

Geological Society of Australia

Earth Science Showcase



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***** AUSTRALIAN LAUNCH *****

Australians urged to size up local graveyards in global project to track pollution and climate change

Walking around an old graveyard may seem more like the stuff of horror movies...but it could actually help save the planet.

That's the message from the Geological Society of Australia, which is calling on individuals, schools and community groups across Australia to visit their local graveyards—and measure the weathering rates of old marble headstones—as part of an international project to track shifts in world pollution levels and climate change.

The global Gravestone Project—which gets underway this month and will continue until late 2011—is the first scientific research project being undertaken across the world as part of the international EarthTrek citizen science program. The Australian arm of the project is being launched today (Monday). Other projects being discussed with scientists for inclusion in EarthTrek in some countries include earthquake monitoring and measuring the size of hailstones.

The Geological Society of Australia, CSIRO Education and Earth Scientists from the University of Sydney are key Australian partners in EarthTrek, which is being led globally by the Geological Society of America. There is no cost for the public to participate in EarthTrek and participants receive rewards based on the number and scope of projects in which they are involved. Participants are guided in their work by local scientists.

In the Gravestone Project, participants will visit their local graveyard (importantly, only after obtaining any required permissions to do so), determine its location using a GPS and add this location to a global graveyard map on the EarthTrek website (www.goeearthtrek.com). They will also note on the map whether the graveyard has (or does not have) white marble headstones. Participants can then go a further step and select five white marble headstones that vary in age (including the oldest and youngest in the graveyard) and vary in the direction they face, record the dates of death shown on these headstones, and (while ensuring full respect and care is shown around the graves) measure the weathering rate of the headstones using micrometer callipers. Participants will log this and various other data about the gravestones on the EarthTrek website.

Rain contains more than just water—it also contains dust particles and acid from air pollution and chemicals. Given the acid in rain chemically erodes marble gravestones (and the more acid the rain contains, the more it erodes the marble) the rate of weathering of marble gravestones can indicate changes in pollution or climate between locations and over time. In this way, the Gravestone Project can help assess whether some regions of the globe are experiencing higher pollution and more rapid climate change than others.

Two methods can be used to measure the weathering rate of marble gravestones. The Lead Lettering Method measures the erosion of a marble gravestone in comparison with the lead lettering used on it (as the lettering is not eroded by the acid in rain but the marble is). When marble gravestones are created, they are polished smooth so the lead letters and marble surface are flush. By measuring the distance that the lead lettering sits out from the eroded marble on weathered gravestones, and relating this to the date of death on the gravestone, scientists can determine by how much the gravestone has eroded over time.

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While not as accurate as the Lead Lettering Method, the Thickness Method can be used for marble gravestones that do not contain lead lettering. It assumes that when the headstone was made it was a constant thickness from top to bottom—so by measuring any subsequent differences in the thickness of the headstone between its top and bottom, and relating this to the date of death on the headstone, scientists can determine the rate of weathering of the headstone caused by acidic rain over time.

President of the Geological Society of Australia, Professor Peter Cawood, said: “The terrific thing about EarthTrek is that it will engage the wider community in a whole range of exciting scientific research while also providing enormous people-power to greatly assist the scientists undertaking the research. EarthTrek projects across the globe will be focusing on critical research into key environmental issues such as climate change, pollution, the spread of noxious weeds and tracking endangered animals, just to name a few. By actively engaging the wider community in their work, scientists involved in EarthTrek can substantially increase the amount of data they collect for their research, dramatically raise the profile of their research in the broader community, and provide younger people with a first-hand opportunity to experience the wide range of fascinating work that a career as an Earth Scientist offers.”

Director Education & Outreach with the Geological Society of America, Gary Lewis, said: “EarthTrek has already received a very positive community response around the globe with participants signing up from the USA, Canada, Germany, Malaysia, Spain and Australia. It is terrific that so many people want to get involved in the project and help scientists with some fascinating research while also spending time outdoors using current technology and having fun. We have also had a great response to EarthTrek from scientists across the world, who can see the real benefits to their research that will stem from this project. We continue to encourage the support and partnership of even more scientific agencies and professional societies across the broad spectrum of science in making this program a powerful experience for both the scientists and the wider community.”

Associate Professor Deirdre Dragovich from the School of Geosciences, University of Sydney, said: “It is amazing to consider that, because marble headstones are freshly cut when they are placed in a cemetery, the weathering ‘clock’ is effectively set to zero. Gravestones are also very accurate indicators of pollution levels—in places where pollution has increased the weathering rates of marble headstones have increased too (and, conversely, weathering rates have decreased in places where pollution has decreased). The Gravestone Project provides a unique opportunity to gather important information about this weathering from different countries, climates and pollution environments—and it is also a great way for the wider community to contribute to cutting-edge research on pollution and climate change.”

Manager of CSIRO Education, Ross Kingsland, said: “EarthTrek is already proving to be great fun for the wider community while also providing an extremely useful framework for undertaking projects that directly support real scientific research. CSIRO Education has organised many Australian-based projects for family and school involvement and a number of future projects will be run in conjunction with EarthTrek.”

Further information: Those interested in finding out more about EarthTrek and the Gravestone Project, or wishing to participate, should visit www.goearthtrek.com. This site is also accessible via a link from the front page of the Geological Society of Australia’s website, at www.gsa.org.au.

Interviews / photographs: Various EarthTrek representatives are available for interviews. Photographs of cemeteries and headstones with lead lettering are also available.

TV and print media please note: Interviews/photographs with EarthTrek representatives can be undertaken at selected graveyards in Perth and Canberra.

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