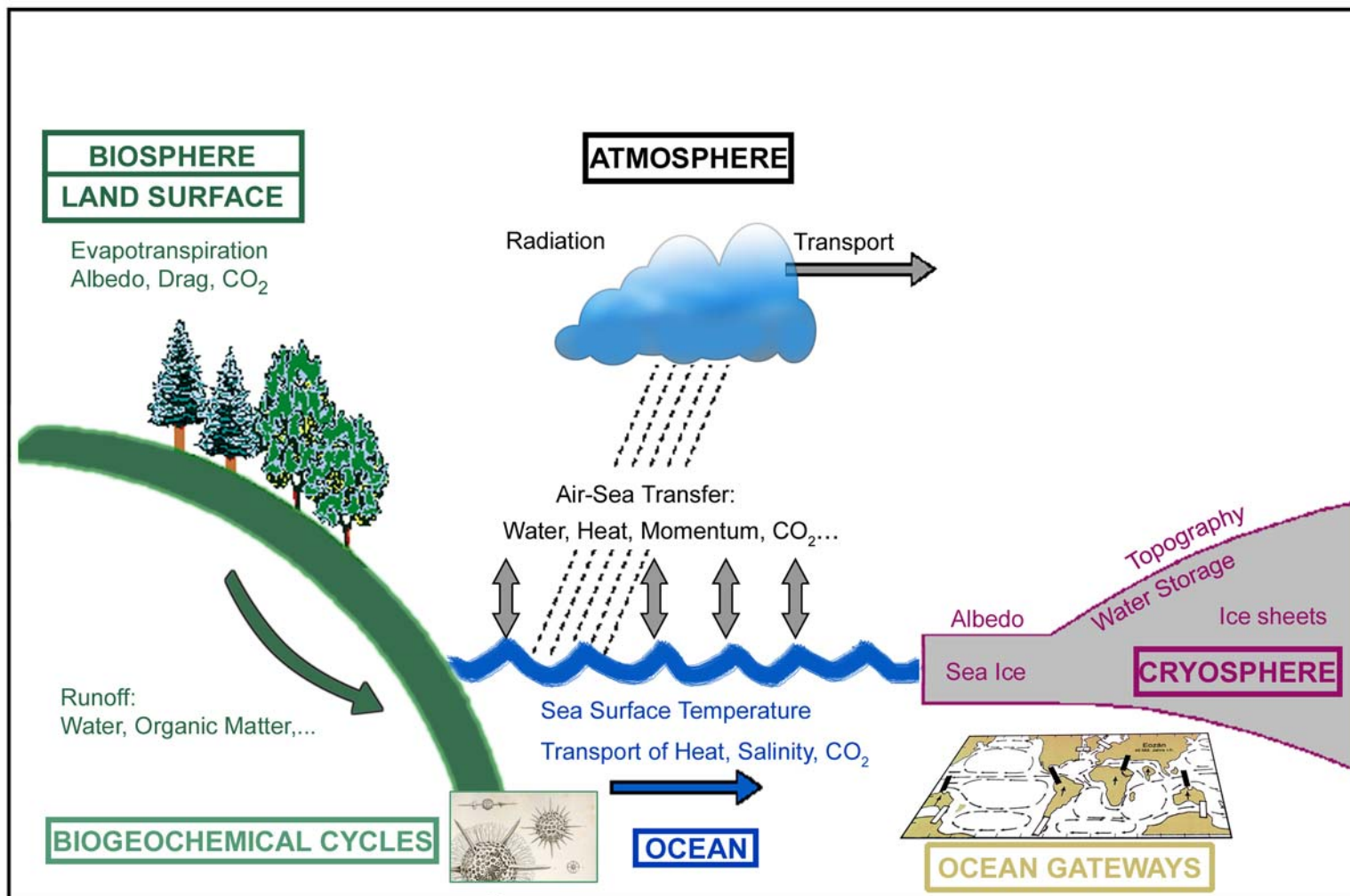


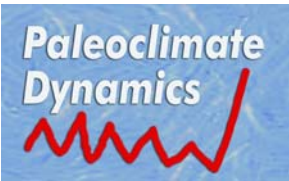
Questions

- Current projects
- Climate components included
- Scientific questions

- Future projects & Coordinated efforts

The complex Earth System requires a multi-disciplinary approach





Current Projects

Quaternary - Holocene

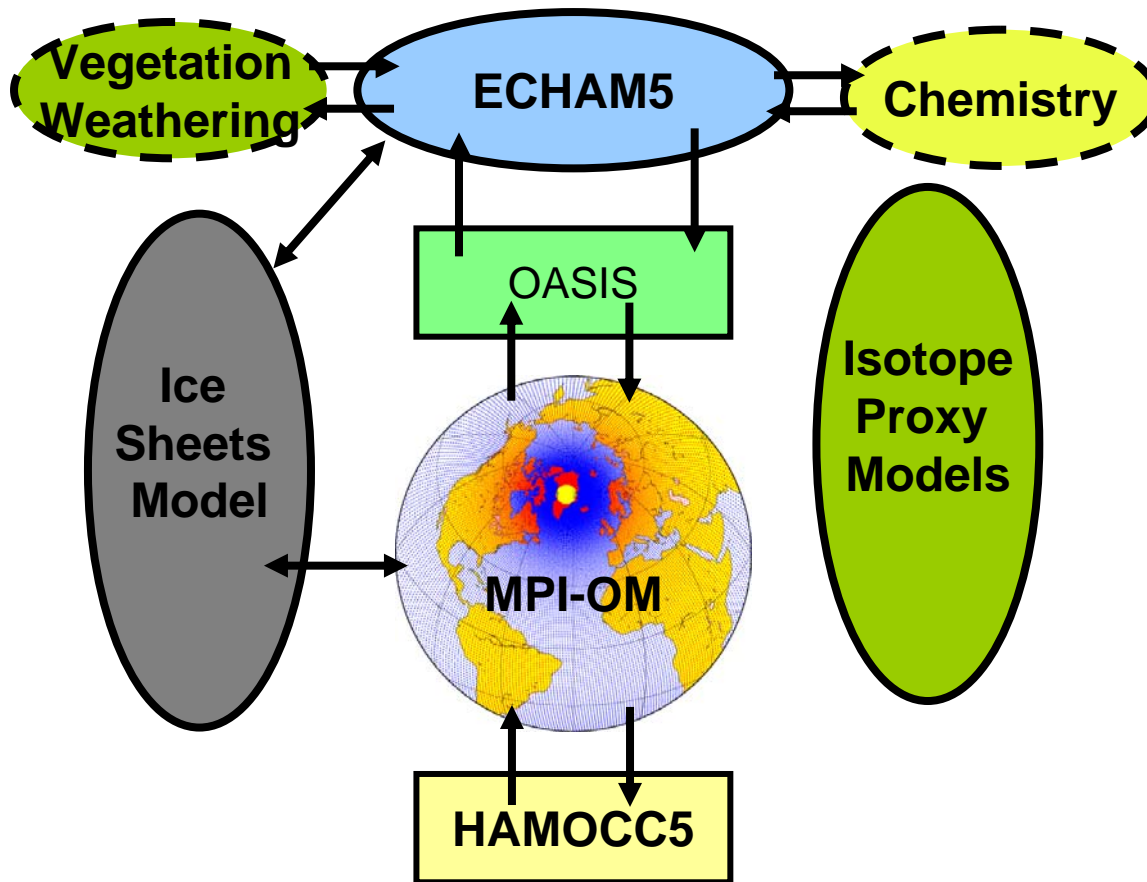
- **Holocene Variability in the Arctic Gateway (HOVAG)**, *with Prange, Spielhagen, Stein et al.*
 - **Evaluation of Eemian and Holocene Climate Trends**, *with Jungclaus, Schneider*
 - **Control of seasonality and interannual to centennial climate in the Holocene**, *w. Felis, Magnini*
 - **Decadal climate variability : marine archives and model simulations**, *with Pätzold, marum/RCOM*
- } SPP
} Interdyn

Cenozoic

- **Neogene development and the circum-Antarctic ocean frontal system**, *IODP/ODP, with T. Bickert*
- **DFG - Research Unit, "Understanding Cenozoic Climate Cooling"** *with MPI Hamburg, University Bremen, Senckenberg Institut Frankfurt*
- **Cenozoic Antarctic Glaciation**, *DFG SPP 1158, with Huybrechts*

AWI Strategy: Earth System Model

Modules (following COSMOS)



New modules:

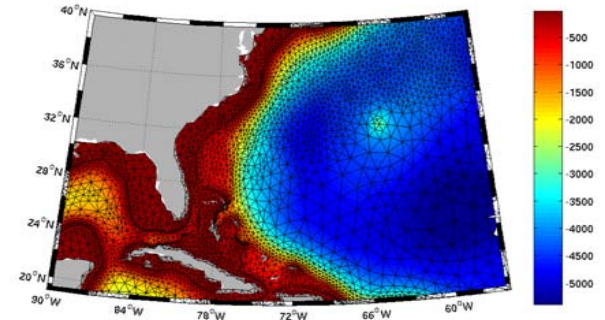
Ice sheets model:
Mass balance & sea level
Ice-ocean interaction
Permafrost

Isotope modules:
Ice cores, Forams, Stalagmites

Biogeochemistry/Ecosystem
(based on Recom)

- marine biogeochemical cycles
- continental weathering input
- sediment module

Finite Element Ocean Model



AWI PACES Programme: Earth System on Long Time Scales

Scientific Goals:

- **Holocene, Glacial-Interglacial, and Cenozoic**
- **Interpretation of Available Proxy Data**
- **Role of Ice Sheets, Carbon Cycle, Ocean Circulation**

Methods:

- **Coupling the Cryosphere & Biogeochemical Cycles**
- **Long-term Simulations: Climate, Elemental Cycles, Isotopes in Marine, Terrestrial & Ice Cores**
- **Synthesizing Data & Models**

COSMOS Paleo

- Current projects
- Climate components included
- Scientific questions

- Synergies (comparable set-ups etc.)
- Future projects
- Coordinated efforts