VOLCANIC PROCESSES, DEPOSITS, GEOLOGY and RESOURCES SHORTCOURSE 2017
Ray Cas, Pat Hayman, Jozua van Otterloo
3rd to 9th December, 2017
Merimbula, New South Wales

- Volcanic processes
- Deposit characteristics
- Rock textures
- Environments and eruption style
- Facies & stratigraphic architecture
- Relevance to mineralisation
- Terminology
- Fieldwork in subaerial and subaqueous volcanic successions
- Display specimens and textures
- Eruption process DVDs

*EARLY BIRD REGISTRATION
23rd August 2017

## ACCOMODATION AND MEALS INCLUDED IN THE FEE
VOLCANIC PROCESSES, DEPOSITS, GEOLOGY and RESOURCES SHORTCOURSE: MODERN AND ANCIENT SYSTEMS

3rd to 9th December, 2017
Merimbula, New South Wales.

This professional shortcourse is presented by Monash University, and the Centre for Ore Deposits Research, CODES, University of Tasmania.

COURSE OVERVIEW

- This week long professional shortcourse has been presented annually since 1982 in an annually updated format. Its structure is:
  - 3 days of lectures on volcanic and associated sedimentary processes, and relevance to ore deposits
  - 2 outstanding field days comparing the products, facies associations and stratigraphic relations of subaerial and subaqueous volcanic and associated turbidite and red bed sediments
  - Practical work based on an extremely comprehensive display of rock specimens and textures, thin sections, posters, maps, books and key research literature
  - DVDs of volcanic eruption phenomena and events.
- All parts of this course incorporate the latest concepts applied to the interpretation of modern and ancient volcanic settings and successions, and relevance to mineralisation.
- The course fee includes all accommodation and meals for the week, except during travel to and from the course on the first and last days.

WHO IS THE COURSE FOR?

- Those who need to understand physical volcanic eruption and emplacement processes, volcanic rock textures, the identification of rock types and their emplacement origins, facies and stratigraphic architecture of volcanic successions, associated sedimentary host rocks, and sub-volcanic intrusions, alteration effects, rock unit relationships and timing.
- Industry geologists/geoscientists
- Government geologists/geoscientists
- Research scientists and research students
- Academics
The course instructors are internationally renowned for their combined skills in the volcanology of modern and ancient subaerial and submarine volcanic systems, including mineralised successions.

RAY CAS (PhD, Macquarie Uni): Emeritus Professor, School of Geosciences, Monash University; Visiting Professor, CODES, University of Tasmania; Past-President of the International Association for Volcanology (IAVCEI). Extensive research and consulting experience in Palaeozoic and Precambrian volcanic and sedimentary successions of Australia (Yilgarn, Pilbara Cratons, Lachlan Fold Belt), Canada (Abitibi), Britain, Greenland, South Africa, and modern volcanic terrains (Andes, Australia, Japan, New Zealand, Canaries, Azores, Italy, Greece), including VHMS, epithermal, orogenic gold, komatiite NiS and diamond kimberlite systems. Co-author of the internationally acclaimed book: Volcanic Successions: Modern and Ancient (1987), which is currently being rewritten.

PATRICK HAYMAN (PhD, Monash Uni): Lecturer in Economic Geology, Queensland University of Technology, Brisbane. Research and exploration experience working on young volcanic terranes in Australia, Italy, Germany, Iceland, Japan and New Zealand, and Precambrian greenstone belts mainly in Australia (Yilgarn Craton, Western Australia), Canada (Ontario, Manitoba, Alberta, Nunavut and Northwest Territories), and West Africa. Pat has extensive experience in kimberlites and diamonds, and worked in VMS, komatiite-hosted Ni sulphide and gold systems. Pat recently completed a research fellowship working on a large industry collaborative project in the Archean Yilgarn Craton focussing on a terrane-scale volcano-sedimentary reconstruction. Recent work has focussed on the emplacement and formation of Au-mineralised mafic-ultramafic sills. He is now involved in AMIRA WAXI project in West Africa with CET, University of Western Australia and Monash University, focusing on Paleo-Proterozoic greenstone terranes.

JOZUA van OTTERLOO (PhD, Monash Uni): Lecturer in Volcanology and Petrology, Monash University. Jozua is a volcanologist and field geologist who likes to apply sedimentology, structural geology and geochemistry to better understand the products of magma-water interaction and how cooling affects magmatic intrusions. His PhD research (Monash University 2013) focussed on understanding the great stratigraphic and compositional complexity of Australia’s youngest volcano, Mt Gambier, South Australia. Currently, he researches complex dyke and sill formation from multiple sources using analogue laboratory models of gelatine. He also teaches volcanology and igneous petrology at Monash University and supervises student research projects.
**COURSE DESCRIPTION AND TOPICS**

- **The Course** will consist of
  - 3 days of illustrated lectures, viewing of eruption DVDs, specimens, and thin sections
  - 2 days of fieldwork on outstanding coastal volcanic and sedimentary rock exposures

- **The lecture course themes** will emphasise
  - understanding of modern volcanic processes, deposits and centres
  - how to apply this to understanding ancient volcanic systems
  - facies and stratigraphic architecture of volcanic and sedimentary successions
  - understanding the host rock successions to volcanic hosted mineral deposits.

- **During fieldwork** the following aspects will be emphasised:
  - differences between continental and submarine volcanic processes and successions
  - the methods of field facies documentation, and facies and stratigraphic architecture
  - palaeoenvironmental interpretation of volcanics, and host turbidites and “red beds”
  - volcanological interpretation in terms of eruption styles
  - assessment of environment, deposit types, proximity to eruptive centre,
  - basin setting and tectonic context.

- **Practical work** will involve examination of
  - spectrum of rock slabs, drill core and modern deposits from around the world
  - slabbed rock specimens with diagnostic textures, including alteration effects
  - thin sections of representative display specimens
  - display maps, posters, and aerial photos
  - a huge display of books and journal literature relevant to course topics

---

**Lecture Topics** to be covered include:

- **Introductory concepts**
  - diversity of processes and products, and facies approach

- **Magma:**
  - physical properties relevant to their eruption behaviour

- **Lava:**
  - subaerial and subaqueous rhyolites, andesites/latites, basalts and komatiites
  - distinguishing lavas from intrusions

- **Pyroclastic fallout deposits:**
  - types and their eruptions

- **Pyroclastic flows, ignimbrites and surges:**
  - intracaldera and outflow ignimbrites: transport and depositional mechanisms

- **Subaqueous pyroclastic flows or flows of pyroclastic debris:**
  - fact, fiction or a problem in terminology?

- **Sedimentary processes and products in volcanic terrains:**
  - their importance in interpreting ancient successions
  - their impact and hazards in volcanic settings

- **Terminology:**
  - the appropriate descriptive and genetic approaches

- **Ancient volcanic successions:**
  - understanding the structure and its origins
  - reconstructing the stratigraphy and facies architecture
  - facies models

- **Volcanism and mineralisation:**
  - volcanological models for mineralised volcanic successions
COURSE LOCATION & GETTING THERE

- The course will be taught residentially at the Black Dolphin Motel, Merimbula, on the scenic south coast of New South Wales. The motel has modern conference room facilities and is ideally situated for easy access to the Late Devonian Boyd Volcanic Complex during the 2 field days.
- Accommodation will be on a twin share basis, unless a $360 surcharge is paid for a single room for the week.
- Sunday 3rd December and Saturday 9th December are travel days to and from Merimbula. Participants can fly to Merimbula from Melbourne, or from Sydney by REX Airlines. Airfares to and from Merimbula will be at the participants OWN COST, and participants will have to make their own bookings well in advance. Flight time from Melbourne and Sydney to Merimbula is about an hour and a half. If enough people indicate an interest in travelling by road a minibus from Melbourne to Merimbula will be provided on Sunday, 3rd December, and back to Melbourne on Saturday 9th December for the scenic 9 hour drive.
- The course starts promptly at 8.30 a.m. on Monday 4th December, so all participants should arrive in Merimbula on Sunday 3rd December.

COURSE FEE AND ENROLMENT INFORMATION

- The EARLY BIRD COURSE FEE for professionals is Australian $3890 per person (including Goods and Services Tax [GST] of 10%), ii paid by 23rd August. The fee after 23rd of August is Australian $4150 (including GST).
- The course fee for postgraduate students is Australian $850 that person (including GST).
- THE FEE IS ALL-INCLUSIVE and will cover:
  - Course notes
  - ACCOMMODATION at Merimbula for six days from the night of third of December.
  - ALL MEALS at the Black Dolphin Motel.
  - Mini bus transport, fieldguide booklet and lunches for the 2 field days.
- Registration deadline: 1st November, thereafter on an availability basis only.
- Please email or mail the attached registration form (next Page) to:
  Professor Ray Cas (ray.cas@monash.edu)
  School of Earth, Atmosphere, and Environment,
  9 Rainforest Walk,
  Monash University,
  Clayton, Victoria 3800
  Australia
- Pay online, by cheque, or on the invoice (see attached registration form)
- For inquiries and preliminary registration
  - Telephone: 0400 967 610
  - email: ray.cas@monash.edu

- ENROLMENTS WILL BE ON A FIRST COME BASIS.
- Early registration will ensure a place for this usually oversubscribed course.
- However, late enrolments will be accepted if vacancies still exist.
NAME: ____________________________________________ Male/Female __________________

ADDRESS FOR CORRESPONDENCE: ______________________________________________________
________________________________________________________________________________

EMPLOYER: ___________________________________________________________________________

POSITION: _____________________________________________________________________________

TELEPHONE NO.: ____________________ • FAX NUMBER: __________________________________

EMAIL ADDRESS: _____________________________________________________________________

SPECIAL DIETARY NEEDS? ____________________________________________________________

SHORT COURSE FEE (this includes GST): Please circle
• Professional Early Bird twin share by 23rd August (Aust) $3,890
• Professional normal twin share after 23rd August $4,150
• Postgraduate student $ 850
• Single room surcharge $ 360
• TOTAL $_____

(NOTE: a cancellation service fee of $500 will be levied for cancellations within 4 weeks of the course, increasing to $1,000 within one week of the course.)

TRAVEL ARRANGEMENTS:
• Fly to Merimbula from Melbourne/Sydney before course (OWN COST) YES NO
• Fly to Melbourne/Sydney from Merimbula after course (OWN COST) YES NO
• Road transport required Melbourne to Merimbula, Sunday 3rd Dec. YES NO
• Road transport required Merimbula to Melbourne, Saturday 9th Dec. YES NO
• Make own way YES NO

PAYMENT DETAILS:
• Option 1: Pay by credit card – go to:
  Select registration items, click add to cart, then click the cart icon at the top, follow payment options.
  Visa and Mastercard are accepted. A tax invoice will be generated automatically upon completion of the credit card transaction.
• Option 2: Pay by cheque (A tax invoice will be mailed to you on receipt of your payment)
  • A cheque for $.___________ is enclosed.
  Please make out the cheque to "Monash University, Volcanics Short Course – 2017"
• Option 3: Pay on Invoice on request
  I verify that __________________________________________ is a full-time postgraduate student.

Signed: ______________________ Head, Department of ___________________
Some Fieldtrip Outcrops
Some Short Course Display Specimens