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How does data assimilation in the Northern Hemisphere affect the representation of Holocene climate ?

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Simulations are performed with the LOVECLIM climate model using data assimilation for snapshots corresponding to 4 and 6 kyr BP. This data assimilation technique, based on a particle filter, allows directly combining the climate model results and proxy records in order to have a reconstruction of the past climate changes that is consistent with proxy data and model physics, taking into account uncertainties on model results and proxy records. The 53 proxy data selected to constrain model results represent the surface temperature. They mainly come from ice core, pollen, alkenone and foraminifera. They are located in the Northern Hemisphere and must have at least a mean temporal resolution of 166 years for the reference period (950 to 450 BP) and during the simulated period (the two snapshots). Preliminary results for 4kyr BP show clear modifications of the surface temperature pattern. The positive annual mean anomaly (w.r.t. the reference period) over the Arctic is higher in the simulation with data assimilation compared to the simulation without it. These results also underline potential incompatibilities between the model dynamics and some proxies.