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Hydraulic relationship between aquifer and pond under potential influence of eucalyptus and sugarcane in tropical region of São Paulo, Brazil

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Abstract

A hydraulic interaction between a pond and shallow aquifer in a watershed surrounded by cultivations of sugarcane and eucalyptus trees was evaluated in a tropical zone in Brazil. The pond, located in lower topographic levels, was prematurely interpreted as the local shallow unconfined aquifer's discharge area, suggesting the groundwater could flow toward the pond. However, water table gradients indicated opposite directions, bringing up questions about the eucalyptus root's potential to access groundwater, consequently lowering the water level and changing the groundwater flow directions. Physicochemical parameters, stable isotopes of $\delta^{18}\text{O}$ and $\delta^2\text{H}$, major ions analysis were determined in samples of groundwater and pond water; geophysical surveys and groundwater level measurements were performed before and