

Special Issue

**Tectonic Control of Continental Sedimentary Basins
in Altai–Baikal, Central Asia**

**Papers from the International Conference on
Active Tectonic Continental Basins held in Gent, Belgium,
in the framework of Projects INTAS-93-0134 and IGCP no. 400**



D. Delvaux

*Royal Museum for Central Africa, Tervuren, Belgium
E-mail: ddelvaux@africamuseum.be*

M. De Batist

*Renard Centre of Marine Geology, University of Gent, Belgium
E-mail: marc.debatist@rug.ac.be*

N.L. Dobretsov

*UIGGM, SB RAS, Novosibirsk, Russia
E-mail: vitya@uiggm.nsc.ru*

J. Klerkx

*Royal Museum for Central Africa, Tervuren, Belgium
E-mail: jklerkx@africamuseum.be*

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Editorial

Tectonic control of continental sedimentary basins in Altai–Baikal, Central Asia: introduction

Since the collision of India with the Asian continent, continuous convergence caused the progressive indentation in India into Asia and the northward propagation of the Cenozoic deformation to Central Asia. The ILP World Stress Map project shows that the compressive stresses generated by the India–Eurasia convergence spread northwards in a fan-shape and affect a large part of the Asian plate. Space geodetic data indicate that the Indian plate is indenting into Asia with 5 cm/year velocity. The effect of the indentation is distinctly displayed in the Tibet and Himalayas and, furthermore, in NW China and Mongolia.

The Altay and Sayan regions of South Siberia constitute the northern boundary of the active deformation zone of Central Asia together with the Baikal rift zone further east. This major intracontinental tectonic feature is associated with a strong seismic activity and surface deformations. In this general convergence context, a series of large sedimentary basins typically form by extensional process. This paradox was examined during the 3 days International Conference: «Active Tectonic Continental Basins. Interaction between structural and sedimentary processes» in Gent (Belgium), 30 April–2 May 1998. It was organized at the occasion of the closure of project INTAS-93-0134 Continental Rift Tectonics and Sedimentary Basin Evolution and also in the frame of project IGCP no. 400: Geodynamics of Continental Rifting. These projects are linked to the Comparative Analysis of Sedimentary Infill In Rifts (CASIMIR) program, a joint Belgian–Russian research initiative.

The conference concentrated on the advances in our understanding of: (1) the interplay of structural, sedimentary and climatic processes in active tectonic

continental basins, (2) the record of these processes contained within the basin-fill deposits, and (3) the spatial–temporal evolution and basin dynamics. Case studies from Central Asia (Baikal, Altai and Tien Shan) and East Africa were specially considered. About 180 persons attended the meeting from 18 different countries: Austria, Australia, Belgium, Brunei, Egypt, France, Germany, Greece, Italy, The Netherlands, Mongolia, Norway, Russia, Switzerland, Tanzania, Turkey, UK and USA. The program was composed of 3 days of scientific sessions, with eight keynote lectures, 26 oral presentations and 35 poster presentations.

No conference proceedings were published after the meeting, but it was decided to publish selected publications issued from conferences presented at this meeting in two special issues of international journals. The papers on stratigraphy, sedimentology and paleoclimate have already been published in De Batist et al. (2000). The papers on tectonics and structural geology are now published in this special issue of *Tectonophysics*. It focuses on the crustal tectonic evolution of the Baikal–Sayan–Altai belt in Russia and Mongolia, with special emphasis on the late Cenozoic genesis of continental sedimentary basins (mainly the Baikal rift basin and the Teletsk graben in Altai). It comprises a set of eight articles on the tectonic aspects discussed at the conference.

The volume begins with a continental-scale review of the relation between intraplate magmatism and rifting during the Permo-Triassic in Eurasia, with discussions on mantle plumes and mantle dynamics (Nikishin et al.). The next paper is an important contribution to the Baikal rift and to the mechanism of rifting in general. D.A. Ionov is clearly in favor of a

passive rifting mechanism. This is supported by a careful analysis of existing geophysical data and by existing and new data on xenoliths in basalts. The paper of Suvorov et al. presents important results of large-scale investigations of the crustal structure of the Baikal rift zone, which otherwise would not be accessible to the western scientific community.

New heat flow data and modeling results on heat transport by groundwater flow during the Baikal rift evolution are presented by Poort and Polyansky. Their model highlights interesting features of heat redistribution that are rather unique in rift settings. Polyansky performed also numerical modeling of crustal deformation in the Baikal region in order to test different hypothesis for the causes of rift opening. His models are calibrated using observed stress and strain patterns.

Thomas et al. present the first results of a paleomagnetic study of Cenozoic rocks in Southeastern Kazakhstan and Siberian Altai. They provide new data for northern Central Asia that are needed to better constrain the Tertiary kinematics of Central Asia and to test possible rotations between different domains of the Pamir–Tien Shan–Altai–Baikal belt.

The Teletsk graben in the northern part of the Altai belt is a unique tectonic basin. The paper of Dehandschutter et al. describes its neotectonic structure and recent evolution. It presents a large amount of excellent fault slip, geomorphological and seismic data. For the same basin, Theunissen et al. discuss the basement

tectonic structure and provide an interesting descriptive work on pseudotachylyte.

References

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D. Delvaux^{*,1}

J. Klerkx²

*Royal Museum for Central Africa,
Leuvensesteenweg 13, B 3080 Tervuren, Belgium*

M. De Batist

*Renard Centre of Marine Geology,
University of Gent, Belgium*

N.L. Dobretsov

*UIGGM, SB-RAS, 63090 Novosibirsk-90,
Russian Federation*

* Corresponding author. Tel.: +32-0-2-769-54-30.

E-mail address: damien.delvaux@skynet.be (D. Delvaux).

¹ Volume completed while ISES Visiting Research Fellow, Vrije Universiteit Amsterdam, The Netherlands.

² Presently : IBES.