

TRMM-forced rainfall–runoff modelling for water management purposes in small ungauged basins

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Abstract River monitoring in Brazil is largely concentrated on medium and large rivers, due to historical reasons related to hydropower generation purposes. In recent years, pressure has increased on small, mostly ungauged rivers for irrigation and urban supply. The National Water Agency (ANA) is responsible for giving out water use rights permits in federal rivers, i.e. rivers that cross interstate borders. In order to estimate water availability in small ungauged basins, and thus enable decision-making, we applied a simplified rainfall–runoff model, based on two parameters (one for infiltration capacity and one for groundwater reservoir depletion). In order to be applied, at least three discharge measurements during one single dry season must be done. Thus, adjustment of the model is focused on hydrograph recessions, which define water availability. We used satellite-estimated rainfall from TRMM as input to the model, with very good results. A graphical interface was also developed to download TRMM data and adjust the model in a user-friendly environment. The advantages of using TRMM estimates instead of rain gauge data for this purpose are: the area-based character of TRMM data; the high coverage of TRMM, compared to sparsely distributed rain gauges; and the immediate availability of TRMM data, compared with the relatively long time needed to collect and process rain gauge data. We believe it to be a much more reliable methodology than the flow regionalization techniques used before.

Key words water; rivers; groundwater