



A stomatal conductance model for miombo trees of southern Africa

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Miombo woodlands constitute the largest single vegetation type in southern Africa and most of the woodlands are located in headwaters of major rivers and catchments.

The accurate assessment of transpiration losses from these woodlands is therefore important in catchment water balance studies and integrated water resource management. In a study to develop a model for tree water use estimation, tree water use was measured with sap flow gauges. Sap flow data were used in conjunction with an inverted version of the Penman –Montheith equation to calculate stomatal conductance for headwater miombo woodland in semi-arid Zimbabwe. By optimisation and parameterisation, micrometeorological variables of soil moisture, specific humidity, air temperature and solar radiation were then used to develop a stomatal conductance model, which could be incorporated in tree water use models for semi-arid areas. The study also showed that stomatal conductance in semi-arid areas is strongly correlated with soil moisture deficit (negatively at -0.7), positively with specific humidity (0.83) and weakly with the solar radiation and air temperature. Soil moisture deficit and specific humidity were found to be strongly correlated, though negatively (-0.84), that is when the soils dry out the specific humidity falls. It is therefore not clear from these data alone that the specific humidity is having an effect.