THE FORMATION AND EMPLACEMENT OF SUEVITE – A REVIEW OF GENETIC MODELS AND UNRESOLVED ISSUES.

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Definition and significance of suevite: By definition, suevite is a polymict impact breccia that contains impact-derived melt particles in otherwise clastic material [1]. Glassy, lithic and mineral clasts are generally embedded in a particulate, clastic cum melt matrix. The presense of melt particles within polymict breccias is usually easy to identify, and therefore represents an important feature for the recognition of suevite as a proximal impactite in general, but specifically in the field. Suevite records various impact-related effects like rock comminution, different degrees of shock-metamorphism including melting, and the dynamics of crater formation. Furthermore, suevites, and specifically its lithic fragments, may record information on deeply buried lithologies. Suevite is a proximal impactite that occurs within or close to the impact structure. It is usually deposited in the upper part of the ejecta blanket, e.g. [2], [3], or impact melt sheet, e.g. [3], but it may also occur below the impact melt sheet, e.g. [4], [5], or as injections into the crater floor, e.g. [6].

Formation and emplacement models: Detailled studies in the recent years (including of the type example at Ries crater, Germany) have significantly improved our understanding of the formation and emplacement of suevite; however, many different hypotheses are still debated today.

Some major hypotheses are (1) collapse of an ejecta plume, e.g. [7-9], (2) deposition via a density flow, e.g. [10], [11], (3) deposition from an impact melt flow, e.g. [12], (4) mixing between fragmented basement and impact melt during outflow, e.g. [4], [5], and (5) collapse of the post-impact phreatomagmatic plume(s) caused by fuel-coolant interaction (FCI) of an impact melt sheet with water or an aquifer, e.g. [13-15].

The co-existence of many different formation and emplacement models of suevite, some of which are controversial, may result from specific studies at different impact environments and conditions, the complexity of the formation process, the general lack of continuous outcrop of suevite deposits, and last not least, from some lack of understanding of the physical processes involved in the formation of such complex material in a highly dynamic environment. In this contribution to the Impact Cratering Workshop, the main existing genetic models of suevite formation will be reviewed and unresolved issues discussed, with some examples.

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