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Global temperature and hydroclimate in warmer climates of the past and future: the Last Interglacial versus greenhouse scenarios

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Past climates contain precious information about the workings of the climate system, and about what can be expected in a changed climate. The Last Interglacial (LIG; ca. 125,000 years ago) is the most recent period of climate warmer than modern, at least in the Northern Hemisphere. Because of this, it has been often proposed that the LIG holds a partial analogy with a future warmer climate forced by enhanced greenhouse effect. Still, such analogy has never been examined in a quantitative manner. Here we address the question: for which scenario, time horizon, regions and season is the climate of the LIG a useful analogue of the future? We use the results of 13 climate models that performed the standard experiments of PMIP4 and CMIP6, and present a comparison of hemispheric temperature and precipitation between the LIG and SSP scenarios of the future. We also two independent assessments of models performance, by comparing their temperature and precipitation to climate reanalysis of the last decades and to proxies of the LIG. Insights gained from this comparison can inform studies in disciplines beyond climate studies, such as hydrology and ecology.

