Reconciling the petrology of SNCs and the composition of the mafic regions of Mars from NIR data

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The surface mineralogy of Mars is constrained using spectral and chemical data gathered by spacecraft in orbit around and landers roving on the planet. One of the most successful techniques for determining surface composition is the near infrared imaging spectroscopy. Virtually the entire surface of Mars has been mapped using the OMEGA instrument. These complex spectral data can be deconvolved into mineral abundances using the Shkuratov radiative transfer model [Shkuratov et al. 1999; Poulet and Erard 2004]. Such a technique was applied to OMEGA data providing the modal mineralogy of a dozen of basaltic regions [Poulet et al. 2009a, 2009b]. Conversely, Martian meteorites provide important compositional information about crustal mafic rocks and enable ground-truth of orbital data. Here we apply the Shkuratov scattering model to the NIR spectra of nine martian meteorites in order to retrieve their modal composition. These compositions are compared to their petrographic characteristics from various studies, and are then used to interpret the mafic regions observed across the surface of Mars. We will show that the cross-comparison of spectral analyses of the meteorites and mineralogy of Mars enables our understanding of the planet's integrated geologic history.