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Interactive comment on "Volatile organic compounds (VOCs) in photochemically aged air from the Eastern and Western Mediterranean" *by* Bettina Derstroff et al.

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We thank D. Taraborrelli for his comment. He is completely correct that it is the effective Henry's law constant that needs to be considered in the calculation of dry deposition velocities, not the physical Henry's law constant. We have adjusted the text of our manuscript accordingly.

Regarding our calculations with the EMAC model, several effective Henry's law constants have recently been updated (thanks again to D. Taraborrelli for pointing out some incorrect values in the previous code). The model runs described in the current manuscript already used the corrected values. However, our comparison with previous simulations with EMAC shows that acetic acid dry deposition velocity changes negli-

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gibly over the ocean surface upon using the correct H* value, which implies that the removal rate is limited by the aerodynamic and quasi-laminar boundary layer resistances and not the H*-inclusive surface resistance terms (see details in Kerkweg et al. (2006)).

The two modelling section scenarios will be amended as follows

"Dilution by vertical and horizontal mixing is not accounted for in the equation. Dry deposition also represents a large uncertainty. We have considered two different scenarios here:

1. We used dry deposition rates calculated by EMAC (Jöckel et al., 2016) over the Mediterranean sea (0.41 cm s-1 for acetic acid, 0.031 cm s-1 for acetone and 0 cm s-1 for methanol). These values are calculated with a resistance scheme based on Wesely (Atmos. Environ. 23, 1293-1304, 1989) and implemented by Kerkweg et al. (ACP, 6, 4617-4632, 2006). They are not necessarily proportional to the Henry's law constants of the species. Assuming an average PBL height of 500 m, we obtained the results shown as light blue lines in Fig. 13. The black lines represent the linear fit of the measured data. It becomes clear that acetic acid is well captured by the calculation while the measured net loss was greater than the calculated loss for methanol and acetone.

2. In the second scenario dry deposition velocities were adjusted so that the measured loss rates were reached. This method yielded dry deposition velocities of 0.21 cm s-1 for methanol, 0.10 cm s-1 for acetone and 0.42 cm s-1 for acetic acid, assuming a PBL height of 500 m.

(2 new references that need to be added: Wesely and Kerkweg).

Kerkweg, A., Buchholz, J., Ganzeveld, L., Pozzer, A., Tost, H., and Jöckel, P.: Technical Note: An implementation of the dry removal processes DRY DEPosition and SEDImentation in the Modular Earth Submodel System (MESSy), Atmos. Chem. Phys., 6,

4617−4632, doi: 10.5194/acp-6-4617-2006, 2006.

Wesely, M. L.: Parameterization of surface resistances to gaseous dry deposition in regional-scale numerical models, Atmos. Environ., 23, 1293–1304, 1989

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