

# INTERNATIONAL GEOSCIENCE PROGRAMME (IGCP)



## Annual Report\* of IGCP Project No. 510

IGCP project short title: **A-type Granites and Related Rocks through Time**

Duration: **2005-2009**

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Project leader(s):

1. Name: Roberto Dall' Agnol, Professor  
Address: Centro de Geociências – UFPA, Caixa Postal 8608, 66075-900  
Belém - PA - Brazil  
Tel.: +55-91-3201.7123  
Fax: +55-91-3201.7537  
e-mail: robdal@ufpa.br
  2. Name: Carol D. Frost, Professor  
Address: University of Wyoming, POBox 3006, Laramie, WY 82071-3006, USA  
Tel.: +1-307-766-6254  
Fax: +1-307-766-6679  
e-mail: frost@uwyo.edu
  3. Name: O. Tapani Rämö, Professor  
Address: Department of Geology, POBox 64, FI-00014 University of Helsinki, Finland  
Tel.: +358-9-191-50810  
Fax: +358-9-191-50826  
e-mail: tapani.ramo@helsinki.fi
  4. Name: Laurence J. Robb, Professor  
Address: School of Geosciences, University of the Witwatersrand,  
Johannesburg Private Bag 3, Wits 2050, South Africa  
Tel.: +27-11-717-6564  
Fax: +27-11-717-6579  
e-mail: lrobb@mineralcorp.co.za
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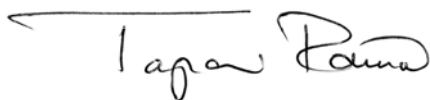
Project Secretary: O. Tapani Rämö, Professor

Project Webmaster: Brent A. Elliott, Associate Professor, Department of Geosciences,  
Midwestern State University, 3410 Taft Blvd, Wichita Falls, TX 76308, USA; Tel.: +1-940-  
397-4288, Fax:+1-940-397-4893, e-mail: brent.elliott@mwsu.edu

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Signature of project leader:



O. Tapani Rämö [on behalf of Roberto Dall'Agnol, Carol D. Frost, and Laurence J. Robb]

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### 1. Website address related to the project

<http://www.igcp-510.org>

### 2. Summary of major past achievements of the project

During the first two years (2005, 2006), the project arranged two Annual Meetings (Moscow, Idaho; Belém, Brazil) and four field conferences (Yellowstone-Snake River Plain; southern and central Finland; Pitinga, Amazonas State, Brazil; Carajás, Pará State, Brazil). An active international consortium of researchers from 41 countries working in the field of A-type granites and related rocks has been established, involvement of mining companies in the project has been enhanced, and first scientific breakthrough regarding the petrogenesis of A-type associations has been realized. The project is well underway of pursuing its goals on a truly global scale.

### 3. Achievements of the project this year only

#### 3.1. List of countries involved in the project (*\*countries active this year*)

Argentina\*, Australia\*, Austria, Belgium, Brazil\*, Cameroon, Canada\*, Colombia, Czech Republic\*, Egypt, Estonia\*, Finland\*, France\*, Germany\*, India\*, Iran\*, Ireland, Israel\*, Italy, Japan, Namibia, Netherlands, Norway\*, People's Republic of China\*, Poland, Portugal, Republic of Korea, Romania, Russia\*, Slovakia, South Africa\*, Spain, Sweden, Switzerland, Taiwan, Turkey\*, Ukraine, United Kingdom\*, United States of America\*, Uruguay, Venezuela, Yugoslavia.

#### 3.2. General scientific achievements and social benefits

In its third year now, the project is well underway pursuing its refined goals (petrogenesis and metallogenic significance of A-type granites, granite typology and lithospheric evolution), with the following main achievements:

- The new model for the petrogenesis of A-type granites and related rocks (presented by R. Martin) was introduced to the Hutton Symposium membership and a new classification scheme for alkaline and A-type rock associations was presented (by C.D. Frost and B.R. Frost). The great variety of metallogenic traits (polymetallic Cu-Pb-Zn-Ag-U-F concentrations in quartz-hematite veins, late magmatic Sn-W-REE mineralizations, a world-class fluorite deposit) of the Paleoproterozoic A-type granites of the Bushveld complex was examined.
- Involvement of exploration and mining companies to promote the project has been continued (Metorex Group; Molycorp Co.). This collaboration was essential for realization of the Bushveld granite field trip in July and the visit to the Mountain Pass carbonatite mine in November.

- Scientists from China, Russia and further countries in Asia, Latin America, and Africa have been recruited to the project and they have actively participated in the activities of IGCP-510 and contributed to the proceedings volumes realized/in preparation thus far.
- Young researchers (at the doctoral and post-doctoral level) have been involved in the project.
- The proceedings volume of the first Annual Meeting of the project (a special session at the 15th V.M. Goldschmidt Conference in May 2005 in Moscow, Idaho) was published as a special issue of *Lithos* (vol. 97, Nos 1-2, pp. 1-246) with C.D. Frost, O.T. Rämö, and R. Dall'AgnoI as Guest Editors. Papers based on presentations given at the second Annual Meeting (Symposium on Magmatism, Crustal Evolution, and Metallogenesis of the Amazonian Craton in August 2006 in Belém, Brazil) are currently being edited for a special issue of the *Canadian Mineralogist* with R. Dall'AgnoI, O.T. Rämö, and R. Martin as Guest Editors. Papers from the 6<sup>th</sup> Hutton Symposium (the venue of the third Annual Meeting of the project) are solicited for a special issue of the *Transactions of the Royal Society of Edinburgh: Earth Sciences*; C.D. Frost is one of the Guest Editors of the issue.

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

July 2-6: The third Annual Meeting of IGCP-510 in conjunction with the Sixth International Hutton Symposium. The symposium gathered ~90 researchers, 20 of them with A-type granites and related rocks as principal expertise, representing 13 countries (*Australia, Brazil, Canada, China, Finland, Germany, Iran, Israel, Russia, Sweden, Turkey, and United States*). 18 presentations (one of them keynote) on A-type granites were given.

July 7-10: The fifth scientific field trip of IGCP-510, arranged by J. Kinnaird (University of the Witwatersrand) and L. Robb (Oxford University). The trip focused on Paleoproterozoic A-type granites of the Bushveld Igneous Province and tin and fluorite mines associated with them and was attended by 14 individuals from 11 countries (*Australia, Brazil, Canada, China, Finland, Iran, Russia, South Africa, Sweden, Turkey, and United States*).

November 1-4: The sixth scientific field trip of IGCP-510, arranged by J.P. Calzia (U.S. Geological Survey), S. Luddington (U.S. Geological Survey), C.F. Miller (Vanderbilt University, Nashville), and O.T. Rämö (University of Helsinki). The trip focused on the Miocene A-type plutonic and volcanic rocks in the Colorado River and Death Valley extensional terrains in southern Nevada and California. The trip was attended by 19 individuals from 6 countries (*Argentina, Brazil, Canada, Finland, France, and United States*).

### 3.4. *Educational, training or capacity building activities*

In the three 2007 meetings of the project, doctoral and post-doctoral students from several countries (e.g., Australia, Brazil, Finland, United States) have been actively involved. We will continue to promote the educational aspect of the project by recruiting further students especially from the less developed countries.

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

A substantial fraction of the occurrences of A-type granites are located in the less developed countries (Africa, Asia, Latin America etc.). The project will continue to actively recruit new delegates from these regions, young and women scientists in particular.

### 3.6. *List of most important publications (including maps)*

In 2007, 24 peer-reviewed and 2 other scientific publications were released (since the beginning of the project, 36 and 5, respectively). These can be viewed through the IGCP-510 website ([www.igcp-510.org](http://www.igcp-510.org); Results - Publications).

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

The project has planned, together with the IUGS Subcommittee of Systematics of Igneous Rocks (SSIR; B. Bonin, Chairman) a joint SSIR–IGCP-510 symposium “*Granite Classification – a Never-Ending Problem*” at the 33rd IGC.

## 4. Activities planned

### 4.1. General goals

Future meetings of the project will continue to target on the four main goals (petrogenesis, metallogeny, typology, evolution of the lithosphere) of the project, with special focus on one or two of them at a time, given the lithologic traits that dominate each convention venue.

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

May 26-28, 2008: Symposium “*Anorthosites to Rapakivi Granites: a Tribute to the Career of Ronald F. Emslie*” at the GAC-MAC-SEG-SGA joint annual meeting in Quebec, Canada.

August 1-5, 2008: Field trip to the classic alkaline Paleozoic anorogenic rocks of the Oslo rift. The trip will be lead by T. Andersen (University of Oslo) and is a joint venture with the *Eurogranites*.

August 6-14, 2008: A joint session “*Granite Classification – a Never-ending Problem*” with the IUGS Subcommittee of Systematics of Igneous Rocks at the 33<sup>rd</sup> IGC (Oslo, Norway).

September 5-11, 2008: Field trip to the volcanic and plutonic A-type suites of Corsica (Propriano-Bonifatto area). The trip will be lead by B. Bonin (Université de Paris-Sud) and it is a joint venture with the *Eurogranites*.

2009: Technical sessions and field trips in Turkey and/or Australia.

2010 (provisional): Final meeting and field trips in Finland and adjacent Russia and Sweden. Participating countries: any number of those listed in section 3.1 plus further countries to be enrolled from 2008 on.

## 5. Project funding requested

In order to be able to support the maximum possible number of delegates from the less developed countries in the 2008 symposiums and field trips in Canada, Norway, and France, we request for maximum project funding for 2008.

## 6. Request for extension, on-extended-term-status, or intention to propose successor project

2009 will be the last official year of IGCP-510. To carry the project plan to completion after 2008, we plan to run further symposia and field trips in the eastern Mediterranean region, Australia, and Fennoscandia, and will request for an on-extended-term-status for 2010.

## 7. Financial statement (\$ USD only)

The IUGS/UNESCO funds allocated to IGCP-510 in 2007 (\$US 5500) were dispatched to support the following individuals to attend the project meetings in South Africa and United States: Dr. Durmus BOZTUG, Cumhuriyet University, Turkey (\$US 1500); Dr. Valdecir de Assis JANASI, Rio Claro, São Paulo, Brazil (\$US 1000); Prof. Davis Carvalho de OLIVEIRA, Universidade Federal do Pará, Marabá, Brazil (\$US 1500); Dr. Daniel RUBIOLLO, Buenos Aires, Argentina (\$US 1000). The remainder of the IUGS/UNESCO funds (\$US 500) was used for administrative expenses (photocopies, postage, telephone).

## 8. Attach any information you may consider relevant

N/A