

Report on the “Australian Geoscience Council National Summit on the Plight of University Geoscience Education and the Supply of Graduates” 27th September 2007.

Introduction

About 50 representatives of university geoscience departments, state and federal government agencies and industry gathered at Geoscience Australia in Canberra under the auspices of the Australian Geoscience Council (AGC) to debate the serious issues surrounding Tertiary geoscience education and to determine a way forward for their long term resolution. The format of the meeting involved a mixture of formal presentations and discussion sessions. The AGC's Tertiary Education Profile 2007 based on its recent survey of university departments was presented - the full results of the survey will be released shortly. Perspectives were also given from a university (Monash - both Head of Department and Dean of Science), the minerals industry (Minerals Council of Australia - MCA), petroleum industry (Australian Petroleum Production and Exploration Association – APPEA, and Woodside) and a government institution (Geoscience Australia). The summit then discussed:

- What should a National Tertiary Geoscience education System look like?
- What options are there to give effect to a national system?
- Who needs to do what? and Next steps.

Key Findings

Overall, geoscience continues to lose status and visibility through merger of departments and reduction in staffing levels although there is much variation from institution to institution. Some geoscience departments have stabilised or have slightly increased staffing levels. This situation is not unique to the geosciences and reflects the underlying unfavourable economics under current student funding formulae of maintaining teaching capacity in minority disciplines such as geoscience. Many of the 'geoscience departments' in the 16 universities identified as having the capacity to teach geosciences as a major, are uneconomic or marginally economic based on teaching the current numbers of students. They are dependent for their survival upon internal cross-subsidy and/or research funding whether it be from government or industry. The problem is structural with too few students per teaching academic and would still be an issue if funding per student was raised to the highest funding cluster. In 2007, 171 academic staff were engaged in some level of teaching in geoscience whilst 198 staff were engaged in research with no formal teaching commitment. The latter are very unevenly distributed with almost all research staff confined to 10 institutions. Nationally 17 teaching positions are funded externally. Under university policies adopted in response to the Government's Research Quality Framework there is expected to be a further de-emphasis on the importance of teaching.

Differentiation in degree types has emerged where some universities have created 'geoscience degrees' from a blend of physical geography or environmental courses and traditional 'solid earth science' courses whilst others have maintained a clear distinction between degree types. It is important for stakeholders in university geoscience to be aware of this differentiation. This change in teaching profile is reflected in areas where thesis topics can be supervised. Ten universities identified themselves as having the capability to supervise theses across a full range of solid earth sciences, eleven had capability in Petroleum Geology; six had capability in geophysics and nine had capability

in hydrogeology – several institutions indicated an expansion of capability in hydrogeology.

Nationally, student enrollments have increased 18% over the last 5 years, but all have occurred in levels 1-3 with enrolments in Honours/level 4 declining a further 6% over the 50% drop that has occurred in the previous decade. However there is much variation between universities with some undergoing a decline in all enrolments and others increasing. There is also a wide variation in student load from department to department with those with the lower values clearly at risk. Retention of students, particularly Australians, into honours and higher degree courses is a major problem and is another threat to the economic viability of many departments. This is currently exacerbated by the high salaries on offer from resource companies.

The response of the employers and employer groups varies. The MCA has established the Minerals Tertiary Education Council which funds the delivery of short course programs in minerals geoscience at Honours and Masters levels at several universities to ensure a supply of graduates with appropriate skills for the minerals industry. Geoscience Australia is offering cadetships to students undertaking course profiles commensurate with its needs. Woodside has combined with Chevron to establish a Chair in Petroleum Geology at University of Western Australia and seeks top graduates for its international operations on a world-wide basis. APPEA is engaged in grass roots campaigns through schools to raise the profile of the industry to encourage students to consider careers in the industry.

A National Tertiary Geoscience Education System

There was a consensus that that unless a national approach was taken it was unlikely that the current situation would improve and there was a significant chance of further deterioration. It was recognized that a range of initiatives would be required and that no single measure or agency action is likely to impact the current situation. It was also recognised that a national framework was required for these initiatives and within which individual institutions could pursue their own interests within this national framework. Some of the characteristics of a national system were identified and can be summarised as follows:

AIM: A National Cooperative Program to Build Human Capital and Infrastructure in the Geosciences from which all Stakeholders will Benefit

- National appreciation of the role of geoscience as an enabling discipline for:
 - the ongoing development of the resources industries and their economic importance at state and federal levels.
 - natural resource management – land, coasts and sea
 - natural hazard mitigation
 - definition of groundwater resources and water supply, and
 - society understanding the world in which we live.
- Geoscience is attractive for universities administrations to support and nurture with funding mechanisms to match, including recognition of high overhead costs of geoscience courses where student numbers will never be high.

- Emergence of a number of larger departments with critical mass in teaching (student numbers) and research to provide longer term flexibility and resilience to change.
- Differentiation and recognition of key strengths across the system amongst smaller and larger departments and development of mechanisms for effective transfer of students to centres of expertise and use of expertise for teaching and mentoring across universities.
- Externally funded teaching /research positions to create independence and engagement with stakeholder groups.
- Systematic program to attract appropriate numbers and quality of personnel to the geosciences
 - geoscience based education programs targeting high schools including education of science teachers in geoscience.
 - scholarship system to attract the brightest and the best
 - regular review of needs for geoscientists
 - promotion of attractiveness of academic careers with salary supplementation in appropriate cases to enable universities to compete with industry.

How to Give Effect to a National System and Next Steps

The Summit brought together a 'federation' of interests in the geosciences – the AGC representing learned and professional societies; universities, industry groups and government agencies. Each has a legitimate interest in the issue but also has its own legitimate interest and activities of relevance to its own *raison d'être*. The challenge is to marshal these interests into a collaborative system whilst allowing for individual interests and expression and to sustain the system into the longer term.

It was agreed that a document be prepared that encapsulated the vision for a national program of action aimed at establishing a national Tertiary Geoscience Education System and recognizing the roles of the various stakeholders. This document would be developed by the end of 2007 and would be used to gain support for the plan by the universities, federal government, industry groups, relevant government agencies and other stakeholders.

Preparation of the document would be lead by the AGC using a committee comprising: Dr Trevor Powell (AGC President and STIR Science Services); Mr Mike Smith (AGC Chair and Austpac Resources); Professor Andy Gleadow (GSA President and School of Earth Sciences, University of Melbourne); Dr Tom Loutit (PESA President and CEO Frogtech Pty Ltd) and supported by a university advisory group comprising Professor Ray Cas (Monash University) Professor Nick Oliver (James Cook University) Professor Allan Chivas (University of Wollongong) and Dr Ian Fitzsimmons (Curtin University of Technology).

I wish to thank all those who gave their valuable time to participate in the Summit and for the open and constructive way in which they participated. I am hopeful that with good will and further constructive work we can make substantial progress in addressing this complex and vexing problem of significant national interest.

Dr Trevor Powell
President, Australian Geoscience Council
October 2007