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Assessment of ozone damage to crop and forest in Europe caused by Danish emissions

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Tropospheric Ozone has a damaging effect on vegetation, where it inhibits growth and reduces yield of crop production, as well as causing visible damage to plant leaves. The reduced crop production and growth of forest trees can be assessed using species specific sensitivity factors and market prices. The damages to agriculture are severe and a treat to food security. However, anthropogenic emissions of air pollution are not causing ozone damage to vegetation locally because of redox titration of ozone in the pollution source area. The ozone damage is taking effect hundreds of kilometers further downwind, where the atmospheric content of ozone has stabilized. This means that ozone damage can have a large effect outside an emitting country's borders, while the effects inside are limited or even have reducing effects of ozone damage from other sources. As part of CEEH (Centre for energy, environment and health), we are assessing ozone damage to forest and vegetation in European countries from Danish emissions using atmospheric chemical transport simulations.