

## ***Interactive comment on “Low modeled ozone production suggests underestimation of precursor emissions (especially NO<sub>x</sub>) in Europe” by Emmanouil Oikonomakis et al.***

### **Anonymous Referee #1**

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One additional remark:

Fig S10 in the Supplements shows the mean vertical O<sub>3</sub> profile as measured by sondes and modelled for six European sites for summer 2010. All these profiles indicate a fairly marked underestimation of ozone by the model at the top model layer (about 4 km or a bit higher). Perhaps the authors could comment on this and on what possible consequences this could have for the model performance at the surface. Does this reflect a systematic bias (underestimation) in the boundary condition of ozone at the upper boundary? This question should be seen together with my previous comment that the vertical extent of the model domain seems somewhat shallow compared to

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standard CTMs that typically extend up to the tropopause. This question also leads to the question whether part of the systematic underestimation of ozone at the surface could be explained by the combination of too low concentration used as upper boundary conditions, a shallow vertical model range and uncertainties in the vertical exchange processes of ozone (the vertical gradients from the sondes differ markedly from the modelled ones).

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