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Aerosol dynamics and dispersion of radioactive particles

Traditionally dispersion models have quite rudimentary descriptions of the processes that change the aerosol size distribution and composition throughout the transport. These processes, aerosol dynamics, include wet and dry deposition, coagulation, condensational growth, chemical interactions, nucleation of new aerosols and the interaction between the released aerosol and the ambient atmospheric aerosol. Using the trajectory box model CALM the importance of aerosol dynamics has been studied. The target of this study is to analyse the relevance of including more advanced aerosol dynamics into dispersion models that are used to track released radioactive particles. When all aerosol processes are involved a clear transformation of the radioactive particles can be seen towards the accumulation mode, approximately particles of sizes between 0.1 and 1 Âµm. If, for example only dry and wet deposition were modelled and the rest of the processes were left out, this is not the case. The time it takes for this transformation to occur differs from site to site and from trajectory to trajectory. However, we conclude that a certain care of addressing the aerosol processes is required especially near the sources of the dispersion.

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