



# 1 The Future of Conferences

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## 8 Abstract

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10 In the spring of 2020, as the coronavirus swept across the globe, millions of people were  
11 required to make drastic changes to their lives to help contain the impact of the virus.  
12 Among those changes, scientific conferences of every type and size were forced to cancel  
13 or postpone in order to protect public health. Included in these was the European  
14 Geosciences Union (EGU) 2020 General Assembly, an annual conference for Earth,  
15 planetary and space scientists, scheduled to be held in Vienna, Austria, in May 2020. After  
16 a six-week pivot to an online alternative, attendees of the newly designed EGU20: Sharing  
17 Geoscience Online took part in the first geoscience conference of its size to go fully online.  
18 This paper explores the feedback provided by participants following this experimental  
19 conference and identifies four key themes that emerged from analysis of the questions:  
20 what did people miss from a regular meeting; and to what extent did going online impact  
21 the event itself, both in terms of challenges and opportunities? The themes identified are:  
22 connection, engagement, environment, and accessibility; and include discussions of the  
23 value of informal connections and spontaneous scientific discovery during conferences,  
24 the necessity of considering the environmental cost of in-person meetings, and the  
25 opportunities for widening participation in science by investing in accessibility. The  
26 responses in these themes cover both positive and negative experiences of participants  
27 and raise important questions about what conference providers of the future will need to  
28 do to meet the needs of the scientific community in the years following the coronavirus  
29 outbreak.

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## 31 1. Introduction

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### 33 1.1 The General Assembly of the European Geosciences Union

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35 The European Geosciences Union (EGU) is Europe's leading organisation for Earth,  
36 planetary and space science researchers. Based in Germany, the Union has 18,935



37 members (as of November 2020) based in more than 135 countries worldwide. Every year  
38 in the spring EGU holds its annual General Assembly in Vienna, Austria; the biggest  
39 geoscience conference in Europe. As a significant part of many Earth, planetary, and  
40 space scientist's research calendars, the EGU General Assembly is a showcase for  
41 research from across 22 Scientific Divisions. The Divisions include fields like  
42 Biogeochemistry, Ocean Science, Atmospheric Science and Solar-Terrestrial science, as  
43 well as more 'traditional' geoscience fields like Geodesy, Geomorphology, Earth  
44 Magnetism and Rock Physics, and Natural Hazards (among many others). In addition to  
45 the scientific research presented, EGU's General Assembly provides researchers with  
46 networking and career development opportunities, training, and the ability to connect with  
47 their extended global community – both personally and professionally. This is especially  
48 key for the Early Career Scientists, who, in 2020, make up 56% of EGU's membership.

49  
50 At the start of 2020, EGU was seven months into the build-up for the 2020 General  
51 Assembly, which was that year planned to be held from 3-7 May. Apart from the primary  
52 aim of enabling scientists to present their research and learn of the work of their  
53 colleagues, the focus of the 2020 General Assembly as an event was to lie on inclusivity,  
54 accessibility, and environmental sustainability. Inclusivity measures aimed to provide a  
55 safe and respectful environment for all, including the promotion of gender neutral  
56 language, a dedicated person of trust on-site, free childcare, family and breastfeeding  
57 rooms, and a kid's corner. Accessibility measures included dedicated information for  
58 getting to and navigating within the conference centre, wheelchair accessibility, quiet  
59 rooms, catering options, information on visual accessibility, pilots with audio streaming and  
60 auto-captioning, and tips for accessible presenting. Measures aimed at reducing the  
61 environmental impact of the General Assembly centred on travel to and within Vienna,  
62 catering, information sources provided by the EGU, and the conference centre.  
63 Discussions in 2019 and early 2020 involved the consideration of enabling remote  
64 participation, in a manner that would allow remote and on-site participants to directly  
65 engage in questions and discussions.

66  
67 The annual 'Call for Abstracts' closed in the second week of January 2020 with a new  
68 record of 18,036 abstracts submitted to 701 scientific sessions, compared to the 2019  
69 General Assembly which had 16,273 participating scientists, who presented 16,250 poster,  
70 oral, and PICO (Presenting Interactive Content) presentations in 683 scientific sessions.  
71 By the end of February, the rapidly escalating coronavirus pandemic was the subject of  
72 constant discussion within EGU's governing Council, who began planning several  
73 contingency strategies. By the 19th March it was clear that the conference could not  
74 progress as planned and for the safety of all members it was announced that the in-person  
75 meeting would be cancelled and replaced with an online alternative. However, with less  
76 than six weeks until the start date of the conference, it was also obvious that this could not  
77 possibly be a conference like any previous EGU General Assembly.

## 78 79 **1.2 The 2020 General Assembly: Sharing Geoscience Online**



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81 In designing EGU2020: Sharing Geoscience Online (hereafter EGU20) in the short time  
82 available, the organisers focussed on providing possibilities that could work across time  
83 zones for all authors to present their work and similarly for participants to access the  
84 presentations. To indicate that all presentation formats were equal, previously assigned  
85 poster, oral, or PICO (an interactive presentation form delivered via touch screens)  
86 presentations were turned into a new concept of 'displays'. The decision was made for two  
87 forms of scientific engagement to be possible for each display: pre-uploaded presentation  
88 materials that could be commented on and that were linked to the abstract, and live text-  
89 chat sessions that occurred during the originally scheduled presentation times from the  
90 Programme published on the 9th March 2020 (prior to cancellation). The pre-uploaded  
91 content with comments used EGU's newly launched preprint repository, EGUsphere,  
92 which provided 50MB of storage for participants to upload their presentation using one of  
93 four formats (MP4, JPG, PDF, or PPT). Authors were free to choose what to post with their  
94 abstract, e.g. an animation, a map, a poster, slides, a pre-recorded talk, a pdf and so on.  
95 The uploaded materials were linked to the abstract, which had a DOI, and the materials  
96 were published via open access (in accordance with EGU's publications policy, specifically  
97 a Creative Commons Attribution 4.0 License) unless authors chose a different copyright  
98 statement. The uploads were then made available for comment from the moment they  
99 were uploaded until the 31st of May 2020. Comments and materials remain accessible on  
100 the EGU website (<https://meetingorganizer.copernicus.org/equ2020/sessionprogramme>)  
101 and EGUsphere (<https://www.egusphere.net/conferences/EGU2020/index.html>).

102

103 The live text-chat function was chosen as a compromise between accessibility and  
104 interaction. Using the host platform 'Sendbird' each of the 701 scientific sessions were  
105 given a text-chat channel that was linked to the pre-uploaded materials of that session and  
106 was moderated by the session conveners (as would be the case for an in-person General  
107 Assembly). There was no limit to the number of people that could digitally attend the live-  
108 text chats and this number varied wildly: though there was a median of 92 participants per  
109 chat, the largest chat had 796 participants. This made for very different experiences of the  
110 text-chat sessions, as the chat window would normally scroll at the speed of the number of  
111 people submitting questions or answers. Participants could also follow multiple chats. EGU  
112 made instructional videos with tips for both conveners and participants that received over  
113 23,000 views by the start of the conference. For example, one of the presenter tips was to  
114 prepare a one or two sentence summary of the display in advance, and this tip was widely  
115 followed.

116

117 In addition, some limited online provision had been made for networking and community  
118 building, and there were several live streamed or pre-recorded video sessions – notably  
119 EGU's flagship Union-wide events, the Great Debates and Union Symposia as well as  
120 selected Short Courses. EGU20 brought the annual photo competition online, encouraged  
121 science and art exchanges through the #shareEGUart programme and virtual Artists in  
122 Residence, ran a Data Help Desk, enabled the Division meetings to take place via chat,



123 and even had an online closing party. The short time that was available to bring the  
124 conference online, however, also meant that other events and activities could not be  
125 scheduled. These included the medal lectures, most of the short courses, most of the  
126 networking events, live-captioning of the Great Debates and Union Symposia, and  
127 measures to help visually impaired scientists (most of whom would not have been able to  
128 participate in the chats). However, as this was nothing like the experience that would  
129 normally be provided to members and the organisers viewed Sharing Geoscience Online  
130 as a pilot since it was the first large Earth, planetary and space science meeting to go  
131 online, EGU's governing Council decided to make attendance free, though only abstracts  
132 that had been submitted by the January deadline were eligible to be presented.

133

134 EGU20 launched on the 4<sup>th</sup> May 2020 for a week of activities that saw over 22,300  
135 individual users in 721 live text chats who posted approximately 200,400 messages.  
136 11,380 presentation materials were uploaded with the abstracts, which received 6,297  
137 comments by end of the week.

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### 139 **1.3 Conference feedback survey**

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141 Each year during and after the General Assembly, EGU conducts an online survey among  
142 the participants to ask feedback about the conference experience. The questions consider,  
143 among others, the scientific programme, the role of participants in the conference, and the  
144 additional conference activities, such as Division meetings, the mentoring programme, or  
145 the photo competition. The survey forms an important source of information and feedback  
146 for planning the General Assembly the following year, and have helped to drive positive  
147 change. For example, environmental sustainability and accessibility efforts received extra  
148 support after comments made via these surveys. However, the usual survey, which  
149 assumes among others travel and on-site attendance, was not suitable for Sharing  
150 Geoscience Online.

151

152 In order to take advantage of this unique opportunity, as well as to try and gain some  
153 insight into where the potential benefits and challenges of an online conference of this size  
154 may lie, the authors decided to write an entirely new conference feedback survey. Given  
155 the massive upheaval this year it was decided to shorten the usual General Assembly  
156 survey and focus it much more closely on participant experience of this pilot event. The  
157 survey was distributed to all attendees via email and through social media. There were  
158 1,580 complete responses (7% of attendees), which is equivalent to the 2019 response  
159 numbers (n=1,666). Of those complete answers there was a reasonable gender balance  
160 (46% female, 51% male, 0.8% non-binary/other, 3.2% prefer not to say), and 56%  
161 identified as Early Career Scientists. Of the completed surveys, 91.5% said they had never  
162 attended a virtual conference before.

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## 164 2. Methodology

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166 The methodology that was adopted in this study involved surveying participants of EGU20  
167 and asking them for their feedback with regards to their experiences of the online  
168 conference. Qualitative content analysis (see e.g., Erlingsson and Brysiewicz, 2017) was  
169 then used to interpret the responses to this survey. The questions that were used in this  
170 survey can be found in Appendix A. The study was carried out according to the British  
171 Educational Research Association's (BERA) ethical guidelines for educational research,  
172 and given that the data contains responses that could lead to the identification of the  
173 respondents (even with their name and institute redacted), we have chosen not to make  
174 the survey responses available, but a redacted version can be provided upon request.

175

176 Any approach which utilises a qualitative content analysis should be guided by the  
177 following six steps: formulation of research question; selection of samples to be analysed;  
178 definition of categories to be analysed; outline and implementation of coding process;  
179 trustworthiness of coding; and analysis of the results of the coding process (Hsieh and  
180 Shannon, 2005; Illingworth, 2020). In defining the methodology utilised in this study, we  
181 will outline the first five of these steps here, with the sixth (i.e., the analysis) being  
182 presented in Sect. 3.

183

### 184 2.1 Formulation of research questions

185

186 The purpose of this study was to better understand how participants of EGU20 engaged  
187 with the online conference, their attitudes in how it compared to a face-to-face event, and  
188 whether they thought there were any opportunities that were presented as a result of the  
189 event going fully online. This was formalised into the following two research questions  
190 (RQs):

191

192 RQ1: what did people miss from a regular General Assembly?

193 RQ2: to what extent did going online impact the event itself, both in terms of challenges  
194 and opportunities?

195

196 In answering these questions, we are aware that many people's experiences of the  
197 conference relate to the technical limitations of the platforms or specific technical issues  
198 experienced during the week. Whilst important, we have not addressed those issues in this  
199 analysis for two main reasons. Firstly, technical issues and limitations are an issue faced  
200 by all types of conference and always impact the experience of the attendee. However, for  
201 our specific questions, the exact nature of technical difficulty was not as relevant as the  
202 fact that engagement was disrupted. Secondly, it is also important to note the extremely  
203 restricted timescale that the organisers had in moving this conference online. As such it is  
204 highly unlikely that any scientific conference would be held in exactly this way again –  
205 particularly when representing this many people.



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## 208 **2.2 Selection of samples to be analysed**

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210 The survey was distributed using EGU's preferred survey platform: zohopublic, and the  
211 link to the survey was distributed via email to all conveners and authors, as well as EGU  
212 members. The link to the survey was also distributed over social media, using EGU's  
213 official Twitter, Facebook, LinkedIn, and Instagram accounts, as well as being shared by  
214 various other affiliated accounts. The survey was open for responses from the 4th May  
215 until the 1st of June 2020.

216

217 Once the survey data had been collated and cleaned of incomplete answers, there were  
218 1,580 responses. This entire dataset was used for the initial implementation of the coding  
219 process (see Sect. 2.4). Once the initial codes had been set, and in order to more  
220 effectively assess the qualitative responses given to the survey, the total dataset of 1,580  
221 responses were divided by career stage (Early Career, Mid-Career or Senior Career)  
222 which cumulatively represented 1,503 responses. From these, 50 complete responses that  
223 included at least one qualitative answer were selected from each career stage for coding  
224 (see Sect. 2.4). This selection included 25 responses from the top of the dataset and 25  
225 from the bottom, representing the first and last respondents to the survey from each career  
226 stage, respectively.

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## 228 **2.3 Definition of categories to be applied**

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230 A conventional approach to qualitative content analysis was adopted in this study, with  
231 preconceived categories being avoided, and instead being determined by the  
232 implementation of the coding process (see Sect. 2.4). While in some instances a directed  
233 content analysis might be more appropriate, this is usually used in those instances where  
234 an existing theory would benefit from further description (Hsieh and Shannon, 2005). As  
235 the research questions to be addressed in this study are unique, a directed approach is  
236 inappropriate. Similarly, a summative content analysis would fail to fully account for the  
237 context of the survey responses alongside their content.

238

## 239 **2.4 Outline and implementation of coding process**

240

241 To begin with, two of the authors (HG and SI) selected the same random sample of 100  
242 survey responses. We then coded responses to the following survey questions:

243

- 244 · How effective/timely was EGU at communicating the change to the General  
245 Assembly?
- 246 · How would you rate the accessibility of Sharing Geoscience Online for you?
- 247 · How would you rate the technical delivery of Sharing Geoscience Online?



- 248 · Was there anything about Sharing Geoscience Online that you would like to see  
 249 maintained for future General Assemblies?  
 250 · What did you miss most about the General Assembly not being a face-to-face  
 251 event?  
 252 · What would the ideal format of the EGU General Assembly be according to you?  
 253 · In what ways has Sharing Geoscience Online supported / could Sharing  
 254 Geoscience Online support your career?  
 255 · Any further comments?  
 256

257 The individual codebooks that were used by both HG and SI in this initial coding exercise  
 258 are shown in Table 1 and Table 2, respectively. Both HG and SI found that data saturation  
 259 had been reached after coding for 100 survey responses, i.e., there were mounting  
 260 instances of the same codes, but no new ones.

261

262 *Table 1: the codebook that was used by HG in the initial coding exercise, including a*  
 263 *definition and an example for each code.*

Code	Definition	Example
Networking	Missing in-person interactions, contact, friendship, virtual life	"Seeing my colleagues and interacting in person"
Multiple Formats Communicating	Viewing, discussing, listening, debating, multiple format communication	"Verbally communicating to people while visually inspecting their work"
Detail	details of science, in depth conversation	"Without the visual interface it's very difficult to go into details"
Behaviour	people do not have respect, people are angry, stressed, rude	"people don't respect their time slots and have cross conversations"



Spontaneity	Missing freedom within schedule, time to talk, debate, explain, find unexpected subjects, interactions or conversations	"spontaneous questions, time for a more personal, friendly chat"
Preparation	Preparation of scientific materials, talks, formats etc	"scientifically I could prepare/have more in depth discussion"
Flexibility	Flexible interactions, being able to move between sessions, multi-tasking	"often the whole session is not totally of interest and you would like to change room just for one talk"
Open Access Science	open access science, sharing science, expands reach of research	"the impact is undoubtable greater than in classic EGU GA where only a few people could stand in front of poster"
Emotion / Nostalgia	Missing the whole event, an intangible sadness, non-specific, excitement and joy, boredom	"Everything! Nothing can replace the face-to-face event"
Overcoming Current Events	Overcoming non-specific challenges of coronavirus to carry on with plans	"You did an amazing job in a short time, and considering the current situation in the world"



Attendance	Able to attend or not attend meeting despite original plans	"it has allowed me to attend a meeting I could not attend in the first place"
Waste of time	it was a waste of time and disappointment, better off cancelling	"I don't see the point of this format, EGU had better been completely cancelled"

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265

266 *Table 2: the codebook that was used by SI in the initial coding exercise, including a*

267 *definition and an example for each code.*

Code	Definition	Example
Deeper engagement	These responses indicate that these participants were able to have a deeper engagement in terms of either more questions or longer discussions etc.	"Scientifically i could prepare/have more in-depth discussion."
Good for Early Career Scientists	Presented good opportunities for Early Career Scientists.	"During oral presentations, generally time for questions is very narrow, and you do not always feel it is your place to do so as an ECR. Having this ability during the whole session time slot is really enjoyable."
Difficulties with Tech	Participants encountered difficulties accessing the online content.	"The chat pages has some glitches. Comments sometimes disappearing for unknown reasons in my window, while other people could see them."



Networking	Participants missed the opportunity to professional network in person.	"Meeting people! Networking! The chat it great but it is just not the same."
Socialising	Participants missed the opportunity to catch up with old colleagues and friends in person.	I can't see my teachers and classmates, we can't talk questions face to face, sometimes ,the text-chat can't arrive the effect. And I miss the scenery and food of Austria, haha.
Too much info	Participants felt overwhelmed with the amount of comms they received.	"The emails where too long and un-structured, plus a bit spammy (emails as author, co-author, personal program, convener....)"
Lack of engagement	These responses indicate that the online format presented less opportunities for deep engagement on scientific topics.	"The 15-min orals and as long as need discussion for the posters. This format cuts down on the ability to explain, drastically. I don't think it's been translated good enough."
Environment	Attending the conference online had a positive impact on the environment.	"carbon footprint issue. Obviously we do not need to go every year to such meetings. So remotely following them is very interesting. And if you have personal restrictions (accessibility, money, child care) preventing you to attend, that's quite an improvement!"



Boring	The online event was less vibrant than the face-to-face meeting	"Nothing special and there are plenty of ways to explore to make this feel more interactive. Scrolling through the presentations makes attendance feel a lot like grading papers."
Convenience	The online event was more convenient to attend.	"Reduce long distance transportation while maintaining the visual and verbal aspects"
Lack of info	Difficult for people to 'discover' the conference or find out how to attend specific webinars etc.	"Found it hard to access the talks or find info about how to attend webinars but the rest was well advertised"
Inaccessible	The online format proved inaccessible to some people.	"I can't concentrate on the virtual meeting, although it's great, especially in text-chat section, I can't follow other people's idea."
Accessible	The online format proved to be more accessible for some people	"Those unable to physically attend can gain some part of the experience from home. That includes physically disabled and financially unable."
Discovery	Online events less likely to have the 'accidental discoveries' possible in the physical version	"Meeting up with friends, meeting new people, walking around, randomly finding interesting sessions"

268

269 After this initial coding exercise was completed, HG and SI combined their codebooks and  
 270 decided on a number of categories that covered all of these codes, and which could be  
 271 used to better represent the themes that were emerging from the data. These combined  
 272 categories are shown in Table 3.

273

274 *Table 3: the initial combined categories that were used to classify the initial codes of HG*  
 275 *and SI.*



Category	Definition	Codes (Original Coder in brackets)
Information	How participants were informed of the new format, and how they accessed this information.	Attendance (HG), Waste of Time (HG), Difficulties with Tech (SI), Too much Info (SI), Lack of Info (SI)
Connecting	How networking and socialising were impacted by moving to a virtual conference.	Networking (HG), Networking (SI), Socialising (SI)
Engagement	The extent to which the online environment either encouraged or restricted engagement. Also includes spontaneity / discovery of sessions.	Multiple Format Communicating (HG), Spontaneity (HG), Preparation(HG), Emotion / Nostalgia (HG), Deeper Engagement (SI), Lack of Engagement (SI), Boring (SI), Discovery (SI)
Environmental Impact	How changes to an online conference impacted the environment.	Overcoming Current Events (HG), Environment (SI)



Accessibility	The extent to which an online conference was more or less accessible to different audiences.	Detail (HG), Behaviour (HG), Flexibility (HG), Open Access Science (HG), Convenience (SI), Inaccessible (SI), Accessible (SI)
Early Career Scientists	The impact that the online environment had on Early Career Scientists.	Good for Early Career Scientists (SI),

276

277 After these combined categories had been determined, both HG and SI re-visited the  
 278 original RQs and decided that some of the survey's questions, whose responses had been  
 279 analysed in the initial coding exercise, were not related to these RQs. The following  
 280 questions were selected as being most pertinent to answering the RQs (given in  
 281 parentheses) of this study:

282

- 283 · How would you rate the accessibility of Sharing Geoscience Online for you?  
 284 (RQ1)
- 285 · Was there anything about Sharing Geoscience Online that you would like to see  
 286 maintained for future General Assemblies? (RQ2)
- 287 · What did you miss most about the General Assembly not being a face-to-face  
 288 event? (RQ2)
- 289 · What would the ideal format of the EGU General Assembly be according to you?  
 290 (RQ1, RQ2)
- 291 · In what ways has Sharing Geoscience Online supported / could Sharing  
 292 Geoscience Online support your career? (RQ2)
- 293 · Any further comments? (RQ1, RQ2)

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295 The other questions (i.e., 'How effective/timely was EGU at communicating the change to  
 296 the General Assembly?' and 'How would you rate the technical delivery of Sharing  
 297 Geoscience Online?') were deemed to be more related to the technical delivery of an  
 298 online conference rather than specific learnings and attitudes towards the experience of a  
 299 face-to-face or online event. At this stage in the analysis, the data was cleaned up to  
 300 remove any responses that did not contain information, and also to split the respondents



301 into three broad categories: Early Career Scientists, Mid-Career Scientists and Senior  
302 Career Scientists. This split was done according to the specific information that had been  
303 provided by the respondents, who as part of the survey ('What is your career stage /  
304 employment status?') had to self-identify as to which of these categories they belonged to.  
305

306 After cleaning the data, the categories shown in Table 3 were again revisited, and it was  
307 decided that the 'Information' and 'Early Career Scientists' categories should be dropped  
308 from the subsequent analysis. The former because of the same reason outlined for  
309 neglecting two of survey questions in this stage of the analysis (i.e., because the  
310 responses were more concerned with technical changes and difficulties), and the latter  
311 because it was decided that it would be discriminatory to highlight one of the three groups  
312 of researchers. As a result, the categories that are shown in Table 4 are those that were  
313 used for this final stage of coding and analysis.

314

315 *Table 4: the final categories that were used in the analysis of the responses to the survey.*

Category	Definition
Connecting	How networking and socialising were impacted by moving to a virtual conference.
Engagement	The extent to which the online environment either encouraged or restricted engagement. Also includes spontaneity / discovery of sessions.
Environmental Impact	How changes to an online conference impacted the environment.
Accessibility	The extent to which an online conference was more or less accessible to different audiences.

316

317 For the final stage of coding, 50 random respondents from each of the three distinct  
318 demographic groups (i.e., Early Career, Mid-Career, and Senior Career) were selected.  
319 HG and SI then individually assigned the categories shown in Table 4 to the responses to  
320 the questions given above for these respondents. Both HG and SI observed that for each  
321 of these 50 sets of responses, the categories that are shown in Table 4 could be assigned,



322 with no newly emergent codes or categories during this process, therefore providing  
323 confidence that the categories shown in Table 4 were the dominant themes to emerge  
324 from the data, and which will be discussed further in Sect. 3.

325  
326

## 327 **2.5 Trustworthiness of coding**

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329 At each stage of the qualitative content analysis that was adopted in this study, the  
330 individual codes and categories were re-examined in order to confirm that they accurately  
331 captured the responses of the survey in relation to the RQ. Both HG and SI carried out this  
332 coding independently, until there were no further codes or categories found to be emerging  
333 from the data, i.e., until descriptive saturation had been reached (Lambert and Lambert,  
334 2012). Similarly, a combination of systematic sampling, constant comparison, and proper  
335 audit and documentation (see Sect. 2.2 and 2.4) were used to ensure both the reliability  
336 (i.e., the consistency with which this analysis would produce the same results if repeated)  
337 and the validity (i.e. the accuracy or correctness of the findings) of this approach (Leung,  
338 2015).

## 339 **3. Results & Discussion**

340

341 As can be seen from Table 4, four major categories emerged from the methodology that  
342 was adopted in analysing the responses to the survey. We now discuss each of these  
343 emergent categories, how they relate to RQ1 ('What did people miss from a regular  
344 General Assembly?') and RQ2 ('To what extent did going online impact the event itself,  
345 both in terms of challenges and opportunities?'), and how they compare to other research  
346 that has been conducted in terms of the transitioning of large academic conferences from  
347 physical to virtual spaces.

348

### 349 **3.1 Connecting**

350 One of the categories identified from the responses from attendees of EGU20 was  
351 'connecting'. This was defined as the interpersonal connections between attendees of the  
352 conference; the human-to-human, individual, or informal interactions. This category is  
353 distinct from the connections made around the scientific content, which is discussed in  
354 'engagement' (Sec. 3.2).

355

356 The responses coded in this category were frequently posted in direct response to the  
357 survey question 'What did you miss most about the General Assembly not being a face-to-  
358 face event?', and the responses were most often framed as negative or expressing loss. In  
359 general, the descriptions of the loss of connection during EGU20 can be summarised as  
360 being those opportunities to interact with colleagues and friends 'beyond the session'. The



361 loss of connection was most often described in terms of informal interaction, such as this  
362 observation from a Senior Career Scientist:

363

364 “Personal communications. The possibility to share a lunch or a dinner together with  
365 potential future colleagues.”

366

367 Networking was also a key aspect of the loss of connection, particularly expressed by Mid-  
368 Career Scientists and Early Career Scientists searching for career development. The  
369 limited scope of a platform such as the one that was provided during EGU20 for  
370 networking, echoes findings of other studies, wherein social media and other digital  
371 platforms are often used to build networking potential, which is then followed up for more  
372 meaningful discussion in-person (Reinhardt et al, 2009; Kimmons and Veletsianos, 2016).  
373 The discussion of a loss of connection in networking was also described as a function of  
374 learning who is potentially a valuable contact and meeting new people, as this Mid-Career  
375 Scientist observed:

376

377 “The ability to network. Randomly meet people you don't even think you're  
378 interested in meeting.”

379

380 The loss of connection for Senior Career Scientists was especially pronounced in the way  
381 they described friendship and treasured colleagues. This was not, however, limited to  
382 Senior Career Scientists, and often included an aspect of nostalgia for the conference  
383 itself and an enjoyment of the city of Vienna. Many respondents described the loss of  
384 contact with friends as central to their General Assembly experience, as this Senior Career  
385 Scientist responded:

386

387 “90% of my motivation to go to the EGU General Assembly is to meet with  
388 colleagues and friends in person. That's a great loss.”

389

390 The final aspect of loss with regards to the theme of connection was in the stimulus and  
391 inspiration that comes from informal conversation and meetings with people. This was  
392 expressed in the form of being able to plan future activities, come up with new ideas, or  
393 simply the inspiration that breaking the routine through connection provides, as this Early  
394 Career Scientist describes:

395

396 “Networking, meeting people in person, the atmosphere of the meeting, Vienna, and  
397 listening more than reading. My job as a scientist is mostly reading and writing, the  
398 physical conference is breaking out of this, which opens many other opportunities to  
399 think, cooperate, and pathways to discuss.”

400

401 These responses show that though the scientific content is key to any conference, the  
402 ability to build and experience meaningful informal connections with friends and colleagues  
403 for both personal and professional reasons, is very valuable to attendees, which is



404 something that is also present in studies of remote working more generally (Nardi and  
405 Whittaker, 2002). This aspect of proving space ‘beyond the session’ for informal interaction  
406 is a useful recommendation for face-to-face conferences as well, but for digital or online  
407 conferences may provide critical to their success or failure.  
408

### 409 3.2 Engagement

410  
411 Another category to arise from the responses from respondents was that of ‘engagement’.  
412 Specifically, this was related to the extent to which respondents were or were not able to  
413 engage with both the online format and the material that was presented.  
414

415 In terms of criticisms, several respondents felt as though the format of EGU20 precluded  
416 the depth of conversation and scientific rigour that would normally be expected at the  
417 conference, as demonstrated by this comment from a Senior Career Scientist:

418  
419 “Maybe I come from an old school, but attending a conference directly offers many  
420 possibilities to establish contacts with other scientists, to interact in a deeper and  
421 less aseptic way than online event provides.”  
422

423 However, others actually found more opportunity for engagement, both during and after  
424 the various sessions. For example, one Early Career Scientist observed that:

425  
426 “It may be topic related, but this time was the first time that I got exactly the kind of  
427 feedback to my presentation I was hoping for. And that came one-two days after the  
428 actual presentation via the discussion section and via email.”  
429

430 This dichotomy of opinions was observed across all three respondent groups, and a  
431 similarly polarising aspect of engagement was the spontaneity of discovery that is  
432 associated with large conferences like the EGU General Assembly. Some respondents  
433 noted that one of the things they missed the most was the opportunity to accidentally or  
434 purposefully walk in on sessions outside of their field of expertise, thereby helping to  
435 cross-pollinate scientific discourse and helping them to develop their own interdisciplinary  
436 approaches. This attitude is evident in the following comment from a Mid-Career Scientist  
437 when noting what it was that they missed most about EGU20 not being a face-to-face  
438 event:

439  
440 “Wandering around and going to attend a random session outside of my field of  
441 expertise.”  
442



443 However, others felt the exact opposite, i.e. that the online format actually made it more  
444 possible to engage in research outside of their specific field of expertise, as evidenced by  
445 this comment from a Senior Career Scientist:

446  
447 “I could take part in sessions at the fringe of my expertise since the short  
448 summaries given by presenters helped me to understand their core message.”

449  
450 The ‘short summaries’ that this respondent refers to, in combination with the pre-uploaded  
451 longer presentations, is one facet of engagement that seems to have been received with  
452 almost unanimous positivity. For EGU20’s scientific sessions, authors were encouraged to  
453 upload and share their presentation materials and opt in to commenting from 1 April 2020  
454 onwards, and then prepare a one or two sentence summary of these presentation  
455 materials for the live text chat. This meant that participants had up to a month to view other  
456 researchers work in detail and prepare any questions for the allocated session and  
457 associate chat during the week of EGU20 itself (4 to 8 May 2020). The opportunity to view  
458 this work in advance was a frequent feature of responses to the question ‘Was there  
459 anything about Sharing Geoscience Online that you would like to see maintained for future  
460 General Assemblies?’. For example, one Early Career Scientist noted that:

461  
462 “This made it much easier to think about the contents without the stress of  
463 everything around you in the conference centre.”

464  
465 The following comment from a Mid-Career Scientist echoed the sentiment of many  
466 respondents that this is a feature that should be utilised in future General Assemblies:

467  
468 “Uploading "displays" online, for anyone to see and comment. Even for a physical  
469 meeting it would be useful for the general public, or the colleagues who couldn't  
470 make it (either to the conference or to the session).”

471  
472 However, the positive response to this pre-release of information must be caveated by the  
473 concerns that many respondents raised around potential issues with intellectual property  
474 and the dangers of permanently hosting preliminary results online, as evidenced by the  
475 following comment from a Mid-Career Scientist:

476  
477 “I’m concerned about the copyright issues when uploading presentation.”

478  
479 One Senior Career Scientist went further, noting that:

480  
481 “Conferences are often about discussing preliminary results, when I submit an  
482 abstract I DO NOT subscribe to permanently DOI-ing preliminary results.”

483  
484 The outcomes of this category are very mixed, with some respondents finding EGU20 to  
485 be less engaging than a normal General Assembly, whilst others noted that it actually



486 presented more opportunities for deep engagement. It would appear that attitudes towards  
487 engagement depend very much on the respondent's personal attitudes towards online vs.  
488 face-to-face conferences, and a more general comment is that EGU20 does not appear to  
489 have swayed many respondents from what are clearly deeply entrenched viewpoints. One  
490 thing that is made clear from the respondents, however, is that they deeply valued the  
491 opportunity to view scientific research in advance of the conference, although this option  
492 needs careful consideration with regards to intellectual property and the sharing of  
493 preliminary results.

### 494 3.3 Environmental Impact

495  
496 One of the clear opportunities that arose from the EGU20 format was the positive impact  
497 that this was perceived to have on the environment, i.e., through the reduced carbon  
498 emissions associated with attendees travelling to Vienna to participate in a General  
499 Assembly. This manifested itself across all three distinct demographic groups (Early  
500 Career Scientist, Mid-Career Scientist, and Senior Career Scientist).

501  
502 EGU has previously taken several steps to mitigate and offset the impact that travel to the  
503 General Assembly has on the environment. These include: giving participants the  
504 opportunity to offset the CO<sub>2</sub> emissions resulting from their travel to and from Vienna (in  
505 2018 and 2019, voluntary carbon offsetting through EGU was used by 25% to 32% of  
506 attendees), advising participants to travel by train to Vienna when possible (and promoting  
507 discounts offered by train companies to participants); and encouraging participants to use  
508 public transportation once in Vienna, by giving away a weekly transportation pass with  
509 every week ticket to the conference.

510  
511 Of course, the environmental impact of hosting a large conference like the EGU General  
512 Assembly extends beyond that of travel, and also includes the printing of materials, the  
513 consumption of power at the venue, and the sourcing of catering. The conference venue,  
514 the Austria Centre Vienna, has a number of green measures in place, including having  
515 energy-saving LEDs throughout the centre, using a solar array to heat the water used in  
516 the kitchens and toilets, and working with an in-house catering company compliant with  
517 green standards. Other measures that have been implemented to reduce the  
518 environmental impact of the General Assembly include no longer offering single-use water  
519 bottles during breaks, installed water fountains for refilling multi-use bottles, phasing out  
520 printed copies of the programme book, and making sure that the lanyards are created out  
521 of 100% recyclable materials. If the 2020 event had taken place in Vienna, all travel of  
522 participants would have been carbon offset, a start would have been in phasing out single-  
523 use coffee cups, and bicycle transport in Vienna would have been promoted. However,  
524 from the results of this survey, these steps do not go far enough to alleviate the concern  
525 that many of the respondents have with regards to the environmental impact of the  
526 General Assembly. Furthermore, as noted by Hirschier and Hilty (2002), the environmental



527 impact of a large international conference such as the EGU General Assembly is  
528 dominated by the travel activities of the participants. Here long-range flights are the  
529 dominant element, as exemplified for the 2019 Fall Meeting of the American Geophysical  
530 Union where 75% of the emissions were due to intercontinental flights over distances  
531 larger than 8,000 km made by 36% of the attendees (Klöwer *et al.*, 2020). Klöwer points  
532 out that for the 2019 EGU General Assembly in Vienna, Virtual participation for 26% of the  
533 highest emitting participants would reduce the carbon footprint by 80%  
534 (<https://github.com/milankl/CarbonFootprintEGU>). As such, despite any green measures  
535 that EGU may take in Vienna, minimizing air travel is the only way to ensure a significant  
536 reduction in environmental impact.

537

538 The hard decisions that many researchers face with regards to the environmental impact  
539 of attending the General Assembly are evident from the following two comments (both  
540 from Early Career Scientists):

541

542 “As geologists we really need to think about being more climate-friendly in our jobs!”

543

544 And

545 “In order to cut the carbon footprint of science, we need to go online more and have  
546 less [SIC] actual meetings (although I prefer those)”

547

548 Despite these quotes coming from Early Career Scientists, this environmental conflict of  
549 interest was felt keenly across the three groups. For example, one Senior Career Scientist  
550 observed that:

551

552 “...because the environmental foot print [SIC] of normal EGU seems unreasonable  
553 nowadays, we have to think differently and this crisis pushes a bit to (SIC) far but  
554 shows us alternatives.”

555

556 As a result of this conflict of interest, many of the respondents (across all three groups)  
557 suggested varying hybrid models of face-to-face and online options for future EGU  
558 General Assemblies, citing environmental concerns as their primary reasons for moving  
559 away from a strictly ‘business as usual’ model.

560

561 The internal conflict of several of the respondents is appropriately reflected by this  
562 comment from a Senior Career Scientist:

563

564 “The online format is a great opportunity to reduce the environmental impact of the  
565 GA [General Assembly] and allows people to attend who cannot travel. But face to  
566 face meetings are important too. I would favour alternating between online and  
567 physical meetings. [SIC] in the future. Both have advantages.”

568



569 16,273 scientists participated in the EGU General Assembly 2019 in Vienna, Austria.  
570 Klöwer *et al.* (<https://github.com/milankl/CarbonFootprintEGU>) estimated that these  
571 scientists travelled in total 94 million km to Vienna and back, which emitted 22,300 tonnes  
572 of carbon dioxide equivalent (tCO<sub>2e</sub>), an average of approximately 1.4 tCO<sub>2e</sub> per scientist  
573 To put this into context, this is the total weekly carbon footprint of approximately 27,000  
574 average American households, and based on other studies (see e.g., Green, 2008; Jäckle,  
575 2019; Bousema *et al.*, 2020), this might be considered to be a conservative estimate.  
576

577 As noted by Bousema *et al.* (2020), although in-person meetings have many benefits, the  
578 ecological impact of conference travel is considerable and demands action. With more  
579 than 16,000 attendees the EGU General Assembly has a substantial environmental impact  
580 and whilst the EGU has taken several steps to reduce their impact, it is clear that this is an  
581 issue that is not being adequately addressed. Even allowing for the environmental impact  
582 of hosting a large online event (Versteijlen *et al.*, 2017), the reduction in carbon emissions  
583 from thousands of people not travelling to Vienna every year is substantial. Whatever  
584 format is taken by future EGU General Assemblies, the results of this survey indicate that  
585 something needs to be done to better mitigate the environmental damage that a face-to-  
586 face conference presents in its current guise. Perhaps this is the opportunity we have been  
587 waiting for to lead by example and transition to a General Assembly that not only presents  
588 research on how to mitigate climate change, but also takes actionable steps in doing so.  
589 As observed by one Early Career Scientist:

590

591 “If it was only online, we’d have to adapt to a new way of working, which would  
592 ultimately accelerate our transition to a green future”

### 593 3.4 Accessibility

594 The fourth category identified in coding is one that is often cited in connection with the  
595 benefits of online conferences: ‘accessibility’. In this case accessibility was related to any  
596 discussion of increasing the ability of people to participate in the General Assembly,  
597 regardless of the reason for their inability to participate at other times. Though this has  
598 particular relevance to under-represented groups in academia, such as those who have a  
599 disability, caring responsibilities, financial constraints or are excluded due to systemic  
600 oppression, this category also included people who may attend in a normal year, but  
601 couldn’t for a specific reason in 2020.

602

603 The first thing to note here is that responses coded as being about accessibility were  
604 overwhelmingly positive. There was a general appreciation of the ability for an online  
605 General Assembly to widen participation – particularly for those who would not normally be  
606 able to attend as these Early Career Scientists stated:

607

608 “Those unable to physically attend can gain some part of the experience from  
609 home. That includes physically disabled and financially unable.”



610

611 And:

612

613 “I think the online format allowed people who could not come to the meeting for cost  
614 or travel restrictions to attend, thus broadening the scientific content.”

615

616 Financial constraints were often stated as a limiting factor, but connected to this was the  
617 burden of travel and all that it entailed – particularly the challenge of obtaining  
618 documentation for residents of certain countries – but many also recognised the value of  
619 being able to invite non-traditional conference attendees that would also normally  
620 experience a financial barrier, thus encouraging open science, as this Mid-Career Scientist  
621 stated:

622

623 “Open access and open chat to everyone who can log in with their email; also  
624 stakeholders could attend as a guest!”

625

626 In addition to improving the accessibility of the scientific information, there was also note  
627 made of improving the accessibility of the format to support those less inclined to engage  
628 in traditional forms of conference questioning (which can be quite combative at times) to  
629 people who are perhaps at an earlier career stage, or of a more introverted personality, as  
630 observed by this Mid-Career Scientist:

631

632 “Accessibility for those with caring responsibilities, lack of financial resources, etc.  
633 And the fact that many are more comfortable asking questions in an online format >  
634 good for introverts and ECRs.”

635

636 However, many stated that despite the improved accessibility, the online conference was  
637 something that should in future be relegated to being supplemental to a traditional in-  
638 person conference. Some even described the accessibility of an online conference as a  
639 trade-off, as this Senior Career Scientist said:

640

641 “The expanded attendance is good, but there is definitely something lost: but also  
642 something gained (accessibility).”

643

644 The benefits of an online conference for accessibility cannot be ignored, and it’s important  
645 to note how many respondents also identified ways in which accessibility in this regard  
646 truly went beyond some narrower definitions to real widening participation. As with other  
647 discussions of accessibility, questions remain as to who is included in this survey and who  
648 is excluded, and how online engagement continues to include or exclude certain people,  
649 often compounding exclusion in non-digital spaces (Khalid and Pedersen, 2016).



## 650 4. Conclusion

651

652 The original purpose of this study was to address the following two research questions:

653

654 RQ1: what did people miss from a regular General Assembly?

655 RQ2: to what extent did going online impact the event itself, both in terms of challenges  
656 and opportunities?

657

658 As can be seen from Sect. 3, it is evident that there are several aspects of a face-to-face  
659 EGU General Assembly that were missed by respondents, not least the opportunity to  
660 connect and interact with colleagues in informal environments. It is also clear from these  
661 emergent themes that there are many aspects of going online that present opportunities  
662 that should not be forgotten for future General Assemblies. The future of the EGU General  
663 Assembly is something that requires careful consideration, and indeed many of the  
664 choices are driven by change outside the control of the EGU Executive and Programme  
665 Committee; the 2021 General Assembly has already been announced as being a fully  
666 online event because of the restrictions that continue to be imposed by the coronavirus.  
667 However, there are still many variables that are within their control, and it is clear from the  
668 responses to the survey that many participants feel very strongly that a fully online, or  
669 hybrid General Assembly is not only an option but a necessity, in order to both make the  
670 conference more accessible and also to address the significant environmental impact of  
671 hosting a face-to-face intentional conference. In moving towards any digital provision for  
672 future General Assemblies, we would like to offer the following recommendations, which  
673 have emerged from the results of this study:

674

- 675 **1. The online provision should not just be an afterthought.** An online digital  
676 conference cannot simply be a replication of a face-to-face version. Similarly, if a  
677 hybrid option is pursued, then there needs to be equal value attached to both  
678 the face-to-face and digital aspects. Care should be taken to enable direct  
679 interactions between those on-site and remote participants.
- 680 **2. There needs to be an accessible and innovative space to enable informal  
681 connections.** One of the biggest issues that needs to be addressed in an online  
682 environment is in creating spaces where researchers can meet up with old  
683 colleagues, encounter new ones, and informally engage with one another. The  
684 café culture of Vienna cannot be replicated in an online format, but then nor is it  
685 replicated in the actual General Assembly itself. Digital interactions that take  
686 place on platforms that already exist for such encounters need to be considered.
- 687 **3. Accessibility needs to be re-considered.** Online conferences make science  
688 much more accessible to many different groups and helps to truly diversify  
689 science. However, it also presents several additional access needs that need to  
690 be considered. These include, but are not limited to: digital literacy, accessibility



691 for visual or hearing impaired participants, access to fast and reliable  
692 broadband, and limitations imposed by time zones.

693 **4. The sharing of preliminary results needs to be carefully thought through.**

694 One of the highlights from EGU20 was the capacity for people to see (and  
695 comment on) scientific research before it was presented. Enabling this feature  
696 for a future General Assembly would be well-received, but careful consideration  
697 needs to be given as to how to ensure that all researchers feel confident that  
698 their research is protected as we increasingly move into an era of Open  
699 Science, especially for those who work with confidential data.

700  
701 The validity and reliability of this study is discussed in Sect. 2.5, but it should be noted that  
702 as with any qualitative analysis there is a degree of interpretation in the analysis of the  
703 responses to the survey. However, we are confident that the emergent categories are  
704 representative of the general zeitgeist of EGU participants.

705  
706 The format of EGU20 was radically changed because of the impacts of the coronavirus,  
707 and whilst there are clearly issues that need to be addressed for any future online version  
708 of the EGU General Assembly (either fully online or in some hybrid form), it has perhaps  
709 forced a change that might not have otherwise occurred. The organisers and participants  
710 of subsequent General Assemblies need to think very carefully about whether the  
711 perceived positive impacts of a traditional face-to-face conference outweigh the very real  
712 concerns about inclusion and environmental impact. Or as one of the respondents to the  
713 survey noted:

714  
715 “The traditional conference is getting more difficult to justify with climate change and  
716 the requirement that everyone jet around the world to discuss earth science,  
717 especially science related to climate change.”

718  
719 If the community does not listen to these requests and consider them very seriously, then  
720 we are at risk of being nothing more than a data point on the ‘business-as-usual’ climate  
721 simulations that many of us have dedicated our professional lives to avoiding occurring at  
722 all costs.  
723

## 724 Data availability

725  
726 Given that the data contains responses that could lead to the identification of the respondents  
727 (even with their name and institute redacted), we have chosen not to make the survey responses  
728 available, but a redacted version can be provided upon request.



## 729 Competing interests

730

731 Author Hazel Gibson is an Associate Editor of *Geoscience Communication*, Author Sam Illingworth  
732 is the Chief Executive Editor of *Geoscience Communication*, Author Susanne Buiter was the chair  
733 of the Programme Committee for EGU2020: Sharing Geoscience Online and is Executive Editor of  
734 *Solid Earth*.  
735

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737

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- 779  
780

## 781 Appendix A:

### 782 EGU Sharing Geoscience Online 2020 survey questions.

783

784 *Thank you for participating in the feedback survey for EGU Sharing Geoscience Online 2020! This*  
785 *has been an unprecedented experiment, where we organised the largest virtual gathering of*  
786 *geoscientists ever, in only 6 weeks since the cancellation of the physical General Assembly. We*  
787 *are very curious about your experience at Sharing Geoscience Online: what has worked well, what*  
788 *could be better, what did you miss, and what should EGU consider to keep for future meetings.*

789

790 *We would like to ask you to take 5-10 minutes to complete this questionnaire, as your input is very*  
791 *helpful for shaping future EGU General Assemblies and possible virtual extensions.*

792

793 *Susanne Buitter (RWTH Aachen University)*

794 *Chair of the EGU General Assembly 2020 Programme Committee*

795

796 Q1. What EGU programme groups do you associate most closely with?

797

– Atmospheric Sciences

798

– Biogeosciences

799

– Climate: Past, Present & Future

800

– Cryospheric Sciences

801

– Education and Outreach Sessions

802

– Earth Magnetism & Rock Physics

803

– Energy, Resources & the Environment

804

– Earth & Space Science Informatics

805

– Geodesy

806

– Geodynamics

807

– Geosciences Instrumentation & Data Systems

808

– Geomorphology

809

– Geochemistry, Mineralogy, Petrology & Volcanology



- 810 – Hydrological Sciences
- 811 – Interdisciplinary & Transdisciplinary Sessions
- 812 – Natural Hazards
- 813 – Nonlinear Processes in Geosciences
- 814 – Ocean Sciences
- 815 – Planetary & Solar System Sciences
- 816 – Short Courses
- 817 – Seismology
- 818 – Special Scientific Events
- 819 – Stratigraphy, Sedimentology & Palaeontology
- 820 – Soil System Sciences
- 821 – Solar-Terrestrial Sciences
- 822 – Tectonics & Structural Geology
- 823 – None
- 824
- 825 Q2. What is your present country of employment / study?
- 826
- 827 Q3. What is your gender?
- 828 – Female
- 829 – Male
- 830 – Non-Binary
- 831 – Prefer not to say
- 832 – Prefer to self describe
- 833
- 834 Q4. Did you feel restricted to participate in the conference due to some physical limitations?
- 835
- 836 Q5. Does any of the following apply?
- 837 – It is difficult for me to attend physical meetings, but I could attend Sharing Geoscience
- 838 Online
- 839 – It is difficult for me to attend physical meetings and I also experienced difficulties attending
- 840 Sharing Geoscience Online
- 841 – I can attend physical meetings, but experienced difficulties attending Sharing Geoscience
- 842 Online
- 843 – I can attend physical meetings and Sharing Geoscience Online
- 844 – Other / Comments
- 845
- 846 Q6. Why did you give this answer?
- 847
- 848 Q7. What is your career stage / employment status?
- 849 – Early career scientist
- 850 – Mid-career scientist
- 851 – Senior scientist
- 852 – Retired
- 853 – Self-employed
- 854 – Not currently employed



- 855       – Other  
856
- 857   Q8. What is your role at EGU Sharing Geoscience Online 2020?  
858   (Tick all that apply)
- 859       – Abstract author or co-author  
860       – Session convener or co-convener  
861       – Session chair  
862       – EGU division scientific officer  
863       – EGU Programme Committee member  
864       – EGU council member  
865       – Scientific participant  
866       – Press/media  
867       – Other (Please State)  
868
- 869   Q9. Have you attended a virtual conference before?  
870
- 871   Q10. Which one?  
872
- 873   Q11. How effective/timely was EGU at communicating the change to the General Assembly?  
874       – Very Good  
875       – Good  
876       – Average  
877       – Poor  
878       – Very Poor  
879
- 880   Q12. Why did you give this score?  
881
- 882   Q13. What were your main sources of information about the changes to the General Assembly?  
883   (Tick all that apply)
- 884       – EGU website (www.egu.eu)  
885       – General Assembly website (www.egu2020.eu)  
886       – Social Media  
887       – Blogs  
888       – Newsletter  
889       – E-mails by EGU/Copernicus  
890       – Other (Please specify)  
891
- 892   Q14. Which activities of Sharing Geoscience Online did you participate in?  
893       – Scientific Sessions  
894       – Union Symposia  
895       – Great Debates  
896       – Short Courses  
897       – Townhall Meetings  
898       – Photo Competition  
899       – #shareEGUart



- 900 – Division Meetings  
901 – Networking Events  
902 – Closing Party  
903  
904 Q15. How many different chat sessions of Sharing Geoscience Online did you participate in?  
905  
906 Q16. How would you rate the accessibility of Sharing Geoscience Online for you?  
907 – Very Good  
908 – Good  
909 – Average  
910 – Poor  
911 – Very Poor  
912  
913 Q17. Why did you give this answer?  
914  
915 Q18. How would you rate the technical delivery of Sharing Geoscience Online?  
916 – Very Good  
917 – Good  
918 – Average  
919 – Poor  
920 – Very Poor  
921  
922 Q19. Why did you give this answer?  
923  
924 Q20. Was there anything about Sharing Geoscience Online that you would like to see maintained  
925 for future General Assemblies?  
926  
927 Q21. What did you miss most about the General Assembly not being a face-to-face event?  
928  
929 Q22. What would the ideal format of the EGU General Assembly be according to you?  
930 – Face-to-face event only  
931 – Mixed face-to-face and online event  
932 – Online event only  
933  
934 Q23. Why did you give this answer?  
935  
936 Q24. In what ways has Sharing Geoscience Online supported / could Sharing Geoscience Online  
937 support your career?  
938  
939 Q25. Any further comments?  
940