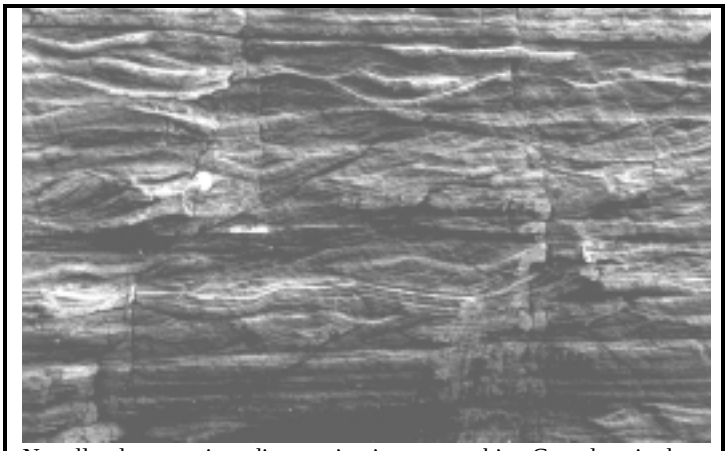

Not all volcanogenic sedimentation is catastrophic. Complex ripple cross-lamination characterizes a discrete unit of basaltic tuff deposited by density currents during a sublacustrine eruption in Pleistocene Lake Russell, CA {see Christensen MN, Gilbert CM 1964 Basaltic cone suggest constructional origin of some guyots. *Science*, **143**, 240-242.}

COMMISSION ON VOLCANOGENIC SEDIMENTS

CVS Newsletter #18

This newsletter is published under the aegis of IAVCEI, International Association of Volcanology and Chemistry of the Earth's Interior. ***http://www.iavcei.org***

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**** CVS Homepage: http://www.otago.ac.nz/geology/cvs.htm ****

INTRODUCTION

This issues begins with a big "thank you" to the many CVS members who have responded to the request for a contribution to support newsletter production! The newsletter is now reasonably stable through the next year's issues, and the Otago accountants are no longer cocking a wary eye at the photocopy and mail charges. Your support is greatly appreciated.

Interestingly, few members have volunteered email addresses, even among those contributing financially to the newsletter. This seems to indicate that hardcopy newsletters are strongly preferred over electronic ones – good news for foresters and the post. We'll keep the newsletters coming.

In this issue:

On a later page of this newsletter you'll find an interesting graphic and contact details for the 2000 regional meeting of the International Association of Sedimentologists. IAVCEI has no formal links with IAS, but members of this commission could certainly make a contribution to the "rest" of our sedimentological colleagues, as well as bringing some sedimentology back from beyond the volcanoes. Any volunteers to provide an account of the meeting highpoints for the late-2000 newsletter?

Commission co-leader Ian Skilling will move into the next millenium with a new address: University of Southern Mississippi, Dept. Geology, Box 5044 Hattiesburg, MS 39406-5044, USA; Ian.Skilling@usm.edu. Note that the CVS web page has been moved to Otago and will be updated before the new year; note also the new web page for IAVCEI (nothing's constant).

We move on to less positive news. Two of our colleagues, Mario Mazzoni and Guy Camus, have recently passed away.

IAVCEI Bali Meeting (July 2000)

This notice is to inform all members of IAVCEI that the General Assembly in Bali, Indonesia will be going ahead as planned. There has been some correspondence with the IAVCEI leadership from 24 members related to the problems in East Timor. After careful discussion and consideration of the issues the IAVCEI Executive Committee has decided that it is inappropriate for an international and humanitarian scientific organisation to become involved in any political issues outside the central aims of IAVCEI to promote the science of volcanology and to mitigate the effects of volcanic eruptions. A fuller statement and explanation for this decision can be found on the IAVCEI Website:

www.iavcei.org

Steve Sparks, IAVCEI President
Steve McNutt, IAVCEI Secretary-General

Michael Ort (*Michael.Ort@NAU.edu*) provided this brief obituary to volcanolist: Mario Mazzoni, one of Argentina's most accomplished authorities on physical volcanology and volcaniclastic sedimentology, died after a massive heart attack on Friday, Oct. 1. Mario worked on Tertiary and Quaternary volcanoes in Patagonia and the Argentine Puna, most recently concentrating on Quaternary Capohue volcano and a proposed Caviahue caldera. He was a professor at the Universidad Nacional de La Plata and a principal investigator and researcher, as well as subdirector, at the Centro de Investigaciones Geologicas. Mario was an active collaborator on many projects and maintained an international scientific dialog. He was a delightful friend, caring about others deeply and maintaining a playful sense of humor. He will be sorely missed. He is survived by two daughters and a son. Condolences can be sent via email to them at *mmmaz@arnet.com.ar*.

Jean-Baptiste Rosseel (*pitcairn@es.co.nz*) provides this personal remembrance of Guy Camus:
"… it is about the real Guy, a very nice man, a good scientist, and also a man who had a fridge in his office (near my own desk), full of beers... Guy Camus was my supervisor during my master degree, in 1996, at the University of Clermont-Ferrand, France. Guy was a man of great knowledge in general volcanology, and was a very enthousiastic teacher, making his lectures real moments of pleasure. He was always present for his students, helpful and straightforward, motivated and dynamic, always ready to go on the field, - especially in the Chaine des Puys, his "volcanic garden"-, to discuss about science for hours, or to share a quiet moment with us, around a beer. It was a great pride for me to be considered as a friend. He will be missed, and the Geology Department in Clermont will seem very empty without the well-known smell of an indonesian cigarette in the corridor…"

On a very positive note, hopefully foreshadowing many wonderful field trips to be run in conjunction with the upcoming IAVCEI meeting in Bali,Vince Neall has provided the following account of the recent CVS-sponsored field trip to Iceland in conjunction with the IUGG meeting in Birmingham.

The trip was an extremely worthwhile one, as you'll see…

****

JOKULHLAUPING ON THE SKEIDARARSANDUR

This report provides a review of the combined IAVECI/IUGG fieldtrip on Volcanigenic Sedimentation in Iceland held prior to the IUGG99 meeting in Birmingham. U.K. from 12 to 17 July 1999. The field trip leaders were Jorunn Hardardottir from the Science Institute at University of Iceland, Oskar Knudsen who is a private consultant based in Reykjavik and Andy Russell from Keele University, U.K.

At the conclusion of this field trip we all asked ourselves "How come we were so lucky to participate on such a superb field trip when so few other volcaniclastic types turned up for it?" Those who did enrol (8) were not disappointed and were most grateful to the organisers for continuing to run the trip despite it not quite making the preplanned minimum number. If ever there was an opportunity this millenium to study jokulhlaup deposits with the local experts – this was it!

On 12 July we departed Reykjavik and drove to the southern coast of Iceland and after a morning's travel began

fieldwork at the Skogarasandur. This sand plain was constructed by jokulhlaups from the Solheimajokull, a lobe of the second largest ice-cap in Iceland – the Myrdalsjokull. The initial outcrops we visited were those described by Maizels ten years previously, which became part of her model for sandur development. Little did we know that one week later an unexpected jokulhlaup was to emerge from beneath the Solheimajokull, inundating the valley downstream and downing the local electricity supply. Had it been any larger, the main road bridge would have been taken out. We first examined coastal exposures and then made our way upstream to view the glacier front and in particular to examine proximal jokulhlaup deposits. In doing this we found that the river draining the glacier has an unexpectedly high sediment yield of 14,482 t $km^{-2}a^{-1}$ for a 78 km^2 drainage basin.

From here we circled around to the next major lobe of the Myrdalsjokull – the Hofdabrekkujokull. This was the source of the famous 1918 jokulhlaup that was triggered by eruptions of Katla beneath the ice-cap. Whilst it is a matter of debate as to how high the jokulhlamp reached on proximal hillsides it is known that the 1918 flow was 10 m deep where the main road now crosses. Here the southern coastline was extended up to 2 km by this massive sedimentation. We then headed east across the Skeidararsandur to Skaftafell for the night.

On Day 2 (13 July) we began a detailed study of the deposits from the 1996 Skeidararjokull hlaup accompanied by Andy Russell's team from Keele University. The Skeidararjokull is a 23km-wide lobe of ice that flows from the main Icelandic ice cap named the Vatnajokull. Various Keele students are tackling different aspects to the 1996 event which for the visitor takes some envisaging.

On 1 October 1996 an eruption began under the Vatnajokull between the calderas of Grimsvotn and Bardarbunga. Water from melting ice began flowing south into the Grimsvotn caldera and by 14 October the eruption died down. Water continued to accumulate in subglacial Lake Grimsvotn and not until 5 November did the water finally escape. Cracks began to open in the glacier up to 1 km from its snout as volcanic sediment forced its way up through the ice and flooded over the glacier terminus. Within half an hour a 3-4 m deep jokulhlaup was in progress, near the source sweeping massive ice flows weighing between 1 and 5,000 tons along like giant marbles. The result has been a unique sequence of deposits with large 'kettle holes' some 50 m across littering the proximal landscape. About 15 million m^3 of ice floes broke away from the glacier. In one river (the Gigjukvisl), 60 million m^3 of sediment was eroded from the sand plain upstream of the main road bridge. Total discharge of water, ice and sediment was estimated at 3.6 km^3 over a 48-hour period. Maximum discharges were estimated at 50 x $10^3 m^3 s^{-1}$. It would appear that on close inspection there were some very rapid penecontemporaneous facies changes both along the front of the glacier and with distance from source as rivers passed through both restricted channels and across unrestricted sand plain. Portions of 2 major bridges vanished and large sections of road were damaged or eroded away. This was a

tumultuous event and despite us being there 3 years later, all participants valued the opportunity to study the resultant deposits in an air of safety and resultant research. This had to be one of the geological highlights of the trip despite the cold and cloudy weather.

On day 3 we departed Skaftafell and spent further time in the morning examining additional localities on the Skeidararsandur. We then headed west until we encountered the 1783 basaltic flows from Laki whereupon we headed inland to see the Laki fissure. Not until you visually grasp the size of the lava flows emanating from Laki do you comprehend the scale of this eruption. The fissure is 27 km long and made of 10 en echelon segments which may have extended beneath the Vatnajokull to the northeast. About 15 km^3 of lava was erupted with resultant flows covering 580 km^2 along two routes to the southern coastline. This eruption was devastating for Iceland – 50% of the cattle, 75% of the horses, 77% of the sheep and over 20% of the people died from fluoride poisoning or starvation. Gaining an insight of the tectonic faulting associated with the eruption and the tephrochronology of the adjacent region were added bonuses. That night we returned to stay at Kirkjubaejarklaustur.

On Day 4 we left Kirkjubae…..! and headed onto the basaltic flows from Eldgja around 938 A.D. Again, of comparable size to Laki, the Eldgja flows emanated from a 75 km discontinuous fissure, of which one-fifth lies below Myrdalsjokull. We travelled on a 4 wheel drive road up to the Eldgja chasm which is about 600 m wide, 140 m deep and extends laterally for about 8.2 km. My impression was that the 938 AD event was not the only set of flows to have originated from this place. We then continued northwestwards to the Torfajokull volcanic system, distinguished by its prolific rhyolitic volcanism. Along the route we saw obsidian from Kirkjufell rhyolite dome and dacitic and rhyolitic flows emplaced in 1480 AD near Landmannalaugar, where we spent the next night. Bathing in the mixed warm and cold waters of a local creek in near zero air temperature proved to our hosts we would do anything to prove what a wonderful time we were having. Brrh!

Day 5 dawned fine and we first visited Ljotipollur (the Ugly Duckling), a maar explosion crater from the 1480 AD eruption we had first encountered late the day before. Across more meadows and stony landscapes we began to approach Hekla only to find the cloud level dropping. We were able to gain an appreciation of a complete tephrochronological record (16 major tephras) from about 900 AD in one section that integrated Hekla's eruptive history with events at Katla. (Katla tephras have higher Ti (4%) and Fe concentrations than Hekla). In the afternoon we visited a controversial site at Selsund which had been attributed to a primary pumiceous pyroclastic flow about 3,500 years ago but most participants felt it was fluvially resorted. Way back in the 15th century this area was inundated by lava flows from Hekla and an old country church was destroyed in 1389-90 AD. A new one was rebuilt and whilst it has not been used since 1897AD we saw the local farmer re-sodding it as a farmhouse.

By this stage we could only see the lower slopes of Hekla as inclement weather approached, so we adjourned to the Hekla Visitor Centre where a video and displays made up for what we couldn't see on the ground. The Hekla story is of course what Sigurdur Thorarinsson made his name on and one can only admire his meticulous work at the time, unravelling a complex volcanic history and in the process coining us the word 'tephra'. Hekla is thought to have formed about 7,000 years B.P. In the 14th century, in 1510 AD and the mid-17th and 18th centuries Hekla created much destruction for nearby farmers – one valley to the west remains deserted. In 1970 thousands of sheep were lost from fluoride poisoning. The last eruption was in 1991.

Day 6, our final day, led us west across country to see the Geysir area and the Strokkur geyser, before travelling to the famous historical and geological locale of Thingvellir. Here was the seat of the Althing – the Icelandic Parliament from AD930 to 1798. To stand on the scarp where the North American and European plates are spreading at 2cm/year and to see the fissures and tilted slabs of once horizontal basalt is a truly memorable sight. Jon Bull from Southampton Oceanography Centre explained to us his work on the lake nearby, profiling tephras in the lake sediments and using these to study fault propagation in the lake floor. The awe of Thingvellir brings the Icelandic sagas alive.

After lunch we were treated to a special four wheel drive north to cross the saddle between the large interglacial shield volcano Ok to the west and the Langjokull Glacier to the east. Of impressive dimensions is a shield volcano recently discovered by imaging beneath Langjokull which is 32 km^3 in size.

This trip had all a volcaniclasticist could ever want to see in 6 days. The understanding of facies relationships in part assisted by video clips of the 1996 jokulhlaup at localities we visited, will undoubtedly become published in the next few years. Understanding the physics of what happened will also be advanced. And then there is appreciating, the hazard, the potential dangers and the handling of risk issues which all impact on how governments react to such crises.

Travelling further northwest we visited the area with the questionably oldest tillite in Iceland considered to be 3.1 m years ago and confirmed tillites of 2.6 m years age. From here we then drove around the fjords of the western coastline back to Reykjavik.

I personally found this one of the most rewarding field trips I've ever been on. To Jorunn, Oskar and Andy we owe a great debt of gratitude for what was a truly memorable adventure.

Vince Neall

International Maar Conference

Daun/Vulkaneifel

August 20 – 23, 2000

PRE-CONFERENCE FIELD TRIPS: AUGUST 17 – 20

Post-conference field trips: August 24 – 27

The Eifel is the type locality of maar volcanoes, and the Eifel maars have been intensively studied during the last few years. Modelling and experiment were employed to understand the maar system and the processes of explosive volcanism, and maar lake sediments were analysed to reconstruct the paleoclimate and paleofauna. Many of the maar volcanoes have been studied using a wide range of methods. The results will be presented during conference, along with international contributions to the study of maars.

The conference will be held in the Quaternary Westeifel volcanic field. Within an area of 600 km^2, about 70 maar volcanoes occur alongside other types of volcano. Ulmen maar is the youngest volcano in Germany, about 10 000 years old. Many more Quaternary, and abundant Tertiary, volcanoes occur in the adjacent volcanic fields.

CONFERENCE SITE: DAUN TOWNSHIP, VULKANEIFEL

The conference will be held at Daun, a small town of 8400 inhabitants situated in the center of the Vulkaneifel. Historic ruins located on a beautiful hill in the center of the more than 1250 year-old town reflect the long history of settlement in this area. The delightful countryside, with its mineral-water springs and the healthy climate, makes the town of Daun a popular Kneipp spa. Walking the nature trails or swimming in the nearby Daun maars provide relaxation.

Main topics

(1) Architecture of maar volcanoes
(Wolfgang Jacoby, Institute of Geosciences, University Mainz)

To understand the processes forming maars and diatremes we need to know as much as possible about their shape, filling, structure including faults, internal heterogeneity etc. Both geological and geophysical studies contribute to a quantitative maar-basin analysis. Negative gravity anomalies are associated with the low-density sedimentary and pyroclastic basin fill. Magnetic anomalies reveal the extent of coarse-grained sediments. Geoelectrics may identify low-resistivity lake sediments. Refraction seismic work can outline tuff bodies and basin boundaries.

Generally, complex modelling must be guided by geological expertise in order to draw as much information from the data as possible. In this way many dry maars and diatremes have been detected and identified where maar lakes are lacking, and locations optimised for hydrogeological and scientific drilling. Papers are invited which focus on the application of geophysical and geological methods to delineate the structure of maars and diatremes.

Last call for symposium abstracts is 29 Feb 2000: IAVCEI General Assembly, Bali, Indonesia

Ian Skilling and James White are convening a symposium on Surtseyan volcanism (eruptive, primary depositional, and reworking and redeposition processes) to be held at the General Assembly at Bali. The aim of the symposium is to bring together a variety of studies relating to subqeueous to emergent fragmentation, dispersal and depositional processes and products. Contributions on any composition or style of subaqueous pyroclast-forming (sensu lato) eruption are encouraged.

(2) Formation of maar volcanoes
(Volker Lorenz, Institute of Geology, University Würzburg)

Maars are subaerial monogenetic volcanoes which are the result of many phreatomagmatic explosions when rising magma of any chemical composition interacts with groundwater. Maars are underlain by diatremes.

Oral and poster presentations are invited dealing with studies on this type of explosive activity, the growth of maars and diatremes, the relationship of diatremes with their feeder dykes, experiments on explosive melt/water interaction (MFCI), and modelling of these processes.

(3) Maar lake sediments
(Jörg F. W. Negendank, GeoForschungsZentrum Potsdam)

Maar lakes are extraordinary sediment traps due to their morphology. In those lakes the influence of the small catchment area on sedimentation is low as sedimentation is dominated by the autochthonous production of the lake. Thus laminated sediments occur which reveal annual changes in sedimentation. Depending on their climatic location, either organic, evaporitic or clastic varves are formed.

Therefore, maar lake sediments are ideal continental depositories for reconstructing the Cenozoic Earth history on an annual to decadal time scale. In particular, paleoenvironmental and paleoclimatological information is preserved. Hence, high frequency climate variability, in contrast to the low frequency variability of Milankowitch type can be studied, and the role of variation caused by external factors, such as solar forcing, assessed.

Papers are invited that deal with a wide range of reconstructions of Earth history from maar lake sediments.

(4) Paleontology of maar lake sediments
(Franz Otto Neuffer, Natural History Museum, Mainz)

Cretaceous and Tertiary maars are extraordinary paleontological archives. Examples are Orapa (South Africa), Messel (near Darmstadt, Germany) and Eckfeld (Western Eifel, Germany).

The taphocoenoses are characterised by a high taxonomical diversity and, at the same time, an excellent preservation of the fossils. This makes them ideal objects e. g. for systematical and taxonomic investigations. As small isolated basins, maars - in contrast to special environments such as swamps and peat moors - furnish us with information especially concerning regional aspects of flora and fauna. It therefore makes them exceptionally useful in the reconstruction of both paleoenvironment and paleoclimate.

(5) Hydrogeology of maar volcanoes
(Georg Büchel, Institute of Geosciences, University Jena)

Maars form as a result of the highly explosive interaction between confined groundwater and the rising melt. So far, it is more or less unknown how much groundwater is necessary for phreatomagmatic eruptions. It seems, however, to be a

large amount, far exceeding that available from a major drinking water well. It is thus surprising that many maars were formed within areas poor in groundwater, e.g. the Lower Devonian Eifel shales.

From many maar diatremes groundwater is produced. The data from groundwater exploration and production help to reveal the characteristics of maars. Consequently, papers about the hydrogeological studies of maars and maar fields and about water-related aspects of maars are very welcome.

Preliminary registration December 30 1999

Further Information

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Coming soon!

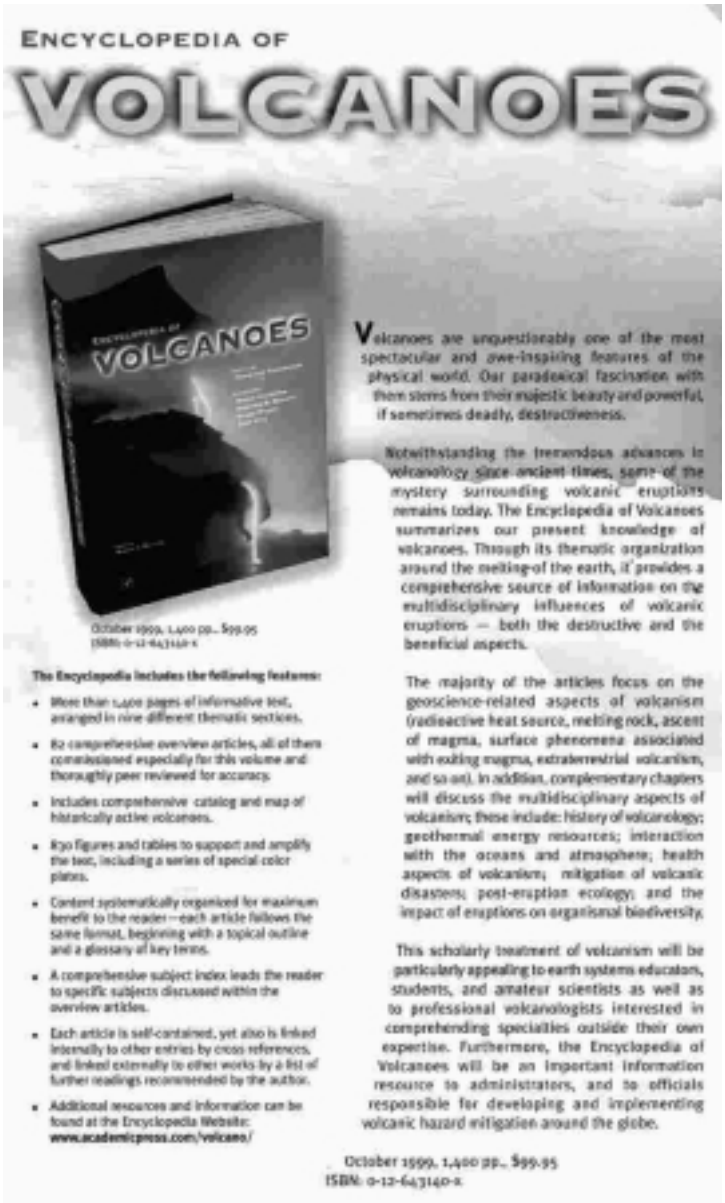
Thematic issue of the
Journal of Precambrian Research

Processes in physical volcanology and volcaniclastic sedimentation: modern and ancient

Edited by
WU Mueller, EH Chown & P Thurston

- Mueller, W.U., Chown, E.H., and Thurston, P.: PREFACE, Processes in physical volcanology and volcaniclastic sedimentation: modern and ancient.
- White, J.D.L.: Subaqueous eruption-fed density currents and their deposits.
- Cousineau, P. A. and Bédard, J.H.: Sedimentation in a subaqueous arc/back-arc setting: the Bobby Cove Formation, Snooks Arms Group, Newfoundland.
- Kessler, L.G. II and Bédard, J.H.: Epiclastic volcanic debrites - evidence of flow transformations between avalanche and debris flow processes, Middle Ordovician, Baie Verte Peninsula, Newfoundland.
- Mueller, W.U., Garde, A.A., and Stendal, H.: Shallow-water, eruption-fed, mafic pyroclastic deposits along a Paleoproterozoic coastline: Kangerluluk volcano-sedimentary sequence, southeast Greenland.
- Oberholzer, J.D and Eriksson, P.G.: Subaerial volcanism in the Paleoproterozoic Hekpoort Formation (Transvaal Supergroup), Kaapvaal craton.
- Ayres, L.D. and Peloquin, S.: Subaqueous, Paleoproterozoic, metarhyolite dome-flow cone complex, Flin Flon greenstone belt, Manitoba.
- Corcoran, P.L.: Recognizing Distinct Portions of Seamounts using Volcanic Facies Analysis: examples from the Archean Slave Province, Northwest Territories, Canada.
- Chown, E.H., N'Dah, E., and Mueller W.U.: The relation between iron formation and low temperature hydrothermal alteration in an Archean volcanic environment.
- Lafrance, B., Mueller, W.U., and Daigneault, R.: Evolution of a submerged arc island: the Normetal volcanic complex, Abitibi greenstone belt, Québec ,Canada.
- Thurston, P.C. and Kozhevnikov, V.N.: An Archean quartzite-andesite association in the Baltic Shield: Implications for assemblage types and shield history.
- van der Westhuizen, W and de Bruiyn, H.: High temperature ash flow - wet sediment interaction in the Makawassie Formation, Ventersdorp Supergroup, South Africa.

Here Now!



As a serious page filler in the absence of a couple of invited contributions, here's the most current list I have of active CVS members. Use it at your peril – it's what's used for mailing the newsletter (to be reviewed next year). The paucity of email addresses reflects the widespread non-response to previous requests for people to send me their electronic contact details.

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