Timing of Precambrian gabbro-anorthosites in the Stanovoy mobile belt (Eastern Siberia)

I.V. BUCHKO[1], E.B. SAL'NIKOVA[2], A.M. LARIN[2], A.B. KOTOV[2], A.A. SOROKIN[1] AND S.D. VELIKOSLAVINSKY[2]

[1]Institute of Geology and Nature Management, Blagoveshchensk, Relochny, 1, Russia (*correspondence: inna@ascnet.ru)
[2]Institute of Precambrian Geology and Geochronology, St.Petersburg, Russia (akotov@peterlink.ru)

We present new geochronological data on the gabbro-anorthosite associations of the Stanovoy mobile belt (SE Siberian craton). The Khorogochi gabbro-anorthosite massif (Larba block) emplacement occurred at 2633±20 Ma [2] actually synchronously with the Kalar AMCG massif (2623±23 Ma) [3] in post-collisional setting.

Formation of the Luktur anorthosite massif at 1.89 Ga [5] and the Kengurak-Sergachi gabbro-anorthosite massif within the Mogocha block at 1866±6 Ma [1] correspond to the Early Proterozoic event of gabbro-anorthosite magmatism within the Stanovoy mobile belt.

Noteworthy that there was negligible time interval between the regional granulite metamorphism (1873±8 Ma), South-Siberian post-collision magmatic belt (1875-1855 Ma) and the Kengurak-Sergachi gabbro-anorthosite massif emplacement. Its indicate post-collision tectonic setting not only for the Late Archaean but also the Early Proterozoic gabbro-anorthosite magmatic association.

Consequently nowadays only the Dzugdzhur AMCG massif (1.74, [4]) belongs to the anorogenic magmatic complexes established within the Stanovoy mobile belt.

[1] Buchko *et al*. (2006) *Doclady Earth Sci.* **407**, 372-375. [2] Buchko *et al*. (2008) *Doclady Earth Sci.* **423** (8), 1312-1315. [3] Larin *et al*.(1997) *An. Acad. Brazil Ci* **63** (3), 295-312. [4] Larin *et al*. (2006). *Petrology* **14**, 4-24. [5] Polyakov *et al*. (2006) *Rus. Geol.and Geoph.* **47,** 1227-1241.

On the role of outer membrane cytochromes in the exoelectrogenic activity of *S. oneidensis*

CLEMENS BÜCKING, FELIX POPP, KATRIN RICHTER AND JOHANNES GESCHER*

Department of microbiology, University of Freiburg, Germany (*correspondence: johannes.gescher@biologie.uni-freiburg.de)

Dissimilatory metal reduction is a bacterial respiratory process in which the reduction of an extracellular metallic terminal electron acceptor is coupled to energy generation. The solubility of metallic electron acceptors is often low under neutral conditions. Therefore, *Shewanella* species have established the formation of an extended respiratory chain from the cytoplasmic membrane to the outer membrane. C-type cytochrome proteins have been identified as key players of this electron transfer chain. The final metal reduction is believed to be catalysed by outer membrane cytochromes (OMC). *S. oneidensis* genome analysis revealed five putative genes for OMCs, three of those have an unknown function so far.

To assess function and specificity of individual OMCs which are supposed to have redundant activities [1], we constructed a deletion mutant in all five OMCs. In this mutant we expressed single OMCs and measured reduction rates onto an array of electron acceptors including manganese and different iron forms, as well as a humic acid analogue. As another method to analyse the exoelectrogenic activity of *S. oneidensis* a microbial fuel cell (MFC) set-up was used.

Our data show for the first time that MtrF, similar to the known key-player OmcB, is a terminal reductase being capable of transferring electrons to anthraquinone-2,6-disulfonic acid (AQDS, a humic acid analogue), ferric citrate, ferrihydrite, and birnessite (manganese dioxide) with rates comparable to those of OmcB. Another remarkable result of our experiments was that expression of OmcA in the mutant strain did not rescue the phenotype. Therefore, we hypothesize that the reported electron transferring activity of OmcA is dependent on other naturally expressed outer membrane cytochromes. Surprisingly, the OMC-mutant retained low-level reduction activity towards ferrihydrite and birnessite that increased after the first 24 h of growth. Furthermore MFC experiments point towards the involvement of membrane-permeable shuttles in electron transfer processes. Electron-shuttling compounds have recently been proposed to participate in electron transfer, but these shuttles were so far believed to interact with OMCs [2]. Since the outer membrane does not seem to be a barrier for this kind of electron shuttle one can speculate about its role as an electron accepting and delivering compound for bacterial communities.

[1] Myers *et al.* (2003) *Lett. Appl. Microbiol.* **37**, 21-25.
[2] Marsili *et al.* (2008) *PNAS USA* **105**, 3968-73.