Factors driving the Mediterranean water cycle from a cold and wet glacial past to a warm and dry future

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Model simulations of the last glacial maximum (LGM) and RCP8.5 projections suggest that factors responsible for past and future changes in the Mediterranean region are different. The wet LGM conditions were determined mainly by low evaporation, with some increase of precipitation in the western areas, while dry rcp8.5 conditions will be driven by a reduction of precipitation over the whole region. These changes were caused by atmospheric dynamics (changes of mean atmospheric circulation) in LGM and it will be caused by the atmospheric thermodynamics (reduction of mean moisture content) in the future rcp8.5. In both cases, the Mediterranean region appears to be more sensitive to climate change than the rest of areas within the same latitudinal range, particularly considering the hydrological cycle, whose characteristics in winter exhibit large changes between these two different climates. These conclusions emerge from the substantial consensus among six PMIP3 and CMIP5 models, simulating LGM, pre-Industrial and rcp8.5 climate conditions.