FLUIDIZATION OF THE RIES CRATER'S EJECTA BLANKET. A. Wittmann[1] and T. Kenkmann[2]. [1]Lunar and Planetary Institute, Houston, TX 77058. wittmann@lpi.usra.edu. [2]Museum für Naturkunde, Invalidenstr. 43, 10115 Berlin, Germany. thomas.kenkmann@mfn-berlin.de.

Introduction: The ~24 km diameter Ries crater formed ~14.3 Ma ago in a layered target of Permian to Miocene sedimentary rocks on top of a Precambrian to Paleozoic crystalline basement. Its continuous ejecta blanket is the Bunte Breccia, a polymict lithic breccia that is mainly composed of sedimentary target clasts and reworked surficial sediments. This unit is locally overlain by Suevite, which indicates far higher temperatures and degrees of shock metamorphism and is mainly composed of clasts and melt particles derived from the crystalline basement [1]. The Ries crater's ejecta blanket is tested for the hypothesis of fluidization during emplacement.

Discussion: Initial interpretations of the Bunte Breccia assumed analogies to the Moon: (I) ballistic emplacement, which triggered a ground hugging debris surge [2], or (II) a rolling and gliding surge under high localized confining pressures [3]. Water saturation in the target sequence of the Ries suggests it more likely formed analogous to Martian rampart craters [4]. Sedimentological evidence from the Bunte Breccia supports this hypothesis: A variably thick cover of poorly consolidated Tertiary sediments and underlying sedimentary rocks likely produced a fluidized ejecta blanket. The apparent lack of surficial water in the target area at the time of impact may be comparable to conditions on Mars, where liberated volatiles from near surface sources in the ground supposedly led to the formation of fluidized ejecta blankets [5]. A working hypothesis is that upon loading with ejecta, the surficial sediments assumed a thixotropic character above a critical yield stress, which accommodated gliding surge of the Bunte Breccia. Loss of momentum released confining pressures, which solidified basal portions of the flowing ejecta blanket. This led to the formation of sub-horizontal glideplanes, which accomodated stacking of ejecta layers within the Bunte Breccia, analogous to inferences from the Chicxulub crater's ejecta blanket [4]. The interface between Bunte Breccia and Suevite is a poorly consolidated quench zone, from which venting pipes originated. These suggest vaporization of water at the Bunte Breccia's surface during the emplacement of Suevites.

Summary and Outlook: Emplacement of the Bunte Breccia likely was a combination of ballistic sedimentation, rolling and gliding, and viscous flowing. Quantification of Tertiary sediments in the target area at the time of impact may constrain the extent of a fluidized ejecta blanket.

Acknowledgments: The study was supported by a Barringer Meteorite Impact Research grant, S. Heuschkel (Märker GmbH), G. Pösges (Rieskratermuseum Nördlingen), R. Barfeld, and Zentrum für Rieskraterforschung Nördlingen (ZERIN).

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