

THE PALEOPROTEROZOIC FRANCEVILIAN SERIES : WITNESS OF A GEOCHEMICAL AND BIOLOGICAL UPHEAVAL

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RESUMO: The 2,1 b.y old Francevillian Basin (Gabon) shows a sedimentary series that contains various geochemical anomalies reflecting the main changes occurring in the atmosphere and hydrosphere at that time. First, the Francevillian series contains the oldest high-grade uranium deposits located in a clastic sedimentary sequence. Two of these uranium-deposits, namely Oklo and Bangombé contain the only natural nuclear fission reactors that are presently known on the earth. Such nuclear reactors needed specific geochemical environment to start and to grow in the geological environment. Upward in the stratigraphic column are located the Mn-deposits of Moanda and Okouma. They form the third Mn reserve of the world. Both uranium and manganese are related to organic material. Uranium deposits are related to petroleum fields which are probably the oldest oil accumulations known at that time and Mn-deposits are associated with C-rich black-shales (up to 15 % organic carbon). Carbon isotopic compositions of organic matters show extremely depleted values reflecting high organic activities before and during the very early diagenesis. Accumulations of Uranium and manganese in this well-preserved sedimentary basin are related to the change of the composition of atmosphere during the so-called "first oxidic event". Occurrence of stratified basins with very high organic activity allowed the deposition of manganese oxides which became Mn-carbonates during the early diagenesis. Rise of oxygen content at the earth surface allowed dissolution of uranium and its mobilization in reduced oil-rich structures where uranium could precipitate. But the rise of oxygen in atmosphere must be related to a drastic change and evolution of life at the earth surface. This is well represented in the Franceville basin where the high organic activity during the deposition of the black-shale is evidenced by their very high organic carbon content but also by the occurrence of new forms of life that have been discovered recently. Comparison between the Francevillian basin and the Águas Claras Formation (Serra dos Carajás, Pará, Brazil) is performed mainly in regard with the manganese occurrences and the sedimentologic characteristics of the stratigraphic columns. This allows to suggest a similar age for the two series.