



Annual Report* of IGCP Project No. 592

IGCP project short title: “Continental construction in Central Asia”

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Duration: 2012-2015

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1. Website address(es) related to the project

<https://sites.google.com/site/igcp592/home> - IGCP#592 official IGCP#592 site
<http://sibconf.igm.nsc.ru> – Novosibirsk 2012 meeting site
<http://geo.stbur.ru/doc/circular-2012-08-en2.pdf> – Ulan-Ude meeting webpage
<http://ees.adelaide.edu.au/research/gg/> - Adelaide 2012 IAGR-IGCP#592 page
<http://www.nhm.ac.uk/cercams> - official site of CERCAMS led by Reimar Seltmann
<http://www.igm.nsc.ru/labs/lab212/~safonova/english/safonova-index-engl.htm>

2. Summary of major past achievements of the project

N/A - it is the report of the first year of project activity since its launch in May 2012

3. Achievements of the project this year only*3.1. List of countries involved in the project (* - active this year):*

Australia*, Belgium, Canada, China*, Czech, France*, Germany*, India*, Iran*, Japan*, Kazakhstan, Kyrgyzstan*, Malaysia*, Mongolia*, Myanmar*, Republic of Korea*, Russia*, Tajikistan*, Taiwan*, United Kingdom*, USA*, Uzbekistan* (22 countries)

3.2. General scientific achievements and social benefits

During its first year, IGCP-592 research activities concentrated on four main topics:

- a) geochronological dating of granitoids and evaluation of juvenile to recycled crust in the CAOB based on geochemical and isotopic studies (e.g., Kröner et al., 2012);
- b) contribution of accretionary processes and intra-plate magmatism into continental construction (e.g., Safonova et al., 2011; Safonova and Santosh, 2013; IAGR 2012 Proc.);
- d) mineral deposits related to continental construction (e.g., Dolgoplova et al., 2012).

General scientific achievements:

- a) conclusion that the multi-disciplinary study of the CAOB must be based on comparison of its units with those of the present-day Western Pacific (Safonova et al., 2011);
- b) zircon dating must be combined with Nd and Hf isotopes to know source characteristics and the Kyrgyz Tianshan is dominated of reworked Precamb crust (Kröner et al., 2013);
- c) the Early-Middle Paleozoic evolution of the eastern CAOB was dominated by double subduction–collision accretionary process as evidenced by Inner Mongolia (Xu et al.);
- d) Beishan orogen in the southern CAOB is a long-lived accretionary belt progressively active during Late Precambrian-Paleozoic (Song et al., in press);
- e) formation of PGE-Ni mineral deposits should be reconstructed based on detailed geological studies and up-to-date petrologic modelling (Kislov, Ed., 2012);
- f) isotopy showed magmas producing porphyry deposits of Mongolia may be originated from juvenile material within a subduction-related setting (Dolgoplova et al., 2012);
- g) the direction of motion and the age of deformations along the Kyrgyz and Chinese Tien Shan transect were similar; they formed during the collisional stage (Biske et al., 2012).
- h) accreted oceanic rises contribute to continental construction because their volume may reach that of modern Europe (Safonova et al., 2012; Safonova and Santosh, in press).

The **social benefits** of the Project are related to mining geology, mineral resources, environmental studies and training of students and young scientists. Project activities contributed to better prospecting and exploration of mineral deposits through better understanding of their formation and evolution in relation to continental construction processes (Novosibirsk Conf. Proc.; IGC34 Proc.; Kislov (Ed.), 2012; Dolgoplova et al., 2012) and environmental impact (Krivonogov et al., 2012). Young scientists and students actively participated in many project activities, especial during the meetings in Novosibirsk, Ulan-Ude and Hong Kong (see sections 3.3 and 3.4 below).

3.3. List of meetings with approximate attendance and number of countries

1. International Workshop "Geodynamic evolution of the Central Asian orogenic Belt", St.-Petersburg, May 25-27, 2012; about 50 participants from 9 countries.
2. 6th Siberian Conference for Early Career Geoscientists, Novosibirsk, June 9-23., 2012; about 200 participants from 19 countries.
3. 34th IGC, Symposium 9.7 "Mineral deposits: episodes, accumulation of metals and related geodynamic processes in China and adjacent regions", Brisbane, Australia, August 5-10, 2012; 100 participants from 15 countries.
4. IV International Conference and III Early Career Geoscientists Workshop "Ultramafic-mafic complexes of folded regions and their mineral resources", Ulan-Ude - Baikal, August 27-30, 2012; about 50 participants from 6 countries.
5. The 2012 IAGR and IGCP#592 Symposium on "Gondwana to Asia", Adelaide, Australia, November 18-21, 2012; about 100 participants from 14 countries.

3.4. Educational, training or capacity building activities

1. In the frame of Meeting 4 (Ulan-Ude) there was a training field session at the Yoko-Dovyren PGE-Ni-bearing massif of Transbaikalia, Russia, August 17-24, 2012.
2. The IGCP#592 organised a training workshop for young scientists from the Novosibirsk State University and Hong Kong University "Chinese-Russian seminar on the Central Asian Orogenic Belt, December 4, 2012.

3.5. Participation of scientists from developing countries, and in particular young and women scientists

The geographic position of the major areas of interest, which all are in Central-East Asia, determines the high portion of project participants from developing countries, namely, China, Kazakhstan, Kyrgyzstan, Mongolia, Russian Federation, Tajikistan, Uzbekistan: in average about 80% of totally 350 participants of IGCP#592-related meetings. Among them about 15% are female scientists including Project's Leader Inna Safonova and 30% are young scientists. Almost 100% of the participants, which were supported by IGCP#592, are of these 3 categories (for details see below Paragraph 7 and Form III).

3.6. List of most important publications (including maps) (^{pr} – peer-reviewed)

1. ^{pr} Dolgoplova, A., Seltmann, R., Armstrong, R., Belousova, E., Pankhurst, R.J., Kavalieris, I. Sr–Nd–Pb–Hf isotope systematics of the Hugo Dummett Cu–Au porphyry deposit (Oyu Tolgoi, Mongolia), *Lithos* (2012), doi: [10.1016/j.lithos.2012.11.017](https://doi.org/10.1016/j.lithos.2012.11.017)
2. Kislov E.V. (Ed.), 2012. Ultramafic-mafic complexes of foldbelts and their mineral deposits: Proc. IV Int. Conf and III Early Career workshop. Ekos, Ulan-Ude, 212 p.
3. ^{pr} Kröner, A., Alexeiev D.V., Rojas-Agramonte, Y., Hegner, E., Wong, J., Xia, X., Belousova, E., Mikolaichuk, A.V., Seltmann, R., Liu, D., Kiselev, V.V., 2012. Mesoproterozoic (Grenville-age) terranes in the Kyrgyz North Tianshan: Zircon ages and Nd–Hf isotopic constraints on the origin and evolution of basement blocks in the southern Central Asian Orogen. *Gondwana Research* 23, 272-295.
4. ^{pr} Krivonogov S.K., Yi, S., Kashiwaya, K., Kim, J.C., Narantsetseg, T., Safonova, I.Y., et al., 2012. Solved and unsolved problems of sedimentation, glaciation and paleolakes of the Darhad Basin, Northern Mongolia. *Quaternary Science Reviews* 56, 142-163.
5. ^{pr} Long, X., Yuan C., Sun M., Safonova I., Xiao W., Wang Y., 2012. Geochemistry and U-Pb detrital zircon dating of Paleozoic greywackes in East Junggar, NW China: Insights into subduction-accretion processes in the southern Central Asian Orogenic Belt. *Gondwana Research* 21, 637-663.
6. ^{pr} Safonova I., Seltmann R., Kröner A., Gladkochub D., Schulmann K., Xiao W., Kim J., Komiya T., Sun M., 2011. A new concept of continental construction in the Central

Asian Orogenic Belt (compared to actualistic examples from the Western Pacific). Episodes 34, 186-196.

7. *pr* Safonova, I.Y., Santosh, M., (in press). Accretionary complexes in the Asia-Pacific region: Tracing archives of ocean plate stratigraphy and tracking mantle plumes, Gondwana Research (2012), doi: [10.1016/j.gr.2012.10.008](https://doi.org/10.1016/j.gr.2012.10.008)
8. *pr* Song, D., Xiao, W., et al.(in press). Progressive accretionary tectonics of the Beishan orogenic collage, southern Altaids: Insights from zircon U–Pb and Hf isotopic data of high-grade complexes. Precambrian Res., doi: [10.1016/j.precamres.2012.06.011](https://doi.org/10.1016/j.precamres.2012.06.011)
9. *pr* Xu, B., Charvet J., Chen, Y., Zhao, P., Shi, G., (in press). Middle Paleozoic convergent orogenic belts in western Inner Mongolia (China): framework, kinematics, geochronology and implications for tectonic evolution of the Central Asian Orogenic Belt. Gondwana Research, doi:[10.1016/j.gr.2012.05.015](https://doi.org/10.1016/j.gr.2012.05.015).
10. The 6th Int. Siberian Early Career GeoScientists Conf.: Proc. Volume (9-23 June 2012, Novosibirsk, Russia). IGM, IPGG SB RAS & NSU, Novosibirsk. 2012. 313 P.
11. The 2012 IAGR Annual Convention and 9th Int. Symp. on Gondwana to Asia. IGCP 592: Abstracts (18-21 November 2012, Adelaide). University of Adelaide Publ., 81 p.

All peer-reviewed publications are available upon request from the project leader and all conference materials are available as pdf files at the IGCP#592 official website <https://sites.google.com/site/igcp592/home>

3.7. Activities involving other IGCP projects, UNESCO, IUGS or others

The IGCP#592 activities involved the programs of IAGR (Adelaide), IAGOD (Novosibirsk, Brisbane), and Russian Mineralogical Society (Ulan-Ude). About 10% of IGCP-592 project members participate also in activities of IGCP-599 “The changing Early Earth”. Project leaders of both projects take the complementary nature of both projects into consideration, started to discuss activities of mutual interest to create synergy, and coordinate efforts to avoid duplication of activities.

4. Activities planned

4.1. General goals

1. To link the bordering geological structures along the transects crossing Altai (Kazakhstan-Russia-China-Mongolia) and Tianshan (Kyrgyzstan-China).
2. To identify Oceanic Plate Stratigraphy in accretionary complexes in order to understand how the accretion contributed to continental growth.
3. To analyse Hf isotopes in magmatic and detrital zircons from granitoids, turbidites and modern sediments to evaluate the proportion of juvenile and recycled crust in the CAO.
4. To enhance the understanding of geodynamic controls of horizontal and vertical accretion towards a better understanding of crust-mantle interaction during ore-forming processes in accretionary orogens and intraplate settings and interconnection of both.
5. To evaluate contribution of intra-plate magmatism to crustal growth and metallogeny.

4.2. Tentative list of specific meetings and field trips (please list the participating countries)

1. “Beishan Orogen in NW China: accretionary tectonics, magmatism, eclogites and granulite complexes”. Field trip and meeting, August 22-28, 2013; Beijing/Urumsqi-Dunhuang-Hami, NW China. Participating countries: China, Russia, UK, Germany.
2. The 2013 IAGR Annual Convention and 10th International Symposium on Gondwana to Asia, October 1-4, KIGAM, Daejeon, South Korea. Participating countries: Republic of Korea, China, Russia, Mongolia.
3. The 2013 International Conference and field trip “The Mesozoic Accretionary Orogen of the South Island, New Zealand”, November, Churchville, South Island, New Zealand.

7. Financial statement (\$ USD only)

IGCP#592 received 5000 USD. From this amount 4500 USD were used in 2012, to support the participation of 11 scientists in IGCP#592-related activities. Among them were 7 young scientists (3400 USD) resp. 3 female scientists (1700 USD) resp. 10 scientists from developing countries and from China and Russia (4400 USD). For organizational expenses we spent 500 USD. Funds structure: 58% - airfare, 18% – accommodation, 14% – registration fee, 10% - organizing expenses.

Additional funding was obtained from the following sources (in alphabetical order)

Basic Res. Project. GP-2012-004, KIGAM	KASKAD Industrial-Technological Centre
Beijing SHRIMP Center, China	Ministry of Science&Technology of Japan
KOFST Brain Pool Program, R. of Korea	National 305 Projects of China
CERCAMS, Nat. Hist. Museum, London	National Science Foundation of China
China Geological Survey Projects	Novosibirsk State University, Russia
Chinese National Basic Research Program	Russian Academy of Sciences
Hong Kong Research Grant Council	Russian Foundation for Basic Research
Hong Kong University	Science Research GeoTechnology Center
German Science Foundation (DFG)	

The total amount of external funding spent the first year (2012) for the research, field works and travel in the frame of IGCP#592 exceeds 200,000 USD.

8. Attach any information you may consider relevant

IGCP#592 was involved in its launch year as co-organizer/co-sponsor of in total 6 meetings because the project depended on its acceptance and funding approval before organizing timely a stand-alone meeting. Thus, other meetings anyway under preparation were adopted to widely promote the project's objectives. This approach secured a head-start for our Project as we needed to advertise it, to attract participants and make them aware of our plans, especially young scientists and scientists from developing countries. We chose those meetings to co-organize and support, which i) involved many young scientists (Meetings 2, 4 and 6); ii) were focused on socially important issues, i.e., formation and exploration of mineral deposits (Meetings 2, 3 and 4); iii) which provided us an opportunity to promote the major goals of our project, i.e. the role of Gondwana-derived terrains in the CAO, the juvenile versus recycled crust in the CAO and the comparison with the Western Pacific, among the researchers, who actually work with relevant objectives at localities of "true" Gondwana terrains (India, Australia, South America) and western Pacific (Indonesia, Tasmania, Japan) – Meetings 5 and 6.

All the materials related to project performance (application, schemes, flyers, circulars, pdf files of meeting proceedings, photo reports, sponsors, etc.) are available at our website: <https://sites.google.com/site/igcp592/home>