Putative Cryogenian ciliates from Mongolia

TANJA BOSAK[1], FRANCIS MACDONALD[2], DANIEL G. LAHR[3] AND EMILY D. MATYS[4]

[1]EAPS MIT, Cambridge MA 02139, tbosak@mit.edu
[2]EPS, Harvard University, MA 02138, fmacdon@fas.harvard.edu
[3]Graduate Program in Organismic and Evolutionary Biology, UMass Amherst, MA 01003, daniel.lahr@gmail.com
[4]EAPS MIT, Cambridge MA 02139, ematys@mit.edu

Major lineages of modern eukaryotes, represented primarily by microscopic taxa, are thought to have originated during the Neoproterozoic. However, microfossils older than 635 Ma rarely bear unambiguous relationships to modern microscopic eukaryotes.

Here we report exceptionally preserved 715-635 million year old eukaryotic tests in limestone strata of Mongolia. These structures are most abundantly preserved within rhythmite and ribbonite strata that record a large negative anomaly in $\delta^{13}C$ of both carbonate and organic matter.

The ~100 μm long organic-rich three-dimensional tests have flask-like shapes, constricted necks, distinct and often thickened collars. The test walls are flexible, composed of densely packed alveolar structures and stainable by dyes that react with polysaccharides. The combined morphological and ultrastructural properties of the Cryogenian tests are remarkably similar to the lorica of modern group of planktonic ciliates, tintinnids.

The presence of putative tintinnids in the pre-635 Ma strata places an upper bound on the divergence of ciliates, marks the increasing diversity of phagotrophic eukaryotes during this time and suggests a reorganization of Cryogenian foodwebs. The advent of planktonic organisms forming recalcitrant organic or mineral-rich tests may have increased export and burial fraction of organic carbon, driving an increase in atmospheric oxygen and the subsequent radiation of metazoans.

Origin and signficance of basic and ultrabasic outcrops from northeastern algeria (Edough massif)

D. BOSCH[1], D. HAMMOR[2], O. BRUGUIE[1], R. CABY[1], AND M. MECHATI[2]

[1]University Montpellier 2, Place Eugene Bataillon 34095, Cedex 05, France (bosch@gm.univ-montp2.fr)
[2]Université Badji-Mokhtar, BP12, El-Hadjar, Annaba 23 000, Algeria

The Maghrebian, Betics and Apenninic chains outcrop around the mediterranean basin and constitute dismembered fragments of the Alpine orogen. Conflicting geodynamic models have been proposed in order to explain the different paleogeographic settings from which these fragments derived. Crust-mantle interactions following subduction of Jurassic oceanic crust and collision-related tectonic events of Eocene age in relation to the northward motion of Africa have been demonstrated by numerous works. The incorporation of mafic/ultramafic rocks into the basement is evidenced in various peri-mediterranean areas, in particular at c. 22 Ma. This work is focused on the basic and ultrabasic rocks from the easternmost internal part of the Maghrebides. An extensive petrological and geochemical study has been performed on three distinct outcrops, i.e. Bou Maiza gabbros, amphibolites from La voile Noire and Sidi Mohamed peridotites. Peridotites display a primitive character (Mg number >85), but slightly enriched trace elements patterns (1 to 10 times CHUR) characterized by negative Nb anomalies and flat to slightly LREE-depleted patterns. Associated isotopic constraints suggest a possible continental contamination of the peridotites by the surrounding gneisses. These ultrabasic rocks are interpreted as parts of the lithospheric mantle incorporated into the continental crust during a late Burdigalian extensional event that opened the Algerian basin. The Bou Maiza gabbros and La Voile Noire amphibolites show complementary trace elements spectra suggesting derivation from a common MORB source reservoir, but without filiation with the Sidi Mohamed peridotites. Such affinities suggest they represent a fragment of the Neothetys lithosphere obducted onto the North African margin during Miocene times.