INTERNATIONAL GEOSCIENCE PROGRAMME (IGCP)

Annual Report* of IGCP Project No. 493 (for 2004)

IGCP project short title: THE RISE AND FALL OF THE VENDIAN BIOTA

Duration and status: Active, 2003-2007

Project leader(s):

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Annual Report of IGCP Projects IGCP 493

1. **Website Address: http://www.earth.monash.edu.au/PreCSite/index.html**

2. **Major Achievements of Project: Please see attached report for detail of achievements of IGCP 493, but in brief:**

IGCP493 workshop held in conjunction with the 32nd International Geological Congress, at Monash University Prato Centre, Italy, with 39 attendees, representing 16 different countries and 29 different institutions. (2004)

Field Workshop 1 on the *White Sea Coast* with development of field guide and new research alliances, discovery of new localities and new taxa, significant new mapping, with 16 participants from 5 countries and representing 10 different institutions (2003). A planning excursion, **Field Workshop 2** of IGCP493, held in the *Flinders Ranges* in 2003 in preparation for an international field excursion to be held before the finalization of this IGCP project. **Field Workshop 3** held in southern *Namibia* during 2004 in conjunction with the Geological Survey of Namiba, the Paleontological Institute of the RAS, and Monash University, led to new discoveries, detailed sampling, new research directions and the training of young student geologists.

Near completion and securing of contract with the Johns Hopkins University Press of **popular book** on the Ediacarans (*Beyond the Edge: the First Animals on Earth*) in 2004 – manuscript to be submitted in May 2005 with October 2006 publication.

Opening of a **new gallery** on the Ediacara biota of the Flinders Ranges at the South Australian Museum in 2004, a major public outreach programme. Another public programme was that developed with **Australia Post for a major stamp issue** on the Ediacarans, to be launched at the Sydney Stamp Expo in April 2005. Namibia Post intends to also produce stamps that highlight Ediacaran assemblages in 2005 or 2006 with guidance provided by participants in IGCP493.

Securing of funding to **purchase cabinetry and securing of space** at the Paleontological Institute of the Russian Academy of Science for the Vendian collections of Russia, Siberia, and the Ukraine. Curation of the Ediacaran collection in the Geological Survey of Namibia, curation of the Ediacaran collection in the South Australian Museum (SAM) and transfer of the University of Adelaide collections to the SAM.

Discovery of new material and significant new sites in Namibia, Australia, and the Winter Coast of Russia and securing of significant funding to continue field work from the Australian Research Council and Research Initiatives Programme at Monash University.

Exhibition entitled “On the Dawn of Life” (“Na Zare Zhizi”) organized by Dr A. Ivantsov and Yana E. Malakhovskaya shown in St Petersburg, Russia and Warsaw,

Arkhangelsk. Exhibition mounted by the Paleontological Institute, Russian Academy of Science, Moscow.

3. Achievements of the project in 2004

Please see attached TAG (=*The Australian Geologist*) report for detail of achievements in 2004

3.1. List of countries involved in the project

Argentina
Australia
New Zealand
Brasil
Canada
China
India
Iran
Ireland
Italy
Japan
Namibia
The Netherlands
Poland
Russia
Spain
Scotland
South Africa
Sweden
Taiwan
United Kingdom
United States
Uruguay

3.2. General scientific achievements (including societal benefits)

Please see attached TAG (=*The Australian Geologist*) report but in brief:

a. Scientific papers

b. Abstracts volume for Prato conference followed by Extended Abstract volume being considered by Royal Society of London for a Special Paper in its series. Presents state of the art, cutting edge research results concerning Ediacaran assemblage, its dating, its palaeoenvironmental and palaeogeographic setting.

c. Secured funding to purchase 25 museum cabinets to house Paleontological Institute, Russian Academy of Sciences, Moscow collection and secured space for

cabinets in PIN. This will consolidate and facilitate the curation of one of the largest collections of Ediacaran material in the world.

d. Opened first museum gallery dedicated to the Ediacara assemblage at the South Australian Museum, underwritten by Origin Energy.

e. Presented scientific and public lectures both nationally and internationally highlighting the scientific research supported by IGCP493.

f. Secured publication of popular book on the Ediacarans with the Johns Hopkins University Press which will be of use not only to the public but also to the scientific community. Secured additional funding from Monash University to insure high quality of photographic material in publication.

g. Secured agreement with Australia Post to issue set of stamps in 2005 highlighting research on the Ediacaran fossils of Austalia. Secured funding from Australia Post and other sources for production of reconstruction art by internationally known artist Peter Trusler.

h. Etc.

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

a. **White Sea, Winter Coast, Russia**, 4 June-12 July 2003, 15 participants, 5 countries. **Field Workshop.**

b. **Flinders Ranges, South Australia**, 21-19 September 2003, 5 participants, 2 countries. **Field Workshop Planning Meeting**.

c. **Prato, Italy.** 30-31 August 2004. 39 Attendees, 16 countries. **Workshop**

To discuss and report on cutting edge ideas. To provide a forum for discussion of highly contentious ideas, to set up cooperative efforts to refine dating and understanding the timing and environmental nature of major biologic innovations and crises in the late Proterozoic.

3.4. Educational, training or capacity building activities

A major effort has been made in this project to nurture new participants in Ediacaran studies and to make links between younger scientists who are working in this field. At present several student projects are underway – two in Australia (one involving the study of acritarchs by undergraduate student Tara Lewis and another on stromatolite biostratigraphy). Two new student projects at Ph.D. level are being formulated for Russian students at the PIN. One Namibian student who currently works for the Namibian Geological Survey has put forward a proposal to carry out Ph.D. studies as a combined degree between the GSN and Monash University. These projects have high priority in IGCP493.

Members of IGCP493 have participated in university courses (*e.g.* at Monash University, School of Geosciences undergraduate course ESC2032/3232; University of Adelaide, School of Earth and Environmental Sciences undergraduate summer course, Palaeobiology III) as well as presenting public lectures not only for the general public, but for specialist clubs (such as the Waterhouse Club allied with the South Australian Museum) or at teachers conferences (for example, the New South Wales Science Teachers Conference where Gehling, Fedonkin and Vickers Rich were invited to give the keynote address in 2003). Professional level keynote lectures have also been part of this project (such as the Annual Selwyn Lecture for the Geological Society of Victoria presented by Fedonkin and Vickers-Rich in 2004). Gehling addressed the Geological Society of Australia, South Australian Division at it AGM on the Ediacaran Global Stratotype Section and Point (April 2004).

Research results incorporated into undergraduate teaching in many courses – one example being the Monash University Course ESC2032/3232 also taught as a graduate course as a part of the Victorian Institute of Earth and Planetary Sciences programmes (code: DYB): *The Dynamic Biosphere: Changing Fauna and Flora Through Geologic Time.*
Many participants in IGCP493 take part as Honourary Research Fellows in the School of Geosciences, Monash University (*e.g.* Fedonkin, Gehling, Turner, Grey, Vickers-Rich, Stilwell, Rich).

3.5. Participation of scientists from developing countries

Several developing countries are represented by participants in IGCP493 – examples being Namibia and Iran, amongst others.

3.6. List of most important publications (including maps)

Bibliography (listed by author in alphabetical order with the most recent work listed first) should preferably respect the following format:

See Attached reports that include 2003, 2004 .

3.7. Activities involving other IGCP projects or the IUGS

See attached report, noting the cooperative meetings with IGCP478 in 2003.
We are also linked with IGCP497 (Gondwana Margin of the Rheic Ocean in the Bohemian Massif) and a new project proposed on Neoproterozoic
Glacial events will be of marked interest to IGCP493.

4. Activities planned

IGCP has completed years 1 and 2 (2003-2004) and below is attached the planned work schedule for the remainder of this project.

Year 3. (2005) Russia, Canada, Japan, Namibia

- Organize and curate, place in new storage cabinets the Neoproterozoic and Tommotian collections in the Paleontological Institute of the Russian

- Continue work in Namibia in cooperation with the Namibian Geological Survey (May-June 2005). Facilitate student projects for Ph.D. work coordinated by the Geological Survey of Namibia and Monash University.

- Completion by the end of 2005 of an international exhibition on the evolution of life in the Archean and Proterozoic, with an emphasis on the Neoproterozoic Ediacaran assemblages worldwide and the dramatic changes that occurred across the Neoproterozoic-Palaeozoic boundary. Exhibition will open first in Japan in mid-2006 and then tour Australia, North America, Europe, South America and Asia over a 10 year period.

- Field excursions to the White Sea of Russia to provided detailed sedimentological analysis of the Vendian/Ediacaran-bearing rocks. Beginning of collection of well core data from the northern part of the Eastern European Platform for data base.

- Field expedition and workshop to Arctic Siberian sites with Burgess Shale-like preservation (July and early August).

- Symposium at the North American Paleontological Convention June 19-26 preceded by an excursion to the Ediacaran succession of the Avalon Peninsula, Newfoundland, June 13-17 (led by G. Narbonne, J. Gehling and D. Boyce).

- Workshop associated with Geological Society of America meeting Aug. 8-11 in Calgary, Earth Systems Processes, associated with an excursion to be led by G. Narbonne.

- Development of educational and outreach programmes in conjunction with Dr. T. Ohno at the Kyoto University Museum. (P. Vickers-Rich to be in residence in Kyoto for 3 months for this project).

- Submission of final manuscript for ***Beyond the Edge: The First Animals*** to the Johns Hopkins University Press, Washington, by May 2005.

- Launch of Australia Post stamps on the Australian Ediacarans. This project was initiated in 2004 and reconstruction artist Peter Trusler was employed by Australia Post and Monash University to create the images. Stamps will be launched in April 2005 at the International Stamp Expo in Sydney. Art work will be available for later publication in both scientific and popular journals.

Year 4. (2006) Australia, Russia, Japan, China, Namibia and South America

- Field visits to locales in China, Australia, Namibia and Russia with postgraduate students to supervise projects begun earlier in IGCP programme.

- **Field workshop** to South China in association with the International Palaeontological Congress in Beijing, Summer 2006 organised by Dr Zhu

The IGCP project symposium will be held in conjunction with the International Commission for Stratigraphy Ediacaran Subcommission symposium and general meeting organized by J. Gehling, Xiao Shuhai and G. Shields. Discussion of potential candidates for future Neoproterozoic subdivision levels, stratotypes and global correlation potential of diamictite horizons and cap dolostones. Presentations and discussions on the influence of Neoproterozoic climate change on biotic evolution.

- Attend Fourth Annual Meeting of IGCP Project 478, begin prospecting for further multicellular eucaryotes in areas and sequences visited by this group in South America.

- Presentation of results of programmes to date both by project participants and postgraduate students.

- Open and manage traveling exhibition, add new specimens that result from field efforts and develop further educational kits that are up to date with new information gained during duration of this IGCP Project. Submit general article to Scientific American or American Scientist to summarize in depth the current research on Ediacaran biotas.

- Symposium in Japan (Kyoto University) for IGCP 493 reporting the results to date of IGCP493 and a second on disseminating the results of this work to pre-Tertiary students and the general public organized with the Kyoto Museum and Dr T. Ohno. This will coincide with the launch of the Precambrian exhibition in Japan.

Year 5. (2007) South America, Russia, and Europe

- Field visits South America to examine sequences with Ediacaran and older multicellular biotas.

- Conference to summarize results of IGCP493 project in Moscow, Paleontological Institute. Presentation of post-graduate results at Moscow conference.

- Publication of a synthesis of entire IGCP Project possibly subsidized by grant from Publications Committee, Monash University.

- Publication of popular versions of technical publications both for adult and young readers.

- Production of a documentary of field work and results, which will have been video-taped during the full five years of the IGCP programme. The Australian ABC and the National Geographic Channel have expressed strong interest and the Monash University Multimedia Unit has the capacity to produce such documentary coverage into a final package. Aspects of this documentary will be implemented as part of the traveling exhibition and CD-Rom/DVD presentation will also be available from 2005 onwards.

4.1. General goals

The general goals remain as they have been from the beginning as stated in our brief outline of the project:

"As so eloquently pointed out in the introduction to IGCP Project 478, the Proterozoic and early Phanerozoic, especially "the Neoproterozoic-Early Palaeozoic saw the occurrence of some of the most significant events in Earth history" which included a glaciation on a global scale, dramatic changes in the composition of oceans and atmosphere, marked changes in continental configuration and, from the point of view of this IGCP proposal, the appearance and great increase in biodiversity of metazoans culminating in the appearance of a variety of hard tissue skeletons that marks the end of the Proterozoic and beginning of the Phanerozoic.

This project, which is intimately linked with IGCP 478, and which can take advantage of a number of field conferences and symposia already in train under the umbrella of IGCP 478, is particularly interested in investigating the precise timing of Proterozoic events, the effects that these changing environments, climates, global chemistry and palaeogeography had on the development and diversification of animals which culminated in the spectacular Vendian/Ediacaran faunas, best represented along the Winter Coast of the White Sea in Russia and in the Flinders Ranges of South Australia.

This project aims to locate additional material from areas with a sparse Vendian biotic record (South America in particular), but with marked palaeobiogeographic interest, to closely compare their settings (sedimentology, carbon and oxygen isotope signatures, palaeogeographic positions) with those of the best known Vendian biotas. This project aims to allow the proposers and associates to gain further experience (and stimulate further discussion and joint research) with those less biodiverse Vendian assemblages in Namibia, as well as classic sites in the Ukraine, Siberia, the Urals, Newfoundland, etc. - and with other older assemblages such as those in the Bangamall Basin of Western Australia and the Western United States, where some of the oldest probable records of multicellular organisms have been reported. In doing so, the proposers wish to bring researchers from other areas to examine and gain experience with the two most biodiverse assemblages in Australia and Russia, to involve students in this interaction, in the hope of markedly increasing the amount of material from some of the lesser known locales and refining the dating of all of these locales.

Parallel to our investigations concerning the megascopic multicellular biota, the work of several associates of this proposal (Beresford, Bierlein, Cartwrignt, Cas, Schaefer, Wilde) will be investigating the geochemistry of the sediments for clues to changing climate and ocean chemistry and the involvement of microfauna in the deposition of major ore bodies of mid to late Proterozoic age (see attached Proposal (Item 17) *Geochemical Impoverishment of the Biosphere and the rise of Complex Life*)."

4.2. Specific meetings and field trips (please indicate participation from developing

See above plan for the next 3 years with meetings noted there.

5. Project funding requested

$12,000

This will be about 1/4 of the total funding required for the work to be carried out by IGCP493 in 2005 and will be used primarily for transportation of participants from developing countries for the workshop in Japan and for field workshops in Namibia and Siberia.

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

N/A

7. Financial statement for 2004

2004 FINANCIAL STATEMENT
Re: IUGS Supplementary Contribution

Project Number and Title: IGCP493
The Rise and Fall of the Vendian Biota

IUGS Supplementary funds forwarded by IUGS treasurer USD

EXPENSES

	Received by (list names)	Country of origin	Allocation (in USD)
Transportation (Long distance)	Dr A. Ivantsov	Russia	$493.00
	Mr Maxim Leonov	Russia	$493.00
	Ms E. Serezhnikova	Russia	$480.00
	Dr V. C. Tewari Mr P. Trusler	India Australia	$350.00 $1200.00
		Subtotal Transporation Expenses	**$3,016.00 USD**

Accommodation	Mr B. Boehm	Namibia	$300.00
	Mr M. Jafari	Iran	$240.00
	Dr A. Ivantsov	Russia	$183.00
	Mr Maxim Leonov	Russia	$183.00
	Ms E. Serezhnikova	Russia	$183.00
	Dr V. C. Tewari	India	$150.00
	Mr Peter Trusler	Australia	$148.00
		Subtotal Accommodation Expenses	**$1,387.00 USD**

Local Transport (ie. bus, minivans)	
Registration fees (which included in some cases local transport, 6 meals and abstracts volume for Chumakov, Leonov, Serzhnikova, Ivantsov (Russia), Jafari (Iran), Tewari (India), Simonetta (Italy), Trusler (Australia) @Euros 120.	
Subtotal Local Transport Expenses	**$1,292.00 USD**
Organizing Expenses (should be less than 10% of the allocation)	
Organizing of Workshop (1 month full time assistant $2000 but only $600 charged to IGCP grant)	**$600.00 USD**
Subtotal Organizational Expenses	**$600.00 USD**
Enter GRAND Total of Above	**$6,295.00 USD**

Signature of IUGS Secretary Gen. and Date

Signature of Project Leader and Date

In addition to the above financial statement that follows is a statement of funds

a. Funds to support the Ediacaran reconstructions prepared by Peter Trusler for Australia Post

Australia Post (to Trusler)	@	$25,000.00
Australia Post to the Monash Science Centre for monitoring project, preparing educational materials		$10,000.00
Andrew Plant for writing childrens' book and illustrations of Ediacaran assemblage, Flinders Ranges, Australia (Aust. Post funded)		$12,000.00

b. Monash University support for Prato Conference including drafting, assistant to help with conference organizing details, rental of space in Prato, production of Abstract volume, etc. @ $15,000.00

c. Monash Publications Committee grant for publication of ***Beyond the Edge. The First Animal***s – for enhancement of colour work in publication $5,000.00

c. Assistance from Australian IGCP Committee for Australian attendance of IGCP493 conference in Prato and IGCP @ $5,600.00

d. Funds (Research Initiatives, Small ARC, Travel Grants) from Monash University to Vickers-Rich and J. Stilwell for travel and field work @ $25,000.00

e. Grant for purchase of cabinets for Russian PIN Ediacaran collections @ $15,000.00

f. Funds for illustrations by P. Trusler of Vendian Illustrations of geology Winter Coast (private donation) $3,600.00

g. ARC grant to Gehling, Droser, Jensen for work in Flinders Range $26,000.00

Total Outside Funding to Support IGCP493 (2004) Aust. $142,200.00

8. Attach any information you may consider relevant

Attachments as files associated with this statement.

a. TAG report
b. Year 2003 report, financials
c. Year 2003 Meetings, Field Excursions, and Activities Report
d. Illustration by Peter Trusler (see IGCP493 website for Trusler Art – on cover page. http://www.earth.monash.edu.au/PreCSite/index.html

Attachment A. The Australian Geologist (TAG) Report for 2004

IGCP 493 THE RISE AND FALL OF THE VENDIAN BIOTA

Co-Project Leaders Australia:
Prof. Patricia Vickers-Rich (School of Geosciences, Monash University, Melbourne, Victoria, Australia, email: pat.rich@sci.monash.edu.au)

Dr Jim Gehling (South Australian Museum, Adelaide, South Australia, Australia; email: jgheling@ozemail.com; Gehling.Jim@saugov.sa.gov.au)

Other Project Leader:
Prof. Mikhail Fedonkin (Paleontological Institute, Russian Academy of Sciences, Moscow, C.I.S. Russia; email: mfedon@paleo.ru)

IGCP493 continues to investigate those significant events in Earth history during the latter part of the Proterozoic, the Ediacaran. It is closely linked with IGCP478 and has heartily supported the proposed new IGCP project that deals with the glacial events during this period. Of particular importance to this project is understanding the complex web of interactions between climate, ocean chemistry, continental configuration and the biodiversity that led to the "Verdun Event" of Dzik– that time when many life forms acquired armor (skeletons) or started to dig trenches (bioturbation).

Much has been accomplished during the second year of this project, in both the academic and popular arenas.

Year 2. (2004). South America, Namibia, North America, Russia and Australia

Field Workshops and Working Groups

- **During April,** a small field workshop was carried out in Argentina hosted by Drs. Guillermo and Florencio Acenolaza (Universidad de Tucuman, Tucuman, Argentina) to assess the possibility of future work on the Puncoviscana Formation. Results of this trip were forward plans to search this formation to the north of Tucuman (where it is less deformed) for Ediacaran faunas as well as determine the palaeoenvironmental settings, earch for datable rocks and samples for carbon isotope signals later in this project. Another short trip was made to a very limited outcrop of Late Neoproterozoic rocks in Rio Negro Province, Argentina.

- Dr Jim Gehling (SA Museum) and Dr Mary Droser (UC, Riverside) completed the second year of their excavation of a serial set of Ediacara fossil beds on the western side of the Flinders Ranges. They have reported on their preliminary findings about the vertical and lateral heterogeneity of Ediacara communities at 32nd IGC in Florence in August, and at the GSA annual meeting in Denver USA, in November.

Conferences and Workshops

- **During April** several papers were presented by IGCP493 participants at two scientific conferences in Russia (St Petersburg and Moscow) celebrating the 90th birthday of B. S. Sokolov (proposer of the Vendian), and at the Origin of Animals Symposium (at UCLA, Los Angeles). In June, several papers were given at the Geoscience Africa meeting in Johannesburg., South Africa. A number of popular lectures were presented by IGCP participants in Namibia, South Africa, Australia and the United States – including an invited keynote lecture at the Geological Society's Annual Selwyn

- **During August**, many members of IGCP493 and the Ediacaran Subcommission on the ICS presented papers at the International Geological Congress in Florence. A two day workshop was held at the nearby Prato Centre, a campus of Monash University, 30-31 August. Thirty-one papers were presented, and the whole conference video and audio-taped for future use in a documentary on ideas presented at the conference. An Abstracts volume resulted and this is now being expanded into an Extended Abstracts volume being considered for publication by the Geological Society of London as a Special Paper volume. The workshop had over 40 attendees representing a variety of fields from palaeontology (both macro and micro), plate-tectonics, geochemistry, geochronology, sedimentology, and molecular biology. The participants ranged from long-time professionals in their fields to students, and the evening discussion sessions allowed those of many different persuasions to amicably interact. Funds from IGCP allowed the subsidizing of participants from India, Russia, Iran and Ireland, and representation at the workshop included participants from Europe, North and South American, Asia, Australia, Africa - essentially all corners of the globe. The IGCP 493 meeting in Prato was combined with the worksop of the Subcomission on the Ediacaran (ICS, IUGS) lead by Jim Gehling, which outlined new strategies and tasks for the future of this group.

Books and Field Guides

- Writing and photography for a highly illustrated popular book on the origin and early evolution of the first animals, emphasizing the Late Neoproterozoic (Ediacaran) assemblages continued. In this book, these first animals are placed within a setting of changing environments, climate and continental arrangements. A contract with Johns Hopkins Press was approved, and the Monash University Publications Committee granted sufficient funds to allow this to be a full colour 300 page publication. Final manuscript to be submitted in May 2005.

- One field guide resulted from work in the Flinders Ranges: Gehling, J. G., 2004. *Field guide to the Ediacaran-Cambrian of the Flinders Ranges South Australia*. South Australian Museum, 70 pp.

Exhibitions, Public Lectures and Internet Access

- Development continued on the *Beyond the Edge* exhibition on the origin of animals, emphasizing the Ediacara assemblages of Australia (in conjunction with the South Australian Museum), the Nama assemblages of Namibia (with the Geological Survey of Namibia) and the Vendian assemblages of Russia, Siberia and the Ukraine (with the Paleontological Institute, Moscow). Materials are now secured for this exhibition that will be launched in 2006 at the Fukui Prefectural Dinosaur Museum on Honshu. Proceeds generated by this exhibition will be used for further research and development of educational materials on the Ediacaran faunas in the future and will benefit many institutions. A joint field trip **in January** into the Macdonnell Ranges of the Northern Terriotry with staff of the Northern Territory Museum allowed collection of stromatolites and archaeocyathids as well as other material to be used in the *Beyond the Edge Exhibition*. Photographs made on the Great Barrier Reef while some participants of IGCP493 were carrying out work at the Lizard Island Research Station will be of use in this exhibition and other programs that are part of IGCP493.

- Three scientific exhibitions devoted to the Vendian Biota were mounted by the Russian members of IGCP493 in the cities of Vladimir and St Petersburg (Russia), and Warsaw (Poland).

- Gehling designed the first stage of a new section in the South Australian Museum Origin Energy Fossil Gallery: "Origin of Animals – Ediacaran-Cambrian fossils of South Australia," opened this year. This gallery enables observers to have a close up and tactile experience with the more subtle Ediacara fossil impressions from the Flinders Ranges.

- Several public lectures and keynote addresses as well as media interviews were presented by members of IGCP493, examples being Jim Gehling's *The End of Snowball Earth and the Entry of Animals: the Ediacaran Period* to the Geological Society of Australia, South Australian Branch Annual General Meeting in April and in March *Origin of Animals: A Window to the Flinders Ranges* to the Waterhouse Club, a public group that supports work on the Ediacaran biota.

- **In July,** Gehling conducted tours of key Ediacaran sites in the Flinders Ranges, South Australia for graduate students and professors from both Australian and overseas universities and members of

- The 2003 Annual Selwyn Lecture of the Geological Society of Australia, Victorian Division, was presented by Patricia Vickers Rich, jointly with Mikhail Fedonkin: *The Cold Cradle of Animal Life: Coldwater Basins, Squestered Metals and Plate Dynamics – Drivers of Biological Complexit(Changes in Metal Availability Through the Precambrian and the Rise of Biological Complexity)*

- Late in 2003 members of IGCP493 provided the content and illustrations for a special large format poster that was published by ***The Age*** newspaper in Melbourne, a poster tied to the National Curriculum and Standards for pre-Tertiary students.

- An internet site has been set up for IGCP493 (http://www.earth.monash.edu.au/PreCSite/index.html) and Russian participants in IGCP493 have a special site devoted to the Vendian biota and related topics near completion (in Russian with a bilingual segment planned for the future).

Field Worshops and Exploration

- **During June,** members of IGCP493 held a field workshop and prospected the Nama Group in southern Namibia with members (including two students) of the Geological Survey of Namibia, resulting in the discovery of several new localities at a number of stratigraphic levels within the Kliphoek Member of the Dabis Formation. Stratigraphy and paleontological specimens are currently being described by M. Fedonkin, A. Ivantsov, P. Vickers-Rich, K.H. Hoffmann, G. Schneider and students working with the Survey. One student from Namibia has applied for Ph.D. work at Monash University and one other may apply in the near future. Sampling for datable ashes (2 possibly datable levels) and carbon isotope content was carried out and samples are currently being studied by members of the IGCP493 group.

- Investigation of the possibility of opening up a Cambrian Burgess Shale-like faunal quarry on Kangaroo Island, South Australia in cooperation between the South Australian Museum and the School of Geosciences, Monash University, took place. This will be both a source of research and provide material for the *Beyond the Edge Exhibition* illustrating the Early Cambrian/post-Ediacaran radiation of metazoans. Jim Gehling assessed this site, and plans are currently being made for a future excavation.

- Two expeditions to Vendian sites in the White Sea Region and Middle Urals were carried out. In addition to the megascopic fossils, representative assemblages of the oldest Vendian (Ediacaran) microfossils have been reported from the northeastern part of the Russian Platform and the SW Siberian Platform.

Student Projects, Short Courses, University Courses, Public Education

- An undergraduate course dealing with Precambrian biostratigraphy, global events, palaeoecology and the development of complex life, which can be used as a shortcourse, emphasizing the events and biota of the Ediacaran time period was under construction – parts of it being delivered in 2004 as a part of 2nd and 3rd year palaeontology in the School of Geosciences, Monash University, Melbourne.

- A number of student projects involving Australian, Russian and Namibian graduate students were initiated. Students included two Namibians, their projects on the detailed stratigraphy of the Kliphoek Member of the Dabis Formation,to one Australian working on the acritarch biostratigraphy of core samples from the Neoproterozoic of the Northern Territory and another Australian working on stromatolite structural analysis. In Russia one student carried out taphonomic investigations of *Beltanelloides* and *Nemiana.* More student projects are under discussion with the main purpose to insure a younger generation of Ediacaran specialists for the future.

- One PhD thesis (*Taphonomic and Ecological Peculiarities of the White Sea Biota of the Vendian*) was successfully defended by D. V. Grazhdankin in November (Moscow State University but much work carried out when an associate at Cambridge University).

- The project with **Australia Post** to produce and launch a series of stamps on the Ediacarans *Spriggina*, *Charniodiscus, Tribrachidium, Dickinsonia, Inaria* at the International Stamp Expo in Sydney 2005 is well underway. Multi-award-winning reconstruction artist (Cover of **Time**

Australian Museum, is preparing silver jewelry, 3 dimensional models, art work and education guides that will accompany this issue.

- Under the direction of Jim Gehling and with the support of Origin Energy, the new Precambrian Gallery at the South Australian Museum was opened. More construction on this gallery is underway. It will stand as the only permanent exhibition of the Flinders Ranges Ediacaran materials.

Research Grants

- An ARC discovery grant (2004-2007) was awarded to Jim Gehling, Mary Droser and Soren Jensen for a project entitled "Overturning the Ediacara biota: community structure of the oldest animal ecosystems." They are excavating and analyzing the Ediacara fossil record on successive Ediacaran bedding surfaces from a site in the western Flinders Ranges.

- A successful ARC grant ($50,000) for *Australia at the Forefront of Science: Australian Contributions to "Big Science*" granted to P. Vickers-Rich and Sue Turner, allowed research on the history of IGCP and the involvement of Australians as well as the history of work on the Ediacaran biota by Sprigg, Glaessner, Wade, and Jenkins, amongst others in bringing the Ediacarams to the world. Preliminary results of this research were presented at the IGC and the IGCP Workshop in Prato.

- In addition to the support provided by the International Geological Correlation Program and ARC, further funds were forthcoming from the National Geographic Society, Monash University, the Russian Fund for Basic Research, the Russian Fund Governmental and the Russian Academy of Science, as well as funds from private donars.

Research Programmes

- **In April and early May** visits of IGCP participants to the Smithsonian Institution to confer with E. Yochelson on 1.4 million year old metazoan remains from North America and Australia, to the National Geographic Society, attendance at Bill Schopf's UCLA symposium on Early Animals (April) occurred. A result of the Smithsonian visit was the completion of two papers on *Horodyskia* by Fedonkin and Yochelson and continued work on *Grypania.*

- Description of material from Namibia and detailed discussion between Russian and Australian collegues and artist Peter Trusler at the Paleontological Institute in Moscow during September will also lead to significant new interpretations and reconstructions of Ediacaran metazoans.

Collections

- Curation of Nama Group fossil collection in the Namibian Geologyical Survey (Windhoek) was carried out and the collection was doubled in size based on the field work in 2004 of IGCP493. Funds were raised for the purchase of 25 cabinets and space was allocated for housing the entire Vendian and Tommotian fossil collection in the Paleontological Institute (Moscow) and the collection will be curated and moved into this new space during early 2005. Curation and digital documentation of the South Australian Museum collections of Ediacaran material continues.

Publications

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Attachment B: YEAR 2003 FINANCIALS

2003 Meetings, Field Excursions, and Activities Report Form: FINANCIALS
Re: UNESCO-IUGS/IGCP
Project Number and Title: IGCP493, The Rise and Fall of the Vendian Biota

1. FIELD WORKSHOP MEETING:

Date: 4 June –12 July 2003
Place: White Sea, northern Russia
Itinerary: Moscow-Archangelsk-Souz'ma (Summer Coast) to Zimnegorsky Region of Winter Coast-Moscow

Train Tickets (Moscow-Archhangelsk-Moscow)	**R2035.00**
Field Gear (e.g. generator, satellite phone, etc.)	**R4897.00**
	$US8165.00
	$A128.00
Food	**R6596.20**
	$US4500.00
	$A500.00
Fuel (for cooking, boats, generator)	**$US 570.00**
Vehicle Rental	
Boats	**$US4300.00**
Trucks, Minibus	**$US1490.00**
	R1053.00
Baggage Handling	**R3000.00**
Helicopters	**$US4236.00**
	$A 2373..00
	R90480.00
Commercial Flights (Archangelsk/Moscow/Aust.)	**$US9,600.00**
	R10443.00
Laboratory Equipment for Analysis	
Computer	**$US4600.00**
Microscope, etc.	**$US3300.00**
	$US47,086.59*

***Does not include expenses incurred by Japanese team**

2. FIELD PLANNING MEETING:

Date: 21 September-29 September 2003
Place: Flinders Ranges, South Australia
Itinerary: Melbourne-Adelaide-Flinders Ranges (South Australia)-Melbourne (or

Food	**$A526.55**
Fuel	**$A636.15**
Maps	**$A 10.00**
Film	**$A 74.55**
Accomodation	$A1623.70
Miscellaneous	$A 27.50
Total	**$A2993.45**
	$US2,198.69
Total Cost	**$US49,285.28**

Attachment B: YEAR 2003 FINANCIALS (cont.)

2003 FINANCIAL STATEMENT
Re: UNESCO-IUGS CONTRACT

Project Number and Title: IGCP 493
THE RISE AND FALL OF THE VENDIAN BIOTA

Funds forwarded by IUGS treasurer under UNESCO contract:

EXPENSES

Transportation (Long distance)	Received by (list names)	Country of origin	Allocation (in USD)
		Subtotal Transporation Expenses	USD **$0** **USD**
Accommodation			
		Subtotal Accommodation Expenses	USD **$0**

Local Transport (ie. bus, minivans)	
See attached sheet for detail – total spent for two field workshops **$40,285.28** USD of which IGCP UNESCO funds formed **$6,900** USD portion. All other monies raised outside of UNESCO funding.	
Subtotal Local Transport Expenses	USD **$6,900**
Organizing Expenses (should be less than 10% of the allocation)	
Subtotal Organizational Expenses	USD **$0**
Enter GRAND TOTAL of above	USD **$6,900**

Attachment C. YEAR 2003 MEETINGS, FIELD EXCURSIONS, AND ACTIVITIES

2003 Meetings, Field Excursions, and Activities Report Form
Re: UNESCO-IUGS/IGCP

Project Number and Title: IGCP493, The Rise and Fall of the Vendian Biota

1. FIELD WORKSHOP

Date: 4 June-12 July 2003.
Place: White Sea, northern Russia
Itinerary: Moscow-Archangelsk-Souz'ma (Summer Coast) to Zimnegorsky Region of Winter Coast-Moscow

SCOPE AND RESULTS OF MEETING:

1.1 Scope of Meeting (program or outline of geological study)

The aims of IGCP 493 activities during this field conference were:

(1) To continue to examine in detail the White Sea sediments producing one of the four important Vendian metazoan biotas and allow in depth discussions in the field of the mode of accumulation, the palaeoenvironmental setting and dating of this sequence in order to compare its setting with regard to faunas from Australia, North America and Namibia.
(2) To finalize a field guide to sites in this type area of the Vendian.
(3) To visit known sites and attempt to collect more complete material in place, for the sake of better dating and secondly a better understanding of the taphonomy and palaeogeograpic relations with other known Vendian faunas, using the diverse backgrounds of the participants in the hope that new discoveries would be made.
(4) To finalize selection of a number of possible student projects to be supervised by many of those involved in IGCP493 and encourage the development of joint projects between the participants from a number of countries represented.
(5) To finalize the photography of field sites and specimens with the intent to use both in scientific and popular publications, again under joint authorship, and to develop concepts to be used both in these publications and in a planned major traveling exhibition .

1.2 Achievements and Outcome of Meeting

The field group on the White Sea had diverse backgrounds: palaeontology (both macro and micro, both vertebrate and invertebrate), sedimentology, stratigraphy (both physical and biological), reconstruction art, science education and public communication, amongst others. Thus, all of the aims were achieved and more.

(1) Detailed lithofacies maps were constructed by Andrew Constantine of several productive sites in the Winter Coast sequence. An open file report is under preparation by Constantine with a plan to submit a paper on the results in 2005.

(2) A preliminary field guide to the Summer and Winter Coasts is under preparation. based on the information already available and gathered on this trip.

(3) An important discovery at Souz'ma was the location of the level which has for more than 20 years produced an abundance of Vendian metazoans. Until this field excursion some key taxa, such as *Albumares*, *Onega*, *Vendomia* and *Dickinsonia*, appeared as float in blocks along the Souz'ma River's edge. Ivantsov and Grazdankin located the very layer from which these fossils were derived, and a second trip later in the summer led by Andre Ivantsov

only from 2 other specimens – one from Russia and a second from Namibia) was recovered from Souz'ma. Thus, with "new" eyes and luck, the data base was significantly expanded.

(4) A number of student projects were determined and in 2004 at least one, possibly two such projects will begin. More are planned for the future with cooperation between Monash University and the Paleontological Institute, Russian Academy of Science (RAS), providing facilities and some funding.

(5) Collections in the Paleontological Institute, RAS (Moscow) were photographed in detail as were the field sites at Souz'ma (Summer Coast) and along the Zimnegorsky Coast (Winter Coast), from just north of Mys Kerets to just south of Mys Ostryy. More than 100 rolls of film as well as more than 500 digital images were taken by Constantine, Fedonkin, Hunt and Vickers-Rich, and these form the basis for a large format, full colour popular book and the graphic material for the planned international exhibition. Certainly some of these images will be used in scientific papers – but most will be catalogued and available.

(6) Outcomes of this field workshop have been presented at three major teachers' conferences, which allows the results of cutting edge research to be transmitted into schools (Primary and Secondary) in Australia (Catholic Education Conference, Melbourne August 2003; Bright Minds Conference, University of Queensland, October 2003; 50th Science Teachers Association of New South Wales State Conference, Dec. 2003). As a result of the field excursion, links were developed with the Archangels'k Museum for exchange of material and programmes with the Monash Science Centre (Melbourne) as well as with the Paleontological Institute (Moscow) in the area of public outreach to schools and the general public – centred around the results of research on the Vendian biota.

(7) Plans for a Workshop in Japan in late 2005 or early 2006 resulted from the interaction of the participants on this excursion – emphasizing both the research outcomes and well as public outreach with cutting edge science results headed up by Drs Ohno and Vickers-Rich.

Country	Institutions	Number of participants
AUSTRALIA	Monash University	2
AUSTRALIA	Museum Victoria	1
AUSTRALIA	Origin Energy	1
JAPAN	Kyoto University Museum	1
JAPAN	Nagoya University	1
JAPAN	Gifu University	1
RUSSIA	Geology and Geophysics, Siberian Branch, RAS, Novosibirsk	1
RUSSIA	Paleontological Institute, R.A.S.	7
UNITED KINGDOM	Cambridge University	1
UNITED STATES	Ronald Chisholm International	1

Field Workshop. Fifteen participants from five countries attended field work in the White Sea, Winter and Summer Coasts Region.

LIST OF PARTICIPANTS - IGCP 478 FIRST FIELD WORKSHOP

Country	Name	Institution
AUSTRALIA	Prof. Patricia Vickers-Rich	Monash University
	Mr Peter Trusler	Monash University
	Dr Andrew Constantine	Origin Energy
	Dr Thomas H. Rich	Museum Victoria
JAPAN	Dr T. Ohno	Kyoto University Museum
	Dr S. I. Kawakami	Gifu University
	Dr B. Tojo	Nagoya University
RUSSIA	Dr Mikhail Fedonkin	Paleontological Institute, RAS
	Dr A. Ivantsov	

	Ms Yula Shuvalova Mr Maxim Leonov Dr A. Kochedykov Representative	Geology and Geophysics, Siberian Branch, RAS, Novosibirsk
UNITED KINGDOM	Mr Dimitri Grazdankin	Cambridge University
UNITED STATES	Mr Nathan Hunt	Ronald Chisholm International

2. FIELD PLANNING MEETING

Date: 21 September-29 September 2003
Place: Flinders Ranges, South Australia
Itinerary: Melbourne-Adelaide-Flinders Ranges (South Australia)-Melbourne (or Adelaide)

SCOPE AND RESULTS OF MEETING:

2.1 Scope of Meeting (program or outline of geological study). The purpose of this small meeting was to:

(1) Assess sites for a later international workshop (to be held in Year 3 of IGCP493) and to photograph and document locales for popular book project and planned exhibition, both the traveling exhibition for 2005 as well as for the opening of a permanent exhibition in the South Australian Museum in 2004.

(2) Prepare a field guide for the Flinders Ediacaran locales which also discussed issues of geochronology, palaeoenvironment, taphonomy, major events (the Acaman event, major glacials), which can be used for the 2005 workshop.

(3) Liase with local pastoralists and caretakers about possibility of setting up interpretive center and field research station in the Flinders Ranges that would allow public outreach for the research being carried out on the Proterozoic in the region. Meet with the South Australian Premier and his group on site in the Ediacara hills to highlight the importance of the Neoproterozoic site in the Flinders Range, both as a geological treasure but also as an ecotourist attraction that should be used with care and wisdom to enlighten people about the Earth's past.

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2.2 Achievements of Meeting

This small meeting was not funded by IGCP funds, but funds from Monash University. It was meant to be a small, intense consultational meeting to plan for the IGCP493 excursion here in 2005 and to provide photographic coverage of the sites, people and fossils from this important late Proterozoic area from which the Ediacaran biota has been collected over the years. Francesco Coffa, an internationally recognized photographer, was part of this group for this purpose. The following was achieved:

(1) Extensive photographic coverage of field sites producing the Ediacaran biota.

(2) Field guide to the Flinders Ranges completed: J. G. Gehling, 2003. *Field Trip Guide Book. Terminal Proterozoic-Cambrian of the Flinders Ranges, South Australia*. South Australian Museum and Monash Science Centre, Adelaide and Melbourne, 61 pp.

(3) Material (e.g. rhythmites, Acaman impact layer, etc.) secured for use in international exhibition to premier in late 2005-early 2006.

(4) Detailed discussions concerning the Ediacaran metazoans and their palaeoecologic, palaeobiogeographic, temporal nature held in preparation for IGCP493 field workshop to be

Country	Institutions	Number of participants
AUSTRALIA	Monash University	2
AUSTRALIA	South Australian Musuem	1
RUSSIA	Paleontological Institute, RAS	1

LIST OF PARTICIPANTS - IGCP 478 FIRST FIELD WORKSHOP

Country	Name	Institution
AUSTRALIA	Prof. Patricia Vickers-Rich Mr Francesco Coffa Dr Jim Gehling Ms Mena Salvatore	Monash University South Australian Museum Melbourne, Ecotourist
RUSSIA	Mikhail Fedonkin	Paleontological Institute, RAS

3- PUBLICATIONS

3.1 Publications in International Journals

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Clapham, M.E., Nrbonne, G.M. & Gehling, J.G., 2003. Paleoecology of the oldest-known animal communities: Ediacaran assemblages at Mistaken Point, Newfoundland. *Paleobiology*, 29: 527-544.

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Fedonkin M.A., 2003 (in press). Biodiversity and Biosphere in the Archeozoic Era through the Cambrian Period. UNESCO International School of Science for Peace Autumn School on "Global Climate Changes and Impact on Biosphere" October 2-13, 2000, Milan.

Fedonkin M.A., 2003 (In press). Early evolution of biosphere. *Nauka*, Moscow, 30 pp. (In Russian)

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Hengeveld, R. and Fedonkin, M. A., 2003 (in press). Causes and consequences of eukaryotization through mutualistic endosymbiosis. *Acta Biotheoretica*. (72 typewritten pages).

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3.2 Short Papers / Extended Abstracts/Abstracts in Conference Proceedings

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Brain, C.K., Prave, A.R., Fallick, A.E. and Hoffmann, K.-H., 2003. Sponge-like microfossils from Neoproterozoic intertillite limestones of the Otavi Group in northern Namibia. In: Frimmel, H.E. (Ed.), *III International Colloquium Vendian-Cambrian of W-Gondwana*, Programme and Extended Abstracts, Cape Town:19-23.

Droser, M.L., Gehling, J.G., and Jensen, S. 2003. Voyage to the bottom of the Ediacaran sea: what's missing from the picture? Geological Society of America Abstracts with Program : 40-8.

Fedonkin, M.A., 2003. Metazoans of the Vendian Period in the aspects of palaeoecology and palaeogeography: White Sea, Russia. *In*: Frimmel, H.E. (Ed.), *III International Colloquium Vendian-Cambrian of W-Gondwana, Programme and Extended Abstracts*, Cape Town: 25-26.

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Grey, K., Hill, A.C., Walter, M.R., and Calver, C.R., 2003 (abstract and talk by MRW), Abstract # 12896 (oral presentation) Plankton and isotope changes at the late Neoproterozoic Acraman impact ejecta layer: *NASA Astrobiology Institute General Meeting,* 2003, February 10-12, Arizona

Maheshwari , A., Sial, A.N., Ferreira, V.P. and Romano, A.W. , 2003. Lomagundi phenomenon in Paleoproterozoic carbonates of Brazil and India. *Fourth South American Symposium on Isotope Geology (IV SSAGI)*, Salvador, Bahia, Brazil

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Zimmermann, V.U. and Germs, G.J.B., 2003. Black Sands as traces of provenance: A heavy mineral case study of the early Paleozoic Haribes Member (Nababis Formation, Fish River Subgroup) of the Nama Group in Namibia- first results. *In*: Frimmel, H.E. (Ed.), *III International Colloquium Vendian-Cambrian of W-Gondwana, Programme and Extended Abstracts,* Cape Town: 45 – 47.

3.3 Public Lectures, Informal Talks, Teachers' Conferences, Web Addresses, Etc.

Fedonkin, M.A., 2003. February 19, 2003. 2-hour lecture "Origin of life and an early biosphere" at the Geology Department, Kyoto University, Japan.

Fedonkin, M.A., 2003. February 20, 2003. 2-hour lecture "Rise of the biological complexity as an evolutionary response to the geochemical impoverishment of the biosphere in Proterozoic" at the Geology Department, Kyoto University, Japan.

Fedonkin, M.A., 2003. February 21, 2003. 2-hour lecture "Eukaryotization of the global ecosystem. Origin and early evolution of Metazoa. Snowball Earth and problem of the Precambrian oil resources "at the Geology Department, Kyoto University, Japan.

Fedonkin M.A. , 2003. Biodiversity and Biosphere in the Archeozoic Era through the Cambrian Period. Lectures at the UNESCO International School of Science for Peace. Autumn School on "Global Climate Changes and Impact on Biosphere" October 2-13, 2000, Milan. (WWW site of the Dept. of Environmental Science, Università degli Studi di Milano Bicocca, Italy) (WWW site of the Paleontological Institute, Russian Academy of Sciences: http://www.paleo.ru/paleonet/library.html?show=9

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Fedonkin M.A. Geochemical impoverishment of the biosphere and rise of complex life. (WWW site of Monash University, Victoria, Australia: http://www.sci.monash.edu/news/articles/pdf/Abs_Fedonkin.pdf

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Gehling, J.G. 2003. "Fossils from a frozen ocean". *South Australian Public Lecture Series,* September 17.

Gehling, J.G. 2003. "Ediacaran Period: Life after Snowball". *South Australian Geology Teachers Association*, SSABSA Workshop, November 28.

Grey, K., 2003 (talk), "Was it life as we know it"….AstroFest 2003, February 8th, Trinity College, Perth.

Grey, K., 2003 (talk), "Acritarchs, impacts, and the Snowball Earth". Gemmological Society, WA Division.

Grey, K., (talk) "Aftermath of an asteroid impact." Mars Society of Australia, WA Branch, Trinity College.

Grey, K., 2003, (talk) "The Dawn of Life Trail": public talk presented at Marble Bar Civic Centre.

Vickers-Rich, P., 2003. "A passion for juggling. A journey in the present and the past. " Keynote Address, *Catholic Education Office Conference: Communicating? Comfortable? Compromising?* Parkville, Melbourne, August, 2003.

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Years Conference, Bright Minds, University of Queensland, School of Education, Brisbane, October 2003.

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Vickers-Rich, P., Fedonkin, M.A. and Gehling, J., 2003 (Abs. and Talk). "The Precambrian Fauna of Russia, Australia and Namibia." *Science Teachers Association of New South Wales, 50th Annual State Conference*, Macquarie University, Sydney, December, 2003, Workshop, *STANSW Conference Booklet*: 17.

3.4 Field Trip Guide

Frimmel, H E, Germs, G J B, 2003. The geology of the external Gariep Belt and Nama Basin. South Africa/Namibia. - *IGCP478 Field Workshop, 25-31 October 2003,* University of Cape Town, Cape Town, 55 pp.

Gehling, J.G., 2003. Field Trip Guide Book. Terminal Proterozoic-Cambrian of the Flinders Ranges, South Australia. *South Australian Museum and Monash Science Centre*, Adelaide and Melbourne: 61 pp.

4- OTHER ACTIVITIES/SOURCES OF SUPPORT

Besides the two field workshops, publications and lectures, IGCP493 had a number of other activities and achievements:

(1) Attraction of Further Funding to Support IGCP493 Programmes:

a. ARC Discovery Projects Grant (for 2004) to Prof. Patricia Vickers-Rich and Dr Susan Turner to document history of research on Precambrian Metazoans, UNESCO-IGCP Programme. Title: Australia in the Forefront of Science: Australian Contributions to "Big Science."

$50,000.00(Aust.).

b. Small ARC grant to P. Vickers-Rich for research on the Vendian/Ediacaran metazoan faunas of Russia, Australia and Namibia.

$9786.00 (Aust.)

c. Research Initiatives Grant, Monash University for work on late Proterozoic biota and palaeoenvironments to Prof. Vickers Rich

$9398.00 (Aust.)

d. Travel Grant, Monash University for work on White Sea, Russia to Vickers-Rich

$1750.00 (Aust.)

e. Monash Science Centre grant to fund visit of Prof. Mikhail Fedonkin for cooperative work at Monash University, Sept.-January, 2003-2004

$8500.00 (Aust.)

f. Private doner support for work on White Sea, Russia, Workshop

$4000.00 (US)

g. Australian UNESCO Committee (for IGCP) **$6000.00 (Aust.)**

h. National Geographic Grant (to M. Fedonkin) **$10,480.00 (US)**

i. Other sources (to M. Fedonkin) **$22,206.00 (US)**

j. ARC Discovery Projects Grant (2004) to Dr, J.G. Gehling, Dr. M.L. Droser, and Dr S. Jensen.
Title: Overturning the Ediacara biota: community structure of the oldest animal ecosystems.
$50,000.00 (Aust)

(2) Curation of Fundamental Collections of Vendian/Ediacaran Metazoans.

Two collections, one in the South Australian Museum in Adelaide, and the other in the Geological Survey of Namibia in Windhoek (Fedonkin and Vickers-Rich), have been curated. In the case of the Adelaide collection it has been housed in Due to cooperative work headed up by Jim Gehling and Richard Jenkins, the University of Adelaide collections have been amalgamated with the South Australian Museum Collections in the SAM. These collections serve as the basis for a major new permanent exhibition that will open next year at the SAM, under the curatorship of Gehling. It is the intention of the IGCP working group to continue this curation and to make available on data base photographs of as many of the Vendian/Ediacaran metazoan taxa as possible.

(3) Organization of large Exhibition, of Substantial Size, on the Archean and Proterozoic, Emphasizing the Rise of Metazoans.

In 2003 agreements have been made with several museums holding key material to provide specimens for this exhibition and text for panels in the exhibition, and design for the support material is underway. Fundraising and venue selection is also underway, with a tentative premier venue to be in Japan in 2005-2006. Specimens, including a 2.5 ton piece of Banded Iron Formation from the Tom Price Mine, have been donated to the Monash Science Centre collections. The Monash Science Centre in concert with the South Australian Museum and the Paleontological Institute (Moscow) and the Archangelsk Museum (White Sea Region of northern Russia) is developing a substantial series of education modules to accompany the exhibition, and these materials will be translated into Russian and Japanese, with other languages possible in the future – for use in Primary and Secondary Schools around the world.

Accompanying the exhibition will be some commercial products – already silver jewelry has been designed and produced, accompanied by an information brochure, for some of the Vendian/Ediacaran metazoans (*Parvancorina*, *Tribrachidium* and *Dickinsonia*). Funds generated from this will be used to support research and educational activities associated with this project.

To be part of the exhibition, a documentary concerning the collection, study and interpretation of the Vendian/Ediacaran biota is underway. Part of this was filmed in Namibia in cooperation with IGCP478 (see report for this project) by a TV crew from America del Sur and TVEO Channel (principals were Mr Horacio Portal and Mr Silvestre Triunfo from Uruguay). Further discussions are underway with the National Geographic Channel in Australia.

(4) Joint Meetings with IGCP 478

A most successful cooperative meeting with IGCP478 was held in South Africa and Namibia and Fedonkin, Gehling and Vickers-Rich are serving in various capacities within that project. Strong linkage between these two projects will continue for the life of both.

Particularly important for some members of the IGCP493 attending the meeting in southern Africa organized by IGCP478 was the linkage made between members of both groups and the linkage of our group with the Geological Survey of Namibia, especially with Drs Gabi Schneider and Karl-Heinz Hoffmann. As a result, further field work with the Namibian Survey is underway as are research projects on parts of the Survey collections in Windhoek. Work with the local primary and secondary schools is planned – a linkage of Monash University to the Namibian Survey through the Monash Science Centre.

(5) Development of Website for IGCP493

(6) Popular Book on the Pre-Cambrian (Emphasizing the Neoproterozoic and the Origin of Animals)

A major effort has been made from October to December 2003 to write this book, with a working title (***Beyond the Edge***). Fedonkin, Vickers-Rich and Gehling are the authors. High quality photographs of most every taxon of Vendian/Ediacaran metazoan is in hand (due to major efforts in Moscow, Windhoek and Adelaide over the past year). A substantial amount of the text has been written, Arthur C. Clarke has provided the Preface, and most of the field data and field photography has been completed. Graphics are underway and Peter Trusler, an internationally recognized reconstruction artist has been engaged to provide a number of illustrations.

A preliminary version of the book will be presented to two interested publishers early in 2004, and it is hoped that this large format, full colour book for a popular audience will be in press by the end of 2004 – a book written for a general audience at a fairly high level, so that it will be useful to both general and scientific audiences.

(7) Planning for meeting of IGCP493 in Prato, August 30-31 at the Monash University Campus to coincide with the International Geological Congress in Florence. See attached invitation document, which has received a significant response.

Signature of Project Leader and Date

2 Dec. 2003