ID de Contribution: **147** Type: **ORAL**

The Gabonionta: Great Oxidation Event, reactors and Life...

mardi 28 juin 2022 16:10 (20 minutes)

The emergence of complex life more than five hundred million years ago marked the beginning of change in the Earth's biosphere. This evolutionary change is associated with numerous events including increasing predation, burrowing, and animal diversity during the so called "Cambrian Explosion"at the Ediacaran-Cambrian boundary. However, several studies have reported that scattered fossils of large individual multicellular macro-organisms that use cells as building blocks existed during most of the Proterozoic Eon, and some of these early lineages (such as red or green algae) still exist. The recent discovery of centimetre-sized fossils of more than 1500 specimens from the 2.1 Ga Paleoproterozoic black shales in Gabon reveals growth of macro-organisms in a coordinated manner. The biogenicity of these remains was investigated using a multi-approach studies. On the surface, the fossils resemble irregularly shaped cookies with split edges and a lumpy interior. High-resolution X-ray tomography revealed their varying elongate, lobate, string, circular and a sheet-like structure with a pervading radial fabric and a neat pattern of central fold shapes and sizes. These structures are too complex to be simple products of inorganic processes. Geochemical data confirmed that the carbon contents in the fossilized tissues were assembled by biological processes. Moreover, the iron-sulfide (pyrite) mineral replacing most of the tissue were formed by bacteria "breathing"sulfate, rather than oxygen, during decomposition of the organisms in sediments. Some of these species showed evidence of organism motility in shallow marine waters with free oxygen and provide support for presence of multicellular life to a minimum of 2.1 billion years ago, almost at the beginning of the Proterozoic Eon. Large size generally signifies an energy-demanding way of life. Breathing oxygen, as we do, is a much more efficient way of obtaining energy than other physiological processes. The Proterozoic Eon saw two major events of oxygen build-up in the atmosphere (and, thereby, in the oceans); the first near the beginning of the Eon, 2.45–2.2 billion years ago, and the second at the end, 0.8–0.54 billion years ago. The evolution of the Gabonese biota, representing an early step toward large-sized multicellularity, may have become possible by the first boost in oxygen, whereas the "Ediacara biota"could have been fuelled by the second. Why it took around 1.4 billion years for the multicellular organisms to take over is currently one of the great unsolved mysteries in the history of the biosphere.

Auteur principal: Prof. EL ALBANI, Abderrazzak (University of Poitiers,)

Orateur: Prof. EL ALBANI, Abderrazzak (University of Poitiers,)

Classification de Session: From Oklo samples to natural core simulations