Reviewing comments
for manuscript HGSS-2021-22 by Lowe et al.

"The international tephra research group 'Commission on Tephrochronology' and its activities – the first 60 years"

General impression:

This reviewer comes from the non-volcano or non-IAVCEI part of the IUGG-community and is representative for the manuscript's impression on an informed non-specialist. The paper is regarded as an important stock-keeping document for CoT which chronicles its foundation, development and zig-zagging trajectory through various parenting groupings over no less than six decades. It contains a welcome addition to the special information overview by Ras (2019) about IAVCEI within the century of IUGG (HGSS Special Issue "IUGG – from different spheres to a common globe"), and provides a typical example of what is mentioned in the final paragraph of MacCracken and Volkert (2019), with special reference to Good (2000).

In form of a journal article the manuscript attempts to provide information similar to, *e.g.*, the IAMAS-commissions for Radiation (IRC; Bolle, 2008) and Ozone (IOC; Bojkov, 2012). Apparently, the evolving CoT is to be seen as a small, yet increasingly global grouping of specialists, who apply physical methods of growing complexity to deduce the age of tephra-sediments. It is recommended that the references provided below are inspected (possibly quoted) and taken as examples how a more general introduction can be given and to what extent the use of appendices helps to store noteworthy, often tabulated material, which disturbs in its detail the main narrative thread (which still has to be defined and explained).

In its present form, the manuscript states as its sole purpose to "summarize and comment on the history of global collaboration by tephrochronologists" (lines 108/109). The network of experts, quite naturally, takes its existence for granted and self-evident. However, sufficient general information is lacking about the relevance of tephra studies in geophysics and the various attempts of the grouping to find a sufficiently strong parenting organization (as INQUA early on and meanwhile IAVCEI). The introduction should introduce some science-historical aims of the article besides a sheer exercise in stock keeping and a chronology of tephrochronological cooperation. As an introduction to the topic and its challenges at least parts of the information provided, *e.g.*, in the Wikipedia-entries https://en.wikipedia.org/wiki/Tephra and https://en.wikipedia.org/wiki/Tephrochronology should be paraphrased.

Ideally, the revised manuscript should combine a compact stock keeping of common activities and key persons who influenced the development of CoT over time with a compelling narrative about the methods, changing with time, to arrive at relevant proxy data to infer important details about previous explosive outbreaks of volcanoes.

I would like to leave it to the topical editor to advise the lead author with guiding hints to be followed during the production of a revised version of the manuscript.

Specific observations from reading the manuscript:

Second half of introduction (lines 155–187):
The mere listing of numerous review references leaves the argumentation rather empty. Extended references of reviews are preferably placed in an appendix, while a few substantiating sentences should explain nature and relevance of the “discipline and science of tephrochronology” (TC; also, what is behind the distinction of the two? Is TC really a discipline or rather a speciality at the interface of geology and geophysics?).
The paragraph about “crypto-TC” is somewhat cryptic itself. It is insufficient to declare the rise (in number?) of studies as “remarkable” and “very influential” without any explanation; again, a long list of recent references makes up the best part of the text – which is regarded as insufficient.

Please state instead a few selected miles-stone or turning points during the history of CoT. Interested readers should get some feel about aims and challenges of TC instead of heaps of references with hardly any information about their content.

Section 2 (title in line 189):
The title is regarded as too long (two times “and” of different weight); the sub-sections appear to deal with the entire 60-year period (until line 722) and is structured mainly by six main meetings (in sub -section 2.3.).

Section 3 (title in line 724):
Again, the title is much too long and potentially misleading (which items does “since 2007” refer to – all together or just the final one?).

It is strongly recommended that the main sections of the article refer to equally important periods (of similar duration? Sections 1 and 2 of Ismail-Zadeh [2016] provide as an example of how to define and concisely describe sub-periods for more than a century); the main focus should be placed on scientific needs and content, measuring techniques, key organizational decisions, regional foci versus global perspectives during each of the chosen eras; they are to be presented in the introduction. Certainly, key personalities and important meetings are of high relevance; yet lengthy listings are better placed in appendices. The 11 figures provide interesting snapshots; however, the chosen content needs to be explained and exemplified better (e.g. in Fig. 2, the presentation of a black-and-white snapshot from Japan with a larger group mainly seen from the back should be used as a starting point of the assumed special character of an early meeting; the nature and purpose of field trips has to be introduced, as field campaigns are of a quite different nature in, *e.g.*, oceanography or meteorology, where the medium of interest is very transient indeed).

Figures:
The manuscript contains 11 figures, most of them multi-paneled. The information provided is considered important. Still it is suggested to carry out some careful photo-editing to emphasize the points to be made. This may include:

Fig.1:
combine a cut of the portrait with the original inscription in Japanese below, e.g.

<inscription>

Fig.2:
cut image and explain its relevance (besides just a group of people during an excursion)

Figs.3, 9, 10, 11:
place small numbers on the few persons to be named and refer to these in caption like S.T. (***1***) and S.S. (***2***)

Figs.4, 5, 7:
in group photographs, place small numbers on persons to be named and refer to these in the caption; display in columns as, e.g., in Figs. 1 and 2 of MacCracken and Volkert, 2019, makes layout compact and quite reader-friendly (reference to an appendix many pages away appears unnecessarily cumbersome – adding a country-code [of work when picture was taken] does additionally provide a concise hint to international cooperation).

Some of the figure captions appears to be too extended. In general, a caption should provide a concise explanation of the displayed content, while additional details are better described in a few sentences around the position where the figure is referenced.

References:

Bojkov, R., 2012: International Ozone Commission: History and activities. IAMAS-Publ. no. 2, iv + 100 pp.; online: www.iamas.org/wp-content/uploads/2019/06/IAMAS-PubSer-No2.pdf .

Bolle, H.-J., 2008: International Radiation Commissions 1896 to 2008: Research into atmospheric radiation from IMO to IAMAS. IAMAS-Publ. no. 1, iv + 141 pp.; online: www.iamas.org/wp-content/uploads/2019/06/IAMAS-PubSer-No1.pdf .

Cas, R.A.F, 2019: IAVCEI: from small beginnings to a vibrant international association. *Hist. Geo Space. Sci.*, **10**, 181–191, https://doi.org/10.5194/hgss-10-181-2019, 2019

Good, G. A., 2000: The assembly of geophysics: Scientific disciplines as frameworks of consensus, *Stud Hist. Phil. Mod. Phys.*, **31**, 259–292, https://doi.org/10.1016/S1355-2198(00)00018-6.

HGSS Special Issue "IUGG – from different spheres to a common globe", 2019, cf. https://hgss.copernicus.org/articles/special_issue996.html

Ismail-Zadeh, A., 2016: Geoscience international: the role of scientific unions, Hist. Geo Space Sci., 7, 103–123, https://doi.org/10.5194/hgss-7-103-2016.

MacCracken, M.C. and H. Volkert, 2019: IAMAS: a century of international cooperation in atmospheric sciences Hist. Geo Space. Sci., 10, 119–136, https://doi.org/10.5194/hgss-10-119-2019.