

Interactive comment on “An optimality-based model of the coupled soil moisture and root dynamics” by S. J. Schymanski et al.

P. Kumar

kumar1@uiuc.edu

Received and published: 5 March 2008

On page 76 the authors state that "The water potential within a plant is commonly assumed to take on the value of the soil water potential when stomata close (e.g. Amenu and Kumar, 2007)." It is not clear in this attribution if the authors mean that Amenu and Kumar (2007) make this assumption or they identify that this is a limitation. The former is incorrect since Amenu and Kumar (2007) clearly state on page 56: "Figure 1 shows a schematic of the hydraulic redistribution. During transpiration from the leaves, the open stomata creates water potential gradient between the leaves and the roots, resulting in net water movement from the soil to the roots and then to the leaves. Water is absorbed from all depths depending upon the potential gradient and passes into the transpiration stream at the leaves. This is true both during wet and dry seasons. When

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



the stomata close, it results in turgor pressure that increases water potential within the plant body. As the potential in the root exceeds the potential in the drier part of the soil, moisture starts to efflux from the root to the dry soil, while water still continues to flow into the roots in the wetter part of the soil. During dry seasons, the upper soil is often drier than the deeper part of the soil, and the net water transport via the roots during night is thus upwards, from deeper to shallower layers, as shown in the left-panel of Fig. 1. On the other hand, during wet seasons, the upper soil layers get wetter than the deeper layers, and the net water movement through the roots will be downwards as shown in the right-panel of Fig. 1."

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 51, 2008.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

