Shocked Quartz and Diaplectic Glass at Miura (Kagawa-Takamatsu) Crater, Japan -New Evidence for an Impact Origin, **Yasunori Miura[1], Michael R. Rampino[2], Miklos Kedves[1], Yuki Uedo[1]and Taro Maeda[1],** 1. Department of Earth Sciences, Faculty of Science, Yamaguchi University, Yoshida, Yamaguchi 753-8512, Japan. yasmiura@po.cc.yamaguchi-u.ac.jp.2. Earth and Environmental Science Program, New York University, 100 Washington Square East, New York, NY10003, U.S.A.

Introduction: Miura (Kagawa-Takamatsu) crater located in Kagawa Prefecture, Shikoku, Japan is a buried circular feature defined by a 4-km diameter negative gravity anomaly in an area of Late Cretaceous (ca.90 Ma) Rhyoke granitic rocks [1]. Previous studies reported glassy and highly zeolitized granitic melt-breccia deposits from within the crater. These breccias were found to contain small Ni-rich grains (up to 94% Ni) and glassy spherules, some with new-growth zircons that were U-Pb dated at 15.3(0.3)Ma inferred to be the age of the structure [2-7]. Recent sampling has produced evidence of shocked minerals and diaplectic glass in the crater-filling breccias confirming the impact origin of Miura (Kagawa-Takamatsu) crater. Purpose of present paper is to elucidate impact origin by using shocked minerals, diaplectic glass on the Miura (Kagawa-Takamatsu) crater which is located outside Takamatsu city defined ca. 4km [1].

Shocked minerals : Rare quartz grains with planar defo r-mation features (PDFs) have been found in clasts in breccia outcrops within and around the crater and in zeolite-bearing breccias in a 300 m deep borehole. PDFs in the quartz grains (measured on a U-Stage) occur in the (0011), (10$\bar{1}$0) and (10$\bar{1}$3) crystallographic directions indicative of intermediate shock pressures. Feldspar grains showing deformation lamellae and diaplectic glass have been found in granitic clasts with glassy clasts and in the matrix of suevite melt breccias outside the gravity anomaly rim[5]. Although quartz with planar features and possible diaplectic glass are found so far, additional analyses are in progress, together with comment by Dr.Richard Grieve.

Satellite images: Japanese satellite (JRES-1) images obtained using microwave radar (SAR) and multi-spectral optical measurements (VNIR) reveal the southern topographic rim of the crater coincident with the edge of the 4-km diameter circular gravity anomaly. Satellite data also support the existence of a secondary ring at ca. 8 km diameter in the south, which is marked by highly fractured Rhyoke granite with vertical fracture surfaces and shear zones, and outcrops of suevitic breccias [8].

Formation process: Miura (Kagawa-Takamatsu) impact event occurred in target rocks of Late Cretaceous Rhyoke Granite on the proto-Japanese islands at 15.3 Ma, and the crater was filled and eventually buried during movement of the Japanese Islands to their present location. Passage through the volcanic front of the Sea of Japan led to basaltic andesite volcanism around and inside the impact structure at about 14.2 Ma [2-7].

Summary: Recent sampling has produced evidence of shocked minerals and diaplectic glass in the crater-filling breccias confirming the impact origin of Miura (Kagawa-Takamatsu) crater, Japan.

Quartz grains with PDFs have been found in breccia outcrops within and around the crater and in zeolite-bearing breccias in a 300 m deep borehole. PDFs in the quartz grains (measured on a U-Stage) occur in the (0011), (10$\bar{1}$0) and (10$\bar{1}$3) crystallographic directions.

Feldspar grains showing deformation lamellae and diaplectic glass have been found in granitic clasts with glassy clasts and in the matrix of suevite melt breccias outside the gravity anomaly rim.

Japanese satellite (JRES-1) images obtained using SAR and VNIR reveal the southern gravity anomaly rim of the 4-km diameter and a secondary topographic ring at ca. 8 km diameter in the south, which is marked by fractured Rhyoke granite and suevitic breccias without zeolite alteration.

The Miura (Kagawa-Takamatsu) impact event occurred in Late Cretaceous Rhyoke Granite on the proto-Japanese islands at 15.3 Ma, and the crater was filled and eventually buried during movement of the Japanese Islands to their present location followed by basaltic andesite intrusion along the small cracks inside and outside the impact structure at about 14.2 Ma.

References:

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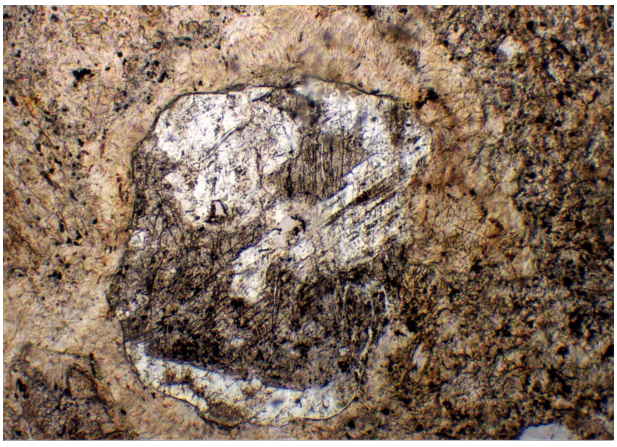

Fig.1. Optical micrograph of shocked quartz altered by zeolite mineral at Miura (Kagawa-Takamatsu) crater in Japan. 1.5mmin horizontal size of the micrograph [5, 8] .