



Charting achievements: a two-year retrospective of the society for environmental geochemistry and health (SEGH) and the evolving strategies

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Abstract Emerging from the shadow of the COVID-19 pandemic, it is time to ground ourselves and retrospectively assess the recent achievements of SEGH over the past years. This editorial serves as a comprehensive report on the progress made in comparison to the aspirations and goals set by the society's board in 2019 (Watts et al., Environ Geochem Health 42:343–347, 2019) (Fig. 1) and reflects on the state of the SEGH community as it reached its 50th

anniversary at the close of 2021 (Watts et al. Environ Geochem Health 45:1165–1171, 2023). The focus lies on how the SEGH community navigated through the extraordinary challenges posed by the COVID-19 pandemic since early 2020, and to what extent the 2023 targets have been met.

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Key events marking SEGH progress to the end of 2023

The importance of conferences and events for sustaining membership and improving engagement has been emphasised after emerging from the shadow of the COVID-19 pandemic. Within this frame, an in-person international SEGH conference took place in Athens, Greece in July 2023. Live streaming of the delegate talks provided the opportunity to people across the globe to attend the conference sessions. The 38th International Conference in Geochemistry and Health, organised by the Department of Geology and Geoenvironment, National and Kapodistrian University of Athens brought the focus of SEGH into Europe. With over 100 accepted abstracts (available to download via the Previous Conference Abstract Books page <https://segh.net/conference-abstracts>) and 138 delegates from 22 countries the conference enhanced the long-term spirit of collaboration and discovery in our community and attracted a high number of new student members. The themes of this conference focused on emerging contaminants

and human health in land, water and air; innovative data collection methods for studying environmental change; environmental geochemistry in the energy transition era; and global databases for geochemistry and beyond. A special issue in the official SEGH journal *Environmental Geochemistry and Health* (EGAH) is currently being prepared, providing the opportunity to SEGH2023 delegates and society members to showcase research trends of environmental geochemistry and health in the post-pandemic, net-zero era. This collection of papers should contribute to strengthening the identity of EGAH as the official journal of SEGH and help maintaining the links between membership and publication, enabling higher profile of publishing to be achieved (Fig. 1).

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Fig. 1 Summary of future aspirations described in 2019 (adapted from Watts et al., 2019)

The inclusion of two pre-conference workshops in SEGH2023 enhanced the overall conference experience by providing a platform for practical learning, skill development, and focused exploration of specific topics. Particularly, the workshop on Nanomaterials in the Geoenvironment organised by the HORIZON EUROPE- nexus monARC project introduced participants to sampling, quality control, and state-of-the-art analytical techniques for studying the fate of nanomaterials in different environmental compartments. A second, very popular, two-day workshop was organised and delivered by the International Union of Geological Sciences (IUGS)- Commission of Global Geochemical Baselines. Participants had the opportunity to get introduced to applied geochemical methods not only through classroom lectures, but also through the demonstration of sampling methods in the field. Such activities contribute to the diversity of the conference program, while increasing value to membership and fostering strategic links with other organisations.

Going back to 2022, soon after returning to normality after the pandemic, was marked by the 37th International Conference of the Society in Eldoret, Kenya in October 2022. This meeting had a hybrid in-person/virtual format and presented SEGH with an opportunity to promote environmental geochemistry for sustainable development across key topics including mining, agriculture, urban development and health. These topics underlined the importance of Africa’s diverse geological conditions on health and promoted capacity strengthening centred on building trained personnel, research experience, and institutional capabilities. Already a number of North to South linked projects leverage global partnerships in Africa. The British Geological Survey and the University of Nottingham gained a Royal Society-UK Department for International Development (RS-DFID) Africa Capacity Strengthening project with

seven university/research institutions in Malawi, Zambia and Zimbabwe. This project ran from 2015 to 2020 aiming to develop of a doctoral training network researching the employment of soil geochemistry to improve human micronutrient dietary intake from staple crops and benefit subsequent health at a population scale. The Royal Society, Overseas Development Agency, Global Challenge Research Funds, the MRC, Newton Utafiti Funds, IARC, and other agencies supported researches that have built levels of participation of African Research and by extent membership or potential members of SEGH. The book of the 49 abstracts presented in the conference is available to download for anyone via the Previous Conference Abstract Books page <https://segh.net/past-conference-abstracts>.

The aforementioned key events have played a crucial role in maintaining the financial stability of SEGH and retaining membership across diverse regions. Membership numbers, as depicted in Fig. 2,

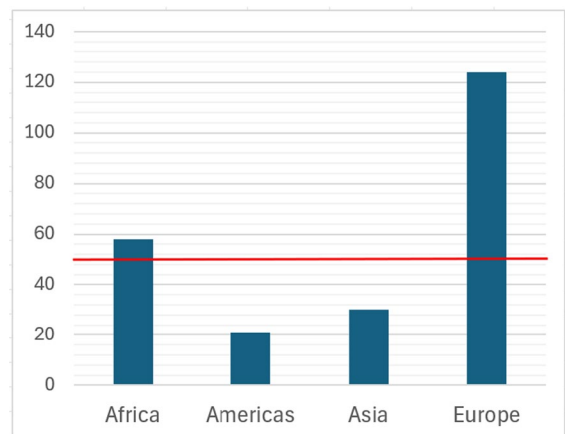


Fig. 2 Number of members per region at the end of 2023, against the 50 members target set in 2019

are inevitably influenced by participation in in-person events. While the target of 50 members per region by 2023 was successfully achieved for Europe and Africa, there is room for improvement in the Americas and Asia. One potential avenue for enhancing engagement in these regions lies in filling vacant Board positions. Regional chairs are encouraged to take the lead in organising both in-person and virtual events to foster networking opportunities and attract new members. Positive strides have already been made in the Asia region, with plans to host an SEGH-Live event showcasing papers from the EGAH collection titled "Evolving Sustainable Strategies for Admixed Micropollutants Mitigation in the Environment." Additionally, organising a live conference in China in 2025 would be an excellent opportunity to boost SEGH membership in Asia.

Putting the health into SEGH

Sessions with high relevance to Health continued to be successfully included in all SEGH events. For example, a session entitled "Emerging pollutants and human health in land, water and air" in SEGH2023 attracted 38% of the total abstracts submitted. Environmental and health issues involving emerging contaminants, i.e. substances which are not yet regulated but may be of environmental or human health concern are becoming top priority worldwide and research relevant to the geoenvironment and human health provided by our community will have direct impact to developing policies.

The SEGH community extends heartfelt appreciation to Prof. Ming Wong for his outstanding leadership as Editor-in-Chief of the EGAH journal from 2003 to 2023. With his transition to Emeritus Editor-in-Chief, we welcome Dr. Michael Watts as the new Editor-in-Chief, alongside Prof. Diane Purchase as the new Co-Editor-in-Chief. They now lead the helm of the journal since January 2023, bringing with them their expertise and vision to improve our journal and forge a closer tie with SEGH and the community. With respect to the associate editorial forum of EGAH, improvement has been achieved regarding the geographic diversity as well as gender balance in the last few years, however, there is still a need to fill in gaps in particular fields, especially those in relevance to health aspects.

Geographical diversity of SEGH

Although Europe and Africa continue to have the lead in membership proportions (Fig. 3), efforts to maintain the geographical diversity of SEGH across all continents have been fruitful mainly through the "new culture" of virtual events organised in each region. A plethora of recorded events are now available through the official SEGH platform on YouTube (www.youtube.com/@segh) with links on the society's website, which has become a resourceful base for all members. A brief summary of completed virtual events is provided below for the 2022–23 period.

After the successful online workshop entitled 'E-waste Pollution and Public Health' with presentations given by researchers from across the Asian region in December 2021, a second workshop on 'Environmental Pollution in Asia' was delivered in April 2022. Eight lectures were presented during the workshop, highlighting emerging environmental pollution issues from Asia and their impact on future economic development, lifestyle, and survival of humans.

Likewise, the SEGH-Americas board members hosted a series of 5 webinar/discussion group meeting sessions from November 2022 to May 2023, where the society and members' research programs were

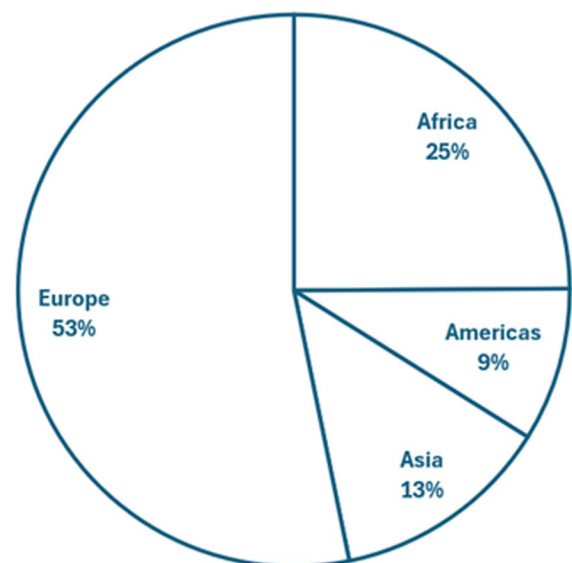


Fig. 3 Geographical diversity of SEGH members across the four regions as of the end of 2023

presented and many great talks and conversations followed. As communication is key towards establishing relationships between North and Latin America the meetings were conducted in both English and Spanish. Participation by junior researchers has been encouraged during the webinars providing the opportunity to present their work and take an active role in expanding this initiative. It is anticipated that continuation of this effort will raise interest in the society's profile in the future.

Events fostering international participation and collaboration with other relevant organisations have also been accomplished during the past two years. The 2nd International Students Conference on Medical Geology and Environmental Health-Africa Edition was organised jointly with members of the Medical Geology Association virtually in 2022. This series of conferences has been designed to provide students with several benefits including the opportunity to showcase their research at no cost, offering a comfortable venue to practice writing and speaking English, essential skills for professional development, allowing students, faculty, and others to learn of complementary research being conducted within their region and to foster future collaborations, receiving constructive feedback on their research projects from knowledgeable attendees, fostering networking with other students and with established researchers in the region. During the 3-day Africa- Edition of the conference 40 abstracts were presented. The European Edition of this event is currently under preparation for November 2024 with an announcement already on the society's web site <https://segh.net/iscmgeh-europe>.

SEGH maintained representation of 39 countries with no significant change from 2021. The initiative of discounted membership fees for the Low- and Middle-Income Countries was sustained enriching the international perspective of SEGH.

Seedlings for the future: nurturing the SEGH early career researcher programme

The Early Career Researcher program remained active during the last two years through strengthening of the ECR initiatives; by creating an ECR Steering Committee to provide direction/oversight, allowing the ECRs to lead the charge of what they would wish the Board to support them with. The ECR community

has built on the principles of SEGH and the aspirations outlined in Humphrey et al. (2021). The number of ECRs has grown overall to 107 compared to 87 in 2021. ECR participation in SEGH2023 was high (40%) and this is anticipated to be reflected in the forthcoming published papers in the EGAH special issue from the conference. The ECRs are recognised within each of the presentations in SEGH conferences, and prizes are awarded comprising of book tokens provided by SpringerNature up to the value of \$250 to first prize and \$150 to second prize winners.

Following the ECR-lunch session at SEGH2023, the current ECR cohort built a discussion group in social media to foster direct and swift communication amongst them. Soon after, the group provided their current aspirations to SEGH board members regarding initiatives to give even greater value for money to SEGH membership:

- Facilitate the exchange between labs led by SEGH members and Fellows with different expertise. Create connections with other departments that can lead to sharing of expertise.
- Build on the writing skills webinars by organising periodic peer-review discussion/exercise among ECR members.
- Manage all resources and information available to ECRs on the Society website to ensure it is findable and easily accessible to all members.

The society's ECR program achieved significant success with The British Academy ECR Writing Workshops held from 2021 to 2022. Funded by the British Academy in collaboration with SEGH, these workshops, conducted in both virtual and hybrid virtual-physical formats, focused on the African region. Drawing participants from diverse humanities and social sciences disciplines, the interdisciplinary approach connected environmental sciences to human health and socio-economic outcomes. The workshops, designed to enhance writing skills for peer-reviewed papers, provided mentorship from journal editors and involved ECRs in subsequent peer reviews. Given the relatively low production of international research papers in Sub-Saharan Africa, a survey conducted one year later offered valuable metrics of success. The survey results, based on feedback from 55 attendees, revealed the publication of 18 scientific papers. Moreover, all workshop materials and

recordings are openly accessible through the SEGH website at <https://segh.net/ba-writing-workshop> as an invaluable resource for the ECRs community.

Revival of the early career researcher best paper award initiative by EGAAH remains relevant and within scope for supporting and motivating our ECRs as well as maintain the link between SEGH and its official journal. This initiative entitles corresponding authors who are currently students (undergraduate, Masters, Ph.D.) or have defended their MS or Ph.D. thesis within the last 5 years to a monetary Best Paper Award. The winner is selected by the editors-in-chief and board members of SEGH at the end of each year. It is anticipated that two more ECRs will be awarded this prize until the end of 2025.

The success story of fellows webinars

Our Fellows provide a core to SEGH. This status is awarded by the SEGH board to individuals who have made significant personal contributions to the promotion of the Society. Many have served as board members, Chair, hosted SEGH conferences and many other areas of contribution. They are also recognised for their contribution to the scientific knowledge base across the SEGH landscape and advancing understanding of the interaction between the environment and human health.

In 2022, SEGH initiated a series of SEGH Live presentations featuring SEGH Fellows, aimed at sharing experiences, knowledge, and fostering the collaborative spirit of our community. Fellows were challenged to communicate their SEGH journey and offer reflections on the circumstances facing ECRs, highlighting how they could benefit from the collaborative interactions typical of SEGH Community events. We encourage readers to explore these insightful narratives on our YouTube channel, where the diverse experiences and valuable insights of our Fellows are showcased. These 35-min presentations, followed by a 15-min Q&A session, occur approximately every two months since 2022. Eight sessions were conducted in the 2022–23 period, and an additional schedule of eight webinars is currently running for 2023–24. The timing of these sessions aims to accommodate participants across global time zones. For those unable to attend live sessions, recordings

are accessible on our website at <https://segh.net/seghlive-fellows>.

Continued relevance of SEGH goals to include United Nations Strategic Development Goals

The metric set by Watts et al. (2023) for this aspiration was to use the number of presentations in recent conferences, including online delivery relevant to the United Nations Sustainable Development Goals (SDGs). Table 1 summarises the output of the last two SEGH conferences, in Kenya and Greece. Relevance to one or more SDGs has been identified in almost all presentations of both conferences, including both oral and poster presentations. Beside the most pertinent SDG 3 (Good Health and Well-being), presented research demonstrated relevance for policy impact of the community with respect to SDGs 2, 6, 8, 9, 11, 12, 14, and 15.

Increase membership of business colleagues

This aspiration poses a significant challenge, particularly considering the ongoing aftermath of COVID-19. Currently, the participation of business colleagues in our conferences stands at less than 10%, encompassing individuals from environmental consultancies and contributors to the science program through traditional sponsorships. In contrast, research institutes, government entities, and non-governmental agencies collectively constitute approximately 70% of conference participants as well as society members within the non-university sector. Recognizing that the lower representation of business colleagues may partly stem from evolving societal priorities, it is crucial to note that this aspect is a work in progress. Despite the ongoing challenges, SEGH is committed to actively engaging with the business community. This proactive approach is essential to maintaining relevance to real-life applications, aligning with our broader commitment to the UN SDGs. Fostering connections with professional consultants specializing in air, land, and water quality, particularly those engaged in the mining, energy, waste, or agricultural sectors, remains an evolving aspect of our ongoing efforts.

Table 1 Updates on key performance indicators for SEGH progress on 2019 aspirations, based on analysis of SEGH2022 and SEGH2023 international conferences

	2022 Eldoret, Kenya ORAL (O) / Poster (P)	2023 Athens, Greece ORAL (O) / Poster (P)
International collaboration	15 of 49	15 of 52 (O) 7 of 55 (P)
ECR presentations versus total in each conference	n/a	28 of 52 (O) 13 of 55 (P)
Public Health content	Complete session devoted to health 7 of 37 (O) 3 of 12 (P)	Complete session devoted to health 15 of 52 (O) 15 of 55 (P)
Non-University organisations e.g. institutes/business	18 of 49	19 of 107
Relevant SDG (number of presentations)	2 (7), 3 (27), 6 (12), 8 (1), 9 (9), 11 (6), 12 (2), 14 (10), 15 (14)	3 (28), 6 (10), 9 (22), 11 (15), 14 (10), 15 (38)
Members in each region e.g. diversity metrics for delegates	AFRICA 34 AMERICAS 2 EUROPE 9	AFRICA 10 AMERICAS 4 ASIA 17 EUROPE 107
Emerging issues – is SEGH relevant for the future?	Environmental geochemistry for sustainable development across key topics of interest to SEGH, including mining, agriculture, urban development and health	Emerging contaminants and health Novel data collection methods (e.g. citizen science) Energy transition Global datasets

N.B. Information used in this table as an example mapped against SDGs 2, 3, 6, 8, 9, 11, 12, 14, 15. Data for conferences evaluated by Argyraki—conference abstracts <https://segh.net/past-conference-abstracts>. n/a—not analysed

Additional outputs for SEGH and future events

A continuous increase in paper submission numbers is noticed in the official SEGH journal EGAH, with 1386 papers submitted in 2023 against 1123 in 2020. The acceptance rate for 2023 was 33% while a slight decrease in the impact factor (4.4) was noted after a peak of 4.89 in 2022. A recent development which is foreseen to improve the journal’s metrics is the adoption of ad-hoc publishing. Paper collections from the society’s international conferences are highly encouraged for improving the outcomes of both SEGH and EGAH.

The forthcoming 39th International Conference-SEGH2024 in Abuja, Nigeria in July 2024 provides an excellent opportunity to retain and build upon the critical mass of engaged African members. Particularly, participation of African students in this event will be financially supported by IUGS, emphasizing the importance of building bridges between SEGH and other international organisations. Likewise, the 3rd ISCMGEH -European Edition virtual students’ conference, organised in collaboration with the

Medical Geology Association in November 2024 will encourage undergraduate and postgraduate students to share their research in the fields of Medical Geology and Environmental Health. The cooperating organisations will benefit by stimulating interest and membership in their organisation and increased awareness of regional medical geology as well as environmental health issues. The novel and inspiring fact about organising this event is that is undertaken by European members of the ECR group.

Overall, the SEGH community has managed to overcome barriers between disciplines and create an all-inclusive environment for members across the globe. Inevitably, efforts on reviving the society’s activity in the Americas and Asia regions will remain in focus for the next two years. Board members from the regions should follow successful examples of identifying other organisations where SEGH could reasonably be expected to add value to their outputs, such as local meetings and conferences. A key factor to indicate progress will be the organisation of regional events in virtual

or in-person format, aiming to raise awareness of SEGH and make our community more visible in these areas.

The future of the society reflects not only on the progress made but also on the collective spirit and resilience of the SEGH community. Over the years, we have witnessed remarkable achievements, from advancing membership engagement to fostering interdisciplinary collaboration and navigating unprecedented challenges such as the COVID-19 pandemic. Dedication, innovation, and mutual support are the qualities we need to carry forward the lessons learned, embrace the opportunities and overcome the challenges that lie ahead. With gratitude for the continued commitment and contributions of each member, SEGH will continue to deliver the desired outcomes of its strategy to fulfil the shared vision for a sustainable and successful future.

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