

Abstract Submitted
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Cluster-Cluster Aggregation Calculations of Fractal Haze Particles: Titan and the Early Earth BERNICE TERRELL-MARTINEZ¹, DAVID BONESS, Physics Department, Seattle University — The atmosphere of the Archean Earth (3.8 to 2.5 billion years ago) is thought to have been dominated by a thick hydrocarbon haze similar to that of Titan’s current atmosphere. To understand radiative transport in the atmospheres of the early Earth and of Titan, it is necessary to compute light scattering in UV, visible, and IR wavelength ranges for realistic fractal aggregate hydrocarbon aerosol particles. We report preliminary work on MATLAB, True BASIC, and Fortran programs to simulate the growth of fractal aggregate aerosols through diffusion limited aggregation (DLA) and cluster-cluster aggregation (CCA) physical processes. The results of these computations are being used with a T-Matrix light scattering program to test recently published, widely-reported conclusions about the early Earth and the faint young Sun paradox [E. T. Wolf and O. B. Toon, *Science* 328, 1266 (2010)]. This modeling is also relevant to understanding atmospheric carbonaceous soot aerosol anthropogenic and natural effects on climate change of Earth today.

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