Evolving Water Resources Systems: Understanding, Predicting and Managing Water–Society Interactions
Proceedings of ICWRS2014, Bologna, Italy, June 2014 (IAHS Publ. 364, 2014, 70-75).

Water budget comparison of global climate models and experimental data in Onça Creek basin, Brazil

D. C. D. MELO, I. S. P. MARIN & E. WENDLAND

Department of Hydraulics and Sanitary Engineering, University of São Paulo, 400 Trabalhador são carlense av., São Carlos, Brazil
melo.dcd@gmail.com

Abstract Groundwater is an important part of the hydrological cycle, accounting for more than 25% of human needs on the global scale. As a result of aquifer overexploitation associated with climate change, even in the most conservative future climate scenarios, mean water-table levels can experience drastic drops. Although there are efforts to include groundwater dynamics in global climate models (GCMs), its influence is still not taken into full account in GCM water budgets, although it is as important as the other water sources considered. To assess the role of percolation in the water balance, we compared the water budget from climate forcing scenarios using 10 GCMs with the water budget from experimental data of a basin in São Paulo state, Brazil. We used the delta factor approach to correct the bias of the model's temperature and precipitation for a control period from 1970 to 1999, and calculated evapotranspiration using the Thornthwaite method. Experimental data for runoff and interception were derived for the basin's representative crops (sugar cane and pasture) for both water budgets. As the GCMs ignore subsurface flow and the only input considered is precipitation and snow melt, the excess surface water is assumed to be redistributed among the other water budget components. The experimental data shows that there is enough available water for infiltration, indicating that recharge cannot be ignored in the water balance. This leads to the possibility of the models' overestimating the other components to compensate for the ignored recharge.

Key words groundwater; global climate models; water budget