

Influence of defocus on electron tomography in TEM mode: application to soot aggregates

M. Cabié^{1*}, D. Ferry²

¹*CP2M, Aix Marseille University, Marseille, France*

²*Aix-Marseille Université, CNRS, CINaM UMR 7325, Marseille, France*

The significant impact of atmospheric aerosols on regional and global climate is now widely recognized, and atmospheric models - used in the assessment of radiative forcing – have been improved to include important aerosol species. Among these, soot aerosol particles are major contributors to light absorption and consequently have a direct impact on the radiative balance of the atmosphere. They are in fact aggregates, which have a complex morphology usually described through its fractal dimension, and are made of spherical primary particles having a diameter typically ranging from a few nanometres to dozens nanometres. Soot aggregates radiative and transport properties are influenced by their morphology that is commonly characterized from 2D images produced by TEM. To date, only a few studies have been performed with electron tomography in order to characterize the 3D shape of these aggregates and we show in this work that one has to pay attention to the defocus during the acquisition of tilted series to avoid artefacts and ensure a realistic reconstruction. The impact of the defocus on the reconstruction of soot particles is investigated in details and a procedure ensuring a realistic reconstruction is proposed and validated with numerically generated spheres.