



LAVA NEWS

Newsletter for the Learned Australasian Volcanology Association

LAVA: Specialist Group of the Geological Society of Australia
LAVA NZ: Special Interest Group of the Geoscience Society of New Zealand



Bomb sag impact structure on Santorini (Photo credit J. Trofimovs).

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CONTRIBUTIONS TO LAVA NEED ONLY TAKE 1 HOUR OR LESS OF YOUR TIME (...10 mins for short items and gap fillers!!)

We are keen to receive YOUR contributions to LAVA News (e.g. short articles, book/article reviews, research activity summaries, field workshop/meeting reports, contributions to the regular items, or other small informal items to fill gaps between articles). Also, we'd like volcano artwork or novel images for the front page. Please send pictures and contributions for the next LAVA News by 15 Nov., 2019

WEBSITES

- Geol. Soc. Aust.: www.gsa.org.au
- Geoscience Soc. NZ: www.gsnz.org.nz
- IAVCEI: www.iavcei.org



The Basalt Column

Seems like everyone is busy nowadays. As I enter further into my forties, I've been calling it "middle age" but perhaps it is more a function of modern society wherein we are used to over-scheduling, instantaneous information and open access to other people's lives..... I digress..... apologies for the late issuing of this LAVA News - we have

for a LAVA grant.

The Geological Society of Australia is also supporting a number of GESSS (GSA Earth Science Student Symposia) conferences, which are student-organized conferences for students in New South Wales, Queensland, South Australia, Tasmania and Western Australia. These will run in November this year, so if you or any of your students wish to contribute they are an excellent way to gain experience in presenting research to a friendly and supportive audience.

In this issue of LAVA News colleagues present an overview of an RV Investigator research voyage to map and sample seamounts, a volcano venture to Mount Masaya and a unique view of volcanoes through the eyes of a lapidary artist. Many thanks for these contributions and as always, please send through anything you would like to share with the LAVA News audience.

Jess Trofimovs
LAVA President

been busy!

A reminder, especially with a number of important conferences coming up, that LAVA offers student and early career researcher members the opportunity for funding to present at conferences. For example, Cities on Volcanoes on Crete is in May 2020 and IAVCEI will be hosted by New Zealand in February 2021. It is never too early (or too late) to think about your conference submissions and apply

LAVA NZ Update

LAVA NZ held their annual meeting on Wednesday 28 November, at the Geoscience Society of NZ annual conference in Napier, and was chaired by Geoff Kilgour. The hot topic of discussion was the planning of the IAVCEI 2021 Scientific Assembly in Rotorua, which is well underway here in New Zealand. The volcanology symposium at the GSNZ conference was also supported by LAVA NZ.

A few international workshops have been held in New Zealand over the last six months. The IAVCEI 5th Volcano Geology Workshop hosted by Massey University was held in Palmerston North, New Zealand and in the field across Ruapehu, Tongariro/Taupo and Taranaki from

25 February - 4 March; it was attended by 65 people from 12 countries.

Earlier in January, Gert Lube from Massey University hosted around 20 international scientists at Massey University and in Taupo for a workshop on volcanic hazard benchmarking and modelling, with a specific emphasis on pyroclastic flows.

The IAVCEI Commission on Volcanic Lakes and GNS Science held the CVL10 workshop on volcanic lakes in Taupo on 17-25 March.

Adrian Pittari
Editor, LAVA News and LAVA NZ Contact

Geological Apps!

More and more we utilise digital technologies and applications (Apps) in our day to day life. Here is a selection that we use here at QUT for educational purposes. If you have any examples of useful geological apps or programs that you are using, please share!

The App I wish existed in my undergraduate studies.... Visible Geology: An excellent browser-based structural geology and stereonet visualisation tool, particularly for foundational (first or second year undergraduate) students.
<http://app.visiblegeology.com>

(continued on p. 6)

LAVA - Aims

- To provide a forum for discussion between members interested in and/or working in ancient and modern volcanic environments in the Australasian region.
- To facilitate the exchange of ideas and information between workers in volcanology and related disciplines such as sedimentology, mineralisation and igneous geochemistry.
- To provide a stronger link between volcanological researchers and industry-based geologists working in volcanic terrains.
- To promote research into the volcanology of the Australasian region.
- To provide a forum for promotion of volcanology within geoscience to the wider community.

RV Investigator - Voyage to the Tasman Sea

Chief scientist: Dr. Joanne Whittaker*

Deputy chief scientist: Dr. Rebecca Carey*

*University of Tasmania

27/12/18 – 10/01/19

Just two days after Christmas on December 27th 2018, a group of intrepid scientists from across the country led by University of Tasmania's Dr. Jo Whittaker and Dr. Rebecca Carey climbed aboard the *RV Investigator* for a two-week voyage designed to unravel the complex tectonic history of the Tasman Sea. Detailed dating of rocks collected from the various seamount chains in the Tasman Sea is hoped to help improve our understanding of the timing of the ocean basin opening between Tasmania and Antarctica, which may have allowed the Antarctic Circumpolar Current to initiate. Such an event would have globally-significant geological and climatological consequences.

Setting off from Hobart, the *Investigator* steamed into the Tasman Sea with the aim of mapping and sampling the seamounts which litter the ocean floor. Each seamount would be mapped in detail by swath bathymetry, and this information would be used to assess the logistics and

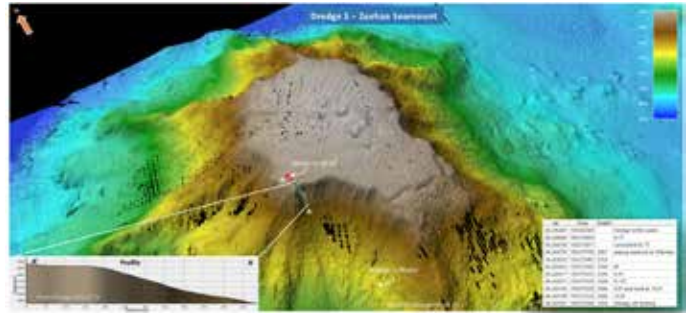
scientific value of sampling. With the ideal location and plan of attack settled on, a dredge would be lowered from the trawl deck to the ocean floor, thousands of meters below. Up to several hours of nail-biting tension would pass with each trawl, as the ship's crew would carefully navigate the dredge in an attempt to collect rocks without getting the rig snagged to the bottom. Once the dredge was recovered, the science team would assess the haul, decide which samples should be sawn into pieces, describe and characterise the samples, and finally bag them up for later assessment on dry land – all in a carefully constructed workflow which operated like clockwork. Sixteen sites were dredged, recovering approximately 2 tonnes of rock, and many more seamounts were mapped and named.

The voyage was well-enjoyed by all, including several University of Tasmania undergraduate and postgraduate students and staff. New Year's Day was brought in with a "rock star" themed dress-up party, while down-time was enjoyed through movies, science presentations, and spectacular ocean sunsets.

Tom Schaap

University of Tasmania





Volcano Images as Lapidary Art

Introduction

Lapidary art creates designs using crafted rocks, minerals and other materials and is a time-honoured cultural skill that extends back beyond Roman times. It includes the famed Florentine ‘pietre dure’ in Italy and Mughal marquetry in India, exemplified in the Taj Mahal, as skills developed in the 16th and 17th centuries. This article focuses on its use in depicting volcanoes. Here, it specifically captures lapidary designs of Susan Judy, an accomplished lapidary artist from the USA. Susan has an extra dimension to offer in her lapidary art. A Geology graduate from the College of Mines, University of Idaho, she also has a background in exploration geology. In her lapidary art career, she uses her knowledge of Earth’s evolution and natural lapidary materials to depict the marvels of geology.

Volcanic scenes

Two volcanic lapidary themes are depicted here. The first is titled “**The enemy within: Mt Erebus Volcanism & Ozone Depletion**” (Figure 1). This piece was shown in May-June 2017 at the Colorado Mosaic Artists themed exhibit “Fire, Water, Air and Earth” hosted by The

National Centre of Atmosphere Research at Boulder, Colorado. To achieve this volcanic vista, a wide range of lapidary materials were incorporated into its construction. These include: **slabs** of limestone, mookaite jasper, agate, quartzite, limestone, dumortierite, sodalite, coquina, slate, conglomerate and marble; **stone pendants** of calcite, aragonite, amethyst, carnelian, jasper, quartzite, sodalite, aventurine, red tiger’s eye, mookaite and obsidian; **spheres** of sodalite, mookaite, orbicular jasper and pyrite. To convey the effect of bubbling gas emissions within fluid eruptive streaming, stone spheres were embedded within alignments of discs sliced from spheres using a special saw.

What message does this colourful lapidary cross-section of a prominent active West Antarctica volcano have for the viewers? According to the artist, the wildly flowing, bubbling volcanic components symbolize emissions of toxic gases from the eruptive vent. Although active over a million years, ejections of these gases from Mount Erebus were extremely voluminous in the early 1980s, pumping out kilotons of ozone-depleting chemicals. These gaseous elements rise within latitude atmospheric circulations over the Ross Sea, initiating depletion in the ozone layer.

The volcanic nature of Mount Erebus, its magma composition, lava lake activity and gaseous emissions, have received considerable study and monitoring of active fluctuations (Oppenheimer et al., 2005; Oppenheimer & Kyle, 2008; Boichu, et al., 2011). The eruptive plume from Mount Erebus ascends from ~4 km above sea level. Its plume includes both SO₂ and NO₂ in a ratio of ~7–12 respectively. The NO₂ probably originates by thermal fixation of atmosphere and/or magmatic N₂ at the lava lake surface (N + O₂ gives NO +O). The nitric oxide (NO) when combining with ozone (O₃), forms NO₂ + O₂ and depletes atmospheric ozone. High HCl and SO₂ from Erebus entering the stratosphere was a significant cause for ozone ‘hole’ depletion (Zuev, et al., 2015).

The second lapidary theme titled “**Diatreme II**” depicts a smaller-scale volcanic structure (Figure 2). This piece was featured in an Art Centre, at Golden, Colorado, USA, in February-April 2017. Diatremes represents deeper-seated volcanic feeders that form explosive pipes at higher crustal levels, as its volatile contents degas, fragmenting enclosing contact rocks and entrained volcanic materials, before forming crater like vent deposits at the surface (White & Ross, 2011). Their emplacements commonly show upward-expanding ‘carrot-like’ forms, as depicted in this lapidary section. As before, the lapidary depiction uses an extensive array of materials, including: **Slabs** of marble, poppy jasper, travertine, chrysocolla with quartz, snow flake dendrites and variscite in the surrounding matrix; **stone discs** of lapis, sodalite, amethyst, onyx, African turquoise, jasper, carnelian, red tiger’s eye, calcite, aventurine and **spheres** of amethyst, to illustrate the ascending eruptive pipe structure.



Figure 1. The Enemy within: Mt Erebus Volcanism and Ozone Depletion. 17” X 27”, 2017. Photo: Jerome Gilmer

Some diatremes represent ascent of deep melts from mantle depths, where kimberlites and lamproite magmas can carry up high pressure minerals, most notably diamond. Diatremes are well known in the Australasian geological records, where diamond-bearing examples are found penetrating older basement rocks (Shigley et al., 2001), form clusters of breccia pipes in the sedimentary basins such as the eroded Jurassic bodies within the Sydney Basin, New South Wales (Branagan & Packham, 2000), or accompany basalts within the young volcanic fields in western Victoria, SE Australia (Cas, et al., 2016) and Auckland, North Island, New Zealand (Hayward, et al., 2011).

Susan Judy exhibits many geological and even planetary themes within her lapidary art. Some pieces include Australasian decorative materials. Lava News readers are encouraged to explore her realms of geological lapidary art from examples posted on her website.

www.stonequiltdesign.com

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Figure 2. Diatreme II. 12” X 20”, 2017. Photo: Jerome Gilmer

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E. Lin Sutherland

Geoscience, Australian Museum, Sydney, NSW, Australia,

with special contribution from
Susan A. Judy
 Stone Quilt Design, Co, USA.

Geological Apps (continued)

FieldMove: Digital mapping and real-time visualisation straight onto your iPad. The QUT third year students use this, together with traditional geological mapping, when visiting the Arkaroola Wilderness Sanctuary, South Australia, for their independent final year mapping. <http://www.mve.com/digital-mapping>

Mineral Data: A simple but useful mineral identification App listing mineral properties and photos. <http://itunes.apple.com/us/app/mineral-database>

Australian Geology Travel Maps: An App you can download various scale maps into, in order to visualise the geology you are crossing when traveling Australia. <http://trilobite.solutions/maps/>

Volcano Ventures



Sonja and I returned from a tour of the Caribbean Plate boundary just 3 weeks ago [as of 1 April]. Lots of island hopping, still recovering. Our first stop was Nicaragua, the highlight a visit to Mount Masaya, an active volcano with a bubbling lava lake near the capital city Managua. Our bus dropped us right at the edge of the crater, we just had to wait till sunset to get a better view of the glowing lava. An unusual feature of the crater is that it is home to a green

parrot colony that clings precariously to the near vertical crater walls in swirling volcanic gasses containing at least H_2S and H_2O . This must be one of the most accessible active volcanoes in the Pacific and well worth a visit. We saw building damage from past destructive earthquakes in both Nicaragua and Haiti.

Kevin McCue



Volcanic Vocabulary

Some of our volcanic words are record-breakers in dictionary terms. Here are a few:

The longest....

The longest word in the Oxford Dictionary of English is:

pneumonoultramicroscopicsilicovolcanoniosis

which is a lung disease caused by the inhalation of fine silicate ash. It is the same condition as silicosis. The word was coined in the 1930s as a send up of long medical terms and was a deliberate attempt to be the longest in the dictionary.

The first....well nearly!

The first word in any dictionary has to be awarded to the indefinite article 'a', but the volcanic word:

aa

is not far behind (it even beats aardvark!). Many of us have heard of aa and pahoehoe lavas, both derived from Hawaiian terms. There are different versions of the word in the Hawaiian Dictionary including a 'a, 'a'a, 'a.ā and 'a.ā; the latter ('a.ā) is attributed to lava and means either 'stony' or 'to burn' (Pukui and Elbert, 1987).

References

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Adrian Pittari

LAVA News editor

LAVA Research Grant Scheme

The LAVA special interest group of the Geological Society of Australia provides a research funding opportunity for current post-graduate student LAVA members or recently graduated LAVA members looking for assistance with writing up/publishing their research. Applications are invited for research grants of \$200-500, up to a maximum of \$800. This grant scheme is designed to provide some financial assistance for volcanological related research activities, and/or for writing up papers from recent projects.

To apply please provide a short summary of your details, including your GSA membership number, the research activity to be undertaken and a detailed break down of your requested budget. Please also provide contact details of two referees and/or a statement of endorsement from your current supervisor.

Email your application to the LAVA Chair, Jess Trofimovs (Jessica.trofimovs@qut.edu.au).

Prioritisation of funds will be based on LAVA membership, students or early career researchers and impact. Successful recipients will be required to contribute to future LAVA Newsletter publications.

Please note that the decision on whether an application is successful will be determined by members of the LAVA executive committee and is subject to funds availability and number and quality of applications. Recipients are restricted to one successful application per year.

Jess Trofimovs

Future Events and Meetings

IUGG 2019, Montreal, Canada July 8-18, 2019
<http://iugg2019montreal.com/>

Cities on Volcanoes 11, Heraklion, Crete, 23-27 May, 2020

Geoscience Society of New Zealand Annual Conference, Hamilton, 27-30 Nov. 2019

IAVCEI Scientific Assembly, Rotorua, New Zealand, 15-19 February, 2021
www.iavcei2021.org

And Finally!

Thankyou to all contributors! We hope you have enjoyed this edition of LAVA News. The next edition will be issued in February/March 2019. We look forward to contributions to the next issue which should be submitted by **Nov. 15, 2019** to:

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