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# Tidal dynamics and their influence on the climate system from the Cretaceous to present day

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## Abstract

Global numerical ocean models used for paleo-climate reconstructions commonly only consider the ocean's general circulation but neglect tidal dynamics. However, tidal dynamics affect the oceans mean general circulation, in particular by vertical mixing and tidal residual mean currents. Through feedback loops the whole climate system is affected.

Plate tectonics modify geometric resonance conditions in ocean basins and thereby tidal dynamics. We study the influence of ocean tides on the ocean general circulation and atmospheric parameters by forcing the coupled atmosphere-ocean model ECHAM5/MPIOM with the complete lunisolar tidal potential. Simulations have been performed for five tectonically important time-slices: the Early Albian (ca. 110 million years ago, Ma), the Cenomanian-Turonian Boundary (ca. 93 Ma, CTB), the Early Eocene (ca. 55 Ma), the Early

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