CÔTE D'IVOIRE TEKTITE STREWN FIELD. P. SORO[1,2], P. ROCHETTE[2], D. BARATOUX[3,1], A. N. KOUAMELAN[1], [1]Félix Houphouët-Boigny University, STRM, Abidjan, Côte d'Ivoire, [2]Aix-Marseille University, CEREGE, CNRS, IRD, Aix en Provence, France, [3]Toulouse University, GET, CNRS & IRD, Toulouse, France

Introduction: Tektites are centimeter-sized glassy bodies formed by the high-temperature melting of target rocks during the impact of high-velocity meteorites on the Earth's surface. They are distributed over vast strewn fields. There are five recognized tektite fields worldwide, including the one in Côte d'Ivoire. The tektites found in this field are called "ivorites" and originate from the Bosumtwi meteorite impact crater formed 1.07 million years ago in Ghana [1, 2 and 3]. The Côte d'Ivoire tektite field has received little exploration compared to other tektite fields worldwide. The geochemical properties of only a few dozen tektites have been measured to date [4 and 5], while there are potentially thousands more to be discovered by analogy with other fields. The exact extension of the ivorite field remains to be determined.

Method: Between 2019 and 2023, we conducted six missions to explore the Côte d'Ivoire tektite field [6], 50 years after the last historical missions. The purpose of this fieldwork was to explore if new specimens may be found within and beyond the limits known field. The physical and chemical properties (mass, dimensions, magnetic susceptibility, chemical composition) of each newly discovered ivorites were measured to examine the heterogeneities of these properties and the possible relationship between them. The mass density was determined using the immersion method, the magnetic susceptibility using a ZH-instruments SM150 portable susceptibility meter, and geochemical composition using a Niton Xl3t Gold+ portable X-ray fluorescence spectrometer (pXRF).

Spatial distribution and morphology of Côte d'Ivoire tektites: During our six exploration missions of the field, we collected 174 new ivorites specimens. Most of these objects were found and provided by the local population, except for 5 specimens that were found *in-situ* by our team. These new discoveries cover an area of approximately 3500 km^2 (Fig. 1), excluding three isolated discovery sites. The historical size of the Côte d'Ivoire tektite field, which was 1500 km^2, has been expanded to an elliptical zone of approximately 4100 km^2 in this study [6]. The Côte d'Ivoire tektite field is eventually much larger than the Belizian tektite field [7]. These specimen exhibit various shapes (drops, dumbbells, spheres, flattened, elongated) with masses ranging from 1 to 96 g and sizes ranging from less than 1 cm to 7 cm (Fig. 2).

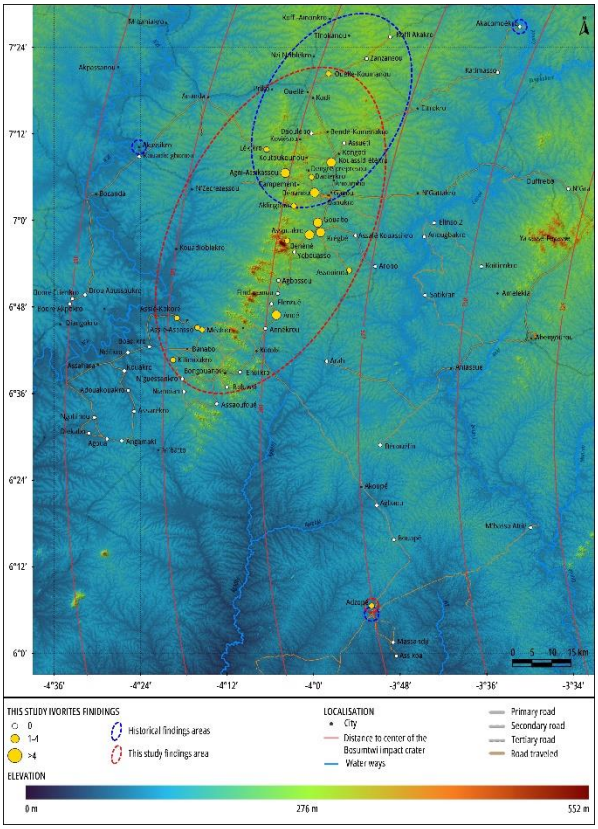

Fig. 1: Spatial distribution of new ivorites found during this field study.

Fig. 2 : The new collection of ivorites at the end of 2022.

Relationships between geochemistry and physical parameters: 285 tektites made available by the SODEMI museum, in addition to the 174 new ivorites found during missions, were analyzed in this study.

The semi-quantitative geochemical compositions obtained using pXRF show greater variability (Fig. 3) and an extension of the geochemical trends already observed in previous work. The results indicate that ivorites may be distinguished from australasites using geochemical ratio of concentrations of a small number of elements measured with the pXRF [6], ruling out confusion in cases of doubtful origin. The hypothesis,

hitherto undocumented heterogeneous chemistry, is favored due to the higher chemical variability observed for elements known to be well constrained by pXRF (e.g. Fe, Ti, Mn). The variability in ivorites from Bosumtwi can be attributed to the incomplete mixing of heterogeneous sources of rocks and regolith found at Bosumtwi.

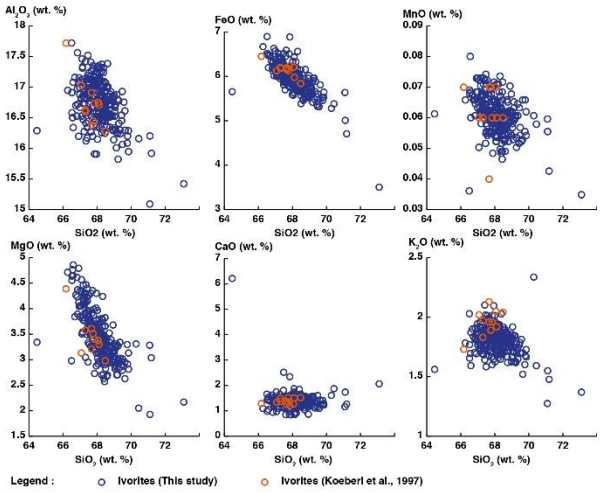

Fig. 3: Main oxides concentrations in our collection, comparted to previous works.

A correlation has been found between the average magnetic susceptibilities and average iron concentrations of the different tektite groups [8 and 9]. The observed correlation closely matches the theoretical curve predicting χ content relative to FeO (assuming all iron is in a paramagnetic 2+ state, [10]), with a slightly larger χ value that can be explained by the contribution of other paramagnetic ions (e.g. Mn, Cr).

Conclusion: The initial results obtained by the tektite search missions in the Côte d'Ivoire streak field have enabled us to extend the main streak field from 1500 km^2 to 4100 km^2 with a relatively high density of discoveries. Additionally, new discoveries and more isolated occurrences of tektites in the south, outside the main field, encourage further exploration of the tektite field. The geochemical composition obtained here is much more variable than in previous work, demonstrating that ivorites are chemically heterogeneous. Future work will present detailed geochemical data to further document this heterogeneity and possible relationships with find locations.

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