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New particle formation during α - and β -pinene oxidation by O_3 , OH and NO_3 , and the influence of water vapour: particle size distribution studies

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Abstract. New particle formation during the oxidation of α - and β -pinene ($C_{10}H_{16}$) by ozone, OH and NO_3 was studied by measuring the particle size distributions with a scanning mobility particle sizer (TSI 3936). The results indicate a drastically higher nucleation potential of the ozonolysis than in the reaction with either OH or NO_3 . On the contrary, the contribution of the individual oxidation reactions to form new aerosol volume was found to depend on the location of the carbon double bond to be oxidised: for the *endocyclic* α -pinene reactions the ozonolysis contributed mostly to the aerosol volume yield, whereas for the *exocyclic* β -pinene reactions the oxidation by O_3 , OH and NO_3 yielded a similar aerosol volume.

In a second part of this study the influence of water vapour on the nucleation in all three possible oxidation routes was examined. The observations revealed only an effect of water vapour during the ozonolysis reactions.

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