General comments :

This paper presents a model that couples the evolution of the soil moisture calcultated by the Penman-Monteith energy balance and the stomatal conductance for O3. Four different methods are evaluated to estimate the biological control of the transpiration. The four methods are evaluated against field data describing a variety of soil water variables, stomatal conductances, and transpiration data for several forest trees. This evaluation is tested in parallel with a sensitivity analysis focused on the accumulated phytotoxic ozone dose.

The rationale and objectives of the paper are clearly laid out, the paper is well structured. I recommend this paper to publication… but, I have some suggestions in order to improve this paper:

- In the introduction, you should introduce a small paragraph on the SVAT models in order to examine your model in comparison with other models. For example, SurfAtm (Stella et al 2011), or PLATIN (Grünhage et al 1997, 2008), or the model of Tuzet et al (2011) are models for pollutant exchanges which integrate the O3 absorption and the energy and soil water balance : What are the advantages and disadvantages of your model compared to a few other similar models ?

- In the chapter "Method", you should improve the use of the references: several references are not the "initial" references:
  for example, Eq 20 is attributed at Lhomme (2001) and Jones (1992) but it is Campbell (1974) who has introduced this equation. The same comments can be done for the table 3 which is the table for the "default soil parameters" of the model. The paper "Tuzet et al" is not focused on the determination of soil parameters and you use these parameters as default parameters without find the origin of these parameters. I recommend to check these parameters.
  (Other example : Eq 5 and value Ka = 0.5 … same type of comments !) … etc …

- In the chapter "Method", I don't understand the time step of the model and the link between the daily processes and the hourly processes (see specific comments). In my mind, it is the most important correction you have to do.

- In the chapters "Result / Discussion" : I feel that these two sections could be better organized : I "feel" that there is about the same information between the comments of the "Results" and the "Discussion"… for example, "l26 p33607 to l8-33608" and "l9 p33609 to l16 33609" explain about the same things and mix results and discussion…I have had the same "feeling" between the results "sensitivity analysis" and the discussions). In these two parts, the text and ideas are clear but I feel that it can be improved. It's not a big problem but, when I read I have found about the same clear information in the two parts…

- In the discussion, you present some proposals as future model developments in relation with this study… When I read the discussion, I expected that the authors give priority to these new developments. It could be done.

Specific comments :

- Line 12-16 p33593: In my mind, this hypothesis is particularly false few days after a rain… How can you verify that this assumption is appropriate for your simulation ?.

- What's happen during the night ?(in particular for the use of the Penman-Montheith equation !!).

- You use the equation 3, 4, 5, 6 …11 with a hourly time step …(Line 14 p33592) but you daily calculate the soil recharge (Line 6 p33594 + Eq 14)… The links between the time steps are not clear … (The precipitations are daily known … you mix hourly values with daily values …?).

- Line 23-26 p33598 and 1-4 p33599, you explain that Ψleaf = Ψsoil is not always achieved after the night. There is a lot of explanation (Bruckler et al 1991, Personne et al 2003, …), in particular in case of dry soil. What is the weight of this assumption in your approach?.

- The title "european" trees … is not adapted in your case …, no ?.
- Can you argue the approximation G = 10% Φn.
- You can mention "run off" as other big omission in the hydrological cycle…

I appreciate the details which have been presented.

Technical corrections:

- Table 2 and 6 are written too small for my eyes.
- Eq (2) needs to be rewritten with good typographical sizes of letters ("max")
- Eq (5), you miss "="
- Eq(9) : Why the brackets "("RbH2O")".
- Line 3, p33602: "*Et"* needs to be change in good typographical size.
- some equations are sometimes not written consistently in a typographical point of view.

Tuzet A., Perrier A., Loubet B., Cellier P.: Modelling ozone deposition fluxes: The relative roles of deposition and detoxification processes., *Agricultural and Forest Meteorology,* Volume 151, Issue 4, 15 April 2011, Pages 480-492.

Grünhage, L. & Haenel, H.-D. (2008): PLATIN (PLant-ATmosphere INteraction) - a model of biosphere/atmosphere exchange of latent and sensible heat, trace gases and fine-particle constituents. *Landbauforschung* **58**, 253-266.

Grünhage, L. & Haenel, H.-D. (1997): PLATIN (PLant-ATmosphere INteraction) I: a model of plant-atmosphere interaction for estimating absorbed doses of gaseous air pollutants. *Environmental Pollution* **98**, 37-50.

Stella P., Personne E., Loubet B., Lamaud E., Ceschia E., Béziat P., Bonnefond J-M., Irvine M., Keravec P., Mascher N., and Cellier P., Predicting and partitioning ozone fluxes to maize

crops from sowing to harvest: the Surfatm-O3 model. Biogeosciences, 8, 2869-2886, 2011, doi:10.5194/bg-8-2869-2011

Personne E., Perrier A., Tuzet A. 2003. Simulating water uptake in the root zone with a microscopic-scale model of root extraction AGRONOMIE Volume: 23 Issue: 2 Pages: 153-168

Bruckler L., Lafolie F., Tardieu F. 1991, Modelling root water potential and soil-root water transport: II. Field comparisons, Soil Sci. Soc. Am. J. 55 (1991) 1213–1220.

Campbell, G.S., 1974. A simple method for determining unsaturated conductivity from moisture retention data. Soil Sci. 117, 311–314.