

EDITORIAL

1 The Society for Environmental Geochemistry and Health (SEGH): 2 building for the future

3 Watts, M.J.^{1*}, An, T.², Argyraki, A.³, Arhin, E.⁴, Brown, A.¹, Button, M.⁵, Entwistle, J.A.⁶,
4 Finkelman, R.⁷, Gibson, G.⁸, Humphrey, O.S.¹, Huo, X.⁹, Hursthouse, A.S.¹⁰, Marinho-Reis,
5 A.P.¹¹, Maseka, K.¹², Middleton, D.R.S.¹³, Morton-Bermea, O.¹⁴, Nazarpour, A.¹⁵, Olatunji,
6 A.S.¹⁶, Osano, O.¹⁷, Potgieter-Vermaak, S.¹⁸, Saini, S.¹⁹, Stewart, A.²⁰, Tarek, M.²¹, Torrance,
7 K.²², Wong, M.H.²³, Yamaguchi, K.E.²⁴, Zhang, C.²⁵, Zia, M.²⁶

- 8 1. *Corresponding: Dr Michael Watts, Inorganic Geochemistry, British Geological Survey, UK*
9 mwatts@bgs.ac.uk
- 10 2. *Prof Taicheng An, School of Environmental Science, & Engineering, Institute of*
11 *Environmental Health and Pollution Control, Guangdong University of Technology,*
12 *Guangzhou, China* antc99@163.com
- 13 3. *Dr Ariadne Argyraki, Department of Geology and Geoenvironment, National and*
14 *Kapodistrian University of Athens, Greece* argyraki@geol.uoa.gr
- 15 4. *Prof Emmanuel Arhin, University for Development Studies, Faculty of Earth and*
16 *Environmental Sciences, Department of Earth Science, Ghana* lordarhin@gmail.com
- 17 1. *Anthea Brown, SEGH, British Geological Survey, Nottingham, UK.*
18 Seghmembership@gmail.com
- 19 5. *Dr Mark Button, University British Columbia, Kelowna, Canada* drmbutton@gmail.com
- 20 6. *Prof. Jane A Entwistle, Engineering and Environment, Northumbria University, UK*
21 jane.entwistle@northumbria.ac.uk
- 22 7. *Prof Robert Finkelman, University of Texas at Dallas, USA* bobf@utdallas.edu
- 23 8. *Dr Gillian Gibson, Gibson Consulting and Training, UK* gillian@gbgibson.com
- 24 1. *Dr Olivier Humphrey, Inorganic Geochemistry, British Geological Survey, UK*
25 bgsvisoli@bgs.ac.uk
- 26 9. *Prof. Xia Huo, Jinan University, Guangzhou, China,* xhuo@jnu.edu.cn
- 27 10. *Professor Andrew S Hursthouse, University of the West of Scotland, UK*
28 andrew.hursthouse@uws.ac.uk
- 29 11. *11.Dr Paula Marinho Reis, Universidade do Minho, Departamento de Ciências da Terra,*
30 *Escola de Ciências, Campus de Gualtarl, Portugal* pmarinho@dct.uminho.pt
- 31 12. *Prof Kakoma Maseka, Copperbelt University, Kitwe, Zambia* kkmaseka@gmail.com
- 32 13. *Dr Daniel Middleton, International Agency for Research Cancer, WHO, Lyon, France*
33 middletond@fellows.iarc.fr
- 34 14. *Dr Ofelia Morton Bermea, Instituto ed Geofísica, Universidad Nacional Autónoma de*
35 *México, Mexico City, Mexico* omorton@geofisica.unam.mx
- 36 15. *Dr Ahad Nazarpour, Department of Geology, Ahvaz Branch, Islamic Azad University of*
37 *Ahvaz, Ahvaz, Iran,* ahad.nazarpour@gmail.com
- 38 16. *Prof Akinade Shadrach Olatunji, Department of Geology, University of Ibadan, Ibadan,*
39 *Nigeria,* as.olatunji@ui.edu.ng or akinadeshadrach@yahoo.com
- 40 17. *Prof Odipo Osano, Department of Environmental Biology and Health, School of*
41 *Environmental Studies, University of Eldoret, Kenya.* odipoosano@gmail.com
- 42 18. *Dr Sanja Potgieter-Vermaak, Manchester Metropolitan University, Manchester, UK*
43 s.potgieter@mmu.ac.uk
- 44 19. *Sherestha Saini, SpringerNature, USA* sherestha.saini@springernature.com

EDITORIAL

- 45 20. Dr Alex Stewart, University of Exeter, UK dragonsteeth@doctors.org.uk
46 21. Dr Moataz Tarek, Geology department, Faculty of Science, Arish University, Egypt
47 Moataz.tarek.m8@gmail.com
48 22. Keith Torrance, University of Strathclyde, Glasgow, UK keith.w.torrance@strath.ac.uk
49 23. Prof Ming Hung Wong, Southern University of Science and Technology, Shenzhen, China.
50 Wongmh@sustech.edu.cn
51 24. Prof. Kosei E. Yamaguchi, Toho University, Funabashi, Japan and NASA Astrobiology
52 Institute kosei@chem.sci.toho-u.ac.jp
53 25. Prof Chaosheng Zhang, National University of Ireland, Galway, Ireland
54 chaosheng.zhang@nuigalway.ie
55 26. Dr Munir Zia, Fauji Fertiliser Company Ltd, Rawalpindi, Pakistan munirzia@gmail.com
56

57 The challenges of sustainable development are ever more pressing, and the skills, interests and
58 capabilities of the SEGH member are well placed to continue to make more meaningful
59 contributions to the environment, society and well-being. We reflect on the historical development
60 of the Society, its response to the dynamic international research landscape and the great
61 opportunities ahead. In 2018, SEGH implemented a new board structure after 2-3 years of
62 consultation, with approval of a new constitution and a new strategy across the large number of
63 international board members. Whilst regions were represented by sections in Europe,
64 Asia/Pacific and the USA, the structure required renewal in order to be more representative of the
65 distribution of members and website traffic that had evolved in preceding years. In addition, the
66 society wanted to improve its position for future growth opportunities across rapidly developing
67 regions.

68 SEGH has been a welcoming society for early career researchers (ECRs) over the years,
69 providing a supportive and encouraging atmosphere at conferences. However, a formal structure
70 was required to continue to engage and support ECRs as they become established in their
71 careers. In addition, retention and recognition of experienced scientists and practitioners was
72 required for past and on-going contributions to the long-standing success of SEGH since the
73 initial formation in the early 1970's. The Society for Environmental Geochemistry and Health
74 (SEGH) was first established in the USA to provide a forum for experts to work together in
75 understanding the interaction between the geochemical environment and the health of plants,
76 animals, and humans. Wixson and Davies (2019) recently provided an account of the Society's
77 formation.

78 We offer this account of current initiatives and future aspirations to enhance the value that this
79 society can offer to the SEGH community and beyond.

80

81 **Evolution of SEGH**

82 The new international board structure of SEGH was formalised in 2018 so that there are now four
83 representatives from each of the European, Americas, Asia/Pacific sections, with an additional
84 African section established at the SEGH 2018 34th International Conference in Victoria Falls,
85 Livingstone, Zambia (Watts et al., 2018). There is scope to co-opt and elect more board members
86 in order to cover wider geographic and multidisciplinary aspects as a way of reinforcing the
87 aspirational nature of SEGH.

88 Elected board members in 2018 came from the UK, Portugal and Greece for Europe; Kenya,
89 Nigeria and Zambia for Africa; China, Japan and Pakistan for Asia/Pacific, and the USA and

EDITORIAL

90 Mexico for the Americas. Co-opted members enthusiastic to undertake new initiatives for growth
91 in new regions/countries include Canada, Egypt, Ghana, Iran and Panama, with discussions
92 progressing elsewhere.

93 In 2018, the first group of 22 ECRs (early career researchers) was established at the SEGH 2018
94 conference with initial plans to develop a programme of mentorship, training activities and
95 interaction over a three-year period. ECR members were connected with appropriate SEGH
96 'experienced' and relevant members as mentors. This grouping is open to new ECRs as we
97 evolve the programme and balance the demographics. The ECRs have been encouraged to
98 establish a community to improve communication through social media and become involved in
99 the peer review process for Environmental Geochemistry and Health (EGAH). The ECRs as a
100 group are ideal for generating and testing new ideas and identifying trends to develop SEGH and
101 potentially grow as individuals for succession management of the international board.

102 In 2019, SEGH launched a new Fellowship status for SEGH (FSEGH) encompassing senior
103 researchers who have been engaged with SEGH for a number of years and maintained their
104 membership., as well as demonstrating that they have worked hard in the EG&H field, and
105 supported the society in a variety of ways. The ECR group will have an opportunity to progress
106 through to FSEGH via nomination from SEGH members, as will senior members with continuous
107 scientific engagement and support of SEGH.

108 **Environmental Geochemistry and Health (EGAH) Journal**

109 Environmental Geochemistry and Health is the official journal of SEGH published by Springer
110 Nature, to which all members can subscribe and access the back-catalogue online via
111 www.segh.net. The journal has been refreshing and updating the list of coordinating editors who
112 are essential to the peer review process for articles submitted to EGAH. Candidates for this role
113 who can commit to supporting the peer review process are welcome, particularly where SEGH
114 can improve geographic diversity and coverage for emerging trends across multidisciplinary
115 themes and reinforce the involvement of health practitioners (clinical and public health) /
116 epidemiologists. The journal has experienced continued and solid progress, particularly in recent
117 years, with the Impact Factor progressing steadily (2018: 3.252) and the number of papers
118 submitted increased from 400+ in 2016 to 600+ in 2018, with a 40% acceptance rate.

119 **Future challenges**

120 Various challenges have resulted in a reduced membership in the USA in recent years, (which
121 had been the cornerstone of the society for much of its history) although SEGH is not alone
122 among societies in this experience. Growth in rapidly developing regions has balanced overall
123 SEGH membership numbers. Greater geographical diversity across the Americas is required to
124 ensure management succession, and efforts are on-going to develop hubs to regrow membership
125 in the Americas.

126 The peaks and troughs in membership in Asia/Pacific, largely reflected by the well-attended
127 SEGH international conferences in China, are both an opportunity and challenge to manage the
128 membership and require imaginative solutions to retain and stabilise memberships between
129 conferences. Nevertheless, core members from Asia are regular attendees at annual
130 conferences as the conferences rotate between the regions.

131 An increase in African membership following on from the 34th International Conference at Victoria
132 Falls-Zambia shows promise for continued engagement with the African science community. The
133 African board members have provided an example to other regions for regular communications,
134 in particular making use of current communication platforms (e.g. WhatsApp and Skype) which

EDITORIAL

135 have attracted additional senior researchers to online discussions to develop new SEGH hubs in
136 Africa.

137 **Future meetings and conferences**

138 Traditionally, annual international conferences have rotated between regions, with the exception
139 of the USA. Often members have drifted away during the 2-3 year cycles, unless smaller
140 meetings or co-hosted meetings with other societies were organised, which more commonly have
141 occurred in Europe. The SEGH board is backing an initiative on a wider scale to engage with
142 traditional sponsors of our international conferences to support smaller regional meetings on a
143 more frequent basis. Other options may need to be considered such as the use of online
144 webinars and web-streaming of keynote presentations.

145 Recent and future conferences and meetings include: Slovakia in 2015, Belgium and Ireland in
146 2016, China in 2017, Zambia in 2018, Greece and UK in 2019. In the run up to the 50th
147 anniversary of SEGH in 2021, we will increase from one to two international conferences a year
148 to be hosted in Eldoret-Kenya and Nanjing-China in 2020, with strong proposals in place for
149 Portugal and Mexico in 2021. Co-badged meetings will become an increasing feature to improve
150 engagement with members, with plans in place for 2020 in the USA and Ireland. Future
151 conferences and meetings will aim to grow interest to attract epidemiologists and health
152 practitioners in both curative and preventive fields, building on growing topics within SEGH in
153 nutrition and agricultural research, which are highly relevant to environmental geochemistry and
154 health.

155 **SEGH and the future**

156 SEGH is at a critical point in its history. The competition for memberships to societies is intense
157 and growing, with financial challenges remaining ever problematic for members. Remaining
158 relevant to current and future trends in scientific development and policy decisions will initially be
159 supported by the recent initiatives, such as the ECRs and new geographical hubs with a fresh
160 ability to review and critique our current position.

161 The multidisciplinary nature and sense of community within SEGH is as highly relevant now as
162 when it was formed in the early 1970's. SEGH remains an effective platform for members to
163 exchange ideas within their own field of interest. This has been emphasized in the past by SEGH
164 membership that as a forum provides a strong and supportive environment (Stewart et al., 2012),
165 which the board has tried to successfully sustain and grow. Following consultations with
166 members, SEGH is strengthening efforts to better connect the diverse community that is SEGH,
167 to encourage new and practical solutions to environmental geochemistry and health challenges
168 via collaborations. For example, the expansion of SEGH membership into rapidly growing
169 regions (e.g. Africa, South East Asia) will help SEGH to keep up with emerging research
170 challenges. Such a move presents an exciting opportunity to increase international collaborations
171 to tackle increasing environmental pressures from anthropogenic activities (Brown et al., 2019;
172 Kanninga et al., 2019; Olatunji et al., 2019; Rodgers et al. 2019; Stewart et al., 2019) that have an
173 impact on human and animal health (Middleton et al., 2019). SEGH presents a platform for
174 emerging technologies to identify and measure environmental pathways for contaminants via
175 exposure and hazard assessment, in addition to interests in nutrition through deficiency of
176 essential nutrients and transfer pathways from soil-to-plant and onward animal/human health
177 investigations (Watts et al., 2019).

178 SEGH has strengthened initiatives in recent years to draw in epidemiologists/health
179 professionals; increasing emphasis on emerging contaminants; the role of agriculture and
180 fisheries in ecological health through to food security. As in the early years of the formation of

EDITORIAL

181 SEGH (Wixson and Davies, 2019), SEGH has a role in connecting increasingly complex and
182 interconnected multidisciplinary studies to better inform stakeholders and policy decision makers.

183

Summary of Future Aspirations

- Improve engagement with epidemiologists and health practitioners (clinical and Public Health) to improve translation of research into policy.
- Achieve greater editorial balance of EGAH geographically and to strengthen the 'Health' component.
- Increase presence of epidemiologists and health practitioners (clinical and Public Health) within the conference programmes.
- Continue to increase regional membership hubs to grow geographical diversity of membership.
- Grow the Early Career Researcher programme for succession management within SEGH and 'stay on trend' with latest research.
- Evolve relevancy of SEGH goals to include the United Nations Strategic Development Goals to reinforce relevance to policy impact
- Increase the membership of business colleagues, in order to encourage research, which is applicable to real-life situations.

184

References

186 Brown, A.D., Yalala, B., Cukrowska, E., Godoi, R.H.M., Potgieter-Vermaak, S. (2019). A scoping
187 study of component-specific toxicity of mercury in urban road dusts from three international
188 locations, *Env. Geochem. Health*, <https://doi.org/10.1007/s10653-019-00351-1>

189 Kaninga, B, Chishala, B.H., Maseka, K.K., Sakala, G.M., Lark, M.R., Tye, A. & Watts, M.J.
190 (2019). Review: mine tailings in an African tropical environment – mechanisms for the
191 bioavailability of heavy metals in soils, *Env. Geochem. Health* [https://doi.org/10.1007/s10653-](https://doi.org/10.1007/s10653-019-00326-2)
192 [019-00326-2](https://doi.org/10.1007/s10653-019-00326-2)).

193 Middleton, D.R.S., McCormack, V.A., Watts, M.J. & Schuz, J. (2019). Environmental
194 geochemistry and cancer: a pertinent global health problem requiring interdisciplinary
195 collaboration, *Env. Geochem. Health*, <https://doi.org/10.1007/s10653-019-00303-9>

196 Olatunji, A. & Afolabi, O.O. (2019). Assessment of Pb contamination of soils, sediments and
197 dusts of the City of Lagos, Nigeria, *Env. Geochem. Health*, [https://doi.org/10.1007/s10653-019-](https://doi.org/10.1007/s10653-019-00330-6)
198 [00330-6](https://doi.org/10.1007/s10653-019-00330-6)

199 Rodgers, K., McLellan, I., Peshkur, T., Williams, R., Tonner, R., Knapp, C.W., Henriquez, F.L.,
200 Hursthouse, A.S. (2019). The legacy of industrial pollution in estuarine sediments: spatial and
201 temporal variability implications for ecosystem stress, *Env. Geochem. Health*,
202 <https://doi.org/10.1007/s10653-019-00316-4>

203 Stewart, A.G., Worsley, A., Holden, V. & Hursthouse, A.S. (2012). Evaluating the impact of
204 interdisciplinary networking in Environmental Geochemistry and Health: Reviewing SEGH
205 conferences and workshops, *Env. Geochem. Health*, 34, 653–664.

206 Stewart, A.G. (2019). Mining is bad for Health, *Env. Geochem. Health*,
207 <https://doi.org/10.1007/s10653-019-00367-7>

208 Watts, M.J., Maseka, K.K., Sakala, G., Mutondo, M. (2018). SEGH 2018 Vic Falls: Geochemistry
209 for Sustainable Development, 17th July 2018,

EDITORIAL

- 210 http://www.segh.net/articles/segh_2018_vic%20Falls_geochemistry_for_sustainable_developme
211 [nt/](http://www.segh.net/articles/segh_2018_vic%20Falls_geochemistry_for_sustainable_developme) [Accessed 19th June 2019].
- 212 Watts, M.J., Middleton, D.R.S., Marriott, A.L., Humphrey, O.S., Hamilton, E.M., McCormack, V.,
213 Menya, D., Farebrother, J. & Osano O. (2019). Iodine status in western Kenya: a community-
214 based cross-sectional survey of urinary and drinking water iodine concentrations, *Env. Geochem.*
215 *Health*, <https://doi.org/10.1007/s10653-019-00352-0>
- 216 Wixson, B. & Davies, B. (2019). The Society for Environmental Geochemistry and Health
217 (SEGH): a retrospect, *Env. Geochem. Health*, <https://doi.org/10.1007/s10653-019-00262-1>