VOLUME 37 | NUMBER 2 | DECEMBER 2020

Quaternary AUSTRALASIA

AQUA e-conference

Lake Tennyson

Victorian vegetation survey

AQUA Current life members

Current life members are Jim Bowler, Eric Colhoun, John Chappell, Peter Kershaw, John Magee and Matt McGlone.

Jim Bowler
(Photo credit: socialpolicyconnections.com.au)

Eric Colhoun
(Photo credit: Tim Barrows)

John Chappell
(Photo credit: Helen Chappell)

Peter Kershaw
(Photo credit: ANU)

John Magee
(Photo credit: Giff Miller)

Matt McGlone
(Photo credit: Manaaki Whenua Landcare Research)

Future issues of Quaternary Australasia

AQUA Members,

For years we have offered our biannual journal Quaternary Australasia in both an electronic and a hard copy form. The cost for electing to have hard copies added to your annual membership was an additional $5. Very few AQUA members have chosen to add on a hard copy to their membership in the past few years. However, the cost of printing and mailing this year's magazines was near to $1000 with less than 15% covered by the $5 fee.

The executive have decide that starting in 2021 we will no longer offer a hard copy version of Quaternary Australasia. We feel that not only does an electronic only option better align with our environmental principals, but we can better use this money towards supporting our members in other ways (eg. Conferences, travel scholarships, student prizes).

We hope that in making this transition we are better able to represent the current needs and ideals of the AQUA community.

Heather Haines
AQUA Treasurer

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Front cover photo:

Springtime at Lake Tennyson. David Barrell (GNS Science) and Greta Stuthridge (VUW/NIWA) set off for another days fieldwork at Lake Tennyson, New Zealand.
(Photo credit: Shaun Eaves)

Below:

Tim Barrows with parts of the Franz Josef Glacier. See "News from the Field".
(Photo credit: Tim Barrows)

EDITORIAL

Dear Quaternarists,

In a fit of nostalgia for a world more normal, I looked back at the December 2019 issue of QA. It seems it was written in a parallel universe, with reports on scientific and social gatherings at INQUA Congress in Dublin; many reports on field tours and reports of active research projects. So much has changed, and now our lexicon includes more words like disruption, pandemics, social distancing, bubbles, R number, vaccine etc. We really had little idea of what was peeking over the horizon back in December 2019.

We have been fortunate in Australasia to have favourable geography: island nations with securable borders, and manageable populations where public health measures can be employed to control outbreaks. And certainly for universities, the impact this year has been swift. Closed borders and few international students has resulted in a drop in revenue and resultant cost cutting measures. A wholesale shift to teaching on line. And quickly. Together with our colleagues in research institutes, we have endeavoured to meet our research outputs. It has been a challenge to our mental and physical energy.

But to quote Benjamin Franklin: "out of adversity comes opportunity". While we had to cancel our AQUA conference, we took the initiative and organised a pop up e-conference which proved to be popular, with sessions to cover both Australian and New Zealand research. We asked our ECR's to step up to the plate and chair sessions, and this proved to be highly successful. Zoe Thomas' report can be found in this issue. And our conference is rescheduled for 2021. With the possibility of a Trans-Tasman bubble early next year, fingers crossed for a successful conference in the Atherton Tablelands.

Field research continues. Here we report on a programme of research in the Lake Tennyson area in Canterbury, incorporating researchers from many different institutes in New Zealand. Matthew Adeleye reports on an extensive vegetation survey in Victoria, while Tim Barrows reflects on a past field trip to the West coast of New Zealand, and the challenges of fieldwork in the impenetrable and wet bush.

In other news, with the recent re-election of the Government in New Zealand and the declaration of a climate emergency on December 3rd, there is the promise its public sector at least can achieve carbon neutrality by 2025. The Government's programme will be backed by a NZ$200 million ($142 million) fund to finance replacing coal boilers and help purchase electric or hybrid vehicles (Reuters, 2020). There is hope that here in New Zealand we can start to prioritise and focus on achieving some tangible outcomes.

Reuters (2020). New Zealand PM Ardern Defends Climate Change Goals After Thunberg Scoffs at Emergency Declaration. Accessed 17/12/2020 from https://www.usnews.com/news/world/articles/2020-12-14/new-zealand-pm-ardern-defends-climate-change-goals-after-thunberg-scoffs-at-emergency-declaration

Teaming up with Sanja and Carol on the editorial team are Emma Rehn and Lydia Mackenzie. They join us as shadow editors on Quaternary Australasia. Welcome aboard.

Yours Quaternarily,

Sanja Van Huet and Carol Smith
Co-editors

Emma Rehn and Lydia Mackenzie
Shadow Co-editors

PRESIDENT'S PEN

Kia ora koutou; greetings fellow AQUA members,

For those who don't know me, my name is Lynda Petherick, and it is my privilege to be the incoming AQUA President. I would like thank outgoing President Tim Cohen and the executive committee for all the hard work over the past few years, which in particular has continued to build on supporting students and ECRs and fostering collaboration in our community. Thank you also to all the newly elected committee members who agreed to stand. It is a real testament to the strength of our community that there were multiple people nominating for positions. There have already been some exciting ideas around an AQUA climate change statement, an equity policy and virtual panels to further support students and ECRs in these uncertain times.

To say it has been a challenging year is a bit of an understatement. The global COVID-19 pandemic is certainly exceptional, which hopefully we won't see again in our lifetimes. Unfortunately, it seems we will be feeling the repercussions for the next few years. However, I think within that there are positives to be taken away, such as our resilience and ability to work together virtually. Although not ideal, it is possible, and certainly reduces our carbon footprints. This was highlighted in particular when the planned AQUA 2020 conference on the Atherton Tablelands had to be postponed. Helen Bostock proposed an "AQUA 2020 pop-up-e-conference", co-organised by Chris Moy. The conference was a great success, with an excellent couple of days of presentations, and strong representation from students and ECRs.

Thanks also the organising committee for the planned Atherton AQUA conference, led by Cameron Barr, who made the difficult decision fairly early on to postpone to 2021. Here is hoping that the trans-Tasman "bubble" opens, and we can all catch up in person. For those in New Zealand, at the recent GSNZ conference Peter Almond proposed a series of "Friends of the Pleistocene" field trips in 2021. The first is tentatively proposed to dovetail with the GNS Quaternary Techniques workshop in April. Keep an eye out for further details.

Finally, I would like to acknowledge the semi-retirement of Prof. David Lowe. David was a member of the Australian Quaternary group from 1979, and a foundation member of AQUA since 1982. He has contributed to both AQUA and the international community in multiple ways, in terms of research, service and teaching, which has been acknowledged by numerous awards. On behalf of our community, I would like to thank you David for all your hard work. Enjoy your semi-retirement, and take a break!

Noho ora mai; stay well and look after yourself,

Lynda Petherick
AQUA President

NEWS

University of Adelaide Earth Science seminars

John Tibby, University of Adelaide. For those who have missed the University of Adelaide Earth Science seminars access these links to see what you have missed.

All presentations were recorded (unless otherwise requested by the presenter).

Please find links here https://globalecologyflinders.com/seminars

Postcard from Scotland

Martin Williams

University of Adelaide.

Martin Williams wanted to share this postcard of a memory with the AQUA community.

Martins description below.

"John Chappell posted this card of the glaciated Cairngorms in winter on 4 July 1991.

David Dunkerley spotted it in my pigeon-hole and added a sticky note. I supervised David's Honours dissertation at Macquarie (Earth Sciences) and John supervised his PhD at ANU. The reference to Waldheim harks back to a walk we four of us did to Frenchman's Cap in Tasmania when we were PhD students at ANU. Our aim was to climb the Cap but a summer blizzard put an end to that."

Martin –
Wow! A card from JC!
You are in luck.
I imagine that he has been having a great time in the UK: I can picture him, drawing idly on a pipe, scratching out elaborate manuscripts, & having a jar at the local afterwards!
D-D

Norman H Taylor Memorial Award 2020

This award, from the New Zealand Society of Soil Science (NZSSS), is nominated annually by the Society's President, in recognition of outstanding contributions to soil science in New Zealand. This year, our Co-editor, Carol Smith was the recipient.

As part of the global celebrations for World Soil Day on Saturday 5 December, the NZSSS teamed up with Soil Science Australia for the first time to present a virtual World Soil Day event. Soil scientists from all over New Zealand and Australia gathered by zoom to participate in a range of presentations. The Trans-Tasman event included the annual NZSSS awards. This included the presentation of the Grange medal to Dr Fiona Curran-Cournane, facilitated by Professor David Lowe, at Waikato University. The Medal is named after Les Grange, the first Director of the NZ Soil Survey Division in DSIR in 1936, and later Director of the NZ Geological Survey in 1952. The Norman H Taylor Memorial award was presented to Carol Smith. She delivered a lecture "Learning is better by doing: pedagogy in a disruptive world". Like the Grange medal, the Norman H Taylor award is named after a founding figure of New Zealand soil science. Norman Taylor, who established the NZSSS, became Director of the Soil Bureau in 1952 taking over from Les Grange. Norman Taylor also introduced the genetic soil classification to New Zealand in 1948, the precursor to the soil classification we use in New Zealand today.

FOUR SEASONS IN ONE WEEK – SPRING FIELDWORK AT LAKE TENNYSON, CANTERBURY, NEW ZEALAND

Shaun Eaves[1] and Andrew Lorrey[2]

1 Victoria University Wellington

2 National Institute of Water and Atmospheric Research

"O Earth, what changes hast thou seen"
Alfred, Lord Tennyson (In Memoriam, sect. 123; 1850)

Glacial modification of alpine regions of New Zealand's South Island represents some of the most striking visible evidence of Earth's recent glacial past (Lorrey and Bostock, 2017). The combination of fast-flowing, temperate glaciers and abundant sediment availability has created iconic landscapes that frequently permit precise delineation of past ice extent. Mountain glaciers exhibit a simple relationship with climate, responding sensitively to even small changes in air temperature (Mackintosh et al., 2017). Thus, these relict glacial landscapes represent useful geological archives from which to measure Earth's past temperature changes.

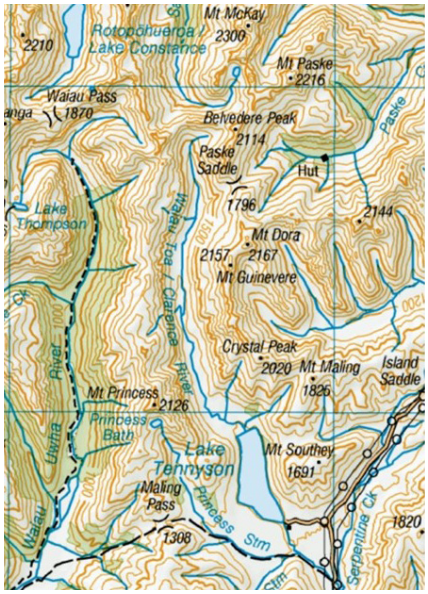
Reconstructing climate from glaciers involves three main steps. First, the spatial distribution of glacial landforms must be mapped to establish the footprint(s) of the former glacier. This step comprises evaluation of remote sensing datasets (e.g. aerial photography, digital elevation models) to identify potential glacial landforms, which is then validated or reinterpreted by field interrogation. Second, the timing of glacier occupation must be established through application of geological dating techniques. Traditionally, glacial geology has lacked methods for direct dating of glacial landforms. However, the emergence of cosmogenic surface exposure dating over the last two decades has revolutionised this field. Finally, the climatic significance of the past ice geometry may be constrained quantitatively using manual snowline reconstruction techniques and/or physics-based numerical glacier modelling (e.g. Eaves et al., 2017). In combination, the products of these research steps provide a powerful insight to the timing and magnitude of pre-historic climate changes.

In September 2020, after national and regional COVID lockdowns, a collaborative team of Quaternarists from NIWA, GNS Science, and Vic. Univ. Wellington descended on Lake Tennyson, a ~2.2km^2 high country lake situated in North Canterbury, about 35 km north of Hanmer Springs township. The lake occupies a glacial trough, excavated by a glacier that descended from the headwaters of the catchment, which rise to ~2100 m elevation approximately 11 km upstream. Numerous moraines bound the southern lake margin, clearly defining previous terminus fluctuations of the former glacier. McAlpin (1992) provided a detailed description of these landforms, but lacking secure chronological methods, could only speculate on their age, and thus their climatic significance. Since 2011, a NIWA-led project, with key support from Lincoln University, University of Auckland and University of Wollongong scientists, has applied surface exposure dating and radiocarbon dating of inter-moraine bogs to provide a new chronological framework for Lake Tennyson's glacial history (Woolley, 2016). This emerging work confirmed, for the first time, that the glacier occupied the site at the peak of the last ice age, approximately 19,000 years ago.

Outstanding questions remain: How much time is represented in the full glacial sequence? Under what climatic conditions did this glacier exist? When did deglacial warming and glacier retreat begin? The aim of our recent field campaign was help find answers for these questions. Specifically, we wanted to better characterise the glacial geomorphology using aerial-LiDAR surveying, undertake radar-based imaging of subsurface sediments, and collect further samples of moraine boulders for cosmogenic surface exposure dating. The spring weather, typically turbulent, stayed true to form providing hail, snow, wind, and sun over just a few days. The strong winds put paid to aerial surveying (this was later achieved), however ground-based work proceeded regardless of conditions. Further work will take place in the 2020-21 summer to shore up the emerging chronology of glacier fluctuations and the implications for the end of the last ice age. Watch this space!

Ongoing work at Lake Tennyson in North Canterbury since 2011 is aiming to use cosmogenic dating to refine New Zealand glacial history. The most recent trip in September saw four seasons in a week

Photo credits: Shaun Eaves / Andrew Lorrey



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FIELD TRIP REPORT: VICTORIA'S LANDSCAPE AT A GLANCE

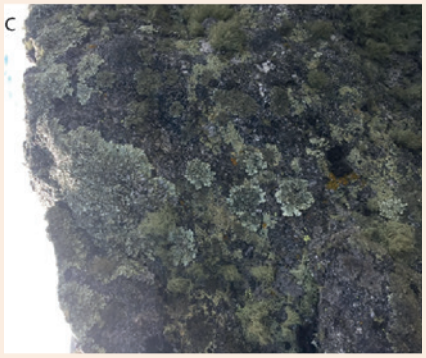
Matthew Adeleye

School of Culture, History and Language, The Australian National University, Canberra, ACT, Australia.

Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage

In April 2019, I participated in a two-week field vegetation survey of the Victorian landscape, southeast Australia (Fig. 1), which was led by Dr. Simon Connor (Australian National University) and Dr. Mariani Michela (University of Nottingham, UK). The purpose of the field trip was to generate vegetation survey and surface moss sample data sets to calibrate fossil pollen records, using the 'REVEAL' modelling approach, for a better palaeo-land cover reconstruction on the southeast Australian mainland. A similar fossil pollen calibration and quantitative land cover reconstruction has been previously done in Tasmania (see Mariani et al., 2016, 2017). The data sets generated for the southeast mainland have now been used in some new exciting studies, which have been submitted for publication. During the course of the Victoria field trip, I made some observations and took some notes, which are highlighted here.

The Alpine Shire tree line is at ~1800 m above sea level (asl) and the vegetation is characterized by heathlands, dominated by members of the Myrtaceae and Fabaceae, as well as tussock grasslands. (Fig. 2a). Other plants present include *Plantago* and *Olmites*. Wetlands (bogs) are also present in some areas, and rocky substrates and bare grounds are covered with lichens (Fig. 2b and 1c). Below the tree line (~1200–1500 m asl), *Eucalyptus pauciflora* (snow gum) and the aforementioned alpine communities dominate, with traces of fire effect. Towards the tree line the snow gums are more of krummholz i.e., they are small and stunted, perhaps due to colder temperatures, shallow soils and limited nutrient availability (Fig. 2d). Below ~1200 m asl, sub-alpine woodland is dominant and characterized by tall *Eucalyptus*, with understories composed mainly of *Acacia*, tree ferns, and *Pteridium*. At ~600–700 m asl, woodland is dominated by heathy understory and Banksia in dry areas, while the understory is dominated by grasses, with patches of shrubs (*Lycopogon, Hakea, Pomaderris* and *Epacris*) in damp and fairly-closed areas. The damp areas also house old growths (*Eucalyptus* trees >60 m in heights), with average diameter of >50 m. Basidiomycete species were commonly observed on tree barks due to the dampness of the forest (Fig. 3n-q).



Left - Figure 1: Location (black dots) and transect (red broken line) of vegetation survey across Victoria, southeast Australia.

Top - Figure 2: The Alpine Shire tree-line heathland and grassy vegetation (a), wetland (b), rocks covered with lichens (c), and heathland, with scattered krummholz (arrow) at tree line (d). All photo credits: Matthew Adeleye.

Figure 3: Warm rainforest in southern Victoria (a), with surrounding shrubland (b), and Eucalyptus and Banksia woodland (c). Fragmented Bass Strait Islands on sight (d) in the southern inlet, with low current, dominated by Aviccenia (red mangrove) and Amaranthaceae (e). Basidiomycete species found in rainforests (f-m), damp forests (n-q), coastal area (r-s), and Little Desert (t-u).

South of the Alpine Shire at low elevation towards Wilsons Promontory, is a warm rainforest, dominated by *Eucalyptus* and *Syzygium*, with *Melaleuca*, tree ferns, *Pteridium* and mosses dominating the understory (Fig. 3a). Basidiomycetes were also common in this forest not only on tree barks (as in the damp forest on higher elevation) but some also rooted directly into soils, further reflecting the forest wetness. Basidiomycetes in the rainforest were also diverse, with about nine different types recorded (Fig. 3f-m). Outside the warm forest are surrounding heathlands dominated by *Leptospermum, Melaleuca, Pteridium,* and *Xanthorrhoea*. (Fig. 3b) and *Banksia–Eucalyptus* woodland, with heathy understory dominated by *Xanthorrhoea, Pteridium, Monotoca,* Fabaceae and *Casuarinaceae* (Fig. 3c).

Further south towards the coastline, *Leptospermum* heathland dominates, interspersed by *Spyridium, Kunzea* and *Melaleuca*. *Typha* and *Plantago* are present in riverine sites in this area. The Bass Strait inlet (around Wilsons Promontory), a low energy coastal area, is characterized by *Aviccenia* (red mangrove) and Amaranthaceae along the coastline, followed by a *Melaleuca* and Amaranthaceae zone away from the coast, with thin and average height-*Eucalyptus* trees (Fig. 3d and 3e).

West of Victoria (before the Grampians) is a volcanic landscape characterized by extremely sparse vegetation, followed by a zone characterized by *Eucalyptus* woodland with bare grounds and grasses. *Pinus* trees are abundant in this area as well with scattered shrubs.

Further west is the Grampians, a generally dry area, characterized by shrubby *Eucalyptus* woodland on rocky substrates, with many traces of recent fires, and woodland floors covered with mosses and lichens. The *Eucalyptus* species are adapted to fire, as most tree barks were heavily charred at the time of survey, but not dead. Shrub communities are dominated by *Leptospermum* and dwarf *Callitris*. Forests also exist in some areas, with fairly moist forests dominated by tall *Eucalyptus* and understories composed mainly of *Acacia* and *Melaleuca*, while dry forests are dominated by *Eucalyptus* and Casuarinaceae, with patches of *Acacia* in some areas, especially at lower elevation (~200 m asl).

Some forests are also dominated by *Callitris, Hakea*, and *Acacia*. In general, *Callitris* is mostly restricted to rocky sites at the Grampians (Fig. 4a).

Further west away from the Grampians is the Little Desert, which is a drier area typified by scattered *Eucalyptus-Banksia* woodland, with abundant *Xanthorrhoea* and *Hakea* understories on sand dunes (Fig. 4b). *Eucalyptus* species in this area are similar to those in the Grampians with fire-adapted barks. Little Desert has scorching temperatures during the day, with a lot of blood-sucking flies that camouflages like common house flies.

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Figure 4: Rocky escarpment in northern Grampians, dominated by shrubs, mosses, lichens and small *Callitris* trees (a); *Eucalyptus*, *Banksia*, and grass trees on glacial sand dunes at Little Desert, western Victoria (b-c).

FIELD FLASHBACK: FIELDWORK ON THE WEST COAST OF NEW ZEALAND

Professor Timothy Barrows

University of Wollongong/University of Portsmouth

In 2011, I led a small expedition to the west coast of New Zealand's South Island. The project was funded through the Australian Research Council to construct some key chronologies in glaciated areas around the Western Pacific Ocean. On board we had Peter Almond (west coast glacial and soil expert), Stephanie Mills (glacial geomorphologist and modeller) and Andre Eger (then PhD student working to the south). I was collecting samples for exposure dating and mapping moraines.

We arrived at Franz Josef in Westland and while waiting for Peter and Andre, Stephanie and I visited Franz Josef Glacier, which has retreated substantially in recent years. In the last Ice Age, the glacier extended out onto the coastal plain down the Waiho valley and onto the exposed shelf. Another lobe flowed north, where Lake Mapourika is now located. This lobe left a series of spectacular retreat moraines over the last glacial cycle, preserved as flow was progressively focused into the Waiho valley. Late in the Pleistocene, there was one final major advance that left a crescentic moraine, the notorious feature known as the Waiho Loop. We visited the back of the Waiho Loop and documented a 1000-year-old forest layer buried under gravel by the nearby migrating river.

Figure 1: Author holding chunks of the Franz Josef Glacier from the Waiho River.

Previous Page:

Figure 2: Franz Josef Glacier, January 2011.

Figure 3: Buried forest at the back of the Waiho Loop.

This Page:

Figure 4: Transport ready for takeoff.

Figure 5: Insertion into the rainforest.

Figure 6: Spot the boulder in the dense rainforest.

Once Peter arrived, we went to collect our permit from the Department of Conservation to sample within the National Park. The ranger passed on to us a map of rat trapping lines that they were using in the forest to protect the kiwis. In the almost impenetrable primeval rainforest of tangled supplejack, this map later proved invaluable. Because of very slow travel times and heavy loads, we opted to be inserted into the middle of the forest via helicopter. We were dropped into one of the few bogs with enough clearance to land and after its departure we were drowned in extraordinary silence. We found a dry camp site, listened to kiwis calling during the night and then over the next week we traversed moraine crests hunting for boulders and digging soil pits.

We had worked back from the oldest moraines, following the rat trapping lines and needed to sample the youngest on the north side of Lake Mapourika. We had prearranged for the helicopter to help us shift camp and although we could hear it, it missed our pickup time. A call on the 'sat phone' back to base revealed that the pilot did not secure the map and it flew out the window. I suggested the pilot head north (we could hear him in the south looking for us) and then I said "warmer" or "colder" according to how loud the helicopter was until he found us.

Although it had been wet, we were faced with our first classic west coast torrential downpour. The average annual rainfall at the edge of the coast is 4 m per year and a balmy 11.5 °C average annual temperature. On our return to the camp, dodging some feral deer, we discovered the small creek we had crossed earlier in the day was swollen with rain. Using some backcountry knowhow, Peter made sure we crossed safely, and we arrived at our tents thoroughly saturated. Fortunately, we were due to be extracted the next day. I had hired a tourist vessel to cross the lake and pick us up along the shore. Most of the rest of the day was spent drying gear in Hokitika.

The results from the exposure dating showed that the outermost moraines are 65,000 years old and the youngest are closer to 17,000 years. The results are consistent with the presence of Kawakawa-Oruanui tephra on the older moraines. Our results have helped constrain modelling of the glacier and can also be used to construct a soil chronosequence to look at soil nutrient evolution through time.

Figure 7: Attempting to keep spirits up during the downpour.

Figure 8: Author helping Peter cross an engorged stream.

Figure 9: Boat pickup, Lake Mapourika.

CONFERENCE REPORT FOR THE 2020 AQUA POP UP E-CONFERENCE: VIRTUAL MEETINGS IN A COVID WORLD

Zoë Thomas

Faculty of Science, School of Biological, Earth & Environmental Sciences, University of NSW

Following the postponement of the 2020 Atherton Tablelands AQUA conference due to COVID-19, Helen Bostock and Chris Moy organised a two-day online AQUA pop-up e-conference on 1-2 July 2020. This was designed to highlight new or ongoing work in the Holocene and Pleistocene with minimal barriers to participation, given the current circumstances. Presentations spanned a vast range of topics, including past climates/environments, tectonics, stratigraphy, geomorphology, volcanology, and biogeography. As usual, submissions were particularly encouraged from early career researchers and postgraduate students. The conference brought together over 120 participants across Australia, New Zealand, and further afield. Chairs were all selected as early-career researchers, under the excellent guidance of Helen and Chris. This is a practice that was introduced in recent AQUA conferences – giving less experienced researchers these opportunities in a friendly environment – and it worked seamlessly throughout the two days.

The first day was New Zealand – centred, hosted by Chris Moy (University of Otago) with presentations sub-divided into 5 themes: Quaternary Life and Environments, Active Earth, Quaternary Chronology, Antarctica and our Southern Oceans, and NZ's History of Climate and Ice. There were 30 presentations each lasting 10 mins (including time for questions). We heard about extending the radiocarbon calibration curve using NZ swamp kauri (Drew Lorrey), a new reference database for Quaternary tephra in NZ 'TephraNZ' (Jenni Hopkins), the discovery of a giant Pleistocene Penguin from the Wanganui Basin (Marcus Richards), a data-model comparison of marine primary productivity during the Last Glacial Maximum (Liz Keller), and a lipid-biomarker approach for reconstructions of south west Pacific climate and environmental change (Sebastian Naeher), amongst many other fascinating talks.

The second day was Australia-focused, hosted by Helen Bostock (University of Queensland), with themes of Ice cores and Southern Ocean, Hydrology and Circulation, Fire, Morphology and Dendrochronology. There were 23 presentations each lasting 15 mins. Some of the highlights were presentations on the Million Year Old Ice Core project (Joel Pedro), a crash-course in ARC grant success (Helen McGregor), climate-vegetation insights on human arrival in Tasmania (Michael-Shawn Fletcher), using GPR to identify water-level history of North Stradbroke Island wetlands and lakes (Allen Gontz), and a tree-ring reconstruction showing links between Australian monsoon transitions and Pacific sea surface temperature (SSTs) (Kathy Allen).

While it was clearly very different to a face-to-face conference, the technology was generally excellent, and like any other conference it was still a great chance to get to know names, faces and research topics of the AQUA community. The rich and diverse research presented during the conference truly highlighted the breadth of interests of the AQUA community, but arguably the most valuable was the opportunity to share ideas and concepts with colleagues. The programme was inclusive to all career stages, with speakers and participants ranging from Honours students through to senior academics. We even had a student in the UK joining to present at the end of day 2! Clear benefits of the online format include the increased accessibility, negligible cost, and flexibility for each participant to fit around their own work and personal commitments. These are important considerations at the best of times, but even more vital in these uncertain times.

One aspect that the online format slightly hindered was the discussion time that would usually happen during the breaks of a face to face conference, or even just the opportunity to give positive feedback. Perhaps more use of the chat function would have helped to create a more inclusive discussion session – certainly the chat was used more throughout each day. In addition, the exact platform of choice, e.g. a standard 'zoom' call, or a 'webinar' is something to consider. There is a balance between the need for some level of security to prevent the inevitable 'zoom-bombing', and the openness of the conference, allowing everyone to be seen and heard. While

most AQUA members are looking forward to the return of face-to-face conferences, perhaps the retention of this two-day online format every other year (alternately to the biennial AQUA in-person conference) could be considered; this would allow the involvement of researchers who cannot travel to conferences due to financial, work, or personal constraints. Whatever the format of future AQUA engagements, a guiding principle of inclusivity is essential to ensure all members of the diverse AQUA community can be represented.

The AQUA AGM immediately followed the presentations at the end of day 2, which resulted in an excellent turnout and a robust discussion of important AQUA-business!

Huge thanks to Helen Bostock and Chris Moy for organising the two days.

AQUA WORKSHOP REPORT

SPLOSH 2020 – WORKSHOP ON SOUTHERN HEMISPHERE PERSPECTIVES ON SUBMERGED PALAEOLANDSCAPES

Ingrid Ward

University of Western Australia

On behalf of the SPLOSH Organising Committee

ABOUT SPLOSH

The study of submerged coastal landscapes and human occupation records has rapidly emerged as a key topic in Quaternary science in the last decade, aided by new and higher-resolution technologies and focused research programs. These are only beginning to be translated to the Southern Hemisphere where; with its wide range of latitudes (from ~12fffN to ~56fffS) and climatic and biogeographic contexts, it presents a whole suite of different challenges and opportunities.

This year a new international focus group on Submerged Palaeolandscapes of the Southern Hemisphere (SPLOSH) was set up (Figure 1).

Funded by INQUA for 2020 – 2023, the SPLOSH focus group aims to increase awareness of submerged landscapes and environmental changes in the Southern Hemisphere, and help provide a platform for scientific exchange and interdisciplinary collaboration to help strengthen the importance of research in this region. Although the SPLOSH webpage is still in development, we do have an interactive map that shows where research has or is happening in the Southern Hemisphere (Figure 2) and welcome any new additions.

Figure 1: Splosh logo

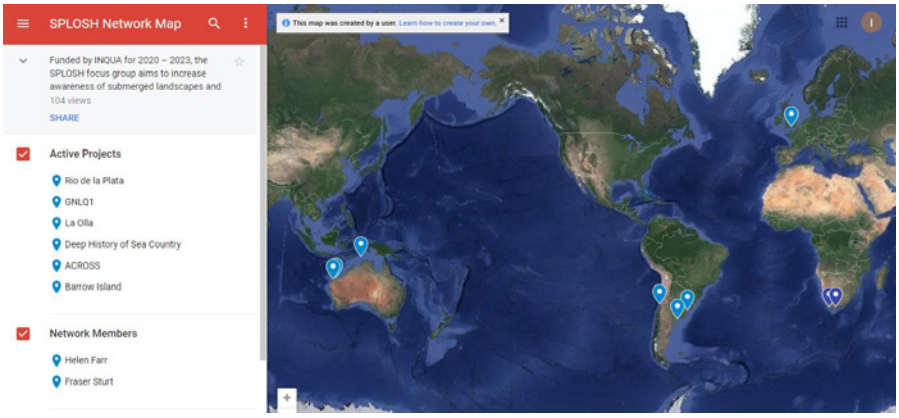

Figure 2: SPLOSH Network Map. Available at https://www.google.com/maps/d/viewer?mid=1B8Kt9dwLTohiGWpeVNNY81xM-WfSvpDK&ll=8.416255304744706%2C-111.27535920000003&z=2

SPLOSH WORKSHOP

On 22 October, SPLOSH held the first of a series of annual workshops aimed at showcasing and exploring current submerged landscape research in the Southern Hemisphere. Due to COVID, this workshop was held online and attracted over 100 registrants. The following provides a brief overview of what was presented.

From the global perspective, there is a growing interest and application of Indigenous Knowledge in environmental and marine resource management as part of a shared heritage. Hence the workshop began with a presentation from Prof. Patrick Nunn (Southern Cross University), who has written books and papers on oral traditions that allude to or may encode memories of extreme events including postglacial sea-level rise and the effects this had on land and people. His presentation outlined how incorporating Indigenous memories can enrich a science-based understanding of such events. Prolonged land loss resulting from postglacial sea-level rise can also be shown to challenge coastal peoples both past and present.

Maintaining an Australasian focus, the next two presentations by Brendan Brooke, (Geoscience Australia), and Helen Farr, (Southhampton University, U.K.) considered drowned coastal landforms on the Australian continental shelf as sites for targeted archaeological investigation. Many of these drowned landforms, which include beach-ridge strand plains, coastal dune fields, estuarine channels and coral reefs, have been mapped using high-resolution remote survey techniques. Helen's talk specifically focused on work now being carried out by the EU-funded ACROSS project in the Bonaparte Gulf of northern Australia and highlighting the need for community-based approaches to submerged landscape research.

Turning next to South America, presentations were given by Alex Bastos (Universidade Federal do Espiroto Santo, Brazil) and Diego Carabias (Centre for Maritime Archaeology Research of the Southeastern Pacific, Chile). Alex presented research on on paleoshorelines, valleys and lagoons in the eastern Brazilian shelf. Sedimentary records here indicate a sedimentation pattern shift from a coastal terrigenous input dominance to a shallow and open marine environment sometime around 11,500 kyr BP. Diego gave us an insight into some exciting emerging work from a site on the Pacific Coast of South America known as GNL Quintero 1 (GNLQ1), dating to around the Last Glacial Maximum (ca. 24-19 kyr). Here well-preserved evidence of extinct megafauna and early human occupation has survived on a relatively narrow and steep continental shelf, with much potential to reveal more about this significant period in prehistory.

Our talks then turned to South Africa, with presentations from Hayley Cawthra (Council for Geoscience) and Andrew Green (University of Kwazulu, Natal). Hayley presented the results of a decade of research on the Palaeo-Agulhas Plain in southern South Africa. This work includes a fully integrated model of an extinct ecosystem including grasslands, savannah and wetlands but which has had a profound and lasting effect on modern biological and anthropological landscapes. Andrew also presented palaeo-landscapes on the SE African shelf, which in many instances showcase a coastal morphology drastically different to the modern coastlines of the region – including waterfalls! These landscapes have potential to provide insights into the past climate, primary drivers of coastal change and anthropological potential for the early Holocene.

The final talk of the workshop was given by Fraser Sturt from Southampton University, U.K., which gave a wonderful overview of the current state of play for submerged landscapes and its research communities. Fraser's presentation highlighted how the research into submerged landscapes is generally episodic as progress is focused on particular parts of the globe, and what we can learn from the methods, results and history of research in the Northern Hemisphere to galvanise future activity including in the Southern Hemisphere. A key conclusion of Fraser's talk is that we need to maintain and grow the community of submerged landscape researchers, including Indigenous knowledge holders. We hope SPLOSH provides some means to help achieve this. In doing so, it will also feeds into the United Nations Ocean Decade (see https://oceandecade.org/) that also aims to provide a platform for information sharing and raising awareness around marine cultural heritage.

THE WINDY DAY DOWN UNDER

Paul Hesse and Sam Shumack

Department of Earth and Environmental Sciences, Macquarie University

23 September 2020, everywhere

What better name for a day devoted to aeolian studies? That's why we shamelessly stole it from the UK community who have held 'Windy Day' symposia annually for many years. In our case, the Windy Day Down Under would also concentrate on the research of students and ECRs but would also include contributions from established researchers (or EORs – exceptionally old researchers – as Patrick Hesp offered).

Of course, the other major difference was that this was a Zoom conference. While this was necessitated by the ongoing pandemic, it was also the perfect technological solution for our small and disparate community.

While the video conferencing technology opens up some wonderful opportunities for exchange, it also opens up some interesting scheduling challenges. In the end, we had 16 speakers from 10 different time zones. While most were from Australia and New Zealand, our speakers called in from Korea, Israel, Germany, Canada and Brazil as well. At least, that was the intention. Our scheduled first speaker was thrown by the time difference and called in the next day. Because of the time differences, starting in the evening in the Americas and finishing in the early morning in Europe, our audience changed over the day. Over 60 people registered interest in the event and at our busiest there were 35 people listening to the talks.

Presentations ranged from the experimental, to data syntheses, from field investigations to remote sensing, from Mars to Earth, from global to local, including coastal dunes in South Australia, New Zealand and the Maldives, and desert dunes in the red centre, and spanned the recent (such as last year's dust storms), through to the past (though still recent-ish) Quaternary, with records of dust in South American bogs, SW Pacific deep-sea sediments, and Central Asian loess and the history of construction of sand dunes in Australia, Israel and Kazakhstan in response to Quaternary change.

After a year in which the International Conference on Aeolian Research was cancelled and we have all endured (or perhaps enjoyed?) months of some level of isolation, this was a great opportunity to share our research and to have some relaxed catch-up chat in the breaks. The Zoom format seems to meet the particular needs of our time but also of our community. Although we're not sure if the Windy Day Down Under will become an annual event or some more regular format, we are sure that it will happen again.

THESIS ABSTRACTS

LATE QUATERNARY HYDROLOGICAL RECORDS IN JORDAN AND EGYPT INFERRED FROM OSL DATING ON LACUSTRINE SEDIMENTS; IMPLICATIONS FOR PALAEOCLIMATE AND HUMAN DISPERSAL IN THE MIDDLE EAST

Mahmoud M.R. Abbas (PhD)

School of Earth Sciences, China University of Geosciences, Wuhan, China

Former lakes and wetlands in the Levant (Middle East) provide valuable insights to late Quaternary hydrological conditions in an area considered a key route for human dispersal out of Africa. Ancient hydrological systems provide crucial clues about fluctuations in the availability of water in what is now an arid environment. Few hydrological investigations have been conducted and hence little is known about the history of water resources in this pivotal region. The investigations in this thesis provide insights to the past and present-day hydrological behaviour of drainage systems with an aim to better understand the links between palaeohydrology and palaeoclimate records in hyperarid deserts.

This thesis consists of two parts. Firstly, a field – and modelling-based reconstruction of the peak flood discharge and related hydrological parameters for an upland catchment, Wadi Umm Sidr, in the Egypt's Eastern Desert. During a major flood in 2016 peak discharge is estimated at ~500 m3 s^{-1}, yielding a unit-area discharge of 4.85 m3 s^{-1} km^{-2}, which is consistent with the runoff generation attributes of similar hyperarid sites in the Levant (Abbas et al., 2020). Secondly, new

Above - Figure 1: Wadi Gharandal wetland oasis, with the Araba Valley beyond.

Left Top - Bottom

Figure 2: Wadi Gregra main valley showing the lacustrine/wetland sediments inset within Proterozoic rocks of Jebel Hamra (left background).

Figure 3: Wadi Gregra, 6 m thick section of lacustrine sediments.

Figure 4: Collecting OSL samples from the Wadi Gharandal site.

Figure 5: Wadi Hasa, collecting OSL samples from the 7 m thick section of lacustrine sediments.

Above Right - Figure 6: Wadi Hasa, Middle Palaeolithic stone artefacts collected from the eroding ground surface.

optically stimulated luminescence (OSL) dating results are presented from sedimentary archives of palaeohydrological change at three sites in the Jordan Rift Valley and Jordanian Plateau: Wadi Gharandal, Wadi Gregra and Wadi Hasa (Figure 1). A set of 32 OSL dates were measured in samples collected from fluvial and lacustrine sediments using the single aliquot regeneration method. The sedimentary fill at Wadi Gharandal comprises mainly sand, gravel, marl and laminated carbonates, indicating the existence of a riverine wetland during the interval ~120–70 ka (Al-Saqarat et al., in press). Wetlands are also documented at Wadi Hasa and Wadi Gregra, spanning ~80–40 ka and ~116–31 ka, respectively (Abbas et al., in prep.). These findings are at odds with much younger radiocarbon ages published previously, implying the problem of sample contamination with younger sources of radiocarbon.

Comparison of our chronological data from sedimentary archives in Jordan with climate proxies elsewhere in the Levant and Arabia suggests that the existence of riverine wetlands at our three sites corresponded with relatively humid periods during marine isotope stages 3 and 5. During such times, intensified Mediterranean cyclones and the summer monsoon were probably the key moisture sources. Along with a growing number of archaeological sites in the Levant and Arabia, these results suggest that presently waterless areas of the Jordan desert hosted water resources that provided potential corridors for human dispersal out of Africa.

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UPCOMING MEETINGS

Editors COVID19 note: While every effort has been made to confirm that these meetings are still 'going ahead' as planned (or that details have changed) please double check with individual meetings organising committees, or on their webpages, for the latest information and possible virtual conference options.

2021

JANUARY 2021

Australasian Research Cluster for Archaeological Science (ARCAS) Virtual Conference
Venue: Virtual
Date: 28-29 January 2021
arcas.org.au/events

FEBRUARY 2021

Australian Earth Sciences Convention (AESC)
Venue: Virtual
Date: 9-12 Feb 2021
www.aesconvention.com.au

MARCH 2021

C-PEAT: Joint PAGES-INQUA workshop on tropical peatlands
Venue: Bangkok, Thailand

Date: March (dates TBC)
http://pastglobalchanges.org/calendar/upcoming/127-pages/1988-c-peat-2020
Contact person: Sakonvan (Moo) Chawchai, sakonvan.c@chula.ac.th

APRIL 2021

EGU General Assembly 2021
Venue: Virtual
Date: 19-30 April, 2021
https://egu21.eu

MAY 2021

XV International Palynological Congress XI International Organisation for Palaeobotony Conference
Venue: Prague, Czech Republic
Date: 1-7 May, 2021
Rescheduled from September 2020
Submissions open until Sept 2020.
www.prague2020.cz

Online Summer School on Trends, Rhythms and Events in the Earth's Climate System
Venue: Virtual
Date: 23 May – 13 June and 22 August – 12 September, 2021
Summer school for doctoral students and early career researchers.
Applications close 1 December 2020
http://141.89.112.21/wp-content/uploads/2020/09/flyer_summerschool_vs2.pdf

JUNE 2021

Sustainability Research and Innovation Congress 2021
Venue: Virtual and Brisbane, Australia
Date: 12-15 June, 2021. Virtual event 17-18 June, 2021
https://sri2021.org

European conference on earthquake engineering and seismology
Venue: International Conference Centre, (Romania)
Date: 19-24 June, 2021

JULY 2021

AQUA Conference, 2020 (now postponed until 2021)
Venue: Atherton Tablelands, Far North Queensland.
Date: tbc July, 2021
https://aqua.org.au/conference/

SEPTEMBER 2021

10th International Conference on Geomorphology
Venue: Coimbra, Portugal
Date: 6-10th September, 2021
https://www.icg2021.eu/

OCTOBER 2021

3rd IPICS Open Science Conference
Venue: Crans-Montana, Switzerland
Date: 10-15th October, 2021
3rd IPICS Open Science Conference "Ice Core Science at the three Poles" scheduled for 18-23 October 2020 in Crans-Montana, Switzerland, until October 2021.
http://pastglobalchanges.org/calendar/2020/127-pages/1967-ipics-2020

NOVEMBER 2021

PAGES-INQUA joint ECR workshop: Past Socio-Environmental Systems (PASES)
Venue: La Serena y Coquimbo, Chile
Date: 8-13th November, 2020.
An initial online session was held in November 2020, and the in-person meeting was rescheduled for 2021.
www.pases2020.com/index.php/programme

DECEMBER 2021

AGU Fall Meeting
Venue: New Orleans, USA
Date: 13-17th December, 2021
www.agu.org/Fall-Meeting

ADVANCE NOTICE

MARCH 2022

IAL IPA joint meeting "Lagos, Memorias del Territorio"

Venue: BEC Bariloche Events and Congresses, (Argentina)
Date: 20-24 March, 2022 (postponed from March, 2021)
https://www.inqua.org/meetings/list/55

AUGUST 2022

19th International Swiss Climate Summer School

Venue: Grindelwald, Switzerland
Date: August, 2022.
The PAGES-endorsed 19th International Swiss Climate Summer School on "Extreme weather and climate: from atmospheric processes to impacts on ecosystems and society" has been postponed and will now be held at the end of August 2022. Finalized dates are still to be confirmed.
A new call will open in September 2021.
http://pastglobalchanges.org/calendar/2020/127-pages/1982-swiss-summer-school-2020

2022 ICAZ International Conference in Cairns, Australia

Venue: Cairns, Australia
Date: 8-13 August, 2022.

To facilitate ongoing planning for ICAZ2022, the conference organising committee would like to establish an initial level of participation at the conference. It would be greatly appreciated if the attendance questionnaire (comprised of six questions) could be completed, providing us with a preliminary indication of delegate numbers. The questionnaire can be found at: https://forms.gle/jevzdezsH89JAiu8

XXI INQUA congress

Venue: Rome, Italy
Date: 13-20 July, 2023
https://www.inqua.org/meetings/list/37

SEMINAR SERIES

Pal(a)eoPERCS (Palaeo Early Career Seminars) Series

Weekly seminars given by ECRs across palaeo – disciplines
https://paleopercs.com/

Palynology Short Talks

Monthly seminars hosted by the Palynology Society
https://palynology.org/palynology-short-talks/

Women in Earth and Environmental Sciences in Australasia (WOMEESA) Virtual Seminars

Monthly seminars by women in Earth or Environmental Sciences on their research and career pathway
https://www.womeesa.net/seminarseries

Quaternary AUSTRALASIA

Quaternary Australasia publishes news, commentary, notices of upcoming events, travel, conference and research reports, post-graduate thesis abstracts and peer-reviewed research papers of interest to the Australasian Quaternary research community. Cartoons, sardonic memoirs and images of mystery fossils are also welcome.

The Australasian Quaternary Association (AQUA) is an informal group of people interested in the manifold phenomena of the Quaternary Period. It seeks to encourage research by younger workers in particular; to promote scientific communication between Australia, New Zealand and Oceania; and to inform members of current research and publications. It holds biennial meetings and publishes the journal Quaternary Australasia twice a year.

Full annual membership of AQUA is AUD50. For students, unemployed or retired people the membership is AUD20. Both these options include an electronic subscription to QA. The AQUA website (www.aqua.org.au) has information about becoming a member; alternatively please contact the Treasurer (address below). Members joining after September gain membership for the following year. Existing members will be sent a reminder in December.

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