



Impact of Andes uplift and Central American Seaway closure on Miocene climate

Pierre Sepulchre

CNRS, Laboratoire des Sciences du Climat et de l'Environnement, Gif-sur-Yvette, France

The Miocene (ca. 23-5.3 Ma) was an epoch of important paleogeographic changes, especially in the Neotropical region, with the rise of the Andes, the restriction of the Central American Seaway (CAS) and major modifications over the continent, with changing Amazon river-routing and long-standing inland seaways. To understand how these perturbations have altered climate, we use the fully coupled general circulation model (GCM) IPSL-CM4 and quantify the impact of the uplift of the Andes and the closure of the CAS on atmospheric and oceanic dynamics. A simulation with lower Andes helps understanding how the mechanical effect of this barrier affects surface winds and in turn, the freshwater balance between Atlantic and Pacific oceans. By including the continental effect of the Andean uplift, i.e. the changes in river routing within the Amazon basin and modified location of its freshwater outflow to the ocean, we show that mechanical and hydrological effects of the uplift are not acting in the same direction. We compare these signals to the CAS closure, which latest model-data studies and geological surveys have shown to occur between 15 and 10 million-years ago.