



## **Non-Stomatal Ozone Deposition to Vegetation: New Insights and Models**

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Tropospheric ozone is a natural constituent of the troposphere but man-made emissions of NO<sub>x</sub> and VOCs have led to an increase in concentrations globally. Ozone plays an important role in the Earth System, e.g. damaging vegetation, modifying the oxidation potential of the atmosphere and by acting as a greenhouse gas. Dry deposition of ozone to terrestrial surfaces governs its potential to cause damage and provides an important atmospheric sink. Ozone is very reactive so readily deposits on most surfaces. It is also taken in through stomata as the plant respire and this stomatal uptake can cause damage to the plant.

Stomatal uptake is estimated using existing stomatal conductance models but non-stomatal deposition has not been well described. As part of ACCENT Biosphere Atmosphere Exchange of Pollutants (BIAFLUX), several sets of ozone flux measurements were collated to examine the non-stomatal deposition process. The data showed ozone deposition increased to dry canopies as temperature or solar radiation increased, consistent with the thermal decomposition of ozone on leaf cuticles or reactions with

emitted biogenic VOCs. It was also found that the presence of surface water increased ozone deposition, probably due to aqueous chemical reactions with compounds in the water; therefore this may depend on the composition of cuticular waxes or the presence of other deposited compounds.

A new parameterisation for non-stomatal ozone deposition is derived and incorporated into a standard deposition model. As non-stomatal deposition will be modified by climate change a range of scenarios are examined to illustrate the potential feedbacks between ozone deposition, its concentration in the boundary layer and surface conditions.