MICROMETEORITES FROM BARREIRAS GROUP AND PÓS-BARREIRAS SEDIMENTS, NORTHEAST REGION OF PARÁ STATE, AMAZÔNIA, BRAZIL – FIRST SCIENTIFIC NEWS. Maurício S. Borges¹, Samuel M. F. Borges², Luciana C. Brelaz³, Claudio N. Lamarão³, Ana P. P. Corrêa¹; ¹Institute of Geosciences, Federal University of Pará, Augusto Corrêa Street, n° 01, Guamá. Zip Code: 66.075-110. Belém, Pará, Brazil. Email: mauricio@ufpa.br; ²ESF Alto Pereru, Rural Zone, City Hall of São Caetano de Odivelas, Pará, Brazil; ³PETREC, Hélio Almeida Street S/N, Room 43, Federal University of Rio de Janeiro, RJ, Zip Code: 21941-614.

Introduction: In this work, we describe for the first time, the records of fossil micrometeorites included in rocks of Tertiary and Quaternary ages arranged in the Northeast Region of the State of Pará, belonging to the Barreiras Group and Pós-Barreiras Sediments. The most recent studies point to Miocene, Meso-Miocene and Mio-Pliocene ages for the Barreiras Group [1, 2, 3] and Pleistocene to Late Pleistocene-Holocene [4, 5] for Pós-Barreiras Sediments in which micrometeorites are present. Thus, the inflows records of extraterrestrial materials in these Geological Units were unknown in the Amazon Region and perhaps in Brazil, especially for the Barreiras Group. Based on these new data, there is clear evidence of the partial contribution of extraterrestrial material in the final sedimentary composition of the siliciclastic stratigraphic successions of the Upper Tertiary and Quaternary ages in the Northeast Region of the State of Pará.

Methods. The research consisted of fieldwork for the samples collection for this specific purpose of looking for micrometeorites, from the year 2010 to the present. The recovered material was submitted to optical investigations through the petrographic microscope and subsequently researched by scanning electron microscopy and energy-dispersive X-ray spectroscopy (SEM-EDS Analysis).

Simplified Geological Setting. The Barreiras Group in Northeast of the Pará Region has marine influence in this beds, that are marked “by the action of tidal currents” [6]. According [5] Pós-Barreiras sedimentation is associated with a fluvial paleovalley.

Expedited description of the Barreiras Group micrometeorites. From the geometric point of view, the micrometeorites with spherical three-dimensional forms (cosmic spherules) dominate (Figs. 01 and 02). However, sub-spherical and prolate forms are common (Fig. 03). Some of them have crystal trails. There are specimens that appear to be "hollow" (Fig. 04). The spherules are composed on their surface by crystals whose arrangements produce textures ranging from anhedral to well-defined euhedral. The results of the chemical microanalyses are varied, however, typically include: O (28.50%), Al (1.35%), Si (1.17%), Fe (68.18%), Ni (0.60%), Pt (0.20%), among others.
They have textural variations on their surfaces, however, with a smoother tendency. But, it is not uncommon anhedral and even circular or elongated textures for some crystals. The chemical microcomposition presented, in general, is: C (5.84%), O (46.78%), Al (29.87%), Si (0.13%), Fe (1.31%), others elements (16.07%).

**Conclusions.** This work describes for the first time the occurrence of micrometeorites in stratigraphic units of the Upper Tertiary and Quaternary in the Northeast of the Pará State. These occurrences indicate the clear contribution of material inflow from extraterrestrial provenance to the final balance on the sedimentary composition of the deposits related to this geological time. The morphology and microscopic appearance and textures of the cosmic spherules is diagnostic of micrometeorites, as well as the textural arrangements of the surfaces of many of them. The occurrences of Fe-Ni and Pt-based compositions also point to this conclusion. The data also indicate the principle that in most cases they are type I spherules [7, among others].

**Acknowledgements.** This work was supported by the Instituto de Estudos Superiores da Amazônia (IESAM), during 2010 to 2014, and later by the Estácio Educational Group, between 2014 to 2017. We thank to the Geology Faculty from Federal University of Pará (UFPA) and the Postgraduate Program in Natural Risk Management and Disasters in the Amazon (PPGGRD), for allowing the execution of the field works, since 2018. We are grateful to the Laboratory of Chemistry Microanalysis of UFPA Geosciences Institute, for the support in the acquisition of data MEV-EDS and the Company Vale S.A, as well as to the Instituto Tecnológico Vale, for the assignment of non-costly use of the Scanning Electron Microscopy Equipment. We are also grateful to the ICJ-UFPA colleague and the Pará State Attorney, Dr. Dennis Veribarco Soares, for the long academic and “Geolaw” discussions that possibly would hatch of the work.