

Interactive comment on “The boundary condition for the vertical velocity and its interdependence with surface gas exchange” by Andrew S. Kowalski

Anonymous Referee #1

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General comment The paper gives a relevant theoretical contribution in the delicate argument of the fluxes of water vapor and other gasses taking place in close vicinity of leaves and other surfaces, where evaporation takes place. This argument was overlooked in the past, leading to some improper simplifications. The paper is well written and organised. I welcome this contribution and I recommend it for publication. I suggest only some minor changes in order to make it more accessible, clear and concise. Specific indications Line 12: The vertical bars indicating processes taking place close to the surface are relatively uncommon and introduced only later in the text. This could reduce the potential readership. I recommend describing the processes by simple words in the abstract (and in the conclusions). Line 86: ‘...are the those properties...’

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I think the term ‘those’ is unnecessary. The same at line 90. In equation 2 the letter k could be capital for consistency with ‘K-theory’ (Line 130). Line 139: What is the condition of the water present in the pool at the beginning of the experiment? Only at line 150 it is reported that the pool has zero salt mass. Line 157: The concept that the tube (or better, the liquid present in the tube) is a source of salinity is somewhat repeated. Line 170: I would recommend defining early in the text the initial conditions. The same in all case studies presented. Line 189: ‘...volume...at a point...’, I cannot understand. A point has no volume by definition, at least in geometry. Line 223 and following. Are these four cases, all similar, strictly necessary? A single case study of the size of a leaf (e.g., 1 cm²) would simplify the text. Line 404. ‘average air speed exiting a stomatal aperture is 3.1 mm s⁻¹.’ I would find interesting if the author could provide a plot or a table showing how the main physical (pore size) or environmental variables (T? P?) affect this velocity. Line 436. ‘described in many chemical engineering texts’. Any references? Line 471: Any more recent references about helox experiments? Line 483: import->importance(?). Line 477 and following (Conclusions). I suggest to remove also from here uncommon symbols or to explain them all. More generally, I would still have a question: do the non-diffusive process described in the text have computational or only theoretical/descriptive effects? In Figure 2, it could be helpful if the presence of Mercury, and the circumstance that the tube is open to the atmosphere, would be indicated in the design.

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