DIFFERENTIAL ALTERATION OF GLASS CLASTS IN THE SURFICIAL SUEVITES OF THE RIES CRATER, GERMANY. H. M. Sapers[1*], G. R. Osinski[1], and N. R. Banerjee[1]. [1]Centre for Planetary Science and Exploration & Dept. of Earth Sciences, University of Western Ontario, London, ON, N6A 5B7, Canada. [*]E-mail: hsapers@uwo.ca.

The mid-Miocene (14.3 ± 0.2 Ma; [1]) Ries impact crater located in southern Germany was formed in a two-layer target comprised of dominantly Mesozoic flat lying siliciclastic and carbonate sedimentary rocks that unconformably overlie crystalline Hercynian basement [2]. Ries is a complex crater with a total diameter of ~24 km [2]. Impactite and ejecta deposits are exceptionally well preserved. The surficial suevites comprise one of four main proximal ejecta deposits [3] and are divided into two distinct lithological units: 1) the dominant main suevite that represents a clast-rich particulate impact melt rock or impact melt-bearing breccia [3, 4]; and 2) subordinate basal suevite [5]. Four main glass types occur within the main suevite both as groundmass phases and as discrete glass clasts [6]. Glass clasts are typically vesiculated, schlieren-rich mixtures containing abundant mineral and lithic fragments [3]. Here we present a detailed micro-textural and chemical study of the surficial suevites focusing on alteration of the glass clasts.

Evidence of a post-impact hydrothermal system at the Ries crater has been documented [e.g., 7]. Despite the identification of hydrothermal alteration phases within the surficial suevites [7], it has been suggested that the Ries post-impact hydrothermal system was restricted to the crater-fill units [8]. Our study suggests that alteration of glass clasts within the surficial suevite followed a progression from high- to low-temperature alteration with textures consistent with hydrothermal alteration, *sensu stricto*, between the two temperature end members. Alteration textures indicative of hydrothermal alteration are spatially restricted and include colliform/rhythmic banding, amygdaloidal infilling, pervasive alteration to complete replacement of glass clasts by clay minerals and the occurrence of course-grained, platy clays. This hydrothermal alteration was preceded by high-temperature devitrification or autometamorphism and followed by low-temperature weathering. The latter two processes represent the dominant form of alteration of the surficial suevites, which is consistent with a limited hydrothermal system within the surficial suevites. Ongoing work seeks to understand the relative importance and timing of the various alteration processes.

References: [1] Buchner E. et al. 2003. *International Journal of Earth Sciences* 92:1–6. [2] Pohl J. et al. 1977. In *Impact and explosion cratering.* Ed. Roddy D. J., Pepin R. O., and Merrill R. B. New York: Pergamon Press. pp. 343–404. [3] Engelhardt W. v. 1990. *Tectonophysics* 171:259–273. [4] Osinski G. R. et al. 2004. *Meteoritics and Planetary Science* 39: 1655–1683. [5] Bringemeier D. 1994. *Meteoritics* 29:417–422. [6] Osinski G. R. 2003. *Meteoritics and Planetary Science* 38:1641–1667. [7] Osinski G. R. 2005. *Geofluids* 5:202–220. [8] Muttik N. 2008. *Meteoritics and Planetary Science* 43:1827–1840.