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The 6 and 130 kyr BP climates as simulated by an updated version of LOVECLIM1.2

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New modules are included in LOVECLIM1.2 (Goosse et al, 2010). First, a modified atmospheric balance equation is implemented. It links the computed changes of the atmospheric streamfunction with the geopotential height at each level (ABEL) by representing the effect of divergent winds on the streamfunction (Timmermann, 2011, personnal communication). Second, a parameterisation of katabatic winds is implemented (KATA). Their impact on the Antarctic sea ice is represented through constant corrections applied to the ice transport in the vicinity of the coast (Barthelemy, 2011). Third, an empirical diagnostic cloud scheme, based on the ERA-40 reanalysis data (Uppala et al., 2005), is introduced in LOVECLIM to address cloud feedbacks (Timmermann, 2011, personnal communication) (CLOU). This modified version of LOVECLIM has been tested under pre-industrial, mid-holocene (6 kyr BP) and last interglacial (130 kyr BP) forcing conditions. Two setups were used and compared to LOVECLIM1.2, i.e. AK01, which includes both ABEL and KATA, and AK02, which also includes CLOU.
First, AK01 and AK02 simulated climates are compared to the LOVECLIM1.2 one. Both AK01 and AK02 induce a global annual mean cooling of 0.4C for the pre-industrial period, and of 0.3C at 6 kyr and at 130 kyr BP. In summer (JJAS) the cooling is mostly located over continents and tropical areas. There is also a strong cooling off Antarctica in the Weddell Sea, while the Pacific sector of the Southern Ocean experiences a warming. In both cases (AK01 and AK02), summer precipitation is reduced in equatorial regions (mostly over the Indian and Pacific Oceans) and enhanced in tropical regions, especially over North Africa.
Second, the simulated Holocene (6 kyr BP) and pre-industrial (present) climate are compared. On global annual mean, the surface temperature is 0.3C higher at 6 kyr BP than at present. The warming in summer (JJAS) is the largest in the high northern latitudes, especially over Greenland and North America. A significant cooling is noticed over the Sahara desert and Saudi Arabia. Moreover, precipitation is more intense over these regions in summer. Summer monsoon is also intensified over India.
At last the 130 kyr BP climate is described. The global annual mean surface temperature at 130 kyr BP is similar to that at 6 kyr BP. However, the latitudinal contrast in summer is much larger at 130 than at 6 kyr BP, with a strong warming in the Arctic, a cooling of the equatorial Pacific region and a significant warming over Antarctica. Summer precipitation displays a similar enhancement.

References:
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