



Pacific Northwest Chapter

Please join us for our Seattle-Area Spring Meeting:

What do Martian meteorites tell us about ancient Martian surface processes?

Nele Muttik, PhD

Saturday March 3, 2018

4:00 pm to 7:00 pm

\$10 contribution toward pizza, salad, drinks, and dessert is requested

Abstract:

The history of a planetary body such as Mars is recorded within its rock record. Each rock type provides insights into different aspects of planetary evolution, with sedimentary rocks capable of recording a rich history of surface processes, as well as past biologic, geologic, and climatic activities. Despite the abundance of sediments on the Martian surface [Malin and Edgett, 2000; McLennan et al., 2005, 2014; Szabó et al., 2015], Martian sedimentary rocks are not represented in the inventory of meteorites with the exception of a single sample, Northwest Africa (NWA) 7034 [Agee et al., 2013] and its pairings, and represent the first brecciated materials to be sampled from Mars. NWA 7034 is composed of igneous, impact, and brecciated clasts within a thermally annealed submicron matrix of pulverized crustal rocks and devitrified impact/volcanic glass. The brecciated clasts are likely lithified portions of Martian regolith with some evidence of past hydrothermal activity. Represented lithologies are primarily ancient crustal materials with crystallization ages as old as 4.4 Ga, and its bulk composition is similar to the estimates of the average Martian surface as measured from measured from orbit [Beck et al., 2015; Cannon et al., 2015]. Consequently, NWA 7034 and pairings provide our first opportunity to directly investigate the mineralogy and secondary chemical processes that occur in Martian regolith materials and how these processes may have changed through time [e.g., Mustard et al., 2008]. In particular, NWA 7034 has elevated abundances of Martian H₂O in the bulk rock (6000 ppm) [Agee et al., 2013], so it is a prime candidate for examining the action of aqueous fluids at or near the Martian surface/crust.

Location:

Mary Lynne Poole's lovely home in the Bridal Trails area of Bellevue. Please RSVP with Marcia Knadle at marciaawg@aol.com or text or call 206-723-8379 by noon on Feb. 2 for the address and directions, and so that we know how many are coming for pizza. Please let me know if you're a vegetarian or have other topping requests; if you can't handle gluten, let me know and I'll try to

make sure to get a gluten-free salad dressing. If you wish to attend only the talk, please plan to arrive by 5:30. Parking is available along the street.

About the speaker:

Nele Muttik holds a Ph.D. degree in Geology with emphasis in geochemistry and mineralogy from the University of Tartu, Estonia. She has a strong background in impact-cratering research, and her primary area of interest involves the investigation of the rock-water interactions throughout the crust of Earth and other planetary bodies. This includes investigating different patterns of aqueous alteration mineralogy, fluid origin, temperature distribution, and composition in hydrothermal/aqueous systems. Nele did her postdoctoral fellowship at the Institute of Meteoritics, University of New Mexico. Her research focused on planetary materials and meteorites. She had a great opportunity to study the unique brecciated Martian meteorite NWA 7034. Before relocating to the Seattle area last summer, she was running the Electron Microprobe Lab at Louisiana State University and developed the routine techniques to perform analysis on different materials. Currently, she consults on electron microscope analysis and materials characterization.



NWA7034

***** AWG-PNW meetings are open to all, including non-members *****