

# INTERNATIONAL GEOSCIENCE PROGRAMME (IGCP)

## Annual Report\* of IGCP Project No.493 (2005)

\*The information in this report will also be used for publication in 'Geological Correlation' (please feel free to attach any additional information you may consider relevant to the assessment of your project).

**IGCP project short title: THE RISE AND FALL OF THE VENDIAN BIOTA  
(EDIACARAN PERIOD)**

**Duration:** Active, 2003-2007

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**Date of submission of report:** 30 November 2005

**Signature of project leader:**

## Annual Reports of IGCP Project 493

1. **Website address:** <http://www.earth.monash.edu.au/PreCsite/index.html>
2. **Summary of major overall achievements of Project 493:**
  - a. **Workshop** coincident with the International Geological Congress, Florence 2004. IGCP493 meeting in Prato at Prato Centre, Monash University. Publication of Papers from this Conference underway with the Geological Society of London, Special Papers, expected date, 2007.
  - b. As part of the North American Paleontological Convention held at Dalhousie University, Halifax Nova, Scotia from 19-26 June 2005, IGCP 493 and the Ediacaran Subcommittee ran a **symposium** entitled: *Ediacaran paleobiology: paleontological, molecular, embryological, and ecological constraints* chaired. An **excursion** entitled: *Life After Snowball: The Mistaken Point Biota and the Cambrian of Avalon*, conducted by Guy Narbonne, Jim Gehling and Marc La Flamme on the Avalon Peninsula of southeastern Newfoundland from June 13-19th, 2005, with 30 participants. The field trip enabled participants to study the latest fossil discoveries in the Ediacaran succession.
  - c. A series of **field workshops** have been held in Namibia, Argentina, Australia, Russia and members have attended and participated in symposia and field workshops with IGCP 478 and 512 and that association will continue.
  - d. **Public outreach projects** include as stamp issue with Australia Post, joint book publication with Australia Post, the opening of two exhibitions (South Australian Museum, Monash University) and launch of a travelling exhibition is planned for July 2006 in Japan with accompanying catalogue and commercial and educational products (development underway currently).
  - e. **Definition of the Ediacaran Period** and of a global GSSP in the Flinders Ranges of South Australia.
  - f. Work towards the development of some of the areas that have produced Ediacaran fossils as **heritage areas**, protected and yet available for tourism, particularly in Australia and Namibia.
  - g. **Publication** of a significant number of **research papers, monographs, proceedings volumes** that spotlight the earliest metazoans as well as the environments that came before and nurtured them, with fundamental publications such as that by Grey (2005) and Narbonne (2005) as exemplary publications.
  - h. **Publication of popular literature and presentation of public symposia.** *The Beginning of Animalia* by Fedonkin, Vickers-Rich, Gehling and Grey has been submitted to Johns Hopkins Press and will be

published in early 2007. Publications such as that by Andrew Plant “Creatures of the Slime” and issued by Australia Post is an initiative of IGCP493 as is the teacher’s guide to the Ediacara stamps also issued by AP and prepared by staff at the Monash Science Centre (see notes below). Public symposia such as that offered by Gehling, Vickers-Rich and Fedonkin at the New South Wales Teachers Conference in 2003 are examples of continued public outreach. The **in the classroom lessons** offered by many members of IGCP493, such as Terufumi Ohno at the Kyoto University Museum in Japan are other forms of public outreach and education – bringing front line science to the public.

**See attached TAG report for more detail and refer to annual reports for 2003 through 2005.**

**3. Achievements of the project this year: See attached TAG report for detail.**

**3.1. Countries involved in this project (all active in 2005):**

Argentina

Australia

New Zealand

Brasil

Canada

Peoples Republic of China

Germany

India

Iran

Iraq

Ireland

Italy

Japan

Namibia

The Netherlands

Poland

Russia

Spain (15 new members added in 2005)

Scotland

South Africa

Sweden

Taiwan

United Kingdom

United States

Uruguay

**3.2. General scientific achievements (including societal benefits)**

See 2a-h above for detail as well as the TAG 2005 report. This project puts very high value on both high quality research, publication and then bringing that information into the public sphere.



Guy Narbonne and colleagues have successfully convinced the Canadian Government to list the Mistaken Point Ecological Reserve as a place of Natural Heritage for its Ediacara fossils. As a consequence, an interpretive center is being built at Portugal

Cove South on the Avalon Peninsula to promote ecotourism and the protection of the fossil locales.

- ☛ A \$60,000 Tourism and Conservation Partnerships Initiative Grant has been awarded to the custodians of Ediacara fossil sites in the Flinders Ranges in South Australia in conjunction with the South Australian Museum to study the feasibility of tourist participation and visitation allied with fossil excavations.
- ☛ A \$68,000 Federal Visions Grant (Australia) has been awarded to Monash University for the preparation of an Exhibition entitled “Wildlife of Australia” that will spotlight the Ediacaran fauna which will bring cutting edge research results to the public and school children. This exhibition asks people to consider climatic and biotic change of the past and use it as a gauge when making decisions about the future.

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

See TAG report and reports for 2003, 2004

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

See TAG report and reports for 2003, 2004. IGCP493 has continued to work with students in Namibia, Australia and Russia, Iraq, Iran and many other countries to have access to front line research of the participants in this IGCP project, by bringing this information into the undergraduate classrooms as well as encouraging participation at the Honors, MSc and Phd levels – support in the way of funding for graduate programs as well as attendance at IGCP493 workshops, field expeditions and symposia.

- ☛ Malgorzata Moczydlowska-Vidal funds the research of student Sebastian Willman (Origins of Neoproterozoic-Early Palaeozoic phytoplankton) with a grant from the Swedish Research Council for 2005-2007 for project “Neoproterozoic microbial diversification – a prelude to the Phanerozoic world.”
- ☛ Mikhail Fedonkin partly funds two graduate students, Maxim Leonov and Ekaterina Serezhnikova from grants of the Russian Government Fund for Basic Research.
- ☛ Jim Gehling has hosted a number of international students to carry out research on the Ediacara fauna from Australia.
- ☛ Monash University has hosted an artist in residence (Pe3ter Trusler) funded by private donations to “illustrate” the Ediacaran Period. This continues in 2005-2007 with the outcome being capacity building of illustrative material available for use in educational publications, scientific publications and as a point of debate among researchers active in this field. These illustrations will be used as the central part of a publication resulting from the World Summit on Evolution held in the Galapagos in 2005 to be published by the University of Chicago Press.

### **3.5. Participation of scientists from developing countries**

Currently we have representation and programs in Iraq, Iran, Namibia, Russia, Argentina, China, Taiwan and are currently seeking further participation from those not currently represented. In 2005 in particular our working group based at the University of Mosul in Iraq was quite active. Dr Nazar Numan had 4 of his Ph.D. students complete projects in structural geology and geotectonics, took on two more and taught significant numbers of students in first (120), and 2nd-4th year (255). Though the record in Iraq begins in the Cambrian, the search for older material is hindered only by the precarious security situation.

At the beginning of 2006 IGCP493 is fielding a small team into Arabia in conjunction with the Arabian Geological Survey with both representatives from the US, Australia and Russia to explore Precambrian there.

### **3.6. Most Important Publications**

**Grey, K., 2005.** Ediacaran Palynology of Australia. *Memoirs of the Association of Australasian Palaeontologists*, 31: 1-439.

This monograph on the palynology of the newly defined Ediacaran System is the culmination of a major project to correlate terminal Neoproterozoic rocks began by Kath Gray as her PhD in 1991. It will be a key reference tool for both petroleum and mineral exploration in the older rocks across Australia. This study paved the way for a parallel study of Cryogenian biostratigraphy in the western Officer Basin of Australia, based largely on the Geological Survey of Western Australia onshore basins drilling program. Both stromatolites and palynology show consistent result across the basin, match results from stable isotope chemostratigraphy, and allow correlation with units of similar age elsewhere in Australia. This revised lithostratigraphy of the Officer Basin for Lancer drillhole 1 were also published this year.

**Narbonne, G. M., 2005.** The Ediacara Biota: Neoproterozoic origin of animals and their ecosystems. *Annual Review of Earth and Planetary Sciences*, 33: 421-442.

**Bibliography:** See attached TAG report and previous year reports for bibliography for 2003/2004

### **3.7. Activities involving other IGCP projects or the IUGS**

- a. As part of the North American Paleontological Convention held at Dalhousie University, Halifax Nova, Scotia from 19-26 June 2005, IGCP 493 and the Ediacaran Subcommittee ran a symposium entitled: *Ediacaran paleobiology: paleontological, molecular, embryological, and ecological constraints* chaired by Jim Gehling and Guy Narbonne, at which 16 papers were presented. An excursion entitled: *Life After Snowball: The Mistaken Point Biota and the Cambrian of Avalon*, conducted by Guy Narbonne, Jim Gehling and Marc La Flamme on the Avalon Peninsula of southeastern Newfoundland from June 13-19th, 2005, with 30 participants. The field trip enabled participants to study the latest fossil discoveries in the Ediacaran succession.
- b. IGCP493 members took part in the first annual meeting of IGCP512 in Aberystwyth from 23-27 August as well as the field workshop organized by Graham Shields and Emmanuelle Arnaud in Western Scotland 28 August to 3 September. Similar crossover participation also occurred in 2005 with the Namibian field trip and meeting held by IGCP478.

## **4. Activities planned**

### **4.1. General goals**

General goals are to encourage the interaction of a broad range of scientists whose task it is to tease out the relationships of the fauna from the Ediacaran Period – are these metazoans closely related to those in living phyla or are they representatives of “lost” architectures which left no living representatives. They are likely both, and sorting out just which is which and just to whom those stems on the phylogentic tree gave rise to its crown groups is a major task of this project. Another, of course, is sorting out those physical and biological aspects of the Earth upon which the ediacarans lived that were critical in their development and thus research in geochemistry, tectonics, paleoclimatology and paleogeography, amongst others all have bearing on this project – and thus the firm interaction with projects such as IGCP478 and 512.

#### **4.2. Specific meetings and field trips for 2006**

- a. IGCP493 Symposium (2 public symposia and one research symposium):  
“The Elusive Ediacarans – Where Did They Come From and Where Did They Go?” Kyoto University Museum and Seto Marine Biological Laboratory, 28-31 January 2006
- b. During 2006 there will be joint participation in both the 2nd annual meeting of IGCP512 at the “Snowball Earth” symposium in Acsona Switzerland and both the South China field workshop organized by Zhu Maoyan as well as with the International Commission for Stratigraphy Ediacaran Subcommission Symposium in China organized by Gehling, Xiao and Sheilds, held at the International Palaeontological Congress in Beijing, China.
- c. During March-April staff and students from the Paleontological Institute, Moscow will be in residence at Monash University to collaborate on research, prepare for the travelling exhibition on the Ediacara fauna to open in Japan (July, 2006) and to visit the collections of the South Australian Ediacaran collections and visit the Flinders Ranges.
- d. During May and June of 2006 a joint exploration program will be carried out in the Nama Group of Namibia by the Geological Survey of Namibia, Monash University and the Paleontological Institute of the Russian Academy of Sciences, and ongoing program began in 2003. Leaders are K.H. Hoffmann, Patricia Vickers-Rich and Mikhail Fedonkin.

#### **4.3. Other Activities**

On the 18th of July 2006 a major exhibition entitled “Before the Dinosaurs. the Ediacarans, Earth`s First Animals” will open at the Fukui Prefectural Dinosaur Museum in Fukui, Western Honshu. Accompanying this exhibition will be an extensive catalogue, teaching materials and a variety of commercial product. Funds that result from this will be shared by the participating institutions and be used for research and support of students. Participating institutions include the Paleontological Institute (Moscow), the Namibian Geological Survey (Windhoek), the South Australian Museum (Adelaide), the Western Australian Museum (Perth), School of Geosciences and the Monash Science Centre (Melbourne) and the Kyoto University Museum (Kyoto).

#### **5. Project funding requested**

Full funding as per 2005

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

We will be applying for an extension of this project for 2008 but at the moment this project continues through 2007.

**7. Financial statement**

See Financial Statement Attached

Significant Additional Funding for this Project was secured in 2005:

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|--|-----------------------|
| a. Australia Post for scientific input, idea, art and writing for<br>Creatures of the Slime stamp issue of Ediacarans              | <b>\$Aust. 50,000</b> |
| b. Purchase of Cabinets to house Vendian Collection<br>at the Paleontological Institute, RAS                                       | <b>\$US 30,000</b>    |
| c. Australian IGCP local committee funding for Aust.<br>researchers (Trusler, Vickers-Rich)  | <b>\$Aust. 2,700</b>  |
| d. Private donation for curation of Boris Sokolov library<br>and curation of Vendian collection, Paleontological<br>Institute, RAS | <b>\$US 3,500</b>     |
| e. Private donation for reconstruction art work by<br>Peter Trusler  | <b>\$Aust. 46,500</b> |
| f. Research Initiatives Grant, etc. from Monash University<br>(to Vickers-Rich)  | <b>\$Aust. 21,000</b> |
| g. Support for attendance at World Summit on Evolution<br>Galapagos, Ecuador (Fedonkin/Vickers-Rich)                               | <b>\$US 7,000</b>     |
| h. ARC grant to Gehling, Drosser and Jensen  | <b>\$Aust. 50,000</b> |
| i. National Geographic Grant to Fedonkin   | <b>\$US 11,000</b>    |

**8. Attach any information you may consider relevant**

- The Australian Geologist (TAG) report
- Announcement for IGCP 493 meetings and public symposia in Kyoto, Japan,  
Jan. 2006
- Information on "Creatures from the Slime" stamp issue by Australia Post
- Additional Notes

**ADDITIONAL NOTES**

## **EVENTS**

### **Official Launch of the Ediacaran GSSP by Premier Mike Rann**

The Premier of South Australia, Hon. Mike Rann, unveiled the Ediacaran GSSP (“golden spike”) for the newly defined Ediacaran period in the Flinders Ranges National Park. The ceremony was attended by government ministers, heads of departments and some 50 guests on April 16, 2005 as part of the South Australian Museum’s “*Out of the Glass Case Road Show*” designed to take the museum to schools and the public in remote regions of South Australia.

### **Launch of the “Creatures of the Slime” stamps of the Ediacarans**

Two years ago, the IGCP493 co-leaders approached Australia Post to issue a set of stamps highlighting the first complex metazoans on Earth, the Ediacarans. Australia Post proceeded with these stamps and released them in April as one of 5 special stamp issues at the Pacific Science Expo in Sydney. AP funded the art work prepared by Melbourne artist Peter Trusler, provided funding to the Monash Science Centre which developed a set of primary and secondary teaching modules that AP circulated to schools around Australia as well as a children’s book written by Andrew Plant. AP, Peter Trusler, and Andrew Plant worked in association with Jim Gehling, Mikhail Fedonkin and Patricia Vickers-Rich to give scientific accuracy to the reconstructions. As a part of the four day Pacific Explorer Expo held at the Sydney Convention Centre, Australia Post hosted an activity session, offered by the Monash Science Centre, each day which allowed children (and their parents) to make casts of Ediacaran animals and learn about these slime eating metazoans from the scientists and technicians who work with them. Close to 100,000 attended this international stamp expo with representatives from more than 75 countries.

### **Launch of the “Beyond the Edge Exhibition” (in Melbourne, Australia)**

Coincident with the launch of the Ediacaran stamps, a small exhibition on the Ediacarans and their environment was opened in Melbourne at Monash University. This exhibition, much expanded, will open in Japan in July of 2006 with a range of Ediacaran aged specimens (both original and casts) from Namibia, Australia, Russia, Newfoundland and China as well as both younger material from Emu Bay (a Burgess Shale equivalent from southern Australia) and older material from Greenland, the United States and Australia. Cooperating institutions for this exhibition include: the Namibian Geological Survey (Namibia), the South Australian Museum, the Western Australian Museum, the Northern Territory Museum and Monash University (Australia), the Paleontological Institute (Russia) and the Kyoto University Museum (Japan).