

NEW IMPACT PROCESS ON SOFT TARGETS ON THE MOON, EARTH AND MARS.

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Introduction: Impact crater process on planet Earth is classified by two types of hard (crystalline continental rocks) and soft (water-sea-bottom soils) which can be applied to the Moon, Asteroids and Mars. The present paper is to elucidate new impact crater process [1-4].

Two types of impact target-materials: Target materials of impact process are classified by two types of hard and soft target materials and textures as follows (in Table 1):

1) Type 1: All hard target rocks of igneous and sedimentary continental crust show this type found in the Barringer, Ries, Wolf Creek, Henbury, and Gosses Bluff etc. Ejected direction by impact of the type 1 is opposite side to form atmosphere and finally ocean water found in water planet Earth [5-6].

2) Type 2: Soft target materials are seawater fluid and sedimentary limestone with multi-targets (including air atmosphere zone). Ejected direction by impact is mainly along transmitted way transported to multi-targets. The type 2 impact craters broken from typical circular structures are considered to be found at lowlands (Acraman Lake, Sudbury, and buried Takamatsu Japan), and at highland remained near the mountain summit (Santa Fe, New Mexico) or mountain side (broken Akiyoshi, Japan) [1-4]. The Santa Fe impact structure explored in 2011 fall, is found limestone breccias with impact-related carbon-bearing

materials by the FE-ASEM works this year. Similar impact-related carbon-bearing grains are found at 950m depth of Takamatsu drilled core as relict of the type 2 impact process [2-6].

Table 1. Two types of terrestrial impact craters.

- 1) Type 1: Hard target rock impact (Earth land)
- 2) Type 2: Soft targets impact (Earth ocean, Moon, Mars, Asteroids etc.)

Application: Extraterrestrial surfaces of waterless Moon and planets with void-rich texture of spoils and breccias are classified to the type 2 impact process, the present type 2c lowlands and highlands. Recent Martian surface (obtained by the Curiosity) is mainly based on volatile-rich difference in impact-related layers, where terrestrial layers (Grand Canyon etc.) are composed with different rock-minerals and ages at cyclic mixing on active water planet Earth with three state change [1, 4].

Summary: Impact structures are divided into impacts on hard rock (type 1) and soft materials with multi-targets (type 2) remained at lowlands and highlands. Moon and Martian surfaces are considered to be the type 2 impact.

References: [1] Miura Y. (2012): NETS-2012 (LPI), #3100. [2] Miura et al. (1995): Meteoritics (USA), 30(5), 552. [3] Miura (2007): LPS XXXVIII, #1188. [4] Miura Y. (2011): LPS XXXXII, #2817. [5] Y. Miura et al. (1992): *Celestial Mechanics & Dynamical Astronomy*, 54, 245-248. [6] Y. Miura et al., *Shock Waves (World Scientific)*, 20 (1997) 1473-1478.