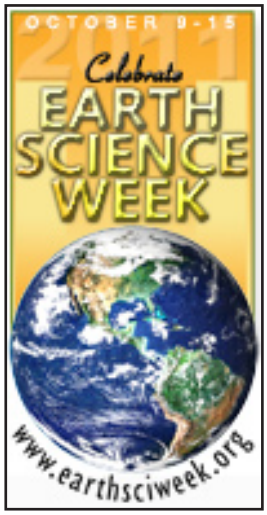
HEDG

HUNTER EARTH SCIENCES DISCUSSION GROUP

Next HEDG presentation:
6.30, Tuesday 11th October 2011
Customs House, Newcastle



Earth Science Week Presentation
2011 theme: Our ever-changing Earth

'From icehouse to greenhouse to icehouse: what is "normal" in Earth's climate?'

Dr. Silvia Frisia
Environmental and Climate Change Research Group
School of Environmental and Life Sciences,
The University of Newcastle

About the talk: We are all puzzled by conflicting information about the current climate change and its causes. There is a quality to the debate that shifts it from purely scientific to an issue of faith. One of the problems is the lack of communication about the Earth's dramatic changes from predominant cold (icehouse) to predominant warm (greenhouse) climates that have punctuated its long history. We all know that a change in a few parameters, the first order controls of planetary climate, alter the proportion of perennial ice on the globe. These are: solar insolation, albedo, and atmospheric greenhouse gases. Today, most of the debate is on warming caused by greenhouse gases, and in particular the increasing concentration of carbon dioxide (CO_2) in the atmosphere from industrial emissions.

In the Neoproterozoic (800–600 Ma) there were severe glaciations with a very high CO_2 concentration in the atmosphere, more than two to three times today's levels. So, why was the Earth glaciated? There are several hypotheses, such as reduced solar flux. Once the glaciation started, dramatic drops in sea level with little calcium carbonate formation resulted in no return of CO_2 to the atmosphere. The effect was a rapid, extreme glaciation. Obviously, there were other factors. For example all the continents were more or less united at about equatorial-tropical latitudes.

Now, things are very different. Looking at more recent times, the Earth transited from a warm climate, when CO_2 in the atmosphere reached 1200 ppm (Cretaceous), and dinosaurs where happily roaming about, to more general icehouse conditions. What happened? Some 50 to 30 million years ago, mountains emerged from the sea (plate tectonics), weathering sequestered CO_2 from the atmosphere and the Earth cooled.

In the very recent times (for us geologists), large ice sheets slowly built, possibly because of the effects of Earth's orbit geometry, and then, in a matter of some 1000 years, they melted. And CO_2 in the atmosphere remained about 200 ppm. So what? Well, as humans, we are a 'product' of the Quaternary glaciations. Our biological system cannot cope with the Cretaceous levels of CO_2.

It is not any more a matter of what will happen to the planet, it will go on, as usual. We are simply bound to disappear, as geology teaches us: species die off. From the Earth's perspective, it will be just another change. From our perspective, we are fools. However, some simple, daily actions may change foolishness into wisdom. It is up to us, to just change the way we eat, the way we reach our work etc. Geology teaches us humility and the courage to be actively part of Earth's well-being.

About the speaker: Dr Silvia Frisia has a Master of Science in Earth Sciences from University of California (Berkeley), and a PhD in Geology (dolomite & dolomitization) from the University of Milano, Italy. She worked for three years at ENI, the Italian National Oil Exploration company in the oil in carbonates sector. Dr Frisia was head of the Continental Carbonate Research Group (palaeoclimate) at Museo Tridentino di Scienze Naturali for ~15 years, and is currently a Senior Lecturer at the University of Newcastle. With over 50 publications, ranging from the *Journal of Sedimentary Research*, to *Geochimica et Cosmochimica Acta,* and one in *Nature Geoscience* as co-author, Dr Frisia has also contributed to more 'popular' promotion of geoscience, including creating and bringing to realization the geology part of the exhibit 'The Deluge' (in 2000), that attracted 150,000 visitors.

Please RSVP by COB on Monday 10th October to phil.gilmore@industry.nsw.gov.au

NSW GOVERNMENT Resources & Energy

HEDG is sponsored by the
Geological Survey of NSW
(Resources & Energy NSW) and the
Geological Society of Australia, Hunter Valley Branch

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About HEDG

HEDG formed in 2008 with the aim to increase the interaction between geoscientists in the Lower Hunter, promote geoscience, provide a platform to learn about current research and provide an opportunity for students look at career options.

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2011 HEDG program

29 Tuesday November (Honours students research projects - details to follow)

Last HEDG event

Over 40 people attended the last HEDG presentation on Tuesday 16th August at Customs House. Peter Stuart-Smith, on behalf of SRK Consulting, presented their recent work on 'A new regional structural/ basin framework for the Gunnedah Basin and the southernmost extent of the Bowen Basin in NSW'.

This recent study was carried out by SRK Consulting for the (former) NSW Department of Industry & Investment. Products included an updated GIS-based regional structural / basin framework for the Gunnedah Basin and the southernmost extent of the Bowen Basin in NSW. This framework was developed from compilation of datasets, magnetic and gravity modelling, interpretation of seismic and geopotential field data and analysis of well and other geological data.

A new and detailed model of the basement surface (SEEBASE^{TM}) was generated, providing a clearer definition of the architecture of the basin, and identifying several new elements. The basement and structural evaluation and basin model developed provide direct benefits to more detailed re-evaluations and/or assessments of petroleum, CSM, CO_2 geosequestration, geothermal energy, and groundwater.

Links to other (local) geoscience resources:

Geological Survey of NSW: http://www.dpi.nsw.gov.au/minerals/geological

Trade and Investment NSW, Mineral Resources & Energy: http://www.industry.nsw.gov.au/ http://www. dpi.nsw.gov.au/minerals

Sydney Mineral Exploration Discussion Group SMEDG: http://www.smedg.org.au

Amateur Geological Society of the Hunter Valley: http://agshv.com

AusIMM – Hunter Region Branch: http://www.ausimm.com.au/content/default.aspx?ID=213

Geological Society of Australia (GSA), Hunter Valley Branch

GSA provides an opportunity to keep in touch with scientific developments, present the results of work, and contribute to discussions on vocational and scientific topics. See: http://www.gsa.org.au

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