

## ***Interactive comment on “Parameterization of the nitric acid effect on CCN activation” by S. Romakkaniemi et al.***

**S. Romakkaniemi et al.**

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We thank Referee # 2 for the comments.

*General Comments: ... The authors have been successful in developing a new parameterization that includes the effect of nitric acid. However, this parameterization is basically an empirical based on results of numerical simulations of the governing equations under a variety of assumed conditions. Its derivation is neither based on analytical formulation nor approximate analytical calculations. Thus, its applicability to the entire range of atmospheric conditions is questionable.*

We agree with Referee that the lack of an analytical basis introduces the question of

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applicability to all atmospheric conditions. Without the analytical basis, the only way to assure applicability is extensive testing, and we have done that. The new parameterization is based on an extensive set of model runs and within the limits of those simulations, it is shown to be suitable for estimating the  $\text{HNO}_3$  effect accurately. The set of model runs has been chosen to be such that it covers all relevant conditions where  $\text{HNO}_3$  may have some influence on cloud droplet formation.

*Specific Comments: The paper is well written but did not show the derivation of the parametric equation.*

The origin of the mathematical form is explained in the answer to Referee #1.

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Interactive comment on Atmos. Chem. Phys. Discuss., 4, 7859, 2004.

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