Asia-Pacific Network for Global Change Research

PAGES Second Open Science Meeting

Final report for APN project 2005-06-NSY-Brigham-Grette

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2005-06-NSY-Brigham-Grette

Final Report submitted to APN

Overview of project work and outcomes

Non-technical summary

PAGES (Past Global Changes), a core project of the International Geosphere-Biosphere Programme (IGBP), held its Second Open Science Meeting (OSM) in Beijing, China from 10-12 August 2005, with the theme "Paleoclimate, Environmental Sustainability and Our Future". Cutting-edge research into past climate, environmental change and human impact was presented, with the aim of developing predictive models of future global changes. The meeting was attended by 370 scientists, 70% of whom were from APN countries. A total of 45 countries and over half of the APN countries were represented. 32 participants, from Australia, China, India, Japan, Mongolia, Nepal, New Zealand, Russia, and USA received support from APN. This APN funding enabled PAGES to boost attendance from developing countries, as well as to cover some of the costs of key scientists, and therefore contributed substantially to the success of the meeting. The supported scientists were able to strengthen existing relationships and establish new links with colleagues in similar areas of paleoresearch from a wide range of developed and developing nations within the APN network and beyond. Young participants were introduced to a wealth of information, including workshops and training opportunities, online databases, student opportunities and potential mentors. A third OSM, to be held in the USA, is planned for 2009.

Objectives

The main objectives of the project were to:

1. Increase the visibility of paleoenvironmental research in developing regions, particularly Asia.
2. Develop and strengthen regional and national relationships amongst the APN paleoscience community.
3. Foster opportunities for international collaborations.
4. Encourage interdisciplinary science by involving the fields of paleoresearch, environmental history and modeling.
5. Facilitate dialog between scientists who might not otherwise focus on common themes or coordinated initiatives between countries or disciplines.

Amount received and number years supported

2005-2006: USD 25,000

Participating Countries

Australia, China, India, Japan, Mongolia, Nepal, New Zealand, Russia, USA

Activity undertaken

The OSM was attended by 370 scientists from 45 countries, of which half were developing countries. 14 of the 22 APN countries were represented. The meeting began with a welcome lecture, given by Jiayang Li (Vice President, Chinese Academy of Sciences), Dongsheng Liu (Chinese global change scientist), Zhongli Ding (Local Organizing Committee) and Thorsten Kiefer (Executive Director, PAGES).

The scientific program consisted of 24 plenary lectures by invited speakers and 3 poster sessions, divided into the following four themes:

- Future Change: Historical Understanding

- Humans and their Environment: Past Perspectives on Sustainability
- Ocean-Continent-Cryosphere Interactions: Past and Present
- Climate, Humans and the Environment in the Asian Region

In addition, PAGES co-convened 5 sessions at the 9th International Association of Meteorology and Atmospheric Sciences (IAMAS) Scientific Assembly, held alongside the OSM. The OSM also included a panel discussion on temperature variability over the last 2000 years, a plenary discussion about PAGES future direction, and three short meritorious abstract talks by young scientists from India (Vartika Singh; APN-funded), China (Chunmei Ma; APN funded) and Japan (Jaesoo Lim). A designated APN area, in which participants from APN countries could meet, was set up within the poster hall and staffed by PAGES Scientific Steering Committee members during morning and afternoon breaks.

A meeting website, with the usual logistical and program information, and including online abstract submission was produced at the PAGES International Project Office (IPO). It was linked to a site operated by the LOC, which included online registration. An online media room dedicated to journalists and the media was also designed and maintained by the IPO. These webpages provided background information on plenary speakers, contact information and press releases.

The OSM was publicized through calendar entries and news items on numerous relevant websites and in newsletters, and through email listservers. A printed Call for Papers was produced and distributed to all PAGES subscribers and other interested parties. Posters were also produced and distributed. The IPO mounted a small media campaign, with the help of IGBP. Press releases were posted on the online media room, emailed to journalists on the IGBP media list, and distributed through EurekAlert, an online global news service operated by the American Association for the Advancement of Science.

Results

The meeting was very successful in bringing together paleoscientists from a variety of disciplines and backgrounds. The broad topics covered in non-parallel sessions meant that the audience was mixed in terms of expertise, facilitating dialog between traditional paleoresearchers, environmental historians and modelers. There was also a good mix of renowned senior scientists and young researchers new to PAGES. Furthermore, there was a range of nationalities from both developed and developing countries. Participants were also able to attend the IAMAS meeting on overlapping days, and thereby interact with a community of scientists focused on meteorology and atmospheric science.

There were a large number of young researchers for whom this was their first international conference and they commented on the excellent contacts they had made, especially with prominent scientists. There were many opportunities for interaction during the meeting, including poster sessions, lecture question time and plenary discussions. A common remark from Chinese participants was that they enjoyed the non-hierarchical character of these interactions, noting with surprise that even some eminent scientists received criticism about their work. Networking was also possible during the organized social events, at lunch and meeting breaks, and in the APN area.

The meeting boosted the visibility of paleoresearch in China considerably. A special issue of the PAGES newsletter, “Chinese Paleoscience”, was timed to coincide with the meeting and was distributed as part of the registration package. Also, the Chinese

"National PAGES" were launched just prior to the meeting. These webpages on PAGES website provide contacts and information about national paleocommunities and aim to help support the national networks. There are currently 7 National PAGES from APN countries—Australia, China, Indonesia, Japan, New Zealand, Russia and the USA. In addition, there were a large number of posters from China and a suite of 5 posters summarizing PAGES-related science in China.

Relevance to APN scientific research framework and objectives

PAGES supports research aimed at understanding the Earth's past environment in order to make predictions for the future. PAGES sphere of interest includes the physical climate system, biogeochemical cycles, ecosystem processes, and human dimensions, on different time scales within the last million years. Thus, PAGES as an organization, as well as the PAGES meeting themes, relate to all the areas of interest within the APN Research Framework, with particular relevance to Climate Change and Variability and the Human Dimensions of Global Change. PAGES fosters international and interdisciplinary collaborations and seeks to involve scientists from developing countries in the worldwide paleoscience community. These are objectives very similar to those of APN.

Self-evaluation

Overall, PAGES was very satisfied with the OSM, its products and outcomes. The meeting presented an extremely high standard of science in the plenary sessions, as well as a large number of noteworthy posters on a range of topics. Feedback received was very positive and the organizers felt that the OSM achieved its objectives. Despite the size of the meeting, there were many possibilities for participants to interact. Participants commented that they found the APN area very useful for networking and exchange of information. It was not possible to organize a special APN event outside the meeting times because the OSM program had already been finalized by the time funding was approved. Such an event would have boosted the area's effectiveness.

The media campaign was a good learning experience for the IPO and as a result, PAGES now has a respectable list of media contacts interested in receiving press releases on paleoscience in the future. The campaign did not result in any major coverage by the international media but this was to be expected due to the very limited staff and funds. Stories were published in local news sources in China, such as *China Daily* and *China Times*.

In general, the timing of the OSM was not optimal. Although PAGES was satisfied with the attendance, it is likely that the numbers would have been higher had the meeting not been held in August, a hot and humid month in Beijing, and a summer holiday month in the northern hemisphere. However, the choice of date was somewhat restricted, since the meeting had been postponed from the previous year due to SARS.

Potential for further work

On an organizational level, the U.S. National Science Foundation, a major funder of PAGES, sent a representative to attend the meeting. He participated as a panel member in the plenary discussion on PAGES future direction. The Indian Department of Science and Technology (DST), who provided funding for the meeting, also sent a representative. This first contact with DST was very fruitful and they have expressed interest in further involvement with PAGES. On a scientific level, two of the scientists

present at the meeting submitted successful proposals to visit the PAGES IPO as part of the PAGES Guest Scientist Program. Several collaborative research projects in the Asian region have been proposed since the meeting, arising directly from contacts made at the OSM. PAGES will continue to support such initiatives and to fund workshops that bring together paleoscience researchers from around the globe. A third OSM, to be held in the USA, is planned for 2009.

Publications

- Brigham-Grette, J., Kiefer, T., Wang, P. and Wanner, H. (Eds.) Paleoclimate, Environmental Sustainability and Our Future, *Climate of the Past*, in prep. This special issue will consist of a collection of the plenary lectures.
- PAGES 2nd Open Science Meeting - Abstract book (189 pp). Hardcopy and digital format, and an online poster exhibition (www.pages2005.org/posters.html).
- Wang, P., Chai, Y., Guo, Z. and Kull, C. (Eds.) Chinese Paleoscience, *PAGES News*, 13:2, 2005.
- Chinese "National PAGES" (www.pages-igbp.org/about/national/china).

Acknowledgments

PAGES greatly appreciates the support of APN and thanks the organization for its financial contribution to the meeting. PAGES also thanks START for managing the transfer of the APN funds. PAGES IPO is funded by the U.S. and Swiss National Science Foundations, the National Oceanic & Atmospheric Administration, and the International Geosphere-Biosphere Programme.

Technical Report

Preface

Founded in 1991, PAGES is the IGBP core project charged with providing a quantitative understanding of the Earth's past environment and with defining the envelope of natural environmental variability alongside which anthropogenic impacts can be assessed. The First PAGES Open Science Meeting (OSM) was held in London in 1998. This report deals with the Second OSM, which was held in Beijing, China from 10-12 August 2005. The theme of the meeting was "Paleoclimate, Environmental Sustainability and Our Future". PAGES applied for an APN grant in order to ensure a substantial contribution from paleoscientists, particularly young researchers, in the Asia-Pacific region.

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Appendix

1.0 Introduction

1.1 Scientific Significance

According to the 2001 Amsterdam Declaration on Global Change[1], the nature of the changes now occurring in the Earth System, their magnitudes and rates of change are unprecedented, and the Earth is now operating in a no-analog state. The IPCC third assessment report[2] states: "There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities." Statements such as these emphasize the ever-increasing concern for our planet and its future sustainability that is generating a demand for climate and environmental information with which to predict the future.

In order to achieve sustainable development, an increased understanding of global change (both climatic and environmental) is imperative[3]. And in order to better understand global change, we need to understand how the Earth System—atmosphere, oceans, land surfaces, continental ice masses, biosphere—operated in the absence of significant human influence, so that we can assess the relative roles played by natural climate variability and anthropogenic forcing. Thus, paleoenvironmental research is a vital component in any holistic study of changes in groundwater, land use and land cover, sea level, and biodiversity, as well as studies of extreme climatic events and human vulnerability[4]. The paleo-record—marine and lake sediments, ice cores, tree rings, corals, archeological remains and other historical records—does not provide a prescriptive guide to the future but analyzed and interpreted, it can provide critical information on present-day trends, future probabilities and likely human consequences[4].

The livelihoods of most developing country peoples are largely dependent on the utilization of land-based resources, as well as on freshwater lacustrine and riverine systems as sources of potable water, fish, transport, etc. Global warming and land-use changes may adversely affect the services provided by these climate-sensitive resources, in turn placing greater stress upon the societies that are currently experiencing economic decline, widespread poverty and high population growth rates. Paleoclimate records show that large and sometimes-abrupt changes, far exceeding anything that has been instrumentally recorded, have occurred in the past under boundary conditions similar to today. The short instrumental record in many developing countries does not provide an adequately long timeseries to capture and understand fully the range of natural climate variability. As a result, the decadal, inter-decadal and centennial scale features of the climate system in developing regions are only poorly understood, and consequently, predictions of possible future climate impacts are highly uncertain. Such societies may, therefore, not be able to adequately prepare for, cope with, or adapt to, climate change impacts. Information from paleo-records is critical to the generation of robust predictive models on regional change that allow for societal and technological adaptation and for informed political and economical decisions.

While PAGES itself is not a research institution, it works towards providing this essential paleo-perspective by outlining an international science direction and specifying a set of priorities that ensure that important scientific questions are addressed in a coherent manner. In a broad sense, PAGES promotes and coordinates paleoresearch, identifying those aspects of past global change that are of greatest significance for the future of human societies. PAGES fosters a multi-proxy and multidisciplinary approach, facilitating worldwide research collaborations involving scientists from developing countries. PAGES has over 3,700 subscribing scientists in more than 100 countries around the world, with 40% of subscribers coming from APN countries. PAGES

membership is free. More information about PAGES can be found on the PAGES website at www.pages-igbp.org.

1.2 Objectives

The specific objective of the APN grant was to support the attendance and participation of scientists, particularly from developing countries, in the APN region, in order to develop and strengthen regional and national relationships amongst the APN paleoscience community.

More generally, the OSM sought to provide a platform to:

1. Increase the visibility of paleoenvironmental research in developing regions, particularly Asia.
2. Foster opportunities for international collaborations.
3. Encourage interdisciplinary science by involving the fields of paleoresearch, environmental history and modeling.
4. Facilitate dialog between scientists who might not otherwise focus on common themes or coordinated initiatives between countries or disciplines.

1.3 Activity Undertaken

The scientific program for the PAGES Second Open Science Meeting (OSM) consisted of 24 plenary lectures by invited speakers and three poster sessions. There were a large number of posters from China and a suite of 5 posters summarizing PAGES-related science in China. Poster sessions were divided into the following four themes (see Appendix 1 for the final program):

1. Future Change: Historical Understanding

One motivation to investigate past environmental conditions is to draw conclusions about future change that could not be drawn from short present-day observations alone. Research presented in this session focused on high-resolution and high-precision reconstructions from the last centuries and millennia before the instrumental record. Contributions put observations of present-day global change and predictions on future change into the perspective of natural climatic and environmental variability. Studies presented here also aimed towards a better understanding of the climate system, or parts thereof, in order to equip predictive approaches, such as climate models, with increasingly realistic process modes.

2. Humans and their Environment: Past Perspectives on Sustainability

The trend of paleoresearch towards ever-higher resolution and towards sub-recent historical and archeological timescales requires us to include man as a component in the Earth System. It also enables us to study the effect of climatic/environmental change on past societies. Contributions to this session addressed both feedback directions of the climate-environment-man system. They did so by presenting high-resolution paleo-data of the last decades to millennia in the context of the archeological and historical records, and by presenting environmental records that contain evidence of human activity. This session was chaired by Daniel Olago from Kenya and included a well-received plenary lecture by Mohammed Umer from Ethiopia, entitled “Climate Change, Human Evolution and Later Adaptation in the Horn of Africa and the Surrounding Regions: Potential for Long Climate Record In Ethiopia”.

3. Ocean-Continent-Cryosphere Interactions: Past and Present

As part of the attempt to converge towards a more holistic understanding of the Earth System, this session addressed interactions between its major components. Approaches included data analysis and computer modeling on different timescales, ranging from seasonal-scale modern-day observations to million-year-scale changes during the Neogene Greenhouse-Icehouse transition. Papers were presented that tested or refined particular ideas of Earth component coupling and others that sought to put new paleoenvironmental observations into an Earth System context.

4. Climate, Humans and the Environment in the Asian Region

This session zoomed in on various regions in and around the host country of the meeting. The ensemble of numerous local studies composed detailed pictures on regional aspects of climate change. Many contributions to this session addressed the human dimension of regional environmental change, an issue of particular importance given the dense and dynamic population in many parts of Asia. Papers covered various timescales and were grouped into regional focus groups.

The meeting also included a panel discussion on temperature variability over the last 2000 years, a plenary discussion about PAGES future direction, and three short meritorious abstract talks by young scientists from India, China and Japan.

The OSM was attended by 370 scientists from 45 countries, including close to 260 participants from 14 of the 22 APN countries. Of these, 32 received funding from APN. A special APN-area within the poster hall was set up to provide participants from these countries space to meet and interact. Members of PAGES Scientific Steering Committee (SSC) from APN countries were present during morning and afternoon breaks to aid in networking. A schedule of SSC attendance was posted outside the area.

In addition to the above-listed sessions, PAGES co-convened the following 5 sessions with the International Association of Meteorology and Atmospheric Sciences (IAMAS), whose 9th Scientific Assembly was held from 2-11 August, alongside the OSM:

C1 Natural Climate Oscillations: ENSO and NAO/AO, Influences and Predictability

C9 Explaining the Climates of Historic Times: Detection and Attribution of Anthropogenic Influences

D4 Asian Monsoon Stability and Change

F2 Climate Variability and Change in the Polar Regions: Causality and Prediction

S2 Special Symposium: The IPCC's Fourth Assessment Report

The OSM was publicized through calendar entries and news items on numerous relevant websites and in newsletters, and through email listservers. A printed Call for Papers was produced and distributed to all PAGES subscribers and other interested parties. OSM posters were also produced and distributed. With the help of IGBP, the IPO mounted a small media campaign. PAGES press releases were posted on the OSM website and sent out to interested journalists on the IGBP media list, and through EurekAlert (www.eurekalert.org), an online, global news service operated by AAAS.

2.0 Conference Outputs

- Brigham-Grette, J., Kiefer, T., Wang, P. and Wanner, H. (Eds.) Paleoclimate, Environmental Sustainability and Our Future, *Climate of the Past*, in prep. This special issue has been accepted for publication in the open-access journal *Climate of the Past* and will consist of a collection of the plenary lectures. See: www.copernicus.org/EGU/cp/cpd/special_issue1.html.
- PAGES 2nd Open Science Meeting - Abstract book (189 pp), designed and produced by the PAGES IPO. Hardcopy and digital format. The digital version can be downloaded free of charge from the PAGES Product Database. See: www.pages-igbp.org/cgi-bin/WebObjects/products.woa/wa/product?id=249.
- OSM website with online poster exhibition. Poster presenters were asked to submit their poster files to the IPO for display on the OSM website. Currently, 90 posters are available for viewing and download. See: www.pages2005.org/posters.html.
- Online media room: A section of the OSM website was dedicated to journalists and the media. These webpages provided background information on plenary speakers, contact information and press releases. See: www.pages2005.org/mediaroom.
- Wang, P., Chai, Y., Guo, Z. and Kull, C. (Eds.) Chinese Paleoscience, *PAGES News*, 13:2, 2005. This special issue of the PAGES newsletter was timed to coincide with the meeting and was distributed as part of the registration package. See: www.pages-igbp.org/cgi-bin/WebObjects/products.woa/wa/product?id=248.
- Chinese "National PAGES" were launched just prior to the meeting. These webpages on the PAGES website provide contacts and information about national paleocommunities and aim to help support the national networks. See: www.pages-igbp.org/about/national/china. There are currently 7 National PAGES from APN countries—Australia, China, Indonesia, Japan, New Zealand, Russia and the USA.

3.0 APN-Funded Participants

The APN funds were used to provide support for chosen speakers and participants. Participants were selected by the OSM Program Committee based on nationality, scientific strength of the abstract, and age (preference given to under 40). Support included registration fee, air and ground travel, hotel and meals, depending on the recipients' needs.

The following 32 people were supported:

Dr. Danda Pani Adhikari
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My research area is paleoclimate reconstruction. I presented a poster on reconstructing the last 40,000 years in central Japan using lake sediment cores (measuring grain-size, diatoms, total organic carbon and total nitrogen). The OSM was the largest scientific gathering I have ever attended. I benefited a lot from the meeting through listening to talks and reading posters on various aspects of paleoscience. I was very much impressed with some of the lectures and poster presentations, and they helped me to widen my understanding of the subjects. I have established some networks with scientists I met at the conference, which is helping me to move ahead in my research work. All the knowledge, experience, and connections I got at the conference are very helpful for my research and teaching.

Dr. Tatiana A. Blyakharchuk
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I am a palynologist working on the natural and human-induced evolution of landscapes in Siberia. My poster attracted the attention of many scientists working in Siberia, Mongolia and China, and I was able to establish new scientific contacts. The meeting allowed me to meet and speak with leading paleoscientists, whom I would never have met without this support (especially scientists from New Zealand, Australia, USA). In addition, I got the opportunity to meet with Russian colleagues, to discuss our problems and achievements, and to plan future joint research. Russian scientists, especially those from the Siberian region, are mostly working in isolation from their colleagues. Participation in such meetings gives us great inner stimulus for further work.

Assoc. Prof. Stephen Burns
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Using speleothems to study climate is the main focus of my work. I have done speleothem-related climate studies and fieldwork in Oman, Yemen, Austria, Costa Rica, Panama, southwestern USA and Brazil. My invited talk at the OSM was on rapid climate change in the tropics, using records of changes in rainfall and atmospheric circulation from speleothems.

Mr. Yuan-Pin Chang
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My PhD research concentrates on the influence of the Asian monsoon on the climate system in the Okinawa Trough (adjacent to the East China Sea). The number of paleoceanographers in Taiwan is small, so it is not easy to have good discussions, to get new information in this field, or to share experiences with colleagues. Therefore, having the chance to attend an international open science meeting was very important to a young researcher like me. I not only learned about new advances in my field but I could present my data and get feedback and ideas from other colleagues. I believe the meeting helped me to advance in my studies, and pushed me to think more and want to share more with other members of the community in Taiwan.

Prof. Patrick De Deckker
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I presented an invited talk on the role of the Indo-Pacific Warm Pool on global climate change during the Quaternary. The PAGES meeting was a very positive experience for me, having attended the first of such meetings in London years ago. In China, I was able to meet a lot of Asian students, mostly form China, and the time spent during the poster sessions was very rewarding. Not only was I able to talk to the students but they were able to discuss their research projects and ideas with us. I was also impressed at the quality of research those students displayed. Science in paleoclimatology is advancing very fast and those students are contributing towards this progress. The PAGES meeting allowed us to witness this rapid change.

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I am working on multiproxy approaches to El Niño-Southern Oscillation (ENSO) reconstruction, integrating evidence from tree-ring, coral, ice core and documentary archives. The meeting provided a forum to share Southern Hemisphere results with people from all over the globe, and to make direct contact with leading paleoscientists. From the perspective of a young scientist, this sort of experience is invaluable. I was able to incorporate advice given to me and the latest theory and methodology into my PhD and related publications now submitted. I made contact with a scientist working on the influence of ENSO in Europe, and plan to collaborate on a future publication. A senior scientist from India has also been in contact with me. It was a "right place, right time" experience for me at my stage of research.

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I am a dendrochronologist studying extreme climatic events, like frosts, and their influence on ecosystems in the Urals Mountains region. The OSM was a very important meeting for me because I had the possibility to present my scientific research and discuss my results with other specialists, and to meet and talk with many scientists from different countries, including Russia. We were able to invite some of these people to an international conference on climate changes and their impact on Boreal and Temperate Forests, in Ekaterinburg in June. It is a really big success for you and us that we could continue these collaborations. I was able to adjust my own research, propose new ideas and make new scientific plans as a result of discussions at the OSM. The meeting also gave me ideas about conference organization, which I was able to apply to our conference.

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My specialization is dendrochronology. My primary research interests are in Holocene climate change and the history of northern forests in Siberia. I enjoyed PAGES 2nd

OSM very much. Many prominent scientists attended it. I was very pleased to meet so many excellent researchers of past climate and environment. The meeting offered me the opportunity to have fruitful discussions with several scientists, especially tree-ring researchers from the USA, India and Russia, to deepen old friendships and to form new ones. One of the additional pleasures for me was being able to see the traditions and customs of people in China.

Prof. Frank Hole
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My principal archeological research has been on the origins of agriculture and the subsequent development of agrarian societies in the Near East, and this was the topic of my invited talk at the PAGES OSM. The modern era is one of unprecedented change in size of populations, agricultural technology, economic forces and technological interventions. Sustainability will require elimination of destructive practices, implementation of efficient water distribution, development of more suitable crops, political and demographic stability, and pragmatic planning.

Dr. Anastasia Knorre
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I am 31, from Russia. My main area of interest is the investigation of new approaches to determining primary production in forest and bog ecosystems. I study forest, forest-tundra, and bog ecosystems of Northern Siberia and investigate annual biomass production and carbon fluxes. I am very grateful for the possibility to participate at the PAGES meeting. Thank you for your support.

Dr. Vasili Kolka
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I presented my work on Late Pleistocene and Holocene evolution of the NE Baltic Shield. The APN grant allowed me to present the new data obtained by our laboratory in 2004-2005. I established personal contacts with researchers from Finland, Belarus and Norway. After the meeting, we started a joint project studying paleoclimatic changes in

the NE Fennoscandian (Kola Peninsula) region on the basis of carbon and oxygen stable isotope investigation of lake sediments.

Mr. Stanislav Kutuzov
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I am a PhD student studying the reaction of glaciers on climatic changes in internal Tien Shan. I think my research could be useful to many scientists who are interested in glaciology, climatology and satellite methods. I couldn't afford travel to Beijing, so I am grateful to APN for giving me a chance to take part in the OSM. It was my first large international meeting. It was a really good experience for me. I met a lot of scientists from different countries (Ireland, Australia, China, Japan, Switzerland). These contacts could be very useful for our future international projects, especially because I am going to be working in Central Asia.

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I am a doctoral student and my research focuses on abrupt climate changes (e.g. extreme floods) and the relationship between humans and environment in the Three Gorges area of China. It was my first international meeting and I learned a lot. The chance to give a short talk gave me courage and self-confidence. I think the meeting will greatly benefit my future research career. I had good discussions with many colleagues, both from home and abroad. I learned a lot from famous scholars who I had previously only read about in books or articles, and I met some active young scientists, which is good for my present and future research.

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My research focuses on the analysis of geomorphic, stratigraphic, paleoenvironmental and chronologic data from fluvial records in western India. As the meeting was well attended by active workers from various places around the globe, it was useful for discussing the possibility of taking up integrated and collaborative studies with scientists sharing common research interests. Apart from the frontline research being

carried out by leading workers, the meeting also provided a good overview of studies in developing countries. I received encouraging comments and valuable suggestions on my poster. A separate booth made available for interaction with the well-established Asia Pacific Network was very useful for youngsters.

Prof. Paul Mayewski
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My work is in documenting natural and anthropogenic changes in the chemistry of the atmosphere, abrupt climate change events, multiple controls on climate, and the association between climate change and disruptions to civilization. At the OSM, I presented a paper on reconstructing the last 2000 years of climate through ICARA (Ice-core Climate Archive Recovery Activity). This global collection and interpretation project aims to recover mid-to-low latitude ice-core records, which are threatened by the warming over the last few decades. The combination of these records and those collected from polar latitudes is needed to further our understanding of global- to regional-scale climate change.

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I research palynology, vegetation and climate changes during the Holocene in the Arctic Siberia. The meeting helped me to meet colleagues from China and Japan, as well as from USA, Germany, Ireland and other countries. I have made useful contacts with scientists from the Siberian Branch of the Russian Academy of Sciences and with palynologists from India. As a palynologist and a paleoclimatologist, I was pleasantly surprised to learn that there are now a lot more pollen records in China and India. I made friends with Indian and Chinese colleagues and hope to meet them again at another conference.

Prof. Soninkhishig Nergui
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Mongolia
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I use diatoms as a past environmental indicator of variations caused by natural and human-effected changes in the natural zones in Mongolia, in order to make informed predictions of future climate, ecosystems and sustainability in the region. The PAGES 2nd OSM in Beijing was a great experience for me as a paleoscience representative from Mongolia, as well as for my personal academic career. It helped me to meet with colleagues from other countries, particularly in the Asia-Pacific region. As a consequence of the meeting, I have already made contact with scientists from China and America about future collaborative projects.

Dr. Bette Otto-Bliesner
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My current research concentrates on understanding climate variability and climate sensitivity during the Quaternary using coupled atmosphere-ocean models, particularly for the present interglacial (the Holocene), the Last Glacial Maximum (21,000 years before present) and the Last Interglacial (120,000-130,000 years before present). At the OSM, I gave a talk on climate sensitivity derived from model-data intercomparisons of Paleoclimate Modeling Intercomparison Project 2 (PMIP-2). I am a lead author for the paleoclimate chapter of the IPCC Fourth Assessment Report. After the OSM, I was elected to join PAGES Scientific Steering Committee. I am also Past Chair of the AGU Paleoceanography and Paleoclimatology Focus Group.

Ms. Nata Panova
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Russia
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I am the only pollen analyst in the Ural region working on the problem of environmental reconstructions based on data from archeological sites. Going to the meeting was of great use for me. Many reports were very interesting and it was of extreme interest (and importance!) for me to compare information from the presented reports with my own results. As regards my personal contacts with foreign scientists, I was very glad to get acquainted with Dr. Rudolf Brázdil from the Czech Republic, and so glad to meet my old friends Dr. Sandy Harrison and Dr. Colin Prentice from the UK, with whom I worked together on the “BIOME-6000” project.

Prof. Charles L. Redman
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My interests include human impacts on the environment, sustainable landscapes, rapid urbanizing regions, urban ecology, environmental education and public outreach. The interactions of society and the environment can best be understood from a perspective that takes the long-term dynamics into account and that addresses questions from an integrated, often interdisciplinary, perspective on human societies and biophysical environments. At the OSM, I presented several case studies of ancient societies where social collapse was due to a failure in the decision-making process as it related to coping with environmental challenges. My aim was to suggest general patterns and recommend agendas for research and for action.

Mr. Naoko Sasaki
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I am 30-year-old Japanese PhD student. My research aims to evaluate human impacts on vegetation during the Holocene in Kyoto and its adjacent areas. PAGES 2nd OSM was a fruitful meeting for me. It was a good chance to present my study outcomes to the paleoscience community of Asia. I have attended other international congresses, but there were few senior Asian participants. However, this time I met many young scientists from Asia (especially from China) and had good discussions about methodology, research topics and so on.

Ms. Anju Saxena
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I am working on the influence of anthropogenic activities on paleoclimate and paleovegetation dynamics in the Ganga Plain, India. I am very pleased, as I received the best poster presentation prize. As a student, it was an excellent experience for me to attend such an international conference. It gave me the opportunity to interact with eminent scientists from different parts of the world and to present my work to them. This kind of interaction, not only with scientists from abroad but also with scientists from India, has opened new avenues for me and made me aware of different fellowship programs.

Dr. Gavin Schmidt
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I am a modeler of past, present and future climate. I work on developing and improving coupled climate models, and am particularly interested in how their results can be compared to paleoclimate proxy data. I also work on assessing the climate response to multiple forcings, such as solar irradiance, atmospheric chemistry, aerosols, and greenhouse gases. The topic of my plenary lecture at the OSM was the thermohaline circulation (vertical movements of ocean water masses caused by density differences due to variations in temperature and salinity) in past, present and future climate.

Mr. Santosh Shah
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I am a PhD student pursuing research in dendroclimatology using Indian trees. The meeting provided me the unique opportunity to attend lectures given by eminent scientists working on climatic reconstructions and climatic modeling using various proxy records from diversified geographic locations, and to communicate with these scientists and young researchers during the poster presentations. It also allowed me to interact with scientists and students of the host country. I made very good contacts with some of the scientists and young researchers working in my field and there is scope for collaborative research.

Prof. James Shulmeister
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I am the PAGES national representative for New Zealand. My talk highlighted some of the contributions of the Paleoclimates of the Northern and Southern Hemisphere (PANASH) project to understanding and ultimately managing climate change. The project is very large, incorporating hundreds of scientists from around the world. The PAGES OSM was extremely helpful to me. It was a brilliant opportunity to network with scientists from Asia and the Pacific Islands and has lead to ongoing discussions that I expect will develop into new research collaborations in due course.

Ms. Vartika Singh
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India
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I am a PhD student engaged in paleomonsoonal studies of Western India, particularly in Gujarat. The PAGES OSM was really a very fruitful experience for me as a student. I benefited a lot from interaction with the international scientific community. By attending the meeting, I discovered that we are also generating good data related to Quaternary paleoclimate but that there is much that remains to be done, and we have started to focus our work on these areas. If encouragement (in the way of financial support to attend meetings) is provided to students and young workers, then Science will grow in a real sense.

Prof. Dmitry Sonechkin
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My areas of scientific interest are atmospheric and climate dynamics, paleoclimatology, current climate change and the application of mathematical dynamical systems theory to meteorology and climatology. My poster addressed the problems and achievements of millennial climate reconstruction. I participated in a panel discussion at the OSM, along with Michael Mann and Gavin Schmidt, on what we know about temperature history and trends of the last 2000 years.

Dr. Indrani Suryaprakash
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I am a palynologist but took a long family break from the field of nearly two years. Personally, I feel attending the OSM was an excellent opening for me to make a real comeback to the field, and it provided an opportunity to meet with colleagues from other countries. I developed contacts both within and outside India and discussed future collaborations on different paleoresearch projects, short-term fellowships and exchange programs with institutions like CNRS, France, University of Bonn, Germany, Universities of Bristol and Liverpool, UK, Monash University, Australia, as well as with Indian Institutions. I went home with a lot of enthusiasm and ideas.

Ms. Nadja Tchebakova
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Over my 35-year scientific career, I have been modeling climate change impacts on Siberian vegetation in the past and future, as well as carrying out vegetation-based reconstructions of past climates. The meeting impressed me extremely with the number of participants and world geography represented. Being a climatologist dealing with climate change, I was very much interested to find out about paleoclimatology in Asia. It was a great chance for me to meet and talk to many scientists from Asia (China, Mongolia, Pakistan, Nepal, etc).

Ms. Svetlana Vidyakina
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Russia
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My research analyzes peculiarities of changes in regional temperatures in northern Europe for the last one thousand years, based on indirect (geothermal, dendrochronological and historical) data. Positive aspects of the OSM: The meeting helped me to meet colleagues from other countries and to discuss results and accuracy of methods, and analysis. It resulted in useful recommendations for my work and for the future. Negative aspects for me: None.

Dr. Shangbin Xiao
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China
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My poster was on coherence between solar variability and the East Asian Monsoon during the past 7600 years. This research highlights how to find proxies of paleoenvironment and paleoclimate in shallow sea shelves. It also shows that we can find a high-resolution record of the East Asian Winter Monsoon in the Holocene on decadal or shorter scales. The method we used can also be applied to other areas in which climate is influenced and controlled by monsoon, for example, the Arabian Sea. I learned much at the PAGES 2nd OSM, especially, I discussed scientific questions with Japanese and African scientists.

Mr. Chaogui Zheng
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China
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I am a PhD student at Nanjing University, China. I am 40 years old. My specialty is in Quaternary geology. My research focuses on the relationship between environment evolution and human activities in the lower reaches of Yangtze River since the late Pleistocene. My abstract provides a significant regional record from East China and contributes to PAGES focus on research into abrupt climate changes, climate transformation and human response.

4.0 Conclusions

The PAGES OSM provided a unique opportunity for the international paleoscience community to address current issues of climate change and to influence the scientific direction of the coming years. The meeting was very successful in bringing together paleoscientists from a variety of disciplines and backgrounds. The broad topics covered in non-parallel sessions meant that the audience was mixed in terms of expertise, facilitating dialog between traditional paleoresearchers, environmental historians and modelers. There was also a good mix of renowned senior scientists and young researchers new to PAGES. Furthermore, there was a range of nationalities from both developed and developing countries. Participants were also able to attend the IAMAS meeting on overlapping days, and thereby interact with a community of scientists focused on meteorology and atmospheric science.

Despite the size of the meeting, there were many opportunities for interaction, including poster sessions, lecture question time and plenary discussions. A common remark from Chinese participants was that they enjoyed the non-hierarchical character of these interactions, noting with surprise that even some eminent scientists received criticism about their work. Networking was also possible during the organized social events, and at lunch and meeting breaks. Particularly successful in this regard were the coffee breaks, which were held alongside poster sessions in the same hall. It was also an advantage that lunches were provided on site each day. The organizers felt that this arrangement of breaks was optimal and is to be recommended for future meetings.

The OSM enabled young scientists to strengthen existing relationships and establish new links with colleagues in similar areas of paleoresearch. It also afforded them the chance to exchange ideas and information with scientists from a wide range of developed and developing nations. Many young participants commented on the excellent contacts they had made with prominent scientists. Through interactions at the OSM, the young participants were also introduced to a wide range of paleo-related information such as workshops and training opportunities, online paleo-databases, student opportunities and potential mentors, possible hosts for visiting researchers, etc. For several of the students, this was their first time at an international meeting. They were able to gain experience and confidence in basic presentation skills during the poster sessions.

By locating the 2nd OSM in Beijing, PAGES increased the visibility of paleoenvironmental research in Asia considerably. Several collaborative research projects in the Asian region have been proposed since the meeting, arising directly from contacts made at the OSM. From the perspective of APN participation, the meeting provided those scientists who attended excellent opportunities to forge new alliances with colleagues in similar areas of research, both within and outside the APN region. APN-participants found the APN area very useful for networking and exchanging information. It was not possible to organize a special APN event outside the meeting times because the OSM program had already been finalized by the time funding was approved. Such an event would have boosted the area's effectiveness.

In terms of meeting outcomes for PAGES on an organizational level, the U.S. National Science Foundation, a major funder of PAGES, sent a representative to attend the meeting. He participated as a panel member in the plenary discussion on PAGES future direction. The Indian Department of Science and Technology (DST), who provided funding for the meeting, also sent a representative. This first contact with DST was very fruitful and they have expressed interest in further involvement with PAGES. On a

scientific level, two of the scientists present at the meeting submitted successful proposals to visit the PAGES IPO as part of the PAGES Guest Scientist Program.

In general, the timing of the OSM was not optimal. Although PAGES was satisfied with the attendance, it is likely that the numbers would have been higher had the meeting not been held in August, a hot and humid month in Beijing, and a summer holiday month in the northern hemisphere. However, the choice of date was somewhat restricted, since the meeting had been postponed from the previous year due to SARS.

Overall, PAGES was very satisfied with the OSM, its products and outcomes. The OSM presented an extremely high standard of science in the plenary sessions, as well as a large number of noteworthy posters on a range of topics. Feedback received was very positive and the organizers felt that the OSM achieved its objectives. A third OSM, to be held in the USA, is planned for 2009.

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Appendix 1: Program

	Tuesday, 9 August 2005
19:00	WELCOME RECEPTION — Beijing Continental Grand Hotel, Banquet Hall, 2nd floor Courtesy of Chinese Academy of Sciences, Institute of Geology and Geophysics
	Wednesday, 10 August 2005
8:30	Welcome Lecture — *Jiayang Li, Dongsheng Liu, Zhongli Ding, Thorsten Kiefer*
	Session 1. Future Change: Historical Understanding - Chair: Julie Brigham-Grette
9:00	*Michael Mann*, USA — Insights from Comparing Empirically-estimated and Modeled Climate Change in Past Centuries
9:30	*James Shulmeister*, New Zealand — Interhemispheric Linkages in Climate Change: Paleo-perspectives on Modern Problems
10:00	*Ricardo Villalba*, Argentina — Long-term Variability in Tropical and High-latitude Circulation Modes of Climate in the Americas
10:30	COFFEE/TEA BREAK
11:00	*Valérie Masson-Delmotte*, France — Dynamics of Global Climate and Water Cycle Changes: Interest of Quantitative Paleoclimatic Reconstructions
11:30	*Bette Otto-Bliesner*, USA — Climate Sensitivity Derived from PMIP-2 Model-Data Intercomparisons for the Last Glacial Maximum and Mid-Holocene
12:00	*Michael Schulz*, Germany — Past Climate Variability at Centennial-to-millennial Timescales: Does it Matter for Predicting Future Climate Change?
12:30	LUNCH
14:00	Panel Discussion — *Michael Mann, Gavin Schmidt, Dmitry Sonechkin* (Moderator: *Heinz Wanner*)
	Session 2. Humans and their Environment: Past Perspectives on Sustainability - Chair: Daniel Olago
15:00	*Mohammed Umer*, Ethiopia — Climate Change, Human Evolution and Later Adaptation in the Horn of Africa and the Surrounding Regions: Potential for Long Climate Record In Ethiopia
15:30	*John Dearing*, UK — Human-Environment Interactions: Past, Present and Future
16:00	*Rick Battarbee*, UK — Paleolimnology, Pollution and Climate Change
16:30	Posters I (with drinks and snacks): Session 1 and Session 2
	Thursday, 11 August 2005
9:00	*Charles Redman*, USA — Human Impacts on Ancient Environments
9:30	*Rudolf Brázdil*, Czech Republic — Human Impacts on Climate Anomalies and Weather Disasters during the Past Millennium in Central Europe: Learning from the Past
10:00	*Frank Hole*, USA — Sustainability in the Period of Agriculture: The Near Eastern Case
10:30	COFFEE/TEA BREAK
	Session 3. Ocean-Continent-Cryosphere Interactions: Past and Present - Chair: Pinxian Wang
11:00	*Hubertus Fischer*, Germany — Global Biogeochemical Cycles and Greenhouse Gas Emissions in the Ice Core Paleoperspective
11:30	*Paul Mayewski*, USA — Reconstructing the Last 2,000 Years of Climate through ICARA (Ice-core Climate Archive Recovery Activity)
12:00	*Sandy Harrison*, UK — Towards Modeling the Ice-core Record of Atmospheric Trace-gas and Aerosol Variations between Glacial and Interglacial Times
12:30	LUNCH
14:00	*Olga Solomina*, Russia — Climatic Events and Tendencies in the North-West Pacific Recorded by Trees and Glaciers during the Last 400 years
14:30	*Stephen Burns*, USA — The Tropics and Rapid Climate Change - Records of Changes in Rainfall and Atmospheric Circulation from Speleothems
15:00	*Ralph Schneider*, Germany — From Milankovitch to Rapid Climate Change, IMAGES Research
15:30	*Gavin Schmidt*, USA — The Thermohaline Circulation in Past, Present and Future Climate
16:00	Posters II (with drinks and snacks): Session 3 and Session 4 (Western Pacific Margin sub-theme)
19:00	CONFERENCE BANQUET (Huizhen Restaurant)
	Friday, 12 August 2005
	Session 4. Climate, Humans and the Environment in the Asian Region - Chair: Peter Kershaw
9:00	*Patrick De Deckker*, Australia — The Role of the Indo-Pacific Warm Pool on Global Climate Change during the Quaternary
9:30	*Zhimin Jian*, China — Millennial-centennial-scale Climate Variability of the Low Latitude Western Pacific during the Late Quaternary
10:00	*Zhisheng An*, China — The Evolutional Process of Asian Dust and its Role for the Earth System in the Past
10:30	COFFEE/TEA BREAK
11:00	*Gifford Miller*, USA — Detecting Human Impacts on the Flora, Fauna, and Summer Monsoon of Pleistocene Australia
11:30	*Ashok Singhvi*, India — Monsoon and Man in the Indian Sub-Continent
12:00	Meritorious abstract talks — *Vartika Singh* (India), *Chunmei Ma* (China), *Jaesoo Lim* (Japan)
12:30	LUNCH
14:00	Plenary Discussion: PAGES Future Direction — *Zhengtang Guo, Julie Brigham-Grette*
16:00	Posters III and award of poster prizes (with drinks and snacks): Session 4 (except Western Pacific Margin sub-theme)

Appendix 2: Participant List

List of participants by country (plenary speakers in bold, APN-funded participants in italics).

Country	Last Name	First Name	Country	Last Name	First Name
Argentina	**Villalba**	**Ricardo**	China	He	Yaoqi
Australia	Barr	Cameron S		He	Yong
	Black	Manu		Hong	Xiao
	De Deckker	***Patrick***		Hong	Yetang
	Gergis	*Joelle*		Huang	Chunchang
	Hesse	Paul		Huang	Wei
	Kershaw	Peter		Huang	Xiangtong
	Tibby	John		Ji	Junfeng
	Wust	Raphael A		Jia	Guodong
Bangladesh	Mohiuddin	Mia		**Jian**	**Zhimin**
Belarus	Makhnach	Nickolay		Jiang	Dabang
Belgium	De Batist	Marc		Jiang	Hanchao
Brazil	Clauzet	Gabriel		Jiang	Wenying
	Cohen	Marcelo		Jiang	Xiuyang
Bulgaria	Tonkov	Spasimir		Jie	Dongmei
Cambodia	Sieng	Sotham		Jin	Chunsheng
Canada	Douglas	Marianne		Jin	Haiyan
	Keatley	Bronwyn E		Jin	Zhangdong
	Pederson	Thomas		Juan	Zhao
	Selbie	Daniel T		Kong	Xinggong
	Smol	John		Li	Fengjiang
	Yi	Yi		Li	Jianru
China	An	Chengbang		Li	Jianxing
	An	**Zhisheng**		Li	Li
	Cai	Yanjun		Li	Mingxia
	Cao	Junji		Li	Quan
	Chen	Chao		Li	Shijie
	Chen	Shitao		Li	Tao
	Chen	Xiaoyun		Li	Tingyong
	Chu	Guoqiang		Li	Yuan
	Chu	Ziying		Li	Zhipei
	Dai	Xuerong		Lin	Qiuyan
	Deng	Tao		Liu	Chuanlian
	Deng	Yun		Liu	Hongyan
	Dong	Jinguo		Liu	Jiaqi
	Fu	Jianli		Liu	Jifeng
	Fu	Shuqing		Liu	Jinfeng
	Gao	Quanzhou		Liu	Lianwen
	Gao	Shu		Liu	Rui
	Gou	Xiaohua		Liu	Xiaodong
	Guo	Yunyun		Liu	Yu
	Guo	Zhengtang		Liu	Zaihua
	Hao	Qingzhen		Liu	Zhifei
	He	Duoxing		Liu	Zongxiu
	He	Juan		Lu	Huayu

Country	Last Name	First Name
China	Lv	Houyuan
	Ma	*Chunmei*
	Pang	Jiangli
	Pei	Yunpeng
	Peng	Shuzhen
	Qiao	Xijun
	Qin	Xiaoguang
	Qiu	Qinglun
	Qiu	Yuchao
	Rao	Zhiguo
	Rioual	Patrick
	Rui	Bo
	Shao	Xiaohua
	Shen	Licheng
	Sun	Qing
	Sun	Xiangjun
	Tan	Jiaming
	Tan	Jungan
	Tan	Ming
	Tang	Lingyu
	Tang	Zihua
	Tian	Jun
	Tuo	Shouting
	Wang	Luo
	Wang	Ninglian
	Wang	Pinxian
	Wang	Rujian
	Wang	Shoubing
	Wang	Shubing
	Wang	Shuyun
	Wang	Xianyan
	Wang	Xiaomei
	Wang	Xiaoming
	Wang	Xiaoyong
	Wang	Xu
	Wang	Yongjin
	Wei	Fang
	Wei	Gangjian
	Wu	Bin
	Wu	Haibin
	Wu	Jiangying
	Wu	Naiqin
	Xia	Lijun
	Xia	Lili
	Xia	Zhifeng
	Xiang	Rong
	Xiao	*Shangbin*
	Xie	Aihong
	Xie	Jing
China	Xie	Jubing
	Xu	Deke
	Xu	Hai
	Xu	Jianzhong
	Xu	Youning
	Xue	Jibin
	Yang	Lirong
	Yang	Shouye
	Yang	Xiangdong
	Yang	Xiaoping
	Yang	Xunlin
	Yao	Tandong
	Ye	Hong
	Yin	Qiuzhen
	Yin	Xuebin
	Yin	Zhiqiang
	Yu	Jimin
	Yu	Lei
	Yuan	Daoxian
	Yue	Leping
	Zhang	Dongju
	Zhang	Feng
	Zhang	Jian
	Zhang	Jianping
	Zhang	Ke
	Zhang	Meiliang
	Zhang	Shuhong
	Zhang	Song
	Zhang	Weiguo
	Zhang	Zhenke
	Zhang	Zhongshi
	Zhao	Jingbo
	Zhao	Liang
	Zhao	Sanping
	Zheng	*Chaogui*
	Zheng	Guozhang
	Zheng	Hongbo
	Zheng	Jingyun
	Zheng	Zhou
	Zhong	Wei
	Zhou	Liping
	Zhou	Yali
	Zhu	Jiangling
	Zhu	Min
	Zhu	Renbin
	Zhu	Xiaoyan
	Zhu	Yanming
China (Taiwan)	*Chang*	*Yuan-Pin*
	Chen	Min-Te

Country	Last Name	First Name
China (Taiwan)	Yu	Pai-Sen
Colombia	Martinez	Ignacio
	Rincón Martínez	Daniel
Czech Republic	**Brázdil**	**Rudolf**
Denmark	Brown	Kendrick
Ethiopia	Legesse	Dagnachew
	Mohammed	**Umer**
Finland	Heikkila	Maija P
	Ojala	Antti E
	Seppä	Heikki
France	Brewer	Simon
	Chappellaz	Jerome
	Fontugne	Michel
	Grousset	Francis
	Masson-Delmotte	**Valérie**
	Melieres	Marie-Antoinette
	Rousseau	Denis-Didier
	Zhao	Yan
Germany	Chaulagain	Narayan
	Dikau	Richard
	Dittert	Nicolas
	Fischer	**Hubertus**
	Floegel	Sascha
	Helmke	Jan
	Herzschuh	Ulrike
	Litt	Thomas
	Mingram	Jens
	Muegler	Ines
	Ni	Jian
	Sachse	Dirk
	Schneider	**Ralph**
	Schulz	**Michael**
	Schwalb	Antje
	Sirocko	Frank
Ghana	Mischke	Steffen
Hungary	Pongracz	Rita
India	Ahmad	Syed
	Bhatt	Nilesh
	Bhattacharyya	Amalava
	Borgaonkar	Hemant
	Busnur	Manjunatha
	Hait	Arghya
	Krishnamurthy	Anupama
	Kumaran	Navnith
	Maurya	*Deepak*
	Meloth	Thamban
	Prithviraj	Mukundaraj
	Saxena	*Anju*
	Shah	*Santosh*
India	*Singh*	*Vartika*
	Singhvi	**Ashok**
	Suryaprakash	*Indrani*
Ireland	Oksanen	Pirita
	Stefanini	Bettina S
Italy	Borsato	Andrea
	Frisia	Silvia
Japan	Hirakawa	Kazuomi
	Hirose	Kotaro
	Inoue	Jun
	Inoue	Yudzuru
	Irino	Tomohisa
	Isozaki	Yuko
	Li	Zhen
	Lu	Xueqiang
	Nagashima	Kana
	Nakawo	Masayoshi
	Nomiyama	Takashi
	Saito	Yoshiki
	Sakai	Akiko
	Sasaki	*Naoko*
	Sun	Youbin
	Suzuki	Sachie
	Tada	Ryuji
	Yamamoto	Masanobu
Jordan	Al-Rousan	Saber
Kenya	D'Jivetti	Edward Mulaama
	Malo	Meshack O
	Olago	Daniel
	Olaka	Lydia
	Rucina	Stephen M
Korea	Kuo Yen	Wei
	Hyun	Sangmmin
	Jaesoo	Lim
	Khim	Boo-Keun
	Nam	Seung-Il
	Park Byong	Kwon
	Suk Bong	Chool
	Woo Kyung	Sik
	Yi	Sangheon
	Yoo	Kyu-Cheul
	Yoon	Ho Il
	Yoon	Seok Hoon
	Korhola	Atte
Mexico	Carriquiry Beltran	Jose
	Villaescusa	Julio
Mongolia	*Nergui*	*Soninkhishig*
Morocco	Benkaddour	Abdelfattah
Nepal	*Adhikari*	*Danda Peni*

Country	Last Name	First Name
Netherlands	Bokhorst	Mark P
	Prins	Maarten A
	Weber	Susanne
	Welschot	Tamara
New Zealand	Alloway	Brent
	Carter	John
	Shulmeister	***James***
Nigeria	Ediang	Okuku
Norway	Jansen	Eystein
Philippines	Siringan	Fernando
Portugal	Voelker	Antje
Russia	*Blyakharchuk*	*Tatiana*
	Bol'shakov	Vyacheslav
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	Knorre	*Anastasia*
	Kolka	*Vasili*
	Kutuzov	*Stanislav*
	Naidina	*Olga*
	Panova	*Nata*
	Pushkar	Vladimir
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	Flores Villarejo	Jose-Abel
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	Veres	Daniel
Switzerland	Brönnimann	Stefan
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	Hole	***Frank***
	Joseph	Mason
	Madsen	David B
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	Miller	**Gifford**
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	Otto-Bliesner	***Bette***
	Redman	***Charles***
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	Schmidt	***Gavin***
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Vietnam	Nguyen	Van Lap

Appendix 3: Funding Sources

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	$108,000

Funding for PAGES IPO
Swiss National Science Foundation
United States National Science Foundation
National Oceanic & Atmospheric Administration

Funding for PAGES SSC
International Geosphere-Biosphere Programme

Appendix 4: Glossary of Terms

AAAS	American Association for the Advancement of Science
DIVERSITAS	International Programme of Biodiversity Science
DST	Department of Science and Technology (India)
IAMAS	International Association of Meteorology and Atmospheric Sciences
IGBP	International Geosphere-Biosphere Programme
IHDP	International Human Dimensions Programme
IPCC	Intergovernmental Panel on Climate Change
IPO	International Project Office
LOC	Local Organizing Committee
OSM	Open Science Meeting
PAGES	Past Global Changes
SSC	Scientific Steering Committee
START	Global Change System for Analysis, Research and Training
TWAS	Academy of Sciences for the Developing World
WCRP	World Climate Research Programme