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Interactive Comment

Interactive comment on "The implementation of a MiXed Layer model (MXL, v1.0) for the dynamics of the atmospheric boundary layer in the Modular Earth Submodel System (MESSy)" *by* R. H. H. Janssen and A. Pozzer

Anonymous Referee #1

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The manuscript 'The implementation of a MiXed Layer model (MXL, v1.0) for the dynamics of the atmospheric boundary layer in the Modular Earth Submodel System (MESSy)' by R. Janssen and A. Pozzer presents a detailed description of the new developed model and a short application to field measurements. So concerning the idea of GMD the paper falls complete in the strategy of the journal. It was a pleasure and also a kind of lecture for me to go through all the equations showed in sufficient detail in the manuscript and besides some minor comments I would say the paper is ready for publication in GMD.

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Discussion Paper

Minor comments for consideration: In chapter 3 you start to explain VERTICO and although I read this section a couple of times the complete sense of this module is still somehow mysterious for me and should be explained – specially in his use – more carefully. Maybe I just don't got the idea behind it and you can explain it specially to me.

Second in the beginning of your equation sections you use the subscript 's' for example to define the surface heat flux. Later on you use the same subscript for the subsidence velocity (ws). Although it is clear what you mean it should be avoided to use the same subscript for spatial complete different places.

On page 7204 line 1 and later in table A1 you define the entrainment/surface heat flux ratio with 0.2 but without any explanation where you received this value. Is it based on measurements, from literature or just defined by you?

On page 7212 lines 6-13 you describe the calculation of the incoming long wave radiation, which I never saw before in this way – but why not. However, I would like to know how you get the value of 0.8 to calculate the atmospheric emissivity and also 10% of the boundary layer height as the surface layer top.

Figures 6 and 7: Although this is a model development journal there is one result plotted which surprised me. In figure 6 you show that your model reproduce the ozone concentration very well compared to the measurements. And then in figure 7 you present that nearly until noon the downward flux of ozone is the dominating source or production term of ozone in your model. This result presents for me a relatively high contribution to the measured ozone concentration at the ground from the free troposphere but I would not say it is not the truth. Can you discuss this!

Page 7219, line 9: figure 3 should be mentioned before figure 4 or just change the order

Spelling error: Page 7201 line 24: 'in into' should be 'into' Table A1: second line 'as as'

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should be ‘as’

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