Optical Properties Volcanic Ash

Based on Fred Prata Calculations (2001)

Ash Composition: Andesite

**For 1μ particle**

Red Green Blue Near IR

Wavelength (λ) 0.64μ 0.55μ 0.47μ 0.865μ

Single Scatter Albedo 0.7600 0.7729 0.7879 0.7271

Asymmetry Factor 0.4390 0.4412 0.4453 0.4319

Extinction Qext (Num x10-4) 2.0890 2.0883 2.0880 2.0910

**For 3μ particle**

Wavelength (λ) 0.64μ 0.55μ 0.47μ 0.865μ

Single Scatter Albedo 0.7580 0.7718 0.7872 0.7240

Asymmetry Factor 0.4349 0.4388 0.4435 0.4249

Extinction Qext (Num x10-4) 2.0879 2.0876 2.0875 2.0890

**For 5μ particle**

Wavelength (λ) 0.64μ 0.55μ 0.47μ 0.865μ

Single Scatter Albedo 0.7570 0.7663 0.7868 0.7226

Asymmetry Factor 0.4330 0.4377 0.4428 0.4218

Extinction Qext (Num x10-4) 2.0875 2.0873 2.0872 2.0881

\*\*\*Extinction (Qext) varies quite a bit from one volcano to another; from one eruption to another (same volcano); and from one time to another, same eruption, same volcano. This condition is largely due to variances in eruption composition from one volcano to another or across a volcano’s eruption cycle or within a single eruptions timeline. The differences in the extinction vary be about 1 order of magnitude (number x 10-4/m to number x 10-5/m).

Eruption will be centered on Cloud Peak in the Big Horn Mountain Range in north central Wyoming. Latitude: 44.38220 Longitude: -107.1733

Eruption Parameters will be based on an eruption of 1.0 x 1019 μg/hr

Ash Composition: used ONLY 5 μm particles - 100% (1.0x1019 μg/hr) – 11/15/2011

Output is in two forms: 1. Concentration - μg/m3 or 2. Mass – in μg

Output (binary) file for either Concentration or mass is called “cdump.”