

DISCOVERY OF IMPACT BRECCIAS IN THE WESTERN OF TAIHU LAKE IN JANGSU PROVINCE, CHINA: NEW EVIDENCE FOR AN IMPACT ORIGIN

H. Qian, H. Wang, Z. Xie, Z. Huang, G. Shi, S. Jiang. State Key Laboratory for Mineral Deposits Research, School of Earth Sciences and Engineering, Nanjing University, Nanjing, 210093, China. E-mail: qhd760@sohu.com

Introduction: In this paper, we report two types of impact breccias in the western of Taihu Lake, Jiangsu Province, China. These breccias show clearly different features from the breccias of endogenetic origin by tectonics, syn-tectonic sedimentation, and granitic intrusion. In Taihu Lake area occurs two major types of lithologies, one is purely sedimentary rocks, such as the quartzite and quartzose sandstone of the WuTong Formation of Devonian unit (D₃), and the other is super-jacent stratum of volcanoclastic rock of Jurassic unit (J₃).

Results: The impact breccias we found occur in the above two lithologic categories:

(1) Impact breccias of fine quartzite or super-fine chalcidonic quartzite. The sizes of the breccias range from micro meter to 20 cm. Breccias dikes with orthogonal orientation were observed in the quartzitic impact breccias in the western of Taihu Lake, which are similar to H-type dikes in the Azuara impact structure, Spain [1,2]. The matrix of the breccia mainly consists of siliceous and Fe-siliceous cement. In thin sections of quartzitic impact breccias, quartz grains regularly show strong mechanical deformations, fracturing, strong undulatory extinction, deformation lamellae, and multiple sets of planar deformation features.

(2) Impact breccias of volcanic precursor plus other rock debris. The fragments in breccia include volcanic gravel, lithoclast, pelitic rocks, felsic breccia, granular chert, irregular or angular-sharp quartz, and feldspar grains etc in groundmass. The black dikes were often observed merging into characteristic black pockets, suggesting a quench melt of shock effect [3]. Quenched melt (glass) is consistent with an impact origin [4]. Under microscopic, the dike with bifurcation is crossing some fragments and matrix. The fragments entrained in the matrix show the shock-related evidences too.

Discussion: The deformation features of quartz quench melt, and breccia features are consistent with the impact features, suggesting an impact origin. The confirmation of impact breccias and metamorphism is an important discovery after the discoveries of the impact ejection materials [5]. The discovery presents new evidence that have played an important role in the understanding and confirming of an impact origin for the Taihu Lake.

Reference: [1] Osinski G R. 2004. *Earth and Planetary Sciences Letters*, 226:529-543. [2] Dressler B O and Reimold W U. 2001. *Earth-Science Reviews*, 56:205-284. [3] Stöffler D. et al. 1991. *Geochimica et Cosmochimica Acta*. 55:3845-3867. [4] Kieijer, S.W., Phakey, P. P. and Christie, J.M., 1976. *Contrib Mineral. Petrol*, 59:41-93. [5] Wang Henian, Xie Zhidong and Qian Handong. 2009. *Geological Journal of China Universities*, 15:4, 437-444.