

Trends in the ARC 2002-2005

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2005 has been a year of surprises from the research funding point of view. A number of one-off schemes and new funding sources have been announced, many at very short notice, to the academic community. The Research Networks, Center of Excellence round, followed by New Initiative Schemes through the ARC produced frantic attempts to put together research teams that might fit the perceived vision of government for future research directions. Much of this activity went unrewarded, though the process itself may have galvanized potential future directions in the minds of those who took part in these bids. The current Commonwealth Environment Research Facility fund through the Department of Environment and Heritage represents a new approach to dividing up government research money and may well signal a future devolving of control of the research dollar from ARC to other government areas. Whatever the case, it is likely that the next year will bring further unexpected opportunities.

Below is an outline of the recent successful grants in the latest ARC Discovery and Linkage round. Congratulations to all those who were successful. These included four APD/QEII fellowships so this is excellent for early career researchers. The 22 successful grants included 19 Discovery plus 2 Linkage and 1 Linkage Infrastructure grant. As in previous years I've compared the results of this years round with previous 3 years and there are encouraging signs of continued ARC support for the Quaternary sciences (including archaeology).

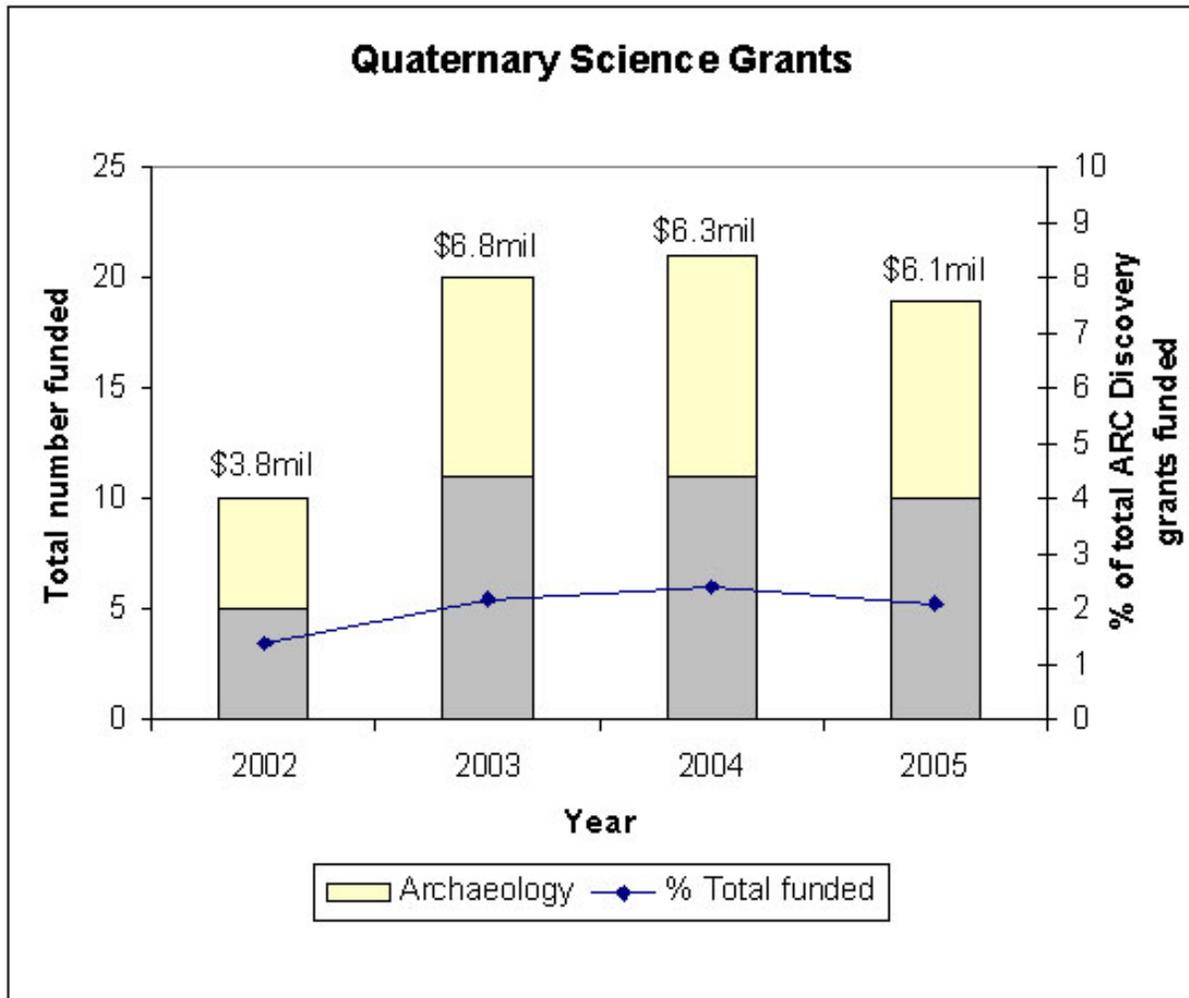
In general the trends are (i) total number of grants is similar to the last 2 years, (ii) funding level of around \$6Mill for Discovery grants in Quaternary Sciences has been maintained for this years grant round, (iii) components of archaeology continues to feature strongly in Quaternary Science applications, (iv) of the 9 successful

archaeology grants only 2 were for Australian based research (~similar to other years), (v) there is a slight drop in the number of institutions receiving funding (~13 in 2003-2004 and 10 in 2005).

This last point, while only a minor drop, may prove to be significant over the longer term, particularly with the forthcoming Research Quality assessment being introduced in 2007. One possible consequence may be the centralizing of expertise in particular disciplines in fewer universities, which may see a further reduction in the number of institutions able to attract ARC funding. Alternatively, a multi-disciplinary research area such as Quaternary Sciences may be able to avoid this through strengthening inter-institutional collaborations and taking advantage of existing links.

Finally, there has been a recent change in personnel in the ARC College of Experts (the body of experts who decide on ARC rankings). The new board will commence in 2006 and we will have different people in the final assessment of our grant applications than in the previous 3 years. It is not clear to me whether the strength of personality of advocates for any given field would necessarily play a role in determining how many grants got over the finish line...Whether or not this will have an impact on how the Quaternary sciences fare in the next round, only time will tell...and we'll be watching....

Figure 1. Quaternary-related ARC Discovery Grants 2002-2005. The bar graphs show total number of Quaternary-related grants funded, the line shows % this represents of total grants allocated in that year, and a figure for the total funding in million dollars allocated to Quaternary-related projects appears above each year. Data from the ARC annual reports 2002-2005 (http://www.arc.gov.au/funded_grants/selection.htm).



Successful ARC grants for 2005

DISCOVERY GRANTS

ARCHAEOLOGY AND PREHISTORY / ANTHROPOLOGY

CI's: Prof AJ Anderson; Dr K Szabo; Dr E CONTE
The origins of human colonization in East Polynesia and their relevance to maritime migration
The Australian National University 2006: \$65,000; 2007: \$65,000; 2008: \$65,000

Project Summary

The IndoPacific is a world of islands, including Australia, which was colonized during prehistory in several phases of migration, the last and longest of which was in East Polynesia. Extensive excavation of a large, waterlogged archaeological site of this era in French Polynesia will provide a better understanding of the period, society and external relationships of the early migrants, and of the processes of prehistoric maritime migration which link Australian peoples to those of our neighbours across the Pacific and Indian Oceans.

CI's: Dr FD Bulbeck; Dr MF Oxenham

The Flores hobbit *Homo floresiensis* or microcephalic eastern Indonesian?

The Australian National University 2006: \$40,000

Project Summary

The hobbit is so controversial as it implies that a tiny hominin with a miniature brain coexisted for 30,000 years with modern humans in our region. This would have immense, fundamental implications for understanding the human colonisation of our region and the role of brain size in human evolution. Our research will determine whether the alternative explanation of microcephalic pathology is viable. If so the hobbit would still be of unique significance as the only known microcephalic huntergatherer who had survived to adulthood. The role of Australian scientists in spearheading the hobbit discovery places a high priority on resolving the debate objectively.

CI's: Dr RF Cosgrove; Dr C Shen; Dr H Lu; Dr S Wang (APD)

Chinese Middle to Late Pleistocene hominid behaviour: exploring cultural variability through time and space

La Trobe University 2006: \$156,000; 2007: \$82,000; 2008: \$125,000

Project Summary

This research will contribute to the understanding of the spread of our species out of Africa 2 million years ago into East Asia. It examines the range of hominid behaviours and ecological circumstances that led to the successful colonisation of China by *Homo erectus*. It also addresses the vexed question of the relationship between *H. erectus* and *H. sapiens*. Did the latter evolve in situ from their antecedents as some suggest, or did *H. sapiens* replace *H. erectus*, in the great diaspora from Africa 120,000 years ago?

APD: Dr K da Costa

Drawing the line: the archaeology of Roman provincial borders in Late Antique Palaestina and Arabia (AD250-650)

The University of Sydney 2006: \$109,000; 2007: \$74,000; 2008: \$84,000; 2009: \$66,000

Project Summary

This project, using archaeological evidence from Jordan, will for the first time accurately establish the boundaries of provinces in the Roman Empire. By linking Australia and the Middle East in international scholarly research dealing with our common cultural heritage, it will increase our mutual understanding. The examination of very longterm trends in an ancient system which dealt with a complex, multicultural population will provide much needed comparative illustrations for the current national debate on the nature and security of Australian borders. It will also provide evidence of longterm economic change and its political consequences.

APD: Dr TP Denham

Unearthing the roots of agriculture: multidisciplinary investigations of Pleistocene and Holocene plant exploitation in Eastern Highlands Province, Papua New Guinea

Monash University 2006: \$140,000; 2007: \$145,000; 2008: \$145,000

Project Summary

The Project will foster greater communication, public understanding and research links between Australia and Papua New Guinea. The Project will also provide archaeological training for students at Australian universities and students and practitioners in Papua New Guinea. The research seeks to understand the development of societies and subsistence practices, particularly plant exploitation and agriculture, in New Guinea from the Pleistocene to the present. The research will chart longterm human-environment relations in New Guinea, which are central to understanding the sustainability of food production and the maintenance of biodiversity in the Australasian region.

CI: Dr AS Fairbairn

Plant use at the dawn of agriculture in central Anatolia

The Australian National University 2006: \$20,000; 2007: \$20,000

Project Summary

The project will increase collaboration with researchers in the UK, and Turkish archaeological authorities. It will refine our understanding of the process, rate and direction of agricultural origins in Western Asia and improve Australia's profile in origins of agriculture research. It will increase Australia's knowledge base about other regions and help to consolidate and promote archaeobotany/archaeological science in Australia's research community.

CI's: A/Prof PC Memmott; Dr SG Ulm; A/Prof IA Lilley; A/Prof ND Evans; Dr EC Stock; A/Prof NG

White; Dr SM van Holst Pellekaan; Prof DS Trigger;
Dr RP Robins

Isolation, Insularity and Change in Island Populations
an Interdisciplinary Study of Aboriginal Cultural
Patterns in the Gulf of Carpentaria

The University of Queensland 2006: \$90,000; 2007:
\$90,000; 2008: \$90,000; 2009: \$55,000; 2010:
\$40,000

Project Summary

The project's national benefits centre on its contribution to safeguarding Australia and to an environmentally sustainable Australia. The participation of northern Indigenous people is critical to border protection policies and procedures. This project will help revitalise the Carpentaria Land Council's Aboriginal Rangers scheme, which has a potential role in safeguarding the nation's northern approaches, including combating feral plant and animal importation, Coastwatch surveillance and marine habitat protection. The geological research on sea level and climatic history in the Gulf of Carpentaria and associated coastal geomorphological impacts will contribute to predictive models on global warming and its consequences (sealevel rise).

APD: Mr M Moore

How Do Stone Tools Reflect Cognition Among the
First Australians and their Precursors?

The University of New England 2006: \$85,000;
2007: \$78,000; 2008: \$78,000

Project Summary

The popularity of the Indonesian 'hobbit' (*Homo floresiensis*) discovery provides an ideal platform for interpreting Australasian prehistory to a wider community. This project explores the arrival of modern humans in Indonesia, their interaction with 'hobbits', and the colonisation of Australia by comparing the different ways these hominins made stone tools. Although research indicates a significant level of behavioural unity in our genus, 'hobbits' were not like us. 'Us' refers, of course, to modern humans, and hence this research is of global relevance. By applying a 'design space' model to toolmaking in the past, this project will demonstrate that the earliest trends in technology apply equally to human groups throughout the world.

CI's: Prof FB Sear; Mr AE Hutson; Dr HM Goldsworthy

Technological Advances in Largescale Roman
Concrete Buildings during the 2nd and 1st centuries
BC

The University of Melbourne 2006: \$70,000; 2007:
\$30,000; 2008: \$40,000

Project Summary

How were the Romans able to build monuments which are still standing after 2,000 years? Skills to achieve this were clearly not developed overnight. A multidisciplinary team from the University of Melbourne has identified the 1st century BC as a time of tremendous technological change in Roman architecture. Was it that the Romans used a technologically advanced type of concrete? Was it

that they had perfected the structural design of vaults and domes? Was it simply their organisational ability or the enormous wealth which flowed from their vast Empire? A team of experienced archaeologists, architects and engineers seeks to answer these questions by survey and material analysis of a number of key Roman monuments.

ATMOSPHERIC SCIENCES

CI's: Dr MK Gagan; Dr WS Hantoro; Dr DH Natawidjaja; Dr JM Lough; Dr G Meyers; Prof Z Liu; Prof K Sieh

The Indian Ocean Dipole, Australasian drought, and the great earthquake cycle: Longterm perspectives for improved prediction

The Australian National University 2006: \$260,000; 2007: \$190,000; 2008: \$180,000; 2009: \$183,000; 2010: \$203,000

Project Summary

The protracted drought across Australia and Boxing Day 2004 earthquake in Sumatra defied prediction, and are causing incalculable environmental, economic, and social harm. Knowledge of past climate extremes will enhance our ability to predict climate change, and alleviate adverse affects for Australasian nations who missout in the future redistribution of lifegiving moisture. Insights into the great earthquake cycle will help fulfil Australia's responsibility to predict tsunamis, for the benefit of nations fringing Australasian seismotectonic zones. Development of improved techniques in palaeoclimatology, palaeoclimate modelling, and palaeoseismology will provide new collaborations and opportunities for research, training, and education.

CI's: Dr MK Gagan; Dr J Zhao; Dr RN Drysdale; Dr WS Hantoro; Dr GA Schmidt

Monsoon extremes, environmental shifts, and catastrophic volcanic eruptions: quantifying impacts on the early human history of southern Australasia

The Australian National University 2006: \$245,000; 2007: \$100,000; 2008: \$100,000

Project Summary

The coincidence of a long, diverse Australasian human history with Earth's greatest climate systems presents the Australian and Indonesian communities with unrivalled opportunities for scientific discovery. Our study will improve understanding of global climate change, environmental shifts, volcanic catastrophes, and their role in early human dispersal, and extinction, in Australasia. The significance of the results will extend to the modern world, where human behaviour modifies, and is modified by, climate and environment. Integration of research strengths in Australia and Indonesia will contribute to an improved bilateral relationship in science, education, and training, and engage the public in the excitement of scientific discovery.

CI's: Dr CS Turney; Dr SG Haberle

Testing the hypothesis of synchronous interhemispheric climatic change during the Last Termination (20,000-10,000 years ago)

University of Wollongong 2006: \$169,000; 2007: \$110,000; 2008: \$100,000

Project Summary

The results generated in this project will provide a greater understanding of the sensitivity of the Australasian region to a range of different climatic conditions (far beyond that recorded in historical datasets). Focussing on climate at the end of the last ice age (20,000-10,000 years ago) we will investigate the timing, rate and magnitude of change in the Australasian region and test whether the variability was in phase with other records from the mid and high latitudes of the Southern and Northern Hemisphere. The results will provide a considerably improved context for understanding present and future climate change in Australia.

CI: A/Prof CD Woodroffe

Variability in El Niño frequency and intensity over the past 4000 years

University of Wollongong 2006: \$45,000; 2007: \$35,000; 2008: \$35,000

Project Summary

Fossil corals contain a rich archive of past climate variability for tropical oceans which can extend the limited instrumental data and increase our understanding of climate sensitivity. El Niño variations in the Pacific have far-reaching impacts on Australian climate, and this project will reconstruct variations in the past in order to better forecast climate sensitivity in the future. It focuses on Christmas Island which is the optimal site to capture El Niño variability at several different time scales, and will lead to a better understanding of atmospheric and oceanic factors that have caused climate variability.

ECOLOGY AND EVOLUTION

CI's: Prof A Cooper; Prof TF Flannery

Using ancient DNA to investigate the environmental impacts of climate change and humans through time

The University of Adelaide 2006: \$160,000; 2007: \$155,000; 2008: \$155,000

Project Summary

This project will provide important information about how climate change and human impact have effected our environment over the past 50,000 years, removing many of the large mammals and altering the landscape. It is critical that the background to our current environment is properly understood if we are to predict the effects of ongoing changes such as global warming. The research will concentrate on the effects of climate change on large mammals in North and South America, New Zealand, Australia and Africa over this time period, and will examine the additional impact of humans in each location.

GEOCHEMISTRY

CI's: Prof Dr R Grun; Prof MJ Spriggs; Dr IS Williams

Microanalysis of human fossils: new insights into age, diet and migration

The Australian National University 2006: \$105,000; 2007: \$90,000; 2008: \$90,000

Project Summary

Human occupation of Australia and the Pacific dates back tens of thousands of years. New microanalytical techniques now make it possible to learn about the life histories of these ancient peoples: their diet, migration paths and the climate in which they lived. This project will benefit the Indigenous populations and researchers of neighbouring countries through collaboration and increased knowledge of their ancestors, thus enhancing Australia's links and status as a good neighbour in the region. This falls squarely into the Research Priority 'Safeguarding Australia Understanding our Region and the World'. In the future, our analytical approach will give important insights into the complex and rich archaeological heritage of Australia.

CI's: Prof RG Roberts; Prof Dr R Grun; Dr Z Jacobs; Dr GA Duller

Out of Africa and into Australia: robust chronologies for turning points in modern human evolution and dispersal

University of Wollongong 2006: \$86,000; 2007: \$30,000; 2008: \$60,000; 2009: \$70,000; 2010: \$70,000

Project Summary

This project will yield important new data on the timing of major turning points in human evolution and the human colonisation of Australia. This will improve our knowledge of Aboriginal cultural heritage and provide a long-term perspective on human/environment interactions to help forecast future impacts of human disruption of the Australian ecosystem (Environmentally Sustainable Australia NRP). Modern dating techniques underpin many archaeological and environmental projects, so the advances made in this study will benefit researchers worldwide, increase capacity for commercial services, and enhance Australia's international standing in geochronology. We will also generate high-quality research students and new collaborative initiatives.

GEOLOGY

CI's: Prof GC Nanson; A/Prof BG Jones

Palaeoclimatic and environmental significance of major Late Quaternary drainage contributions and disruptions in the Lake Eyre basin.

University of Wollongong 2006: \$110,000; 2007: \$80,000; 2008: \$80,000

Project Summary

This study will advance our knowledge of the most remarkable floods ever known to have occurred in

Australia. They were associated with a vast aquatic ecosystem in what today is the barren northern end of the Flinders Ranges, a region of desert dunes and salt lakes. Remarkably, such wet conditions appear to have coincided with episodes of megafaunal extinction and with the human occupation of Australia. The results will provide valuable information with which to better understand the the main global drivers of episodes of profound wetness and dryness in Australian climate.

CI's: Dr JD Woodhead; Prof PW Williams; Dr F McDermott

Of caves, bones, and climate change: new insights from old speleothems

The University of Melbourne 2006: \$80,000; 2007: \$80,000; 2008: \$80,000

Project Summary

Australia has an enviable reputation as a leading innovator in geochronological studies and this research will reinforce that standing. The outcomes will have an immediate and significant impact on studies of global climate change, and provide new insights into the evolution of Australia's unique fossil mammal fauna. In these ways, and as described in more detail elsewhere in the application, this project addresses directly our current national research priorities 'responding to climate change and variability' and 'the sustainable use of Australia's biodiversity'.

QEII: Dr SW Wroe

Australia's mammalian carnivore diversity in space and time

The University of New South Wales 2006: \$200,000; 2007: \$150,000; 2008: \$150,000; 2009:\$125,000; 2010: \$125,000

Project Summary

To more effectively address the current extinction crisis we need to understand past diversity. This research program will comprehensively investigate the diversity of mammalian carnivores on three continents over geological time. Results will provide insight into whether the evolution of Australia's mammal carnivores differs fundamentally from those of other continents, as has often been suggested but not quantitatively demonstrated. Studies focused in the present are important, but often miss critical factors that can only be clarified through analyses with deep time perspectives. The findings will translate into an improved understanding of what makes Australia unique and better informed decisions regarding wildlife management.

LINKAGE GRANTS

ECOLOGY AND EVOLUTION

CI's: Dr PA Gell; A/Prof DM McKirdy; Dr J Tibby
Retrospective ecological character assessment for a review of Ramsar status of The Coorong, SA.

The University of Adelaide 2006: \$100,000; 2007: \$49,220

Partner Organisation(s)

Department of Water, Land and Biodiversity Conservation (DWLBC) I & B Division Upper South East Prog

Department for Environment and Heritage SE Region
Project Summary

Integrated analyses of the chemical and biological remains contained in the sediments of the Coorong will provide for a reconstruction of ecological change and variability over the last several thousand years. Detailed analyses of the recent sediments will measure how the condition of the Coorong has departed from this natural background and so provide an audit of human impact on the last wetland in the Murray darling Basin. This evidence will directly inform the determination of the ecological character of this Ramsar listed, national ecological asset and steer its management for a sustainable future.

CI's: Dr J Tibby; Dr PA Gell; Mr PJ Leahy

New approaches for protecting stream health in temperate Australia: Devising nutrient and salinity guidelines using diatoms

The University of Adelaide 2006: \$24,650; 2007: \$24,650; 2008: \$24,650

Partner Organisation(s)

Environment Protection Authority (South Australia)

Environment Protection Authority (Victoria)

Project Summary

Salinity and nutrient enrichment are the most significant forms of water quality degradation in Australian lowland rivers. This project will identify the biological effect of the water quality pollution and develop new methods for its assessment. Most importantly, through the identification of water quality "thresholds" which result in reduced biodiversity, better guidelines for maintaining stream health will be developed.

LINKAGE INFRASTRUCTURE GRANTS

SOIL AND WATER SCIENCES

CI's: Dr RN Drysdale; Dr ID Goodwin; Dr SW Franks; Dr JD Woodhead; Dr J Zhao

A highthroughput stable isotope ratio mass spectrometer for water resource management and climate change studies

The University of Newcastle 2006: \$100,000

Partner Organisation(s)

The University of Newcastle

The University of Melbourne

The University of Queensland

Project Summary

Cave speleothems are highly sensitive to climate and are widely used to investigate past climate variability. Many researchers in Australia are now employing speleothems to find out more about the longterm behaviour of the Australian climate system,

especially regarding ENSO. However, progress is inhibited by a lack of appropriate instrumentation capable of meeting the unique demands of speleothem research. Our new mass spectrometer will provide precise, rapid and lowcost isotope analyses of speleothem samples, and in doing so generate exciting and important palaeoclimate data, particularly in the area of preinstrumental rainfall histories.

GENETICS

CI's: Prof A Cooper; A/Prof MP Schwarz; Prof SC Donnellan

Expansion and enhancement of the South Australian Regional Facility for Molecular Ecology and Evolution and the Australian Centre Ancient DNA

The University of Adelaide 2006: \$115,000

Partner Organisation(s)

The University of Adelaide

The Flinders University of South Australia

South Australian Museum

Project Summary

Provision of dedicated instruments for contemporary and ancient/fragmentary DNA analyses will provide numerous opportunities for innovative research solutions in basic biology, archaeological, agricultural, biomedical, forensic and environmental sciences. No similar combination of facilities currently exists in the Australian region severely curtailing and jeopardising the quality of current and proposed research programs. The facilities will underlie innovative approaches to research in National Research Priorities 1 and 4 An Environmentally Sustainable Australia and Safeguarding Australia.