

SIDERITE CONCRETIONS BEARING ANGULAR-QUARTZ IN THE VICINITY OF TAI LAKE, SOUTHEAST OF CHINA: IMPLICATIONS FOR AN IMPACT ORIGIN OF TAI LAKE

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Introduction: Here we report the occurrence of the siderite concretions containing abundant angular quartz grains and minor clay minerals in the vicinity of Taihu Lake, Southeast of China. The occurrence and mineralogy of the siderite concretions is consistent with the impact hypothesis for the origin of Tai lake.

Occurrence: The siderite concretions occur in four morphologies: micro-sphere dust, bean-sized lapilli, elongated rods, and irregular-shapes. The irregular shapes include massive, sheet, and tear shaped concretions. Dust, lapilli, Rod and irregular concretions were found dispersed in a specific mud layer in several locations in the vicinity of Tai lake, while rod concretions were found vertically in a mud layer in Shi Lake [1].

Mineralogy: The concretions consist of aggregates of μm -sized siderite spheroids or siderite crystals as concretion matrix, and μm -sized angular quartz grains and minor clay residues as concretion debris. The ratio of the debris to siderite varied from ~10 % to 80 %. The sizes of concretion range from μm to cm. The surface of rod and irregular-shaped concretions show irregular ripples and furrows.

Quartz grains are very angular with sharp edges and corners. They also show deformation features with parallel fractures and undulate extinction under cross polarized light. Siderites can show euhedral crystal habit with rhombic shape. The siderite crystals commonly occur as radial aggregates in micro-sized spheroids.

Age: The age of mud layer contained siderite concretions were constrained by peat woods and shell by using C14 dating, indicating a calibrated age of ~ 8000 BP, indicating the concretions formed later than 8000 years BP.

Discussion: Based on these observation and preliminary results, the origin of the siderite concretions could be explained by three distinct mechanisms: aqueous deposition within the mud, volcanic lapilli formation and lapilli formed in the ejecta plum of an impact. The round shape of Tai lake has been use as evidence of an impact, but the large size and shallow depth of the lake are inconsistent with a young impact structure. An alternative impact model that could produce a shallow crater without major crustal disruption is an aerial burst of an impact. Further evidence of shock metamorphism is needed to support this model.

Additional evidences of shocked sandstone and impact breccia in Tai Lake area are presented in another two separate abstracts [2, 3].

References: [1] H. Wang, Z. Xie*, and H. Qian, 2009. *Geological Journal of China Universities*: 15: 437-444. [2] Z. Xie et al., 2010, *MAPs*, this meeting. [3] H. Qian et al., 2010, *MAPs*, this meeting.