

Interactive comment on “Future humidity trends over the western United States in the CMIP5 global climate models and variable infiltration capacity hydrological modeling system” by D. W. Pierce et al.

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Dear referee #2,

Thanks again for your interesting and thoughtful points on the manuscript. They have prompted me to take some time to examine this issue in greater detail, including tracing through multiple versions of the VIC code to see exactly what the specified annual soil moisture does and determine what bearing it has on the final simulation and on

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humidity in particular. I have additionally done a series of test simulations with VIC where I have altered the annual precipitation specified in the soil file over a wide range, from 1.e-6 to 1.e30, to ensure that actual results from running the model agree with the code analysis. In doing this I have used three versions of VIC, including the newest one available on the VIC home page (4.1.2.g, with a README dated 2013/01/11), a "middle vintage" version released in 2008, and the oldest version I have available, which is VIC_4.0.5, dated 2004/10/04.

It turns out that the annual precipitation specified in the soil file does not affect the humidity calculation. The code shows, and the test runs verify, that humidity is calculated using only annualized precipitation based on the 90-day moving window as described in the existing manuscript. The annual precipitation specified in the soil parameter file is not used in the calculation.

This is true for versions that I checked from 4.0.5 through 4.1.2.g. The model release notes, which date back to 2000/5/16, do not seem to identify any change to the humidity calculation after the initial incorporation of the MT-CLIM algorithms in 2000, so I cannot be sure what was done with the specified annual precipitation in model versions released between 2000 and 2004.

This is clearly a point that could cause confusion, so I will update the manuscript to address this, i.e., to state that the annual precipitation given in the soil parameter files does not affect the humidity calculation in versions of VIC released since late 2004.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 13651, 2012.

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