***Supplement S1 of:***

Assessing Water Security in the Sao Paulo Metropolitan Region Under Projected Climate Change

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**HYMOD Model**

We used the spatially lumped HYMOD model conceptual rainfall-runoff model with six parameters (Boyle et al. 2000; Wagener et al., 2001). HYMOD consists of a variety of different excess generation, percolation and streamflow routing functions that can be put together in different combinations to describe the different hydrologic behaviors of the watershed system (Boyle et al. 2000). The model uses precipitation and potential evapotranspiration data to generate daily estimates of actual evapotranspiration and streamflow through two flow processes, vertical and horizontal (see Fig. 1). The nonlinear vertical flow is based on the rainfall excess controlled by two-parameter soil moisture (Huz and β). The parameter Huz describes the maximum storage capacity in the catchment, and β the degree of spatial variability of the soil moisture capacity. The horizontal flow is simulated in linear routing module that includes a Nash cascade (tanks in series) for quick-flow routing and a linear reservoir for slow-flow routing. The effective rainfall is distributed by the parameter α and either routed through a number of tanks (Nq parameter) with residence time Kq in series, and a single tank with residence time Ks.

References

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Figure 1: Schematic diagram of HYMOD and Parameters description.