



What determines the Atlantic-Pacific salinity contrast through the Cenozoic?

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Climate model simulations at various time slices of the Cenozoic have indicated that several global patterns of the thermohaline circulation may have existed under different continental geometries. In the Oligocene for example, where both an Antarctic Circumpolar Current and a Circumglobal current at low latitudes existed, deep water formation was (i) shallower than today and (ii) occurred in both the North Pacific and North Atlantic Oceans. The different thermohaline circulation patterns are related to the distribution of salinity among the main ocean basins. Here, we investigate which circulation pattern is favored under several continental geometries and which sea surface salinity distribution is associated with it. This is done within idealized ocean models by systematically studying the effect of asymmetries in the system as, e.g., the surface forcing or land-sea distribution. We address the physical mechanisms that relate the sea surface salinity distribution and the associated circulation pattern, which is crucial to compare model results with proxy data.