



QU
UATERNARY
ERSPECTIVES

The INQUA
Newsletter



Issue 29
December
2020

From the President of INQUA

Trust in science... 3

INQUA news

INQUA – new funding framework 4

News of the Quaternary

The Quaternary in the Geological Time Scale: An update 6

From the Commissions**Coastal and Marine Processes (CMP)**SPLOSH – an International Focus Group on Submerged
Palaeolandscapes of the Southern Hemisphere 10
NEPTUNE activities in 2020 14**Palaeoclimate (PALCOM)**

Terminations Five to Zero 15

Terrestrial Processes, Deposits and History (TERPRO)

Preparing PATA Days Chile 2021 15

Stratigraphy and Chronology (SACCOM)The Commission on Stratigraphy
and Chronology (SACCOM): an overview 16
Stay connected – The SEQS-DATESTRA 2020 19
Virtual Meeting in Poland 19**All roads lead to Rome2023**

What's happening there? 22

ECRs on the road to Rome 2023 22

A view of the WorldINDIA - Association of Quaternary Researchers (AOQR)
and INQUA ECR interaction: A report 26**The stress-releasing page** 27**Quaternary International**

New Releases 28

Cover photo: Panoramic view to the west of the Caleta Herradura Fault, Mejillones Peninsula, northern Chile. First plane shows the roll-over structure in the Miocene-Pliocene sedimentary infill of the Caleta Herradura Fault. White horizon is a Pliocene diatomite layer. Flat surface on top of the footwall is a Pliocene marine abrasion platform, lower flat surface in the right side is a Pleistocene marine abrasion platform. Flats irons are made of Pliocene marine strata preserved in the footwall.

Credits: Dr. Gabriel González L., Universidad Católica del Norte, Chile

inqua.org
info@inqua.org
Twitter: @INQUA

[QP website](http://QPwebsite.com)
Quaternary International

ecr@inqua.org
Facebook: INQUAECR
Twitter: @INQUA_ECR



XXI INQUA
Congress
Rome
13-20 July 2023

inquaroma2023.it
Facebook: InquaRoma2023
Twitter: @InquaRoma2023

QUATERNARY PERSPECTIVES
is the newsletter of



INQUA
INTERNATIONAL UNION
FOR QUATERNARY
RESEARCH

Established in 1928, INQUA is the representative body for Quaternary science world-wide. INQUA is dedicated to removing barriers and to fostering diversity and inclusivity by prioritising funding for early career and developing country researchers to enable their participation in the international scientific networks that INQUA supports. INQUA promotes – and operates according to – a philosophy of inclusivity, not discriminating against any individual on the basis of race, colour, religion, gender, gender identity or expression, sexual orientation, genetics or disability. We encourage you to join INQUA through any of its Commissions, and contribute to the development of Quaternary science worldwide.
inqua.org/about

EDITORS

Guido Stefano Mariani
Kim Davies
Francesca Ferrario
Aliyu Adamu Isa
Annie Lau
Nivedita Mehrotra
Salunke Mokshada
Emuobosa Orijemie
Sourav Saha
Martin Seeliger

Trust in science...

The year 2020 will for sure be remembered as the year with the COVID-19 pandemic crisis; a global crisis with a large impact on our daily life. And it also disturbs our normal way we used to do our research. In many parts of the world, scientists have only limited access to their lab facilities, fieldwork has been cancelled. These restrictions heavily affected our scientific progress. The crisis had, and still has, an enormous impact on the work of, in particular, the Early Career Researchers, also in our Quaternary Research discipline. However, not only lab work of field work result in scientific progress, being inspired and discussing research questions and results are important as well. Communication as well as international collaboration is crucial in our efforts to make scientific progress.

Before the COVID-19 pandemic we used to be very mobile; to communicate with colleagues we attended conferences, symposia and workshops and we visited sites and institutes all over the world. However, due to the crisis our almost unlimited mobility changed in a lockdown for many of us and most of the international conferences and workshops did not take place in 2020. Most of the meetings have been postponed to 2021 assuming and hoping that the situation will be (almost) back to normal next year. However, it might take slightly longer; but let us be optimistic and cross our fingers.

Not all the meetings have been cancelled. The organisers of several workshops/meetings looked for alternative ways to meet and to communicate. They decided to change the format of the meeting and to set up a virtual meeting by making use of the present-day technical options; to make use of the internet that connects us all.

Recently, I have attended the SEQS-2020 virtual conference organised by our Polish colleagues in September 2020 and the PAGES-INQUA joint ECR workshop: Past Socio-Environmental Systems (vPASES2020) organised by the PAGES and INQUA ECR community together with local organisers from Chili. The SEQS-2020 was a one-day meeting with a large number of presentations; the PASES meeting, spread over three days, included presentations, discussions and a so-called breakout activity in which participants were invited to actively participate in identifying the most pressing challenges and opportunities for genuine ECR interdisciplinary paleosciences.

The PASES format appeared to be a very good format;

participants not only identified and discussed the challenges and opportunities, some of them also expressed their worries about their future and the impact of the decreasing public trust in science. Ashok Kumar Singhvi, INQUA's former Vice-President (2015-2019) addresses the issue of trust in the excellent Guest Editorial entitled Future Geosciences, to be published in Journal of Geological Society of India, Vol 96 (December issue), Page 533-538, 2020 (DOI: 10.1007/s12594-020-xxxx-x). Ashok states that: *Science today is at cross-roads, with a distinctive trust-deficit between its practitioners and stake holders, the society* and in his editorial he presents a clear vision how to deal with it.

Indeed, 'the decreasing trust in science' is an important issue scientists have to face and fight and for organisations such as INQUA a challenge; to invest in communication with the general public; to inform them about our research of the past and the importance of our work for the future of our globe. It is one of INQUA's challenges for the near future.

Please take care and stay healthy.

Thijs van Kolfschoten
INQUA President

Thijs van Kolfschoten
On behalf of the INQUA Executive Committee

INQUA – new funding framework

In response to feedback from members, INQUA has developed a new funding framework for Commission activities which replaces the previous system which was arranged around International Focus Groups and Projects. There are three new categories of INQUA Commission support:

1. Funding for single year or multi-year projects
2. Funding to support a stand-alone conference or meeting
3. Funding for skills enhancement

For the coming year, 2021, we have also added additional allowable funding types in response to the changing academic landscape caused by Covid-19. In addition, there is still the option to apply for INQUA endorsement with the right to use the INQUA logo and name when applying for funding and organising conferences. This endorsement does not involve financial support from INQUA. Detailed explanation of the different funding categories and an online application form are available on the relevant [funding pages](#). Please contact the Commission officers in case you need more information.

MULTI-YEAR / SINGLE-YEAR PROJECT INQUA GRANT

A **multi-year project** is a non-permanent collaboration designed to address scientific topics of wide international significance. Thus projects do not represent a field of study (which is the role of the INQUA Commissions) but rather seek to answer specific scientific questions.

Multi-year project duration is normally the 4 years of the inter-congress period, but may, if started later in the

cycle, also cross the inter-congress period boundary and will be able to continue in the following inter-congress period. This will however require approval of the new Commission and Executive Committee at the time of handover between Commission officers. The maximum number of years of funding available for a multi-year project is 8 years.

The funding application should lay out a plan for up to four years (in the first instance) and involve ECRs and DCRs in the planning and formulation of the project. Progress will be reported each year and continuing funding will be contingent on the success of the project.

Yearly support for multi-year projects is 5000 Euro. In exceptional cases, where a convincing case is made, funding may be extended to a maximum of 8000 Euro per year.

A **single year project** can be on a smaller scale than a multi-year project, both in terms of scientific questions being asked or level of international participation. It is designed to allow international networking between researchers on any topic relevant to the funding Commission. These projects should aim to complete their activities within one calendar year, but may apply for repeat funding to enable them to become multi-year projects if their activities continue and grow over time.

Yearly support for single-year projects is also 5000 Euro. In exceptional cases, where a convincing case is made, again funding may be extended to a maximum of 8000 Euro per year.

Applications for multi or single-year project funding (application form available [here](#)) must demonstrate that the project:

1. will address a significant question that is central to the work of the sponsoring Commission;
2. make significant progress towards answering this question through collaboration and within a reasonable timeframe (within a calendar year for the single-year project category);
3. has an explicit plan for activities throughout the proposed duration of the project, and have a high-level of buy-in from the international INQUA community, as shown by e.g. active participation;
4. has a framework that is responsive to community needs and open to community participation, including involving early-career and developing-country researchers in significant roles;
5. has identified concrete outcomes or products explicitly.

CONFERENCE / MEETING INQUA GRANT

Funding is available for stand-alone conferences or meetings outside of the umbrella of the single or multi-year INQUA Project funding. INQUA is able to support international meetings that cover topics of interest to sponsoring Commissions. To secure funding, meeting organisers should prioritise ECR and DCR involvement in these meetings.

The maximum level of support for a stand-alone conference or meeting is 5000 Euro. In exceptional cases, where a convincing case is made, funding may be extended to a maximum of 8000 Euro to support a single meeting.

SKILLS ENHANCEMENT ACTIVITY GRANT

The goal of this funding is to widen the skill base within the INQUA community, specifically through assisting scientists who lack well-developed infrastructures or networks (including but not limited to early career and developing country scientists), through encouraging networking, exchanges of information and techniques, training, and bringing people together e.g. to develop new

single or multi-year projects.

Skills Enhancement funding can be used for the development and running of INQUA training courses or summer schools, INQUA workshops focusing on networking within a specific region or for a specific technique/interest area, and/or the production of teaching and training resources to assist new practitioners in specific techniques.

Applications for Skills Enhancement funding must demonstrate:

1. the need for skills enhancement in a particular region/field;
2. how the proposed activities will foster skills enhancement;
3. who will benefit directly from the funding;
4. how the skills enhancement activity will benefit the INQUA community in the longer term.

Applications to this scheme are independent and distinct from the other categories of funding. A proposal under the Skills Enhancement scheme would typically be for funding of between 4000-8000 Euros.

FINANCIAL CONSIDERATIONS

Funding through any of the categories of INQUA grant may be used for:

- Participation (travel, accommodation and subsistence) of researchers in meetings organised through the Project or Conference. At least 75% of the amount of the grant used to fund participation should support the participation of ECRs and/or DCRs in project events.
- Rental of rooms for conferences/meetings.
- Rental of vehicles for meeting-related field trips.
- Costs associated with video-conferencing (Zoom, etc)
- The development of webcasts and podcasts

Funding through the Skills Enhancement grant may additionally be used for:

- Development of teaching/training resources relating to the skill enhancement activity being planned

Funding requests that INQUA will NOT support:

- Salaries or stipends on any type.
- Travel and registration costs for meetings such as EGU, AGU, etc. However INQUA can support project meetings held in association with larger meetings e.g either before or after but not during the third party meeting.
- Server costs for websites, databases etc.
- Journal or book publication costs.
- Purchase of equipment or analyses.
- Institutional overheads.

Multi-year Projects will normally be approved in principle for the whole of the current inter-congress period. However funds will be allocated on a yearly basis, subject to evaluation of Project activities in the preceding year and submission of an updated budget each October.



Jan Zalasiewicz¹ (Chair SQS) Adele Bertini² (Secretary),
Liping Zhou³ (Vice-Chair) Martin Head⁴ (Vice-Chair)

The Quaternary in the Geological Time Scale: An update

The Quaternary System/Period is evolving – in our scientific understanding of it, in terms of its formal subdivision within the International Chronostratigraphic Chart (ICC) which serves as the basis of the Geological Time Scale, and currently also in its changing dynamic as anthropogenic global change intensifies, a phenomenon which has raised its own formal stratigraphic questions. Over the last one and a half decades, the Subcommittee on Quaternary Stratigraphy (SQS) has been active in revising and updating the Quaternary time scale, and the work – as we describe below – continues.

The present shape of the Quaternary was effectively determined in 2009 (Gibbard & Head, 2009a, b, 2010; Gibbard et al., 2010; see also Head et al., 2008) with its base officially aligned with that of the Gelasian Stage (2.58 Ma). The strict hierarchy of the ICC required that the base of the Pleistocene Series/Epoch and Calabrian Stage/Age, which had been defined by the Global Boundary Stratotype Section and Point (GSSP) at Vrica in Italy (~1.8 Ma) in 1985 (Aguirre & Pasini, 1985), be lowered to the Gelasian GSSP. This hard-fought move was achieved with the strong support of both INQUA and the ICS (Head & Gibbard, 2015). It took advantage of a pre-existing GSSP (the Gelasian) which had earlier been established to signal the final intensification of Northern Hemisphere glaciation (Rio et al., 1998). Studies have since shown a major Northern Hemisphere cooling event close to the base of

the Gelasian (Hennissen et al., 2014, 2015). Hence the newly defined Quaternary was to better represent the change from the 'coolhouse' climate conditions of Miocene-Pliocene times of essentially unipolar (Antarctica) glaciation into the more severe icehouse conditions that followed, characterised by bipolar glaciation (Westerhold et al., 2020).

The boundary between the two accepted series/epochs of the Quaternary, the Pleistocene and Holocene, was later fixed (Walker et al., 2012) in the Greenland NGRIP ice core, at a level dated to 11.7 ka, within the marked northern-hemisphere post-glacial (post Younger Dryas) warming, at a sharply expressed northward shift in the North Atlantic polar front for which changes in the ice deuterium/hydrogen ratios are a proxy. This particular stratigraphic marker is really only detectable in Greenland ice, but various associated proxies (e.g. wind-blown dust) together with the use of five carefully correlated auxiliary stratotypes in different depositional environments worldwide have helped to make this a widely effective formal boundary.

Subsequent changes to the Quaternary timescale (summarised in Head et al., in press) similarly reflect significant Earth System changes, and also formalise, and thus make clear and consistent, more generally defined Quaternary subdivisions used by stratigraphers *sensu lato*. Thus, the long used, if not always consistently applied,

tripartite subdivision of the Pleistocene into three subseries/subepochs has now been formally ratified (Head et al., in press). In this, a Lower Subseries/Early Subepoch now encompasses the Gelasian and Calabrian stages/ages, whereas the Middle Subseries/Subepoch equates to the (also newly defined) Chibanian Stage/Age, defined at a level at 0.774 Ma (Suganuma et al., in press) that lies very close to the Matuyama/Brunhes palaeomagnetic polarity change. The Upper Subseries/Late Subepoch corresponds to an as yet un-named 'Stage 4' that, beginning at ~0.129 Ma, is tied to the warming phase of the Last Interglacial (Marine Isotope Substage (MIS) 5e), work on which we will discuss further below.

Another widely if inconsistently used tripartite subdivision, that of the Holocene Series/Epoch, was formalised and ratified in 2018 (Walker et al., 2018, 2019). The new divisions also have the formal status of Lower, Middle and Upper subseries (and Early, Middle and Late subepochs) and, respectively, the Greenlandian, Northgrippian and Meghalayan stages, based on brief (a few centuries-long) but widely felt climate fluctuations.

So, the last decade has seen an architecture emerge for the Quaternary that should prove durable for future stratigraphy-based research (Figure 1). Nevertheless, there is still work to do, and the next phase of SQS work is continuing to build on these foundations. Ongoing and new areas of activity are:

- **Resampling of the base-Gelasian (now base-Quaternary) boundary at Monte San Nicola.** While this GSSP (Figure 2) securely fixes this stratigraphic boundary, the underlying data were collected more than two decades ago, and refinement of the GSSP level is one of the projects of the SQS. This is particularly to more precisely constrain how the GSSP relates to the Matuyama/Gauss palaeomagnetic boundary, the primary guide marker, and to MIS 103. The sampling as a whole aims to capture

stratigraphically important events from 2.8–2.4 Ma, including the main inception and intensification of Northern Hemisphere glaciation, and associated ocean reorganization and glacial events; it will also help place the GSSP in the broader context of transition from the Mid-Piacenzian Warm Period onwards into the Quaternary. SQS funding has been agreed to help with the sampling and analysis of the section, while we hope to arrange some virtual meetings on this work, to stimulate interest into the Gelasian International Field Workshop, for which INQUA support has been secured. The COVID-19 situation has inevitably caused delays, with the International Field Workshop being postponed until June 2021.

- **A stratotype for the Upper Pleistocene.** In general terms, the boundary for the Upper/Late Pleistocene is widely recognisable, being based on the warming into the last interglacial, MIS 5e. However, precise correlation of any level within this warming is not straightforward, as there are leads and lags between different stratigraphic settings, particularly between the oceanic and terrestrial realms (Shackleton et al., 2003). The Fronte section, in Taranto, Italy, has been suggested as a candidate section. It comprises a notably thick pelitic succession of marine deposits that has continuous onshore exposure and easy accessibility (Negri et al. 2015, 2016). It provides an excellent section through the peak interval of MIS 5.5 that has yielded foraminifera (and oxygen isotopes from these), a palaeomagnetic record and some palynomorphs. However, it suffers, as do many onshore sites of this time, from incomplete sedimentation from MIS 6 to MIS 5, with a lack of continuous foraminiferal isotopic record and no record of Termination II. An alternative site has been suggested (Head, 2019) that would use the EPICA DOME C core from Antarctica. This shows a unique, large and sharp methane increase, probably sourced

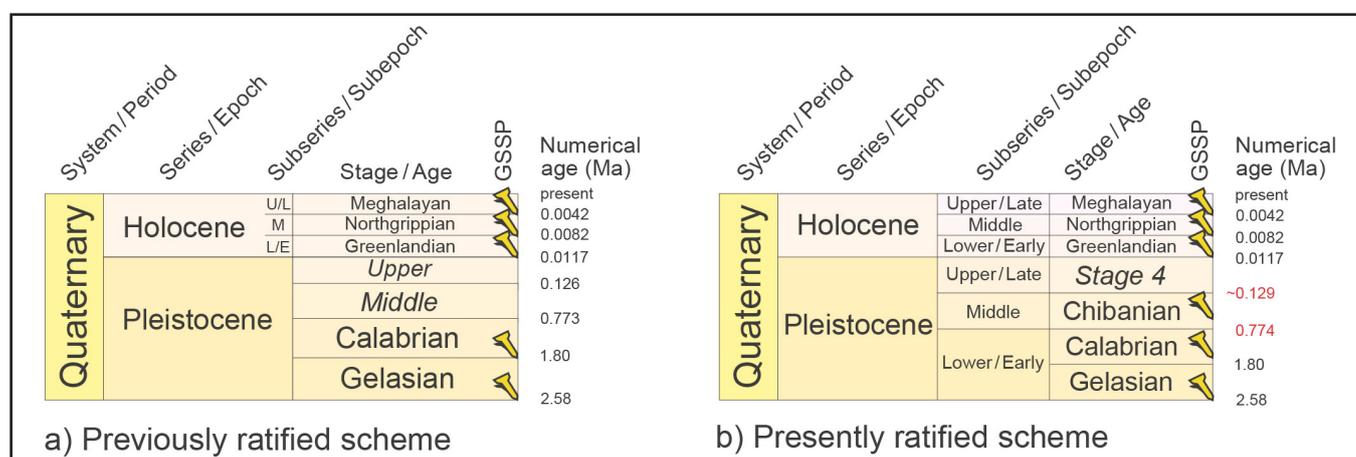


FIGURE 1: Quaternary interval of the ICS International Chronostratigraphic Chart showing: a) the scheme as of May, 2019, and b) the now ratified scheme. From Head et al. (in press).

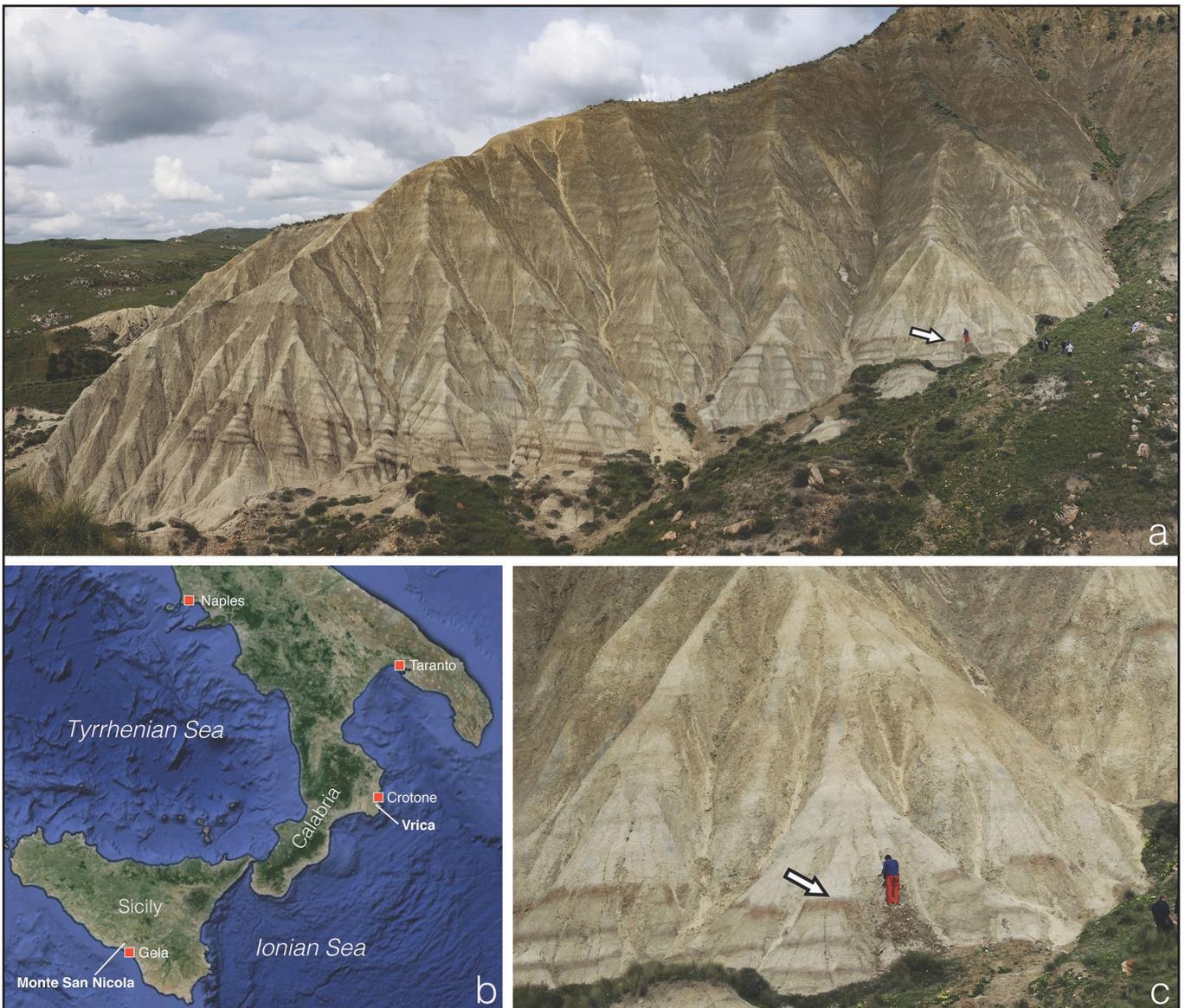


FIGURE 2: GSSP for Gelasian Stage, Pleistocene Series, Quaternary System, and the newly ratified Lower Pleistocene Subseries. Panorama (a) and detail (c) of the Monte San Nicola section, showing the level (marked by an arrow) of the GSSP which is placed at the base of a marly layer overlying the prominent, sapropelic San Nicola bed. Photos kindly supplied by John Clague. The location of Monte San Nicola (b) is also given. From Head et al. (in press).

from the equatorial latitudes, that relates to abrupt global warming and which potentially has detectable correlatives around the world (Head, 2019, fig. 9). These options are being further explored, in work towards preparing a stratotype proposal.

- **A second Stage for the Middle Pleistocene?** There is now a formally defined Middle Pleistocene Subseries, together with the Chibanian Stage that is exactly equivalent to it, and which therefore might be said to be technically necessary but formally redundant. There is therefore the possibility to subdivide the Middle Pleistocene, by introducing a second stage within it, which would abbreviate the Chibanian while at the same time make it functionally non-redundant. There is no long tradition for a stage boundary within

this interval in any formal sense, but there has been increasing recognition of the 'Mid-Brunhes Event' (Jansen et al. 1986) more recently termed the 'mid-Brunhes Transition' (Yin, 2013; Barth et al., 2018), an abrupt step-change to increased amplitude of the 100 kiloyear cycles that led to warmer interglacials from MIS 11 onwards. The position of the GSSP would logically occur around the MIS 12 – MIS 11 transition, a level which can be clearly recognised in the marine record. Correlating this level into terrestrial sequences around the globe could raise interesting correlation challenges, and stimulate some productive research, for instance to more securely and unambiguously link the continental European Elsterian, Holsteinian and Saalian stages to the marine record. This possibility will initially be explored by an SQS position paper. If

this produces sufficient SQS support to pursue the concept of a second stage, then a Working Group will be established to analyse the case more formally.

- **Smaller-scale units within the Quaternary.** The complex climate/environmental history of the Quaternary, and the complex resulting successions, have led to a rich diversity of kinds of stratigraphic subdivision that form important parts of the practical temporal framework of this period. Although not formal in the sense of formally ratified GSSP-based chronostratigraphic units, they closely intersect with them, and help characterise and define them. These include the now iconic marine isotope stages, regionally-based stage systems (that include such as the Elsterian, Holsteinian and Saalian), and also other terms that are more widely geographically applicable, such as the Late Glacial and Younger Dryas. Given the continuing advances in the formal Quaternary stratigraphy, we feel it timely to review these smaller-scale units and their relations to this part of the Geological Time Scale.
- **Anthropocene.** The relatively new concept of the Anthropocene, that emerged within the Earth System science community (Crutzen & Stoermer, 2000) has been examined as a potential formal new geological time unit since 2009, by the Anthropocene Working Group (AWG) of the SQS. Having assembled a wide array of evidence to show that the Anthropocene concept is geologically real (summarised in Waters et al., 2016, Zalasiewicz et al., 2019; see also Syvitski et al., 2020), the AWG formally voted in 2019 to pursue

a proposal to define the Anthropocene by GSSP, with a primary guide to be a stratigraphic signal somewhere around the mid-20th century. The rank has not been decided or formally voted on yet, but the working hypothesis is of a potential series/ epoch, which if agreed and ratified would terminate the Holocene Series/ Epoch including the Meghalayan Stage/Age. The focus of work is now on analysing a number of potential GSSP sections (see Waters et al., 2018) supported by funding from Berlin's Haus der Kulturen der Welt. Work continues, too, to more fully characterize, and explore the use of, the Anthropocene as a chronostratigraphic unit.

AFFILIATIONS

¹University of Leicester, UK.

²University of Florence, Italy.

³Peking University, China.

⁴Brock University, Canada.

REFERENCES

- Aguirre E & Pasini G (1985). *Episodes* 8, 116–120.
- Barth AM, Clark PU, Bill NS, et al. (2018). *Climate of the Past* 14, 2071–2087.
- Crutzen PJ & Stoermer EF (2000). *IGBP Global Change Newsletter* 41, 17–18.
- Gibbard P & Head MJ (2009a). *Quaternaire* 20(2), 125–133.
- Gibbard P & Head MJ (2009b). *Quaternaire* 20(4), 411–412.
- Gibbard P & Head MJ (2010). *Episodes* 33, 152–158.
- Gibbard PL, Head MJ, Walker MJC & the Subcommittee on Quaternary Stratigraphy (2010). *Journal of Quaternary Science* 25(2), 96–102.
- Head MJ (2019). *Quaternary International* 500, 32–51.
- Head MJ & Gibbard PL (2015). *Quaternary International* 383, 4–35.
- Head MJ, Gibbard PL & Salvador A (2008). *Episodes* 31(2), 234–238.
- Head MJ, Pillans B, Zalasiewicz JA & the ICS Subcommittee on Quaternary Stratigraphy (in press). *Episodes*.
- Hennissen JAI, Head MJ, De Schepper S & Groeneveld J (2014). *Paleoceanography* 28, 564–580.
- Hennissen JAI, Head MJ, De Schepper S & Groeneveld J (2015). *Quaternary Science Reviews* 129, 321–332.
- Jansen F, Kuijpers A & Troelstra SR (1986). *Science*, 232, 619–622.

- Negri A, Amorosi A, Antonioli F et al. (2015). *Quaternary International*, 383, 145–157.
- Negri A, Florindo F, Lurcock PC et al. (2016). *Alpine and Mediterranean Quaternary* 29(2), 137–142.
- Rio D, Sprovieri R, Castradori D & Di Stefano E (1998). *Episodes* 21, 82–87.
- Shackleton NJ, Sánchez-Goñi ME, Pailler D & Lancelot Y (2003). *Global and Planetary Change* 36, 151–155.
- Suganuma Y, Okada M, Head MJ et al. (in press). *Episodes*.
- Syvitski J, Waters CN, Day J et al. (2020). *Communications Earth & Environment* 1, 32.
- Walker MJ, Berkelhammer M, Björck S et al. (2012). *Journal of Quaternary Science* 27(7), 649–659.
- Walker M, Head MJ, Berkelhammer M et al. (2018). *Episodes* 41(4), 213–223.
- Walker M, Head MJ, Berkelhammer M et al. (2019). *Journal of Quaternary Science* 34(3), 173–186.
- Waters CN, Zalasiewicz J, Summerhayes C et al. (2016). *Science*, 351, 137.
- Waters CN, Zalasiewicz J, Summerhayes C et al. (2018). *Earth-Science Reviews* 178, 379–429.
- Westerhold T, Marwan N, Drury AJ et al. (2020). *Science* 369(6509), 1383–1387.
- Yin O (2013). *Nature*, 494, 222–225.
- Zalasiewicz J, Waters CN, Williams M & Summerhayes CP (eds) (2019). *The Anthropocene as a geological time unit: a guide to the scientific evidence and current debate*. Cambridge: Cambridge University Press.

SPLOSH – an International Focus Group on Submerged Palaeolandscapes of the Southern Hemisphere

INTRODUCTION

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 (e.g. splashcos.org). These are only beginning to be translated into the Southern Hemisphere (SH) where the study of submerged palaeolandscapes faces specific challenges and unique opportunities (e.g. Benjamin et al. 2018; Cawthra et al., 2015; 2020; Veth et al. 2019; Ward et al. 2013, 2018). Global

changes in relative sea level of up to 120 or 130 m below present during the last glacial period (~ 22 ky BP) have had a profound influence on the movement of modern humans including between South Asia and Greater Australia, as well as across the South America and South African landmasses. Vast coastal plains and a significant portion of prehistory were drowned during the marine transgression, with a decrease in continental landmass of over one third (~ 190 sq. km/yr) within the Pacific and Indian Oceans since the Last Glacial Maximum.

The new INQUA SPLOSH focus group aims to increase awareness on submerged landscapes and environmental changes in the SH, and help provide a platform for scientific exchange and interdisciplinary collaboration to help strengthen the importance of research in this region. Common themes such as sea-level change, coastal landform evolution, human dispersals and coastal resource use will be explored through a series of workshops and synthesis outputs, with a particular emphasis on Indigenous perspectives and connections with Sea Country.

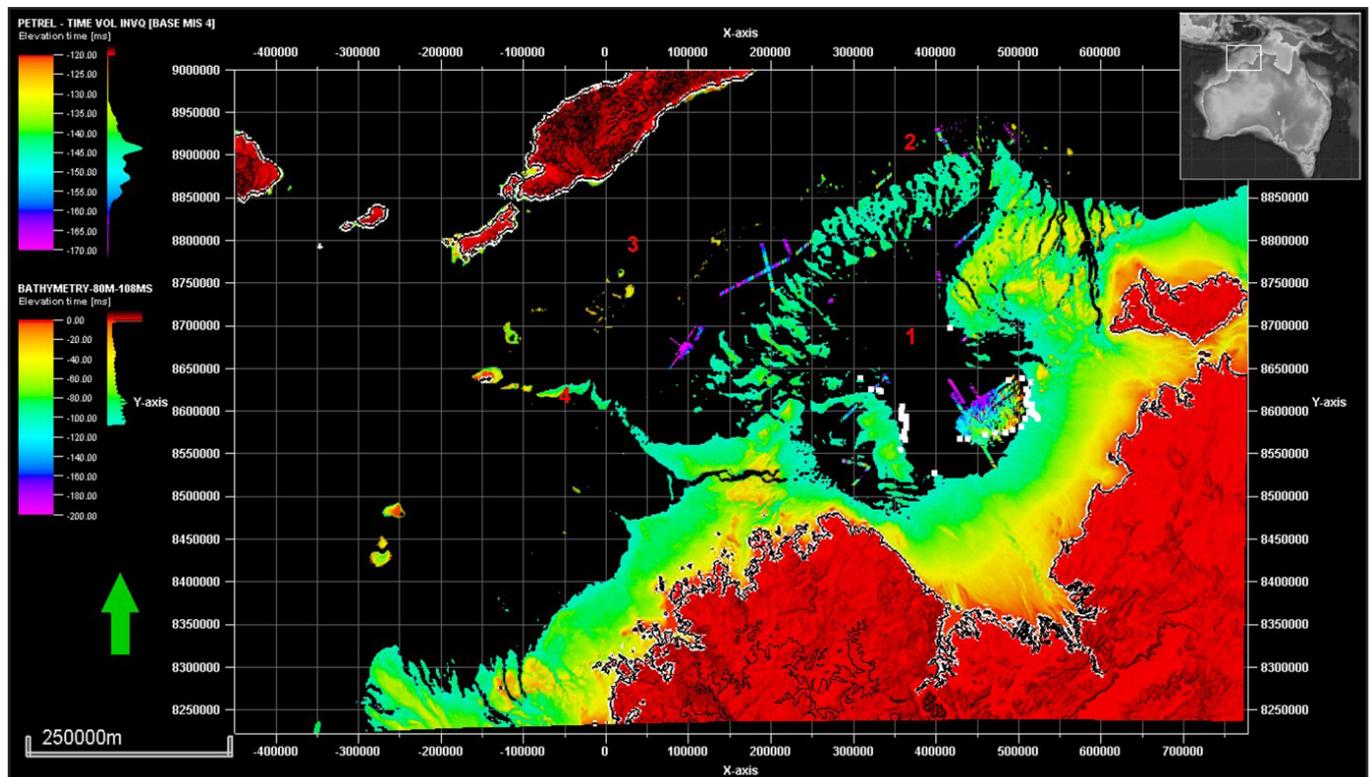


FIGURE 1: Present day bathymetry of the northern Australia shelf (Geoscience Australia) showing emergent landscape based on 108ms (80m) contour for the MIS 4 lowstand. Base MIS 4 picks are also displayed, the seismic geomorphology of these events is estuarine or marine. Mapped shore break positions and depositional margins (white squares) are also displayed. Present day coastline is shown as a black contour. Provisional predicted MIS 4 lowstand emergent landscape using the 80m seabed bathymetry as a proxy indicates the Malita basin is (1) open to the sea with an (2) inner and (3) outer archipelago and a (4) peninsula. ERC funded ACROSS (project 759677) (from Fogg et al. 2019).

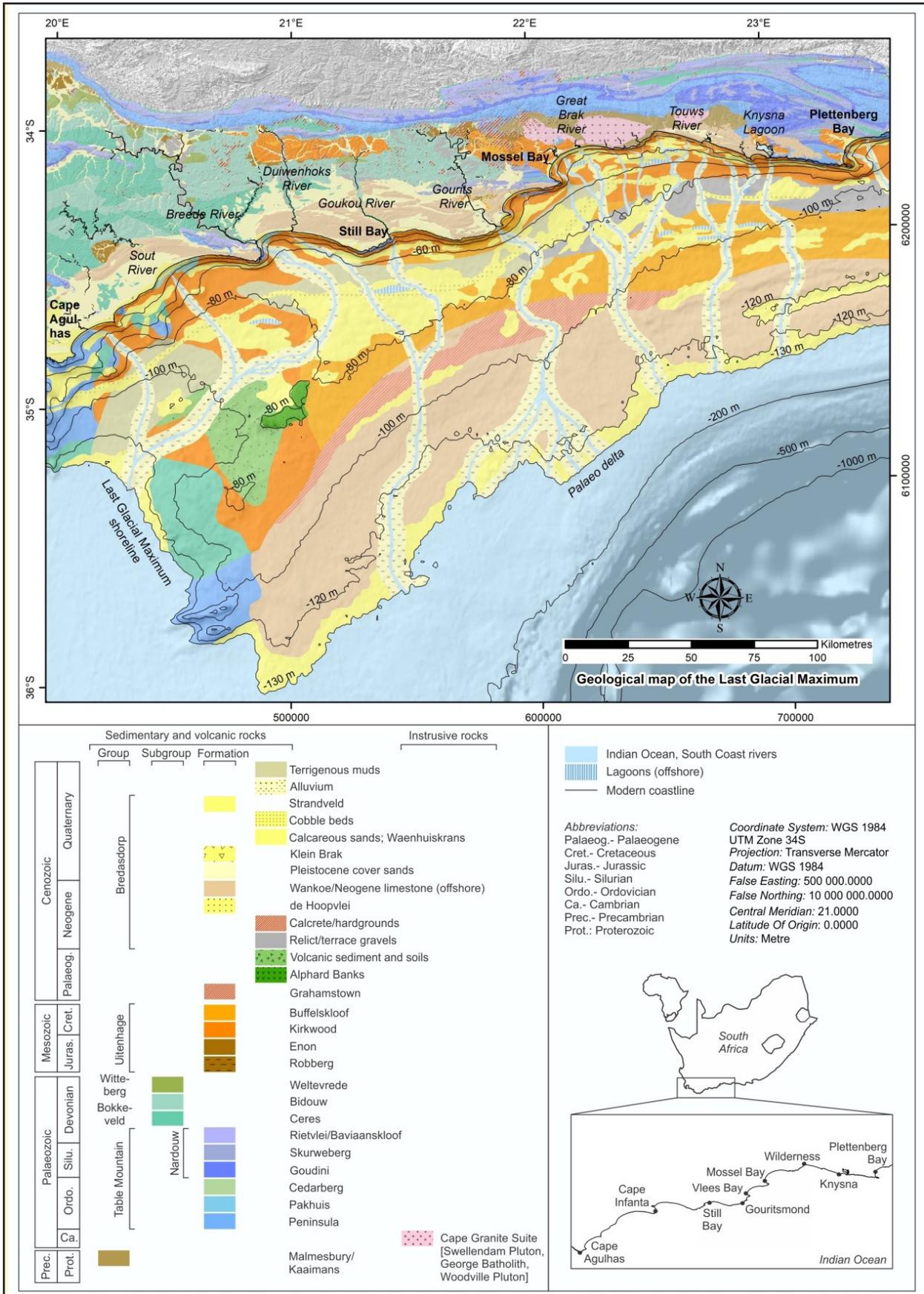


FIGURE 2: In the South Cape of South Africa, the Palaeoscape project (Marean et al., 2014) defined and studied the Palaeo-Agulhas Plain; an extinct, submerged terrestrial ecosystem. Following a ten-year investigation of the continental shelf, a geological map of the Last Glacial Maximum was compiled that covers ~55,000 km² of seafloor and coastal plain and demonstrates a remarkably different submerged landscape compared to the present-day Cape Foreland (from Cawthra et al. 2020).

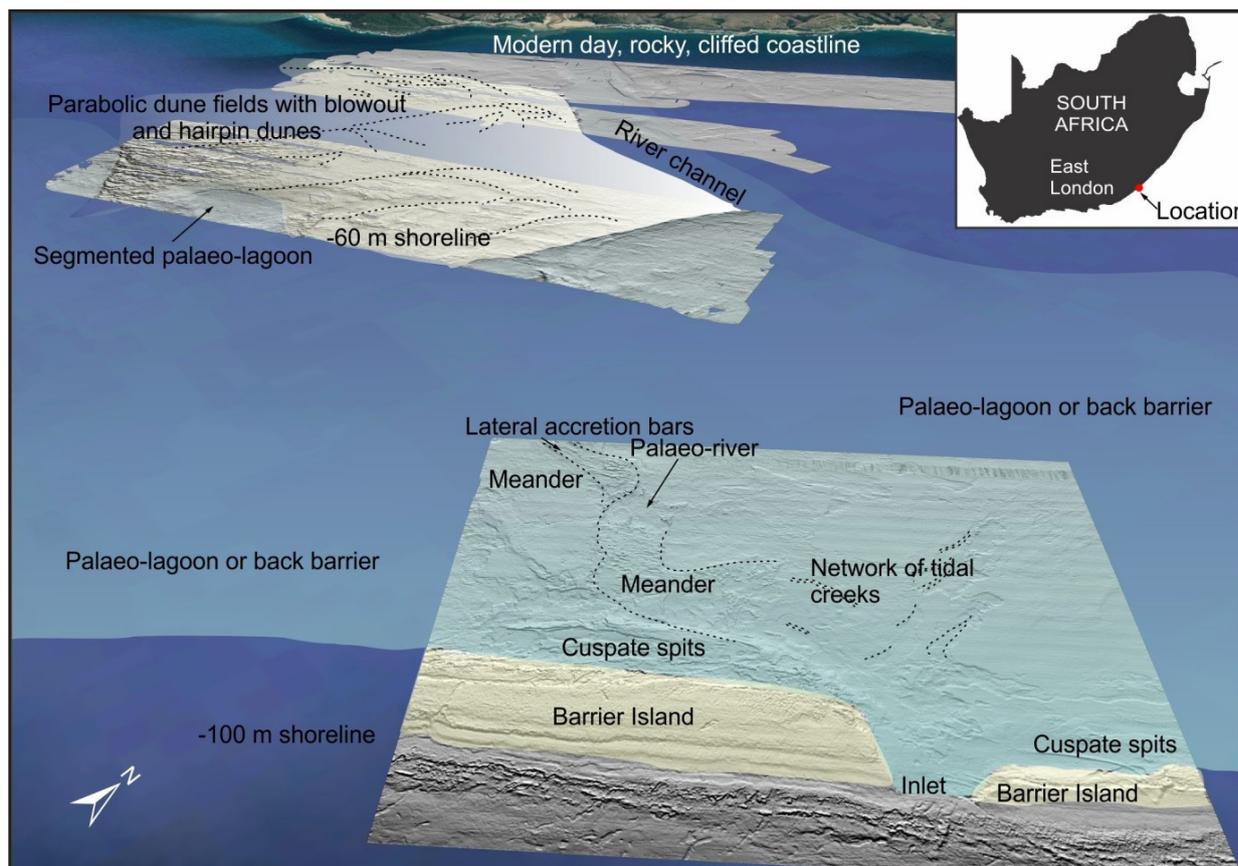


FIGURE 3: Post-glacial geomorphology off the Eastern Cape Coast, South Africa, showing how the present rocky cliffed coastline is so different from the past coastal landscape at lower sea levels, with large dune systems and coastal waterbodies (from Green et al. 2020 in press).

A SOUTHERN HEMISPHERE PERSPECTIVE

The SH comprises five continents, including over 8300 islands, and four oceans (80% water) and has been largely ice-free for much of the Quaternary. This has allowed for more open dispersals (Bird et al. 2019) and greater potential for landform preservation on the shelf (e.g. Brooke et al. 2017). It also covers regions with very different climate conditions, ecosystems and geological contexts that offer different biogeographical perspectives on use of coastal corridors (e.g. the Kelp Mangrove Highways) and use of watercraft (Erlandson 2007).

From the global perspective, there is increasing acceptance that oral traditions might contribute to an understanding of natural phenomena (Nunn 2018; Reid et al. 2015) and a growing interest and application of Indigenous Knowledge in environmental and marine resource management as part of a shared heritage (e.g. Coastal

Mapping Laboratory 2017; Ward et al. 2018). SPLOSH will work to highlight the unique SH perspective, not only as a different geographical and environmental region but also with an academic discourse inclusive of Indigenous science knowledge and pedagogies.

There are many science questions that can be explored within this geographic scope, some of which are already being explored through projects happening in the SH, such as ERC funded ACROSS project (Farr, e.g. Figure 1) and the Palaeoscape project on the Cape South Coast of South Africa (see QSR Special Issue introduced by Cleghorn et al. 2020; Figure 2). Through themed annual workshops, we hope to explore some key questions, including:

1. *How does the greater oceanic area of the SH influence the nature and preservation of submerged landscapes, and how these are studied?*

Differences in local climatic and geological setting (e.g. Green et al. 2020; O'Leary et al. 2020; Figure 3), including active versus passive margins, would have influenced site preservation. Complementing new INQUA-funded projects such as NEPTUNE - NEW Procedures and Technologies for UNDERwater paleo-landscape reconstruction, we can explore site preservation and site prospection, with use of new technologies.

2. *How can we incorporate concerns, interests, knowledge, traditions, and perspectives of First Nations people in submerged landscapes research?*

In Australia especially, there is growing awareness of cultural continuity with the offshore coastal landscape through ongoing cultural connections and resource use practices (e.g. Rist et al. 2019). We hope to explore how these Indigenous perspectives compare with new scientifically informed sea-level change chronologies, and how we

might benefit from Indigenous science and pedagogy.

3. *How do different biogeographical perspectives from the SH influence our understanding of human migration and past coastal resource use?*

The distinct ecological and physical features of SH will have influenced biodiversity, sediment dynamics, past human occupation and migration (including use of watercraft) across the shelf at times of lower sea level. Insights can be gained from explorations of these submerged cultural landscapes and from modern analogues.

4. *What new challenges and opportunities can arise from SPLOSH?*

SPLOSH will provide a forum to raise timely and significant questions on submerged prehistoric cultural heritage of the SH and to share published and publicly accessible records.

Annual workshops will be held in different countries and will combine face-to-face participation with use

of video-conferencing facilities, with the latter becoming essential with the emergence of the COVID-19 pandemic. Given the more widespread geography of the SH it is hoped that use of video-conferencing will also allow more people to participate in the workshop discussions, especially ECRs and Indigenous partners, and those from more remote regions. Due to COVID, this years' workshop was held online and was aimed at showcasing and exploring current submerged landscape research across the SH. [Recordings of the talks](#) are available online.

In addition to the annual workshops, we are working on a SPLOSH website that will serve as a central dissemination 'blackboard' for workshop events, newsletters, research & publications, as well as collaboration and outreach including links to other [existing](#) and future sites on submerged sites. The website will eventually host an interactive map of known sites/project areas across the SH, allowing a virtual insight into research on submerged landscapes in this region. A

[working version of the map](#) is available and we welcome contributions to this. If you are interesting in participating or contributing to any aspect of SPLOSH, please contact any of the country leads.

PROJECT LEADERS

Ingrid Ward (University of Western Australia), Helen Farr, Fraser Sturt (University of Southampton, UK), Hayley C. Cawthra (Nelson Mandela University & Council for Geoscience, Cape Town), Andrew Green (University of KwaZulu-Natal), Alex Bastos (Federal University of Espírito Santo, Brazil), Diego Carabias (Centre for Maritime Archaeology Research of Southeastern Pacific, Chile).

REFERENCES

- [Benjamin J, O'Leary M, Ward I, Hacker J, Ulm S, Veth P & Bailey G \(2018\). *Antiquity Project Gallery* 92\(363\).](#)
- [Bird MI, Condie SA, O'Connor S, O'Grady D, Reepmeyer C, Ulm S, Zega M, Saltré F & Bradshaw CJA \(2019\). *Scientific Reports* 9: 8220.](#)
- [Brooke BP, Nichol SL, Huang Z & Beaman RJ \(2017\). *Continental Shelf Research* 134: 26–38.](#)
- [Cawthra HC, Compton JS, Fisher EC, MacHutchon MR & Marean CW \(2015\). In: Harff J, Bailey G, Lüth F \(eds\) *Geology and Archaeology: Submerged landscapes of the continental shelf. Special Publication of the Geological Society of London* 411: 219–233.](#)
- [Cawthra HC, Cowling RM, Andò S & Marean CW \(2020\). *Quaternary Science Reviews* 235: 105858.](#)
- [Cleghorn N, Potts AJ & Cawthra HC \(2020\). *Quaternary Science Reviews* 235: 106308.](#)
- Coastal Mapping Laboratory, Graduate School of Oceanography/University of Rhode Island, 2017. *Developing Protocols for Reconstructing Submerged Paleocultural Landscapes and Identifying Ancient Native American Archaeological Sites in Submerged Environments: Best Practices*. U. S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs, Herndon, VA OCS Study BOEM 2017-XXX.
- [Erlandson JM, Graham MH, Bourque BJ, Corbett D, Estes JA & Steneck RS \(2007\). *The Journal of Island and Coastal Archaeology*, 2\(2\): 161-174.](#)
- [Fogg A, Dix JK & Farr RH \(2019\). *ESSOAr*](#)
- [Green AN, Cooper JAG, Dlamini NP, Dladla NN, Parker D & Kerwath S \(2020\). *Marine Geology \(in press\)*.](#)
- [Marean CW, Cawthra HC, Cowling RM, Esler KJ, Fisher EC, Milewski A, Potts AJ, Singels E & De Vynck J \(2014\). In: Allsopp N, Colville JF, Verboom T \(eds\) *Fynbos: Ecology, Evolution, and Conservation of a Megadiverse Region*. Oxford: Oxford University Press: 164-199.](#)
- [Nunn PD \(2018\). *The Edge of Memory: Ancient Stories, Oral Tradition and the Post-Glacial World*. Indigenous Australian Stories and Sea-Level Change. London: Bloomsbury.](#)
- [O'Leary M, Paumard V & Ward I \(2020\). *Quaternary Science Reviews* 239: 106353.](#)
- [Reid N, Nunn PD & Sharpe M \(2016\). *Australian Geographer* 47\(1\): 11-47.](#)
- [Rist P, Rassip W, Yunupingu D, Wearne J, Gould J, Dulfer-Hyams M, Beck E & Smyth D \(2018\). *Aquatic Conservation: Marine and Freshwater Ecosystems* 29\(S2\): 138-151.](#)
- [Veth P, McDonald J, Ward I, O'Leary M, Beckett E, Benjamin J, Ulm S, Hacker J, Ross PJ & G Bailey \(2019\). *The Journal of Island and Coastal Archaeology* 15\(4\): 477-503.](#)
- [Ward I, Larcombe P, Mulvaney K & Fandry C \(2013\). *Quaternary International* 308-309: 216–229.](#)
- [Ward I, Smyth D, Veth P, McDonald J & McNeair S \(2018\). *Ocean and Coastal Management* 160: 167–174.](#)

Gaia Mattei¹, Claudia Caporizzo¹, Ana Novak^{2,3}, Livio Ronchi⁴, Martin Seeliger⁵
Project number: 2003P

NEPTUNE activities in 2020

Neptune project started on March 30th, 2020 in the framework of INQUA CMP commission activities with the purpose of creating an interdisciplinary working group of young scientists aimed to develop multidisciplinary techniques to analyze and reconstruct past landscapes, presently submerged due to the postglacial sea-level rise. The project is focused on coastal landscape changes over the last 12 millennia. In particular, we aim to fuel the research, discussion and innovation on a wide range of studies dealing with the reconstruction of submerged landscapes, from the onshore to the offshore, from the regional to the local scale, from the nearshore zone to the continental shelf. Such information is crucial to assess the potential impact of relative sea-level rise and to prepare the adaptation of coastal communities threatened by the changing climate. In 2020 our main activities were focused on our first community meeting and on preparing a Special Issue in Quaternary International.

Due to the pandemic, the first meeting of our community unfortunately had to be transferred from Naples to a virtual space. However, the

online format of our meeting, which took place on 3rd September 2020, allowed unlimited participation. This resulted in excellent attendance with over 60 participants from all over the Globe ranging from PhD Students, Early Career Researchers and Senior Scientists.

The conference was opened with talks from the CMP vice-president Matteo Vacchi and the SPLOSH IFG leader Andrew Green. The keynote was given by the PALSEA IFG leader Alessio Rovere. The introductory part of the meeting was followed by presentations of the research work of PhD Students and Early Career Researchers from our community. In twelve interesting presentations the young scientists discussed in detail the suitability of several methods of indirect surveys, often integrated with a unique multidisciplinary approach, to reconstruct coastal paleo-landscapes and their evolution over time. The following panel discussion was kicked-off with the exploration of the possible avenues of collaboration between the NEPTUNE project and the SPLOSH IFG represented by Andrew Green. The meeting concluded with an ECR-focused discussion coordinated by

NEPTUNE project leaders where the participants discussed the open issues they normally face during their activities with an emphasis on the six main objectives of NEPTUNE:

1. The relationship between the evolution of the coastal landscape and the rates of relative sea-level rise
2. The importance of a multi-disciplinary approach in modelling underwater paleo-landscapes
3. The role of the innovative technology applied to coastal/marine surveys to perform high-precision measurements in environments of different depths (from the continental shelf to the nearshore zone)
4. The identification of new Holocene sea-level indicators
5. How the nearshore population dealt with changing shorelines or shifting positions of their settlements and how this knowledge can be utilized by present-day near-shore communities
6. The promotion and establishment of new connections and collaborations between researchers of the coastal-continental shelf domains with emphasis on the ECRs

This ongoing discussion, started during the First meeting, will help the Neptune community to better understand the effects of global and local processes on coastal changes over the last 12 millennia and the anthropic adaptation to these changes. Furthermore, this scientific project aims to address several open questions regarding the changes in the Holocene period by using a multi-disciplinary approach based on the innovative technologies for high-resolution reconstruction of underwater environments at different bathymetric ranges.



Group photo of some of the participants of the ECR-focused discussion of the 1st NEPTUNE meeting

This year we were also actively involved in submitting proposals for a NEPTUNE-themed Special Issue in [Quaternary International](#) and a NEPTUNE-themed session at [vEGU21](#) which were both approved. Our QI SI titled "Lost Landscapes: Reconstructing the Evolution of Coastal Areas Since the Late Pleistocene" – PALEOCOASTS is expected to be open for submissions during the first half of 2021. Meanwhile, submissions for abstracts for our EGU session titled "[Underwater paleo-landscape reconstruction by using multi-proxy approaches in the framework of NEPTUNE INQUA Project](#)" is open until January 13 2021. More information and the latest updates are available on our [website](#) and [Facebook page](#).

Additionally, we also represented our project at national and international conferences. In particular, Gaia Mattei presented the Neptune project during the annual meeting of the working group on coastal morphodynamics of the AIGEO, Italian Association of Geomorphologists. Martin Seeliger presented the project at the Virtuelle Jahrestagung AK Geomorphologie Cottbus 2020.

In 2021 we plan to organize an online NEPTUNE event with a "Facebook live" stream where we will present some results of our multidisciplinary studies carried out in the Gulf of Naples. This event will be considered as a prologue to the first face-to-face workshop that will be held at Parthenope University of Naples as soon as the global emergency will finish. Depending on the future development of the situation, we also tentatively plan a second NEPTUNE face-to-face meeting in Frankfurt in the second half of 2021. Last but not least, a joint SPLOSH-NEPTUNE online event is planned for the first half of the year. All the information about our ongoing and future activities will be available on our [website](#) and [Facebook page](#).

AFFILIATIONS

- ¹Parthenope University of Naples - Italy
²Geological Survey of Slovenia - Slovenia
³University of Ljubljana - Slovenia
⁴University of Padova - Italy
⁵University Frankfurt - Germany

Project number: 2004F

Terminations Five to Zero

PALCOM's Terminations 5-0 IFG held a virtual workshop that focused on Glacial terminations 1 and 2 on November 9 -12. The workshop was co-sponsored by PAGES Quaternary Interglacials (QUIGS). There were 13 oral presentations followed by discussion, involving participants from around the world, which made for some early morning/late night hours for some. Among the topics that were covered were past changes in global temperature and sea level, carbon cycling, deep ocean circulation, centennial/millennial scale variability, ice sheet dynamics, meltwater events and vegetational response to deglaciation. Many of the talks were recorded, and can be accessed in the following links provided by the organizer of the workshop, Dr. Laurie

Menviel of the University of New South Wales, Australia:

- [Session 1 - Main, breakout 1 \(Deglacial carbon changes\) and discussion](#)
Passcode: 9?v4guWa
- [Session 1 - Breakout 2 \(Deglacial climate and ice-sheet dynamics\)](#)
Passcode: f*p\$i#h7
- [Session 2 - Main, breakout 2 \(Deglacial carbon changes\) and discussion](#)
Passcode: u2##zTq0
- [Session 2 - Breakout 1 \(Deglacial climate and ice-sheet dynamics\)](#)
Passcode: \$?BMB@b2

Preparing PATA Days Chile 2021



The PATA Days in Chile had to be postponed to November, 2021, but we can't wait until then. On 18 December, 2020, from 15:00 - 16:30 UTC we will have a zoom meeting to at least partly compensate for not having a real meeting this year. No pre-registration is necessary. Please watch [paleoseismicity.org](#) and the [INQUA TERPRO blog](#) for updates and the meeting link.

15:00 - 15:30: Introduction by INQUA TERPRO and TPPT staff

- Jim McCalpin, President -

TERPRO projects and plans for intercongress period

- Stephane Baize, IFG leader - TPPT project and future PATA Days
- 15:30-16:30: Invited speakers
- Tom Rockwell – topic to be confirmed
 - Gabriel Easton and colleagues – Earthquake geology of northern Chile

See you all online in December and in person next year!

Lewis A. Owen

The Commission on Stratigraphy and Chronology (SACCOM): an overview

SACCOM is continuing to help promote and co-ordinate international cooperation and integrate regional and national chronostratigraphic nomenclature through stratigraphic methods and dissemination of stratigraphic knowledge. AD 2020 has continued to be very challenging as we face many issues associated with the COVID-19 pandemic. Despite these unprecedented times, SACCOM is continuing its mission to study the Quaternary period through stratigraphy and chronology and provides a forum to discuss and establish stratigraphic investigations and classification throughout the world. Our two international focus groups, a working group, and a project, are moving ahead with their activities. These activities involve several hundred scientists and more than one hundred early career researchers from distant parts of the world.

The **International Focus Group 1709, Ponto-Caspian Stratigraphy and Geochronology (POCAS)**, led by Prof. Valentina Yanko-Hombach is

continuing to study the Quaternary geology of the Ponto-Caspian region. POCAS specifically aims to bypass linguistic/political/disciplinary boundaries, link continents (Europe and Asia) more closely, and encourage East-West dialogue and cooperation among Quaternary researchers. POCAS is planning field programs in the coming years. This includes in the Caspian Sea region, under supervision of Prof. T. Yanina, the examination of: (1) the Lower Volga (Astrakhan and Volgograd counties) and the Middle Volga (Saratov county) where they plan sampling for OSL dating of the Khvalynian transgression for reconstruction of the time and stages of its development; and (2) correlation of the Northern Caspian and river terraces for further correlation with transgressive-regressive cycles of the East European Plain.

In the Black Sea region, directed by Profs. Yanko and Yanina, POCAS is studying: (1) the Crimean and Taman peninsulas with the purpose of OSL and radiocarbon dating of marine sediments; (2) Odessa and Tiraspol

counties examining horizons of Neopleistocene and Eopleistocene loess and paleosols; (3) the Daymouth barriers of the Dnistrovskiy, Dniepro-Bugskiy, Tiligulskiy, Kuyalnitskiy and Khadzhibeyskiy limans that contains a pretty complete succession of the Late Pleistocene-Holocene sediments; and (4) the Dnestrovian terraces including the site Bayraki with Oldowan human culture. The POCAS conference and field trip for (2)-(4) is postponed to 2021 due to COVID-19 pandemic.

In the Manych depression, directed by Prof. D. Semikolnykh, POCAS is undertaking a comprehensive study of sediments to reconstruct the Manych paleostait connection between the Caspian and Black seas. The main goal is to find natural outcrops of the Khvalynian deposits in the Manych valley and sample them for OSL and radiocarbon dating.

International Focus Group 1612F, Database on Terrestrial European Stratigraphy (DATESTRA), led by Prof. Pierluigi Pieruccini, aims to

improve and complete their database on terrestrial stratigraphy that is designed for sites with stratigraphic importance across Europe. The 2020 Meeting of DATESTRA was dedicated to Prof. Adam Nadachowski on his 70th birthday. This was organized by Prof. Krzysztof Stefaniak and Drs. Urszula Ratajczak, Artur Sobczyk, Adrian Marciszak, Adam Kotowski, and several others. Adam Nadachowski was honored by “fireworks” and >50 virtual presentations, with >100 participants from at least 15 different countries. Fuller details of the meeting are presented elsewhere in *Quaternary Perspectives*. Special attention was given towards developing a common database. The organizers plan to publish the contributions to the meeting in a special issue of *Quaternary International*. News and updates about

SEQS activities can be found on the [SEQS homepage](#).

The many decades of activities of the loess and pedostratigraphy community continue as a working group, **Loess and Pedostratigraphy 2007WG**, led by Prof. Shiling Yang. The plans for the loess workshop in Wroclaw in June 2020 had to be postponed in the first instance until November and now until spring/summer 2021 due to the COVID-19 pandemic. However, there were several loess sessions that took place at the virtual European Geophysical Union annual meeting, including “*Aeolian dust: initiator, player, and recorder of environmental change*”, “*Pedogenic processes of soils and palaeosols across scales - influence of various factors, including imprints of human activities*”, and “*Integrating*

stratigraphy, sedimentology, paleoclimate and human evolution in- and out of Africa?”. Small, invited virtual presentations also took place at Wroclaw University, Poland. Additionally, resulting from smaller regional meetings in 2019, special issues in *Journal of Quaternary Science* and *Quaternary Research* are underway, titled “*The Eurasian environments and human occupation on different time scales*” (Guest editors: Janina Nett and Wei Chu) and “*Geoarchaeological and palaeoenvironmental research in European loess*” (Guest editors: Slobodan B. Marković, Qingzhen Hao and Nick Lancaster), respectively. The time in COVID-19 lockdown has been spent working on the group's administrative side with a new constitution and bylaws in consultation with the committee. The next stages



Punta di Maiata is one of the many sections examined by POCAS. This beautiful natural cliff exposes calcareous and marly limestones of the Trubi Formation. The succession is characterized by a quadruplet, grey-white-beige-white color alteration with lithological variation is due to mineralogical changes triggered by precessional cycles (21 kyr) that induced paleoclimatic and paleoceanographic variations in the Mediterranean Sea. The change in thickness of some selected beige layers was caused by the obliquity of the Earth's axis (41 kyr). Larger-scale eccentricity (100 kyr) related cycles are clearly visible in the weathering profile of the cape. Layers richer in carbonate are linked to phases of eccentricity minima. For more details, please see: Caruso, A., Capraro, L., Di Stefano, A., and Marino, M. (Eds.). 2017. *Field Trip Guide of UNESCO - IUGS – IGCP 610 and INQUA IFG POCAS Joint Plenary Conference and Field Trip, October 1-9, 2017, Palermo, Italy*. Photo and caption: Valentina Yanko-Hombach.



Monte San Nicola section, near Gela, in Sicily. The GSSP for the Gelasian Stage, Pleistocene Series, and Quaternary System is placed at the base of the marly layer overlying the sapropelic "Nicola bed" indicated by the lower red arrow. The GSSP has an age of 2.58 Ma. Photo: Antonio Caruso.

will involve consultation with members of the group as well as developing a code of conduct. Finally, the committee is in the initial stages of new website development.

The SACCOM INQUA and Subcommittee on Quaternary Stratigraphy (SQS) of the International Commission for Stratigraphy (ICS) *International Field Workshop and Symposium on the Gelasian Stratotype* in Sicily was initially scheduled for June 2020. Owing to the pandemic, the event has been postponed to June 2021. The field workshop and symposium will examine the Neogene–Quaternary transition, focusing on the spectacular Monte San Nicola outcrop in Gela, Sicily, which serves as the GSSP for the Gelasian Stage and Quaternary System. The participation of early career researchers has been encouraged, along with senior academics. The field workshop will provide an opportunity to assemble a research team and

inaugurate the project "Gelstrat" aimed at reinvestigating the Gelasian stratotype using a multi-proxy approach at very high stratigraphic resolution. This will allow the detailed reconstruction of the climatic history across one of the most critical intervals of Earth history. The organizers are Drs. Antonio Caruso, Martin J. Head, Adele Bertini, and Maria Marino, with Antonio Caruso as the local host.

SACCOM's activities will continue to span the whole of the Quaternary period and identify critical times to focus on for the benefit of the broader community. Much of this will be done virtually in the coming year, given the challenges related to the COVID-19 pandemic. We are planning to develop monthly virtual seminars in the coming year that will be open to the community and send details out in the coming months. Details of SACCOM's activities and updates are available on the [INQUA website](#). SACCOM is particularly aware

of the need for societal relevance and outreach, diversity and inclusion, supporting early career researchers, and training the future workforce. We welcome creative ideas for bringing our community together to promote and enhance our research during these tough times. Please reach out to the [Commission Officers](#) to provide suggestions or opportunities to advance our commission's goals. And please [join SACCOM](#).

AFFILIATION

North Carolina State University
Raleigh, USA

IFG 1612F

Stay connected – The SEQS-DATESTRA 2020 Virtual Meeting in Poland

The Section on European Quaternary Stratigraphy (SEQS) developed during the past decades to a scientific family and the annual SEQS meetings and fieldtrips strengthened the cordial friendships between the participants from several countries from Eastern and Western Europe. It also allowed personal insights into the Quaternary Geology of Italy, Romania,

Armenia, Slovenia, France, Russia etc. Prof. Adam Nadachowski, from Poland was a frequent participant of the SEQS meetings and fieldtrips and the 2020 SEQS-Meeting was dedicated to his 70th birthday. Perfectly organized by his Polish colleagues (Prof. Krzysztof Stefaniak, PhD Urszula Ratajczak, Artur Sobczyk, Adrian Marciszak, Adam Kotowski, and several others)

Adam Nadachowski was honored by a “firework” of more than 50 virtual presentations.

On 28th of September 2020, under the patronage of Professor Przemysław Wiszewski the Rector of University of Wrocław, the INQUA SEQS-2020 conference “Quaternary Stratigraphy – paleoenvironment,



The Rector of the University of Wrocław Prof. Przemysław Wiszewski at the opening ceremony of the Meeting and Prof. Adam Nadachowski, the special guest of the Meeting, celebrating his 70th birthday.



The Organizing Committee, including Prof. Adam Nadachowski and his wife Ania.

sediments, fauna and human migrations across Central Europe” was held remotely due to the COVID19. The following organizations and institutions took the patronage of the conference: INQUA - SEQS Section on European Quaternary Stratigraphy; INQUA – SACCOM Commission on Stratigraphy and Chronology; INQUA – International Union for Quaternary research; University of Wrocław; Polish Academy of Sciences; Committee for Quaternary Research PAS; Polish Geological Society

The opening ceremony and the Meeting took place in the historic Library of the Institute of Geography and Regional Development. The Meeting was opened by the Chairman of the Organizational and Scientific Committee prof. Krzysztof Stefaniak from the Department of Palaeozoology at University of Wrocław and conducted by MSc Adam Kotowski. The opening ceremony consisted of speeches by the following: Rector of the University of Wrocław Prof. Przemysław Wiszewski; President of INQUA Prof. Thijs van

Kolfschoten; Deans of the Faculty of Biological Sciences Dr. Marcin Kadej; Deans of the Faculty of Geosciences and Environmental Management Prof. Henryk Marszałek; President of INQUA - Section on European Quaternary Stratigraphy Prof. Markus Fiebig; Chairman of The Committee for Quaternary Research of the Polish Academy of Sciences Prof. Zdzisław Jary; Director of the Institute of Systematics and Evolution of Animals of the Polish Academy of Sciences in Kraków Dr. Sebastian Tarcz.

All of the speakers underlined the uncommon circumstances under which the conference was organized. The Rector of the University of Wrocław underlined, among others, that this conference is in line with the activities of the University of Wrocław as a research university. In the speeches the merits of the jubilarian – prof. Adam Nadachowski - were emphasized and prof. Jan Burdukiewicz gave a laudation for prof. Adam Nadachowski who at the end the jubilarian responded with

warm words of thanks. During the 30-minutes break preceding the lecture session, a diaporama was presented to illustrate the various stages of prof. Nadachowski’s work.

The lecture and poster sessions were divided into 4 thematic parts:

- Session 1 Karst and cave sequences
- Session 2 Quaternary stratigraphy, chronology, geomorphology and tectonics
- Session 3 Human and environment in the Quaternary
- Session 4 Major regional subdivisions of the Quaternary in European and Asian regions: toward a common database (Datestra).

The sessions were directed by Urszula Ratajczak, Artur Sobczyk and Adam Kotowski. 103 participants representing the following countries were registered before the conference: Austria (1), Croatia (1), Czechia (1), Spain (2), the Netherlands (1), India (1), Israel (1);

Lithuania (1), Germany (3), Poland (45), Russia (23), Slovenia (1), Ukraine (13), UK (3), Italy (6). Due to the large number of registrants, 10 minutes were planned for each oral presentation, including a short discussion, and 2 minutes for posters' presentation. The sessions ended with an open discussion. In total, 28 oral presentations were delivered and 42 posters were presented. About 45% of all presentations were held by female researchers and a very balanced mixture of experienced and young Quaternary scientists attended the sessions of the Meeting. The topics of the presentations varied from biostratigraphy, fauna and vegetation, Karst and Cave sequences, Quaternary stratigraphy, chronology, geomorphology and tectonics, Human and environment in the Quaternary to major regional subdivisions of the Quaternary in European and Asian regions. Special attention was for the SEQS Project DATESTRA - towards a common database. A total of 95 participants from 14 countries heard about new investigations from the Himalaya, the Chinese loess plateau, the caves of the Russia far east, the Hominid sites in Kyrgyzstan, river plains in Slovenia and numerous other sites in Poland, Russia, Italy, Austria etc. In the last part, the Chairman of the Organizing and Scientific Committee, Prof. Dr. Hab. Krzysztof Stefaniak thanked all the participants, the University Authorities, INQUA and INQUA-SEQS representatives, organizers and the jubilarian Adam Nadachowski and invited everyone to the next edition of this conference next year to Wrocław, Poland. Summary speeches were taken by the President of INQUA Prof. Thijs van Kolfschoten (the Netherlands), the President of SEQS prof. Markus Fiebig (Austria), the Vice-President of SEQS Prof. Guzel Danukalova (Russia) and the Secretary of SEQS Prof. Pierluigi Pieruccini (Italy).

Despite the technically complex organization, due to the pandemic situation and the large number of participants, the meeting was managed without major problems. For this reason, a special thank is devoted to the efficient team supporting the virtual meeting, in particular the moderators and session directors, as well as

the participants who followed the recommendations set by the organizers. Apart from the Organizational and Scientific Committee, following employees of the University of Wrocław and the University of Nicolaus Copernicus in Toruń were involved in organization of the conference: computer specialists: Marcin Hatalak, Mateusz Haglauer, Marek Ćmikiewicz, Karol Geinert, Mateusz Skrzatek; media and photography service Małgorzata Jurkiewicz and Magdalena Marcuła, students from the Scientific Association of Student Palaeobiologists: Dorota Orlińska and Aleksandra Kropczyk.

Summaries of all presentations along with the academic profile of Prof. A. Nadachowski, his list of publications and several speeches devoted to his person were presented in the [volume of abstracts](#), which is available online. The organizers will apply to publish the contributions to the Meeting in a Special Issue of Quaternary International. The SEQS-Meeting in Poland was a big success, despite the fact that it was "only" virtual. The Fieldtrip, originally scheduled for September 2020, is postponed to September 2021. Our hope is to meet all the participants in Poland next year and to visit the exciting Quaternary sites learning about the geology of that specific area.

News and updates about SEQS activities can be found on the [SEQS homepage](#). We hope to meet you again in the future and we wish Prof. Adam Nadachowski all the best and we congratulate him again with his 70th birthday.

PROJECT LEADERS

Markus Fiebig (University of Natural Resources and Life Sciences Vienna, Austria); Pierluigi Pieruccini (University of Torino, Italy); Guzel Danukalova (Russian Academy of Sciences, Russia); Thijs van Kolfschoten (Leiden University, The Netherlands; Shandong University, China); Krzysztof Stefaniak, Urszula Ratajczak-Skrzatek, Adam Kotowski, Adrian Marciszak, Artur Sobczyk, Marek Kasprzak, Andrzej Wiśniewski (University of Wrocław, Poland).

What's happening there? ECRs on the road to Rome 2023

In this new section we want to prepare our journey towards the next INQUA Congress to be held in Rome in 2023. Over the course of the next issues of Quaternary Perspectives, we will highlight the many aspects of the Italian and Mediterranean Quaternary and how past, present and future research on this highly complex area represents a vital source of knowledge for our extended community.

Here we start with the goals and interests of ECRs: young, active and focused on the new frontiers of Quaternary research, this next generation of scientists is starting to shape how we look at the world around us. So we asked a group of them to illustrate what they do and how they contribute to their own field of research, on the road to Rome 2023.

*Guido Stefano Mariani
INQUA ECR Representative*

Large, abrupt, and widespread climate changes with major impacts have occurred repeatedly in the past, when the Earth system was forced across thresholds.

In the framework of the Italian Quaternary research, much fruitful work remains to be done to increase our understanding of such rapid and extreme climate flips and their effects on terrestrial ecosystems. It is of paramount importance to support high-resolution studies on continuous series, given that changes between ecoclimatic modes can occur within decades, a rate similar to that of recent climate change.

The so-called Heinrich Events are among the most abrupt climate perturbations of the last glacial period. Their

Northern Hemisphere-wide footprint is a proof of coherent interactions among atmosphere, oceans, and cryosphere on millennial timescales.

In this context, the paper "The fast-acting "pulse" of Heinrich Stadial 3 in a mid-latitude boreal ecosystem" (Badino et al., 2020) presents new insights on timing and expression of Heinrich Stadial 3 (HS 3) in the framework of a mid-latitude ecoclimatic gradient. Here we present a 3800 year-long palaeoecological record from Lake Fimon (Vicenza, N-Italy). The high median time-resolution of 58 years allowed the identification of five abrupt event-boundaries (i.e., main forest expansion and decline excursions) synchronous with the sharp stadial/interstadial (GS/GI) transitions within dating uncertainties. During HS 3 we reconstructed more open and dry conditions, compared to the other GS, at the continental edge of the forest-steppe ecological gradient. While a regional scale fire signal prevailed during this interval, high-magnitude local fire peaks occurred at GI/GS boundaries, arguably linked to climate-driven fuel changes. Interestingly, palaeoecological data unveiled an HS 3 internal variability consistent with $\delta^{18}O$ changes in alpine speleothem records, suggesting rapid and sensitive ecoclimatic response to even abrupt atmospheric circulation patterns.

An extensive collection of high-resolution palaeoclimatic and paleoecological series represents a prerequisite for improving past climate assessment and projection in anthropogenic scenarios.

Federica Badino
University of Bologna, Italy
CNR-Institute of Environmental Geology
and Geoengineering (IGAG), Italy.

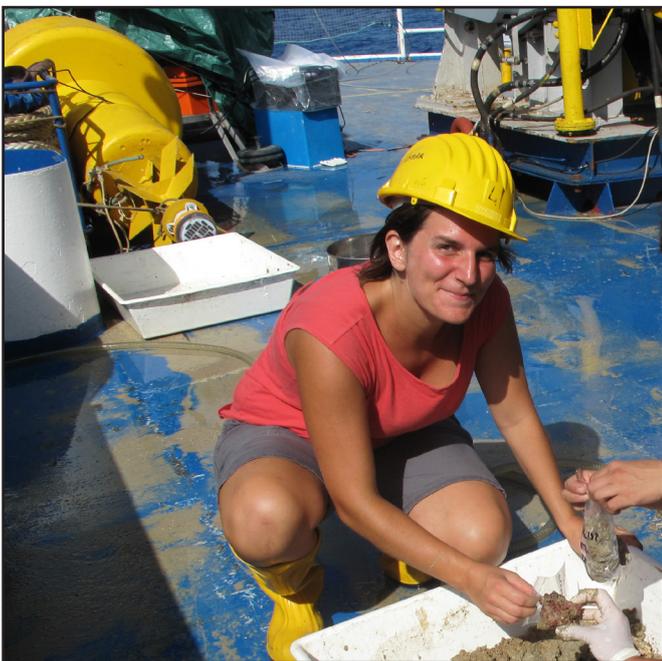
[Badino F, Pini R, Bertuletti P et al. \(2020\). Scientific reports, 10\(1\), 1-14.](#)



My research activity is aimed at the study of Quaternary marine bioconstruction (coralligenous and rhodolith beds) and the macroinvertebrate thanatocoenoses/fossil assemblages that characterize the carbonate sediments of the temperate continental shelf, in the context of paleontology and applied marine paleoecology, with an inter- and multidisciplinary approach which includes geobiology, sedimentology, geomorphology and geochemistry.

The research focuses on the systematic classification of the organisms involved and the relationships existing between them in time and space, with the aim of

reconstructing paleoenvironmental, paleoclimate and paleogeographic scenarios of the whole Quaternary. Bioconstructions develop at the scale of geological time, giving rise to both the accumulation of sediments and the formation of solid and raised structures from the bottom (rocks) that influence the dynamics of seabed. They also represent valuable archives of the variations climatic and environmental past (both hot and cold interglacial). A particular aspect of the research concerns the analysis of the sedimentogenetic role of biogenic carbonate along the continental shelf, by studying the rate of production and accumulation, as well as the evaluation of the areal distribution e volumetric of these deposits.



Valentina Alice Bracchi
University of Milano-Bicocca, Italy

[Bracchi VA, Basso D, Savini A, Corselli C \(2019\). Marine Geology 411, 119-132.](#)

I apply geochemical analyses such as U-Th dating, oxygen and carbon stable isotopes and trace elements and on cave carbonate deposits (mainly stalagmites). By doing so, I am able to produce high resolution palaeoclimate and environmental reconstructions, in turn useful for:

- Unveil rainfall and temperature changes over the last 500,000 years;
- Absolute geochronological redefinition of inter-hemispheric rapid climatic events, such as stadial/interstadial shifts, Heinrich events and glacial terminations;
- Comprehending the impact of Quaternary intra- and inter-millennial timescale climate changes on the geomorphological evolution of karst and non-karst terrains.

My main area of study is the Mediterranean area,



particularly the southern Italian peninsula and the Sardinia Island. These regions lacks of high resolution palaeoclimate reconstructions, considering the latter are strongly biased toward northern Italy. Specifically, it is not clear how climate at southern Italian latitudes reacted to important environmental changes at global scale, such as the expansion/contraction of polar ice sheets and variation of the Atlantic overturning meridional circulation during the late Quaternary. Thus, my work aims to fill this knowledge gap in the understanding of the Italian Quaternary.

Recently, I am developing a particular interest in evaluating the role of climate in driving the bio-cultural shifts of Palaeolithic cultures in southern Italy, as well as Neolithic to recent cultures in Sardinia. Specifically, I am focusing to what extent climate influenced the transition between Neanderthals and Sapiens in Apulia at around 42,000 years ago, as well as the end of the Nuragic culture in Sardinia at around 2,000 years ago.

Andrea Columbu
University of Bologna, Italy

[Columbu A, Chiarini V, Spötl C et al. \(2020\). Nature Ecology & Evolution 4, 1188-1195.](#)

Pollen-based quantitative reconstructions of climate parameters from natural archives in alpine, foothills and plain areas of northern Italy

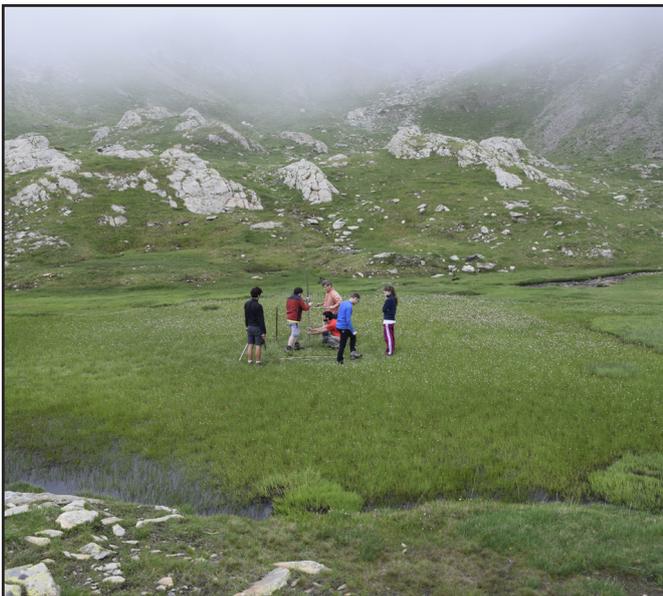
Fossil pollen records obtained from lakes, peat bogs, mires and ocean sediments are used since the early 20th century as a tool to qualitatively reconstruct past vegetation and environments and their response to climate change and human pressure. From the qualitative description of past Quaternary climates inferred from microfossil assemblages, a step further towards quantitative reconstruction of environmental and climate parameters has been done during the last 50 years.

The research focuses on pollen-based quantitative reconstructions of climate parameters from natural archives in alpine, foothills and plain areas of northern Italy, a new

challenge in the framework of the Italian Quaternary research.

Within this context, the paper Furlanetto et al. (2018) presents Holocene vegetation history and quantitative climate reconstructions from a high-elevation sedimentary record (Armentarga peat bog, 2345 m asl) located on the southern flank of the European Alps. Quantitative reconstructions of July temperature and annual precipitation were obtained by applying numerical transfer functions built on an extensive pollen-climate calibration set from the European Alps. Changes in elevational vegetation arrangement were primarily driven by phases of precipitation increase, and to a lesser extent by millennial-scale temperature changes already known from glacier, timberline, chironomids and speleothem records at Alpine scale. Changes in pollen-inferred annual precipitation occurred in three main steps: an early Holocene moderately humid phase, a precipitation increase at 6.2 ka cal BP and a further, prominent step forward at the Middle to Late Holocene transition that led to the high values of snowfall and runoff characterizing today's oceanic elevational climates of the outer Italian Alps.

Past climate variability is a key for future climate scenarios and mitigation strategies.



Giulia Furlanetto
CNR-Institute of Environmental Geology
and Geoengineering (IGAG), Italy.

[Furlanetto G, Ravazzi C, Pini R et al. \(2018\). Quaternary Science Reviews 200, 212-236.](#)

Climate variability reflects the interactions between natural forcing and external forcing and has an important influence on the socio-economic development, ecological systems and human issues. For a better prediction and understanding of possible future climate evolution, it is essential to understand the mechanisms, causes, and



amplitude of natural climate variability. Paleoclimate information facilitates understanding of Earth system feedbacks on time scales longer than a few centuries, which cannot be evaluated from short instrumental records (IPCC 2013).

In this framework, the Mediterranean area is considered one of the most responsive regions to global change. In the Mediterranean area the effects of the climate change, likely supplemented by human activities, are rapidly transferred to the deep sea via an effective thermohaline circulation, pointing to the exceptional sensitivity of the coupled ocean and atmosphere dynamics to combined anthropogenic and natural climate forcing in the region.

In this framework, planktonic foraminifera represent the most important tool for monitoring for paleoceanographic, paleoecological and sea-surface temperature reconstructions through the properties of their fossil assemblages or as a substrate for extraction of geochemical signals. The high abundance and the excellent preservation of planktonic foraminifera in marine sediment make them probably the best fossil record on Earth, providing unparalleled archives of morphological change, habitat and ecological variations.

The principal aim of my research is to give a high-resolution overview about the climatic variability over the late Quaternary in the Mediterranean area and to correlate the climatic event in an interhemispheric-scale based on planktonic foraminifera and geochemical analysis. The multidisciplinary approach allowed to correlate the climate variability to the social-cultural development in Europe.

Giulia Margaritelli
CNR - Istituto di ricerca
per la Protezione Idrogeologica (IRPI), Italy

[Margaritelli G, Vallefucio M, Di Rita F et al. \(2016\). Global and Planetary Change 142:53-72.](#)

My work focuses on the reconstruction of Quaternary sedimentary basins, ranging from field-based geological and geomorphological mapping to 3D numerical modelling. My work spans among the disciplines of sedimentology, geomorphology, geopedology, geophysics, stratigraphy, tectonics. My current research looks at improving the reliability of (hydro-) stratigraphic models of Quaternary sedimentary basins at multiple scales, by characterizing the space-time constraints on their evolution as rules for

numerical computations. My favourite place to do research is the field, both at gentle and steep slope settings. I actively cooperate at international projects in Developing Countries.

I wrote my PhD on the characterization and modelling of the Quaternary Po Basin geology (N-Italy); I proposed a new geological and landscape evolution by combining geological field surveys, geopedological analyses and subsurface stratigraphic correlations. I cooperated with the CHYN Department in Neuchatel (CH) to refine and publish a new method for multiscale modelling of Quaternary alluvial systems.

Relevance of my work in the Italian Quaternary research relates to the adopted multidisciplinary approach: Geology - new maps and stratigraphic scheme of the Quaternary Po Basin integrate the Geological Map of Italy where they are currently lacking; Landscape evolution - hints on the relations between (palaeo-) soils and the nature of the geological surfaces have applicability to the study of tectonically active settings; (palaeo-)seismology - the morphostructural investigations in low-relief areas contribute to the debated seismic hazard assessment in the southern Po Basin; geomodelling of Quaternary reservoirs - the implemented modelling method helps to automatically test different geometrical-evolutionary hypotheses in various geological settings; hydrogeology and geothermics - the geological models are predisposed to set-up numerical flow/transport models of Quaternary aquifers, contributing to ameliorate the groundwaters management of the Po Plain.

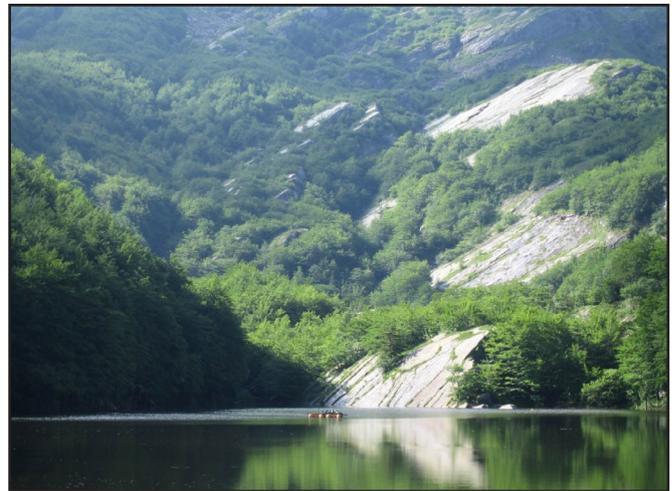
Chiara Zuffetti
Università degli Studi di Milano, Italy

[Zuffetti C, Bersezio R \(2020\). *Geomorphology* 364, 107245](#)



Quaternary webinars start from Pisa

In preparation to the next INQUA congress, AIQUA is organizing a series of webinars and meetings in collaboration with various Italian Universities and the National Research Council (CNR). To start, the University of Pisa (Department of Earth Sciences, MS in Environmental Sciences, BS in Natural and Environmental Sciences and CIRSEC) leads the way with the webinar: "[Vegetation responses to warm Mediterranean mid-Holocene summers](#)" (26 November, now available online) held by Willy Tinner, professor at the University of Bern (Institute of Plant Sciences Paleoecology) and the Oeschger Center for Climate Change Research.



Lake sediment coring at Lago Gemio Inferiore, Tuscan-Emilian Apennines, in the background the dominating *Fagus sylvatica* forest

From the abstract: *The Mid-Holocene Thermal Maximum (HTM) has been increasingly used to assess future climatic impacts on ecosystems. Ample palaeo and modelling evidence suggests that during the mid-Holocene summers were warmer than today (past 30 years) over the northern hemisphere, including the Mediterranean. Quantitative palaeoclimatic and palaeoecological time-series from the Tuscan-Emilian Apennines provide the opportunity to numerically address the local and regional response of plants to changing climate. The outcomes are ecological surprises. However, such evidence contrasts with pollen-based palaeoclimatic reconstructions, which infer that over the Mediterranean an anomalous Mid-Holocene Thermal Minimum prevailed. On the basis of the available multiproxy evidence we discuss an alternative interpretation of such pollen-based palaeoclimatic estimates.*

India

Akash Srinivas¹ & Binita Phartiyal²

Association of Quaternary Researchers (AOQR) and INQUA ECR interaction: A report

As part of the recently concluded Early-Career Researchers' Webinar Series: 'Emerging Areas of Research in Quaternary Science', organised by the Association of Quaternary Researchers (AOQR), a joint initiative by the ECR teams of AOQR and INQUA was organised as a special session to introduce the various features and facets of INQUA, to the broader community of students, researchers and enthusiasts of the Quaternary based in the Indian subcontinent.

The Association of Quaternary Researchers (AOQR) is a recently established association committed towards the overall ascent of Quaternary research in the Indian subcontinent. The association aims to bring together different researchers, students, and enthusiasts of the Quaternary of the region. One of the key objectives of the association is to bring Indian Quaternary researchers at par with global research developments in terms of the latest techniques, methods and practices and enable to fill the gaps in available datasets. In line with this objective, the association seeks to organize regular meetings, national and international conferences, field workshops, laboratory training sessions, brainstorming sessions, and open panel discussions.

This webinar series was hosted concurrently on Google Meet and YouTube Live, with technical support provided primarily by the Birbal Sahni Institute of Palaeosciences, Lucknow, and Christ College (Autonomous), Irinjalakuda. The series was promoted employing social media platforms (WhatsApp Groups and Twitter - @AOQRIndia). The webinar series went live on Monday afternoons between 7th September, 2020 and 29th October, 2020. It featured eight ECR speakers from the length and breadth of India, and covered a broad range of topics and themes related to the South Asian Quaternary record. A detailed list of abstracts and speakers is published in the newsletter of the AOQR - Quaternary Chronicles (QC Vol. 2, No. 3 - December 2020). The presentations and ensuing discussions were recorded, and these are freely available to view on the [YouTube channel](#) of the Association of Quaternary Researchers and the website of [AOQR](#).

On an average, over 250 viewers attended the lectures, ~80 % of which were students and ECRs. Participants represented various regions of India and the series drew in an international crowd, with participants from diverse countries such as Sweden, Nigeria, the United Kingdom, the United States, Switzerland, Brazil, Pakistan, the Philippines, Israel, and Taiwan. Overall, the series was

critically acclaimed, received tremendous support and an overwhelmingly positive feedback. Hence it was decided to organise an interaction with the ECR team of INQUA to brief these Quaternary enthusiasts about the global platform of INQUA and its activities. Thus, at the end of the series, a special interaction was organised on 2nd November, 2020, to brief the participants, especially the ECRs and students of Quaternary research, about the organisation and opportunities available at INQUA. This session, organised jointly by the ECR teams of AOQR and INQUA, included five short presentations from members of the INQUA ECR team.

Dr. Francesca Ferrario from Università dell'Insubria, Italy; Chair, ECR-INQUA and ECR representative of TERPRO commission was the first of the presenters, and her presentation outlined the new funding policy of INQUA for the year 2021. This presentation was followed by Dr. Nivedita Mehrotra from the Birbal Sahni Institute of Palaeosciences, India; Secretary, ECR-INQUA and the ECR representative of the PALCOM commission. The presentation detailed the structure of INQUA, outlining the different commissions, their scope and roles. Dr. Annie Lau from the University of Queensland, Australia, and the ECR representative for CMP commission, outlined the various web-based activities of INQUA and the range of social media engagement undertaken by members of INQUA on various forums (Facebook, Twitter, among others). Dr. Martin Seeliger from the Goethe University, Germany, and ECR representative of the CMP commission, provided an example of the functioning of the different INQUA commissions and INQUA supported projects. The presentation detailed the working of the NEPTUNE project, under the aegis of CMP. The final presentation, by Dr. Guido Stefano Mariani, Università degli Studi di Cagliari, Italy, and ECR representative of the TERPRO commission, detailed the various avenues available for publication within INQUA - focusing on both Quaternary International (QI) and Quaternary Perspectives (QP).

This event marks the first of many hopeful programs and activities resulting from the continued cooperation and coordination between AOQR and INQUA.

AFFILIATIONS

¹Indian Institute of Science Education and Research (Mohali), India

²Birbal Sahni Institute of Palaeosciences, India

Francesca Ferrario

The stress-releasing page*

*: no earthquakes involved. Sorry for the creepy (oops, again...) pun.

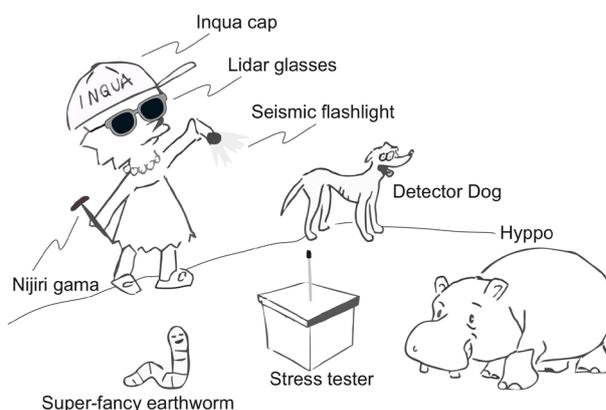
During stressful times, it's ok to take a break... The ECR Committee is here for you! Some famous songs seem to be written for describing Quaternary research: link the lyrics to the scientific theme!

Lyrics:

1. "Another brick in the wall" (The wall, Pink Floyd)
2. "There is a crack in everything" (Anthem, Leonard Cohen)
3. Cover of "The dark side of the moon" (Pink Floyd)
4. "Thick as a brick" (Jethro Tull)
5. "There are heroes in the seaweed" (Suzanne, Leonard Cohen)
6. "A hard rain's a-gonna fall" (Bob Dylan)
7. "Where the pellets of poison are flooding their waters" (A hard rain's a-gonna fall, Bob Dylan)
8. "Blowing in the wind" (Bob Dylan)
9. "Stuck in the mud" (Isaiah Rashad)

Scientific themes:

- a. Ternary plots of grain size
- b. River contamination from industrial activities
- c. Understanding algae-bacteria interactions
- d. Construction techniques at archaeological sites
- e. Investigation of mud bricks as a building material
- f. Paleoseismological trenching in a humid region
- g. Characterizing loess deposition
- h. Mapping surface faulting following a magnitude 7 earthquake
- i. Typhoon forecasting



May 2486.

Jane is an Early Career Researcher and she has recently been granted a project to study a sequence of earthquakes occurred almost 500 years ago, in 2016 to be precise, in the Central Apennines of Italy. A reappraisal of this sequence is now timely, because lots of data were taken at the time, but using technologies now outdated – you know, like floppy disks or phone booths in XXI century. Jane is super-excited because today is her first day of fieldwork... actually she is lying in pajamas on her sofa because we are in 2486 and there's no need to physically go there – her avatar will do the job.

A last check to the equipment, everything is ready:

- Inqua cap, to avoid sunburn.
- Lidar glasses, to get a 3D view of the site.
- Fault-hunting dog (aka Detector Dog), who can smell tiny active faults up to 6 feet under. If needed, they also digs trenches.
- Seismic flashlight, to go deeper into the Earth's depth.
- [Nijiri gama](#): it was invented centuries ago, but no tool is better for scratching sediments.
- Stress tester: this portable instrument identifies all unknown faults in a region and reconstructs the changes in Coulomb stress induced by an earthquake. It was invented during a pandemic by a white man without kids or caring responsibilities.
- Super-fancy new instrument: at a first sight, it looks like a regular earthworm. But it can dig a borehole, date every stratigraphic layer with a resolution of 12 seconds, measure on- and off-fault deformation, compute fault slip, seismic wave propagation and aftershock distribution.
- Hyppo, the field/lab assistant: they are in charge of collecting samples from trenches and to perform grain size and micromorphology analyses. Contrarily to most humans, Hyppo loves silty sediments and shallow groundwater. When they are working, they sing all the time "[The hyppopotamus song](#)" (mud, glorious mud...).

GEOREBUS 1
Earthquake products (7, 4)

SEIS



GEOREBUS 2
Water (4, 4)



SOLUTIONS
1d, 2h, 3a, 4e,
5c, 6i, 7b, 8g, 9f
Georebus:
1 Seismic wave
2 blue gold

Jule Xiao¹ & Thijs van Kolfschoten^{2,3}

Quaternary International - New Releases

In the June 2020 issue of Quaternary Perspectives the release of 8 new volumes of Quaternary International have been presented. The number of volumes published in 2020 is today, November 15, 27; in the coming weeks 9 more volumes will appear to complete the 36 volumes QI publishes each year. Nine of the [27 issues](#) are so-called Regular Issues with standalone papers; the remaining 18 issues are Special/Thematic Issues. Follow the latest updates on the published issues on the [Quaternary International](#) website.

SPECIAL/THEMATIC ISSUES

[Volume 543](#) - Pages 1-148

The Archaeology of Human-Bird Interactions: Essays in Honour of Dale Serjeantson. Volume 1

Edited by Umberto Albarella, Polydora Baker, Evelyne Browaeys, Chiara Corbino, Jacqui Mulville, Ged Poland, Fay Worley

The importance of birds in human life is undeniable. They affect current human societies profoundly, but the human-bird relationship was arguably even more



FIGURE 1: Participants to the 9th ICAZ Bird working group meeting (Volume 543). Photo: Helene Benkert.

important in the past, when people were in closer contact with the natural world than today. Birds, in their domesticated and wild forms, have greatly contributed to subsistence, economy, social structure and ideology of human communities. All these aspects are explored in the 18 contributions presented in this volume – and further exploration will be available in the second volume of these proceedings (figure 1).

[Volume 545](#) - Pages 1-128

ArchaeoLife and Environment

Edited by Oren Ackermann, Mauro Coltorti, Ladislav Šmejda, Itzhaq Shai

A broad range of novel topics dealing with archaeological finds, environmental impacts of human activity, life science methods and environmental changes are presented in the given special issue. This issue was initiated and is based on an international workshop which took place at Ariel University in 2017 entitled “Archaeology, Science and Environment” organized by O. Ackermann and I. Shai and funded by the Israel Ministry of Science.

[Volume 546](#) - Pages 1-244

Quaternary Stratigraphy and Karst & Cave Sediments: the INQUA-SEQS 2018 Meeting

Edited by Guzel Danukalova, Markus Fiebig, Nadja Zupan Hajna, Pierluigi Pieruccini, Andrej Mihevc

This Special Issue presents part of the contributions to the SEQS-DATESTRA 2018 Meeting “Quaternary Stratigraphy and Karst and Cave Sediments” held in Postojna (Slovenia), 12–18 September 2018. 143 participants from 16 countries joined the Meeting, organized by Dr. Andrej Mihevc, Dr. Nadja Zupan Hajna and their collaborators and hosted by the Karst Research Institute of the Research Centre of the Slovenian Academy of Sciences and Arts.

[Volume 547](#) - Pages 1-220

Groundwater and Palaeoclimate

Edited by Jianyao Chen, Sylvi Haldorsen, Rein Vaikmäe

Groundwater is the main water supply for a large and growing population. The risk of local overexploitation is high. For instance, exploitation of the Nubian Sandstone Aquifer System in Egypt has involved significant lowering of the discharge in oasis systems in Egypt (Powell and Fensham, 2016). Considerably more fossil groundwater will probably be extracted in the future, mainly because there will be no alternative resources available.

[Volume 548](#) - Pages 1-124

Stable Isotope Analysis: Methodological Approaches and Case Studies in southern South America

Edited by Clara Otaola, Francisca Santana-Sagredo, Paul Szpak

This special issue presents the results of the second workshop (Arqueología e Isótopos Estables en el Sur de Sudamérica), which was held in the city of San Rafael

(Mendoza Province, Argentina) in 2017. This volume brings together applications of stable isotope analysis that address a range of research questions surrounding the interactions between humans and their environment.

[Volume 549](#) – Pages 1-248

Long-term perspectives on circumpolar social-ecological systems

Edited by Sean P. A. Desjardins, Peter Jordan

Seventeen papers in this issue “look back” examining human-environment interactions in three regions: Arctic Eurasia; Arctic North America and Greenland; and Sub-Antarctic South America. Conversely, three papers “look ahead” exploring emerging challenges and future implications. We conclude this editorial with a series of recommendations – or “action points” – that are addressed to the wider interdisciplinary research community.

[Volume 551](#) – Pages 1-264

Peopling dynamics in the Mediterranean area between 45 and 39 ky ago: state of art and new data

Edited by Stefano Benazzi, Dusan Boric

The purpose of this special is to extensively review and update our current knowledge on the critical problem of the arrival of MHs in southern Europe. Most contributions focus on the relationship between Late Mousterian and transitional-Early Upper Palaeolithic technological and material cultural assemblages, as well as on the emergence of the Initial Upper Palaeolithic assemblages in the Near East, and on the role of environmental change and its impact on adaptive strategies, technology, settlement pattern, subsistence practices, and timing of human dispersals over the continent.

[Volume 552](#) – Pages 1-174

Loess records of environmental change

Edited by Martin Kehl, Farhad Khormali, Manfred Frechen

This special issue provides insights into these topics of Quaternary research by compiling recent studies on loess deposits from Europe, West and Central Asia as well as the Chinese Loess Plateau with special regard on less well-known loess covered areas of the Southern Eurasian loess belt such as Iran.

[Volume 555](#) – Pages 1-164

Africa under the microscope: What's new in techno-functional analyses in archaeology?

Edited by Giulio Lucarini, Sonja Tomasso

This special issue includes eleven original contributions on functional (use-wear and organic micro-residue), technological (lithic reduction processes, and petrographic and geochemical analysis of raw materials, both performed on lithics and ceramics), and ethnographic approaches, performed on stone tools or pottery assemblages, coming from archaeological contexts located in Mediterranean Africa, the Sahara,

the Nile Valley and Southern Africa. The first group of six articles includes the contributions on knapped and ground stone tools; the second group of five articles includes the works carried out on pottery assemblages.

[Volume 556](#) – Pages 1-230

Electron spin resonance (ESR) dating in Quaternary studies: evolution, recent advances and applications

Edited by Mathieu Duval, Gilles Rixhon, Lee J. Arnold
Figure 2

[Volume 557](#) – Pages 1-136

High resolution analyses of large mammals dental remains: broadening horizons

Edited by Florent Rivals, Carlos Tornero

This special issue gathers specialists from different fields in dental studies, including tooth microwear and mesowear, stable isotopes, cementum analysis and osteometry. The papers cover a wide range of sites and chronologies, and are focusing on many different problematics in archaeology.

[Volume 559](#) – Pages 1-198

Current Research on Prehistoric Central Asia

Edited by Andrei I. Krivoshapkin, Arina M.

Khatsenovich, Evgeny P. Rybin, John W. Olsen

This Special Issue incorporates a broad range of topics, including the origins and dispersal of the genus *Homo* in Asia with a focus on Denisovans and the Altaic population of Neandertals, especially their lithic technology and hunting behaviour. Central Asia's broad spectrum of Pleistocene climatic zones encourages the study of environmental impacts on human settlement patterns and the cultural geography there.

[Volume 563](#) - Pages 1-118

Dispersal barriers into Southeast Asia during the Late Pleistocene

Edited by Fabrice Demeter, Christopher J. Bae

The purpose of this special issue is to evaluate, from a multidisciplinary perspective (vertebrate paleontology, paleoanthropology, archaeology) the impact of various barriers in mainland and island Southeast Asia on faunas, including modern humans and other hominins, and floras during the Late Pleistocene.

MOST DOWNLOADED

Number 3 of the 20 most-downloaded articles from Quaternary International in the last 90 days, recently published is:

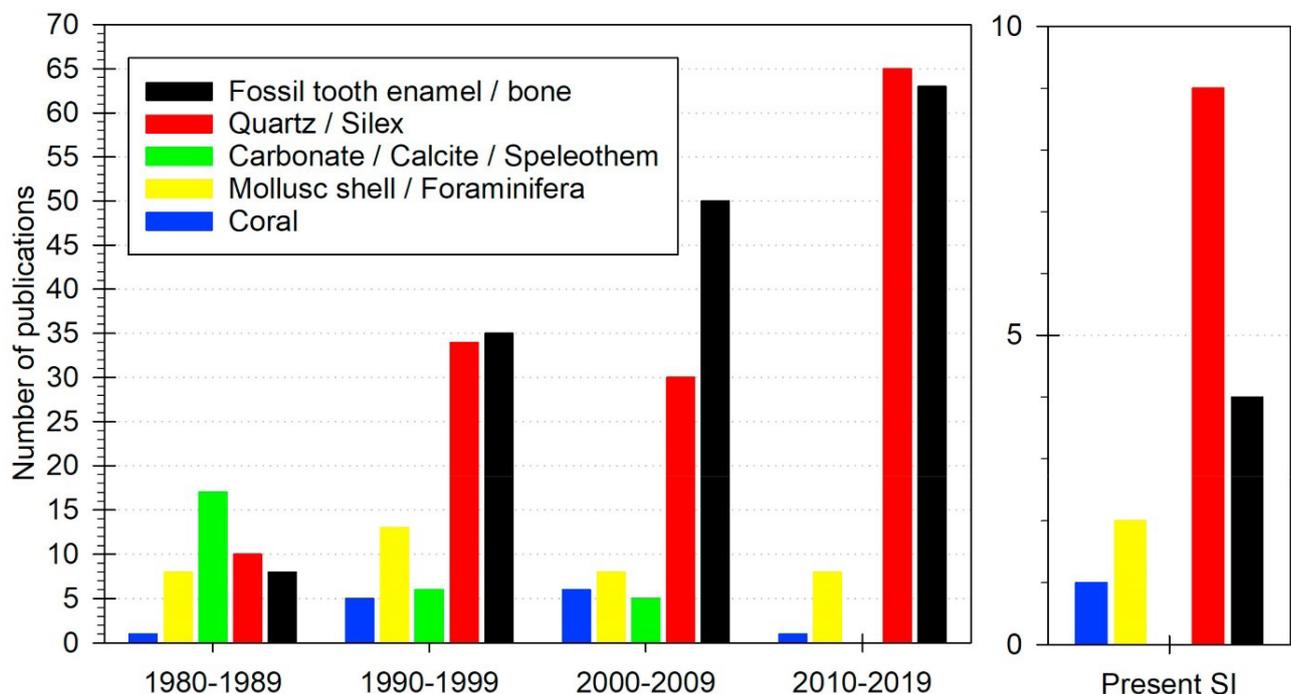


FIGURE 2: Evolution with time (by decade) of the most popular ESR dating applications since 1980, expressed by number of publications (left), and comparison with the present SI (right). Source: Scopus search (24/06/2020) based on the selection of journals that have traditionally included ESR dating studies: *Quaternary Geochronology* (data available since 2006), *Quaternary Science Reviews* (since 1982), *Quaternary International* (since 1989), *Journal of Human Evolution* (since 1972), *Radiation Measurements* [including the former *Nuclear Tracks and Radiation Measurements*; *International Journal of Radiation Applications and Instrumentation. Part D. Nuclear Tracks and Radiation Measurements*; *Nuclear Tracks and Radiation Measurements* (1982)] (since 1982). Note: (i) the papers from the present SI that have been available online before 2020 have not been included in the left graph, but only in the right graph; (ii) The ESR dating study by Bahain et al. (2020, this volume) includes applications to both fossil tooth enamel and quartz grains, and has thus been counted twice in the right graph; (iii) In contrast, the historical review papers by Grün (2020, this volume) and Falguères et al. (2020, this volume) have not been included in the right graph.

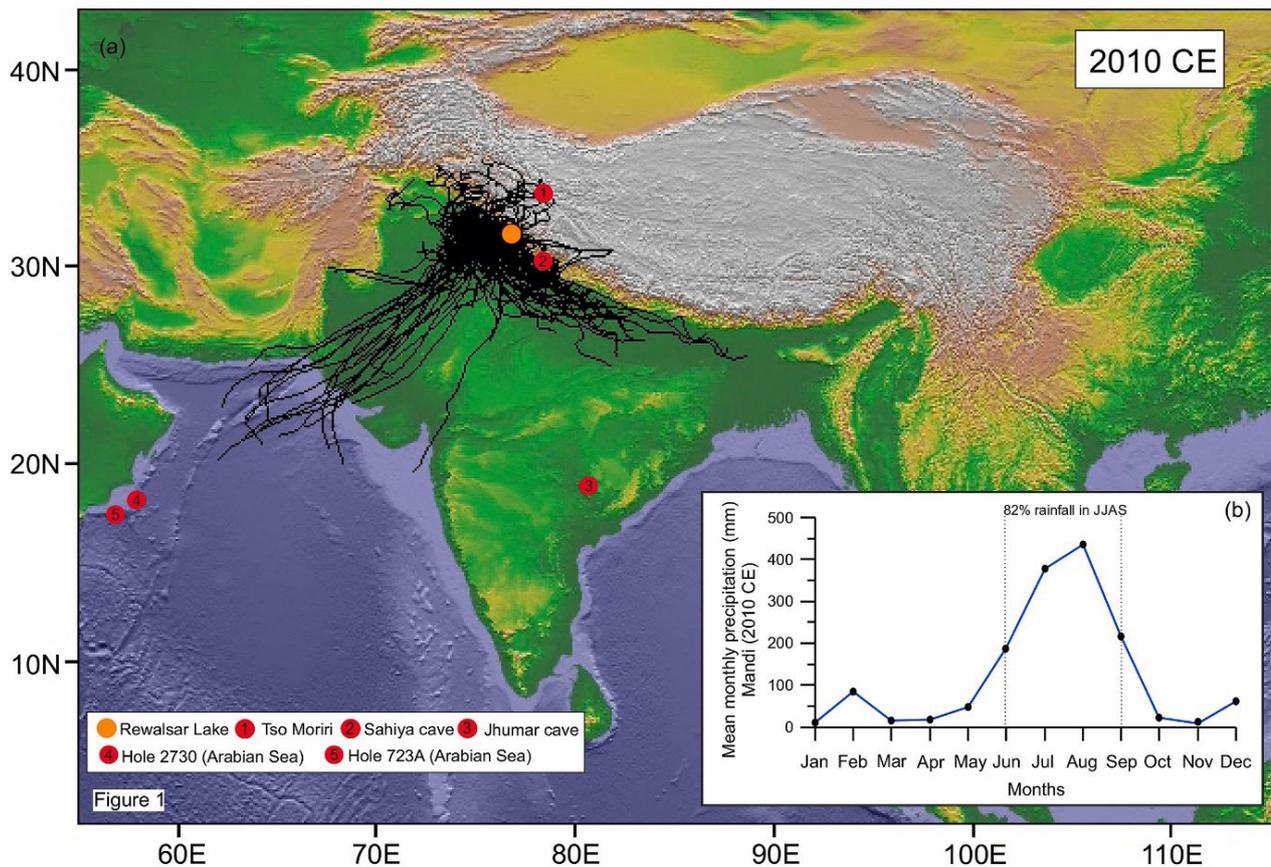


FIGURE 3: a) Map showing Rewalsar lake location and wind trajectories for 2010 CE using Meteoinfo; b). Mean monthly precipitation record from Mandi, Himachal Pradesh for the year 2010 using India water portal ([India Meteorological Department](#)). Also shown are location of other proxy records used in this study for comparison.

Marjolein Admiraal, Alexandre Lucquin, Matthew von Tersch, Oliver E. Craig, Peter D. Jordan - **The adoption of pottery on Kodiak Island: Insights from organic residue analysis.** [Quaternary International 554, 128-142.](#)

Number 10 in the list of most-downloaded papers (figure 3) is:

Shweta Singh, Anil K. Gupta, Som Dutt, Ajoy K. Bhaumik, & David M. Anderson - **Abrupt shifts in the Indian summer monsoon during the last three millennia.** [Quaternary International 558, 59-65.](#)

For the complete list of most-downloaded papers please consult the [Quaternary International](#) website.

NEW PROPOSALS FOR SPECIAL ISSUES

The policy of Quaternary International is to publish thematic issues, including peer-reviewed collected research papers from symposia, workshops and meetings sponsored by INQUA's Commissions, Sub-Commissions and working groups. We would like to invite leading scientists to propose SIs in Quaternary International. Please contact the Editor-in-Chief ([Jule Xiao](#)) for further details.

Standalone manuscripts of outstanding quality presenting advanced research that were deemed to

be of broad interest for the global Quaternary research community as a whole are also accepted and published in a restricted number/year regular issues after passing the review process.

AFFILIATIONS

¹Chinese Academy of Sciences, Beijing, China
jlxiao@mail.iggcas.ac.cn
²Leiden university, The Netherlands
³Shandong University, China
t.van.kolfschoten@arch.leidenuniv.nl

