



Ann-Marie Anderson-Mayes

Welcome to this conference edition of *Preview*. In a return to a previous format, you will find that this issue contains both the Conference Handbook as well as 20 pages of regular *Preview* content. I hope that over the next few days you will enjoy catching up with old friends and colleagues, meeting new ones, and 'Unearthing New Layers' of knowledge and understanding about the continuously developing world of exploration geophysics.

Those of you who have been reading this column for the last couple of years will know that I delight in 'big picture' ideas. So, it will come as no surprise that yet another piece of popular science has caught my imagination. During July and August 2011, the ABC screened a documentary called 'Wonders of the Universe'. In the first episode, 'Stardust', Professor Brian Cox describes how all the building blocks of ordinary matter in the Universe were created in the first second after the Big Bang. Quarks were created at 10^{-35} seconds, then combined to form protons and neutrons at 10^{-6} seconds. A

few minutes after the Big Bang, protons and neutrons had joined together to form hydrogen, deuterium and helium. All the other elements in the Periodic Table were created by nuclear fusion in stars, a process that continues to this day. It is a truly wonderful thought that every atom in your body was created in a star; every atom in every object that makes up the world around you was created in a star; every atom in your very favourite object or person or place was created billions of years ago in a star, flung into space by a massive explosion when the star died, and then reformed into our Solar System.

So why is this relevant to geophysics you ask? Well, the ideas presented by Professor Cox really made me think about the abundance of the elements in the Earth's crust and in particular, the rarity of one very important element, gold.

Gold (Au) is one of the heaviest elements. Its abundance is 0.6 ppb by weight in the Universe and 3.1 ppb by weight in the Earth's crust (<http://www.webelements.com>). The conditions needed to create gold only occur in very large supernovae – on average such an explosion happens once in a galaxy every 100 years. Thus the rarity of the element is explained. In the primordial Earth, the gold would have been relatively heterogeneous in the Earth's crust. Fortunately, a range of geological processes helped to migrate the Au atoms creating deposits. It is these concentrations that were readily found near the Earth's surface in historical gold

rushes and that now are the targets for deeper exploration.

Gold becomes even more fascinating when you consider some statistics. According to the USGS, annual gold production in both 2008 and 2009 was approximately 75 million troy ounces per year. This means that if all the gold produced in one year were smelted into one large cube, that cube would only be 4.9 metres long on each side. In other words, all the gold found in one year would probably fit inside your house! A visit to the World Gold Council website (<http://www.gold.org>) reveals a whole host of interesting statistics. For example, the total quantity of all the gold mined since the beginning of civilisation is 166 600 tonnes, which would fit into a cube just 20 metres on each side; 100 million people worldwide depend on gold mining for their livelihood; and approximately 15 000 tonnes of gold are held in the world's oceans.

As we go about our daily business of searching for new resources – be they minerals, petroleum or water – it is fascinating to ponder that the very elements we seek were created in exactly the same way as the elements that make up our own brain and body. All of us have been endlessly recycled and will continue to be into the future. But despite all those old (you might even say ancient) elements that make up our world and our brains, we are constantly generating new ideas to help 'Unearth New Layers'. Have a great conference!

Preview EDITOR – POSITION VACANT

In mid-2012, the role of *Preview* Editor will become vacant. Ann-Marie Anderson-Mayes has filled the role for almost three years and is now looking for a replacement.

Are you the person for the job?

- You need to enjoy communicating science and sourcing ideas for articles about all facets of our industry – technical, people, industry, research, conferences, etc.
- It helps if you have an eye for detail – in other words reading and editing submitted material carefully.
- You need to be able to make time every two months to meet the publication schedule. Issues are prepared in the month before publication – thus one or two weeks in January, March, May, July, September, and November will be busy with articles arriving, being edited and sent off to the publisher. Other duties include sourcing articles, making regular contact with contributors to remind them of due dates, and proof-checking material before final publication.

What do you need to know?

- This role is extremely well supported by the current publisher, CSIRO Publishing. You are only responsible for sourcing, forwarding, and proof-checking content. Layout, advertising, printing, distribution, etc. are all handled by the Publisher.
- All you need is a computer and an Internet connection – so it is very straightforward to manage and portable if you travel.
- You are paid an honorarium by the ASEG to acknowledge the contribution this role makes to effective communication and education within the Society.

The role of *Preview* Editor is extremely rewarding. It is a great way to find out what is happening in our industry and to meet people involved in all areas of geophysics. If you would like more information, please contact Phil Schmidt (Publications Chairman) on 02 9490 8873 or phil.schmidt@csiro.au, or Ann-Marie Anderson-Mayes on 0427 443 919 or preview@mayes.com.au.

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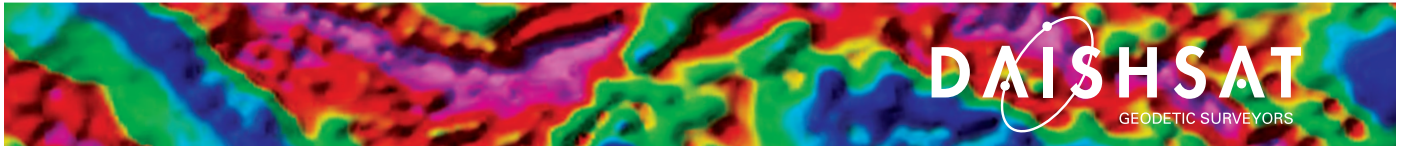
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