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Modelling the stomatal and non-stomatal ozone fluxes to coniferous forests in Northern Europe

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The Eulerian chemical transport model of the European Monitoring and Evaluation Programme (EMEP) model was improved to allow more realistic estimation of the dry deposition sink and stomatal uptake of ozone. Improvements were incorporated into the DO3SE (Deposition of Ozone and Stomatal Echange) deposition module implemented in the EMEP model. To better reflect the current understanding of factors governing the surface exchange of ozone, the constant resistance of external plant surfaces was replaced by a variable resistance with lower values for wet surfaces. The wetness of surfaces was parameterised as a function of atmospheric humidity. The stomatal component of EMEP-DO3SE was modified by adjusting the factor representing the phenological development of coniferous forests, resulting in more realistic estimates of gas exchange at the start and end of the growing season. The improvements to the surface resistance were tested against micrometeorological flux data from a Scots pine forest at Hyytiälä, Finland. The implications of the new parameterisations were studied by running the EMEP model with different versions of DO3SE. In this presentation, the modelled deposition parameters, ozone concentrations and ozone fluxes over Northern Europe will be analysed. In addition, improved ozone exposure and dose indicator maps will be presented.