# IRON DEPOSIT AND ITS BEARING ON THE METEORITE IMPACT EVENT IN THE LIBYAN GLASS AREA SOUTHWESTERN EGYPT

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**INTRODUCTION:** On December 29, l932 Mr. Patrick A. Clayton reported to the scientific community an attractive material of gem quality in southwestern Egypt [1]. Such material has been known as, Libyan glass, Libyan Desert glass, Libyan Desert silica glass and silica glass. Libyan glass is a unique natural material of attractive green to yellowish-green color, composed almost entirely of silica (about 96 % $SiO_2$). Its specific gravity is 2.2 and the hardness is about 6 on Moh's scale. Many studies, e.g., [2] show that it was formed from about 28.5 million years.

Libyan glass occurs as fragments of various sizes ranging from a few mm up to about 50 cm in maximum diameter, on the surface of an oval area in the south western termination of the Great Sand Sea, Western Desert of Egypt, between lat. 25° $\bar{0}$2 - 26° $\bar{1}$3 N and long. 25° $\bar{2}$4 - 25° $\bar{5}$5 E. This area is made up of Late Cretaceous sandstones bedrock covered by a sand sheet and an extensive field of sand dunes. Individual dunes are about 100 m high, tens of km long and 2 to 5 km apart. Interdune corridors of 2 to 5 km wide separate between these dunes. The glass fragments lie on the surface of the interdune corridors in association with gravel, well-rounded granules, pebbles, and cobbles of quartz and other siliceous materials including artifacts, petrified wood and fulgurites.

The origin of Libyan glass is a matter of discussion and interest. Several hypotheses have been introduced to explain how it was formed. Both terrestrial and extraterrestrial origins are suggested as well as high and low temperature formation processes. However, there is a general tendency to consider Libyan glass to be formed from fusing the sandstone country rocks by the heat generated from impact of a large heavenly body e.g. asteroid or comet, e.g., [3]. Lack of evidence on meteorite impact effects on the area of the Libyan glass lead some workers to suggests that it was formed by meteorite impact at Libya and transported to its present site [4]. However, recent discoveries of central uplift, megascopic sandstone breccias, shock deformation features within the quartz of the sandstones and high-pressure mineral forms (diamond) in the area support the formation of Libyan glass in situe by the impact of a large celectial body [5],[6],[7]. The present study draws attention to the occurrence of iron deposit within the area of the glass distribution as a contribution to the meteorite impact effects in the area.

The iron deposit:

Iron deposit rich strip trending roughly WNW-ESE and consisting of goethite, hematite, quartz and other subordinate phases has been traced in the interdune corridors of the western side of the glass area between latitudes 25° 23´-25° 40´ N and longitudes 25° 24´-25° 32´ E, north of a little exposure of the mixed breccia [6]. The S.S country rocks are noticed as fragments of various sizes ~ mm up to 20-cm within the iron deposit. On a petrographic ground, the iron oxy-hydroxides cement and diffuse through shattered and fragmented quartz grains, some of which shows PDFs.

The chondrite-normalised REE pattern shows the least degree of LREE enrichment relative to the HREE where the LREE/HREE is less than 3, with moderate Eu deficiency.

These observations suggest that the iron deposit, like the detected chalcedony patches mark meteorite impact effects on the Libyan glass distribution [8], in agreement with the locating of a small chunk of rock congaing diamond grains and other phases of extraterrestrial origin [7],[9].

**References:**

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