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Title:	Nocturnal pollutant uptake contributes significantly to the total stomatal uptake of <i>Mangifera indica</i>
Authors:	Datta, Savita (/jspui/browse?type=author&value=Datta%2C+Savita) Sharma, Anita (/jspui/browse?type=author&value=Sharma%2C+Anita) Sinha, Baerbel (/jspui/browse?type=author&value=Sinha%2C+Baerbel)
Keywords:	Nocturnal pollutant <i>Mangifera indica</i> Stomatal uptake
Issue Date:	2022
Publisher:	Elsevier
Citation:	Environmental Pollution, 310(1), 45201
Abstract:	DO3SE (Deposition of Ozone for Stomatal Exchange), is a dry deposition model, designed to assess tropospheric ozone risk to vegetation, and is based on two alternative algorithms to estimate stomatal conductance: multiplicative and photosynthetic. The multiplicative model has been argued to perform better for leaf-level and regional-level application. In this study, we demonstrate that the photosynthetic model is superior to the multiplicative model even for leaf-level studies using measurements performed on <i>Mangifera indica</i> . We find that the multiplicative model overestimates the daytime stomatal conductance, when compared with measured stomatal conductance and prescribes zero conductance at night while measurements show an average conductance of 100 mmol(H ₂ O)m ⁻² s ⁻¹ between 9 p.m. and 4 a.m. The daytime overestimation of the multiplicative model can be significantly reduced when the model is modified to include a response function for ozone-induced stomatal closure. However, nighttime pollutant uptake fluxes can only be accurately assessed with the photosynthetic model which includes the stomatal opening at night during respiration and is capable of reproducing the measured nighttime stomatal conductance. At our site, the nocturnal flux contributes 64%, 39%, 46%, and 88% of the total for NO ₂ uptake in winter, summer, monsoon, and post-monsoon, respectively. For SO ₂ , nocturnal uptake amounts to 35%, 28%, 28%, and 44% in winter, summer, monsoon, and post-monsoon, respectively while for ozone the nighttime uptake contributes 30%, 17%, 18%, and 29% of the total stomatal uptake in winter, summer, monsoon, and post-monsoon respectively.
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URI:	https://doi.org/10.1016/j.envpol.2022.119902 (https://doi.org/10.1016/j.envpol.2022.119902) http://hdl.handle.net/123456789/5000 (http://hdl.handle.net/123456789/5000)
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