Early Cretaceous climate, anoxia and sea-level change

***Föllmi, K.*[1]**

1) Institute of Earth Sciences, University of Lausanne, Lausanne, Switzerland, E-mail:-karl.foellmi@unil.ch

The Early Cretaceous environment was strongly influenced by the break up of Pangea leading to both increased seafloor spreading and volcanic activity, as well as the formation of epicontinental rift basins. These processes were important for the development of Early Cretaceous climate and the associated hydrological cycle. Predominantly arid conditions are postulated for the early Berriasian, the late Barremian, and partly also the late Aptian. Predominantly humid conditions, likely linked with intensified greenhouse conditions, were important during the shorter episodes of important environmental change during the Valanginian, the late Hauterivian, the early Aptian, the early late Aptian, and the late Aptian to early Albian. Arid conditions went along with increased evaporation, lower biogeochemical weathering rates, and lower nutrient fluxes. Humid conditions triggered elevated biogeochemical weathering rates and nutrient fluxes, important runoff and the buildup of freshwater lids in proximal basins, intensified oceanic and atmospheric circulation, widespread upwelling and phosphogenesis, important primary productivity and enhanced preservation of organic matter in expanded oxygen-minimum zones. Negative feedback on the global carbon cycle and climate through increased marine organic matter preservation was less important than organic burial on the continent during the Early Cretaceous. The transition of arid to humid climates went along with the net transfer of water to the continent due to the infill of dried-out groundwater reservoirs in internally drained inland basins. This resulted in fluctuations in sea level, which are independent from the presence or absence of ice. These sea-level changes and the influx of freshwater into the ocean may have influenced marine oxygen-isotope signatures und suggest that this proxy can not be translated one-to-one into sea-surface water temperature.