

PROPERTIES, DEPOSIT AND SPATIAL DISTRIBUTION OF TEKTITES FROM CÔTE D'IVOIRE.

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Résumé: Les tectites sont de petits objets naturels en verre formés lors de l'impact d'une météorite sur la surface de la Terre. On les trouve à grande distance du point d'impact de la météorite (éjecta distaux). Celles du champ de tectites de Côte d'Ivoire sont appelées "ivoirites" et proviennent du cratère d'impact météoritique de Bosumtwi, formée il y a 1,07 Ma au Ghana. Contrairement aux autres champs de tectites dans le monde, le champ de tectites de Côte d'Ivoire est resté peu exploré et ses tectites peu étudiées après les travaux précurseurs. Dans notre étude, nous approfondissons les connaissances sur les ivoirites par le biais de missions d'exploration du champ de tectite de Côte d'Ivoire et d'analyses des propriétés physiques, chimiques et magnétiques de nouveaux échantillons d'ivoirite.

Introduction: Tektites are small natural glass objects formed during the impact of a meteorite on the surface of the Earth. They are found at great distance from the meteorite impact site (distal ejecta). There are currently five tektite fields in the world, including the one in Côte d'Ivoire. The tektites of this field are called "ivoirites" and they come from the Bosumtwi meteorite impact crater formed 1.07 Ma ago in Ghana. Contrary to other tektite fields in the world, the Ivory Coast tektite field has remained little explored after the first tektites found on the continent or at sea [1; 2; 3; 4 and 5]. To date, only the geochemical properties of a few dozen tektites have been measured [6 and 7], while there are potentially thousands that could be discovered by analogy with other tektite fields, and the exact extent of the field remains to be determined.

Method: Several exploration missions were carried out to determine the spatial distribution in Côte d'Ivoire (and possibly Ghana) of tektites associated with the Bosumtwi crater in Ghana. This fieldwork was accompanied by an analysis of the morphological, geophysical and geochemical properties of each new ivoirite found, in order to explore the relationships between these properties and the spatial distribution of the ivoirites.

Results: Five field missions carried out in 2019, 2020, 2021 and 2022 resulted in the discovery of 176 new ivoirite samples. These samples were mainly obtained from villagers who discovered and preserved them, except for five samples that we found ourselves. These finds are mostly within the known limits of the field [1 and 7], but we report a few finds outside these limits (e.g., Andé, Adzopé,...). These new ivoirites present various shapes (drops, dumbbells, spheres, ellipsoids) [Fig. 1] with masses ranging from 1 to 96 grams.

A semi-quantitative geochemical analysis of these 176 ivoirites was performed using a portable X-ray fluorescence spectrometer. In addition to the tektites

found in the field, 285 tektites (location unknown, labelled as ivoirites) made available by the SODEMI museum were also analysed on this occasion. This collection of the SODEMI museum contains the largest known ivoirite of 132 grams [Fig. 1]. Their geochemical composition is comparable to that of previously measured Ivory Coast tektites and clearly distinct from that of tektites from other fields. Some elements or element ratios (Cr; Sr/Zr; Fe/Ca; Rb; Ni), despite the relatively low precision of the concentrations obtained with portable XRF, can be used with confidence to discriminate Côte d'Ivoire tektites from tektites from other fields [Fig. 2]. These analyses reveal a more variable chemical composition than the apparent homogeneity deduced from a small number of samples [6]. The magnetic susceptibility of these tektites was measured with the SM150 portable instrument. The magnetic susceptibility of our samples is homogeneous and comparable to the values obtained on ivoirites from a collection of the Museum of Natural History in Paris [8]. The density of these ivoirites was also measured and allowed us to note an average specific gravity equal to 2.4 for these ivoirites.

Conclusion: These initial results from the new ivoirite discoveries allow us to assume that the ivoirite field extends beyond the limits of the initial fieldwork, and encourage further exploration. Future work will focus on exploring the relationships between physical and geochemical properties and spatial distribution to understand the causes of this diversity.

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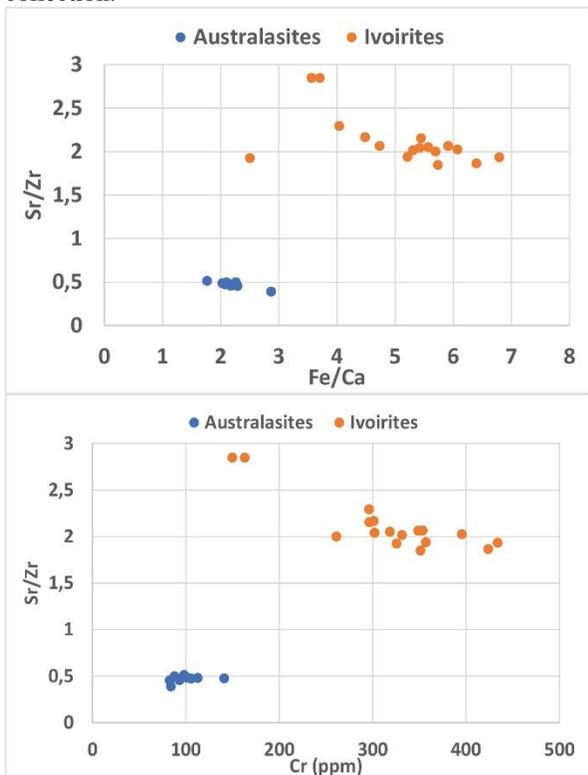
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Figure:



[Fig. 1] : Some tektites from the SODEMI museum collection.



[Fig. 2] : Diagrams discriminating ivoirites from australasites.