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Diversity among Editorial Boards of *Elements* and other selected Geochemistry, Cosmochemistry, Mineralogy and Petrology journals

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Original sketch drawn by Dasapta Erwin Irawan

The publication of scientific work is foundational to our disciplines. To ensure equitable publication standards during the global flow of knowledge production, professional societies and publishers must take positive steps to avoid any biases that might hinder the publication of scientific work (e.g., Liévano-Latorre et al., 2020). Biases among editors and reviewers can be unconscious and influenced by different aspects of an author's identity, from country of origin, first language, affiliation, gender, ethnicity, and/or other factors, that could result in challenges to publication rates and visibility in key journal forums for under-

represented groups (Lerback et al., 2020). Ensuring that there is diversity in the peer review and publishing process and on editorial boards may help to eliminate bias.

Diversity promotes innovation from hypothesis through peer review to final publication (e.g., Hofstra et al., 2020), and should be set as a new standard, as shown by The Royal Society of Chemistry (<https://www.rsc.org/new-perspectives/talent/joint-commitment-for-action-inclusion-and-diversity-in-publishing/>). Personal identity impacts how we engage with our science; it impacts how we approach a problem, and what we value, study, and write. It influences how we select reviewers, how we review, and ultimately what is successfully published. Therefore, the limited diversity of major editorial boards will act as a barrier to representation of all academic members. The members of editorial boards shape the direction and success of a journal, and influence the authorship of papers and what is published within the journal. And, differences in scientific networks may be a core reason for persistence of implicit bias from editorial boards, particularly with regard to gender (Hanson et al., 2020). Therefore, editorial bias or perceived editorial bias, can exclude certain groups and exacerbate historic inequities regarding under-representation of entire continents within the geoscience literature (e.g., Africa; see North et al., 2020). Hence, for an editorial board to be inclusive and unbiased, it needs to be as diverse as the research community it represents that we know do not exactly represent the general population.

In this piece, we provide an exploration of diversity among editorial boards by presenting data for *Elements*, in terms of gender and geographic affiliation. We further compare these data with editorial board data from journals that are published by the societies that jointly publish *Elements* (thereafter termed “journals of participating societies”).

Historically (from 2005 to 2021), 19 principal editors (PE) have served with *Elements*, among them four were women (21%). In the past 10 years, there have been 11 PEs, 3 of which have been women (27%). These numbers, though falling short of gender parity, are representative of the proportion of the mid- to late- career women in the field and are indicative of wider challenges to diversity in our discipline. The executive editor is also

considered part of the editorial board: both executive editors have been women. So, *Elements* editorial board (executive and principal editors) has always had 25% to 50% women at any one time. All serving editors are white and affiliated with institutions in Northern America (n=13, 62%; USA and Canada) or Western Europe (n=8, 38%; UK, France, Germany, Denmark).

Examination of the editorial team among the journals of participating societies of *Elements* highlights the pervasiveness of editorial lack of diversity within our field (17 journals published and edited by various commercial publishers and learned societies; Figure 1). Here we identify that as of April 2021, the current editorial boards span a range of gender representation from 7 (50%) men and 7 (50%) women for *Geochemical Perspectives Letters* to 37 (97%) men and 1 (3%) woman for *Journal of Mineralogical and Petrological Sciences*. Of the 683 total Editorial Board members, 142 (21%) are women and 539 (79%) are men. These numbers are comparable to the February 2021 Elsevier Benchmark Gender Diversity distribution across “Geochemistry & Planetary Science” (25% women, 74% men and 1% prefer not to disclose) or “Applied Geosciences” portfolio Editors (with 14% women, 86% men). It must be noted that numbers from Elsevier are from an incomplete voluntary survey of the editors yet provide a good indication of gender distribution. Moreover, in some of the journals (i.e., those with larger editorial boards), turnover happens more quickly and thus numbers can fluctuate (up to a few percent in six months).

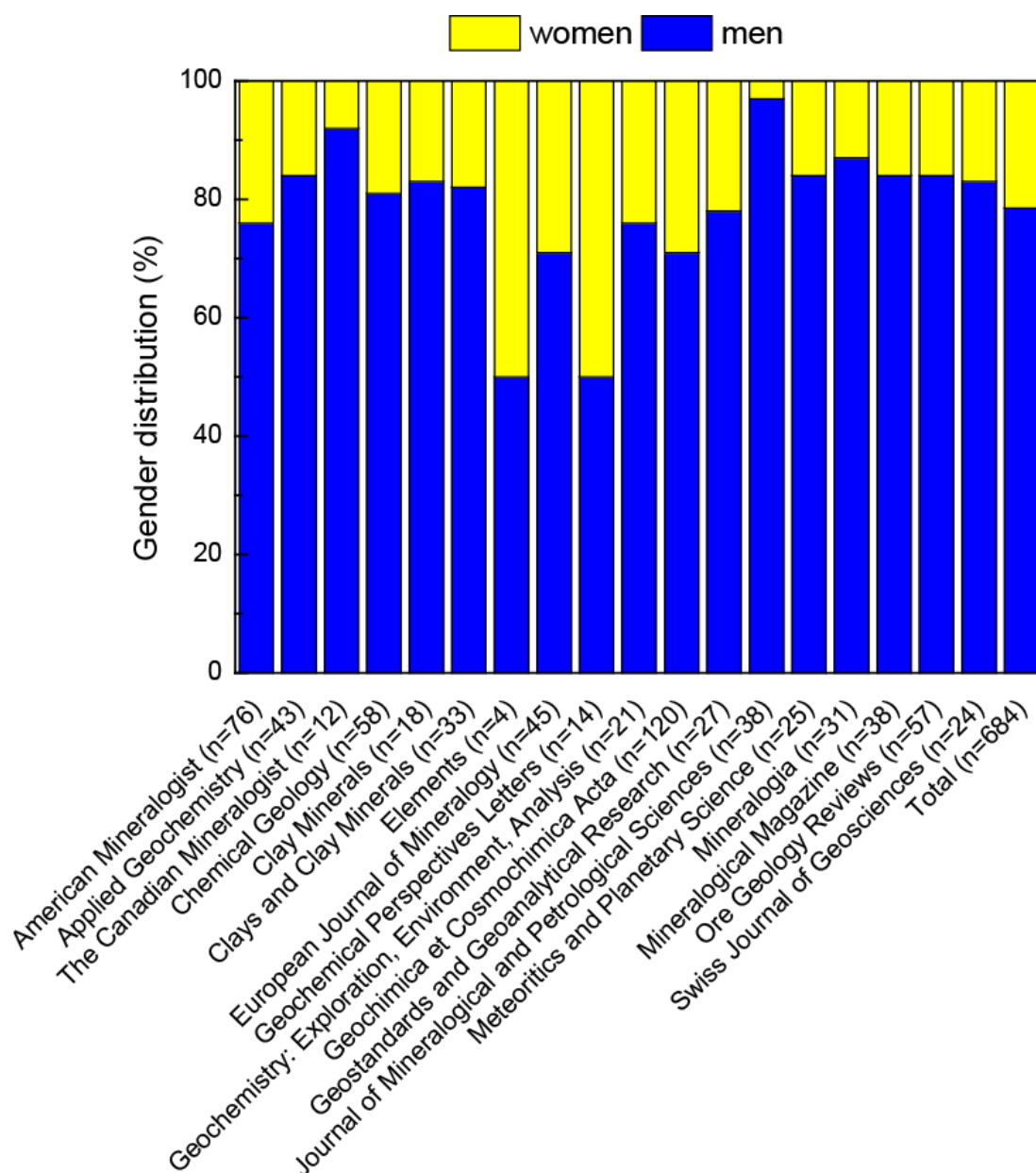


Figure 1 Gender breakdown of editorial board members from selected journals (data accessed on journal websites on 8 April 2021). Editorial board members were assigned a binary gender using first names and in some cases, based upon the authors' own perceptions and knowledge, n stands for the number of editorial board members. This approach has multiple limitations: (i) it may misgender people and (ii) gender is not binary, non-binary people were not included in this first-stage analysis due to lack of available information.

As with gender distribution, geographic distribution is also strongly biased (Fig. 2). Country is based on the affiliation of editors and implicitly may create a bias when an editor originates from a country and moves to another country. Journals like *Chemical Geology* (36% from Northern America, 41% from Western Europe, 2% from Sub-Saharan Africa, 2% from Northern Africa and Western Asia, 2% from Central and Southern Asia, 5% from Eastern and South-Eastern Asia and 12% from Oceania) and *Geochemistry: Exploration, Environment, Analysis* (14% from Northern America, 10% from Latin America and the Caribbean, 38% from Western Europe, 10% from Eastern Europe, 5% from Sub-Saharan Africa, 10% from Eastern and South-Eastern Asia and 14% from Oceania) are the more geographically diverse whereas *Elements* (75% from USA and 25% from Western Europe), *Journal of Mineralogical and Petrological Sciences* (79% from Japan) and *Swiss Journal of Geosciences* (79% from Switzerland) are more limited in geographic representation among editors. Such differences, in spite of ongoing efforts by participating societies to progress scientific excellence via improved diversity and inclusion, may be explained by unconscious bias arising from legacy influences and the current management of expectations for editorial roles. Most journals are published in English and editors are expected to be native or fluent in English, therefore, most editorial boards would consist of individuals who originate from countries where English is an official language (e.g., United Kingdom). Moreover, the regional scope of some journals like the *Swiss Journal of Geosciences* (readership from Switzerland) and *Journal of Mineralogical and Petrological Sciences* (readership from Japan) can also explain a distribution biased towards a specific region.

Overall, editorial board members are predominantly from Western Europe 39% , Northern America 29%, Eastern and South-Eastern Asia 16% and Oceania 5%. If we look at gender distribution among regional groupings, Latin America and the Caribbean editorial board members are 46% women and 54% men (but represent less than 2% of the total) whereas Northern America and Western Europe have a 23% to 77% and 26% to 74% distribution, respectively. Eastern and South-Eastern Asia distribution is far less balanced

(5% of women and 95% of men). The observed differences in gender distribution likely reflect regional or local progress towards gender equality (Hori 2020).

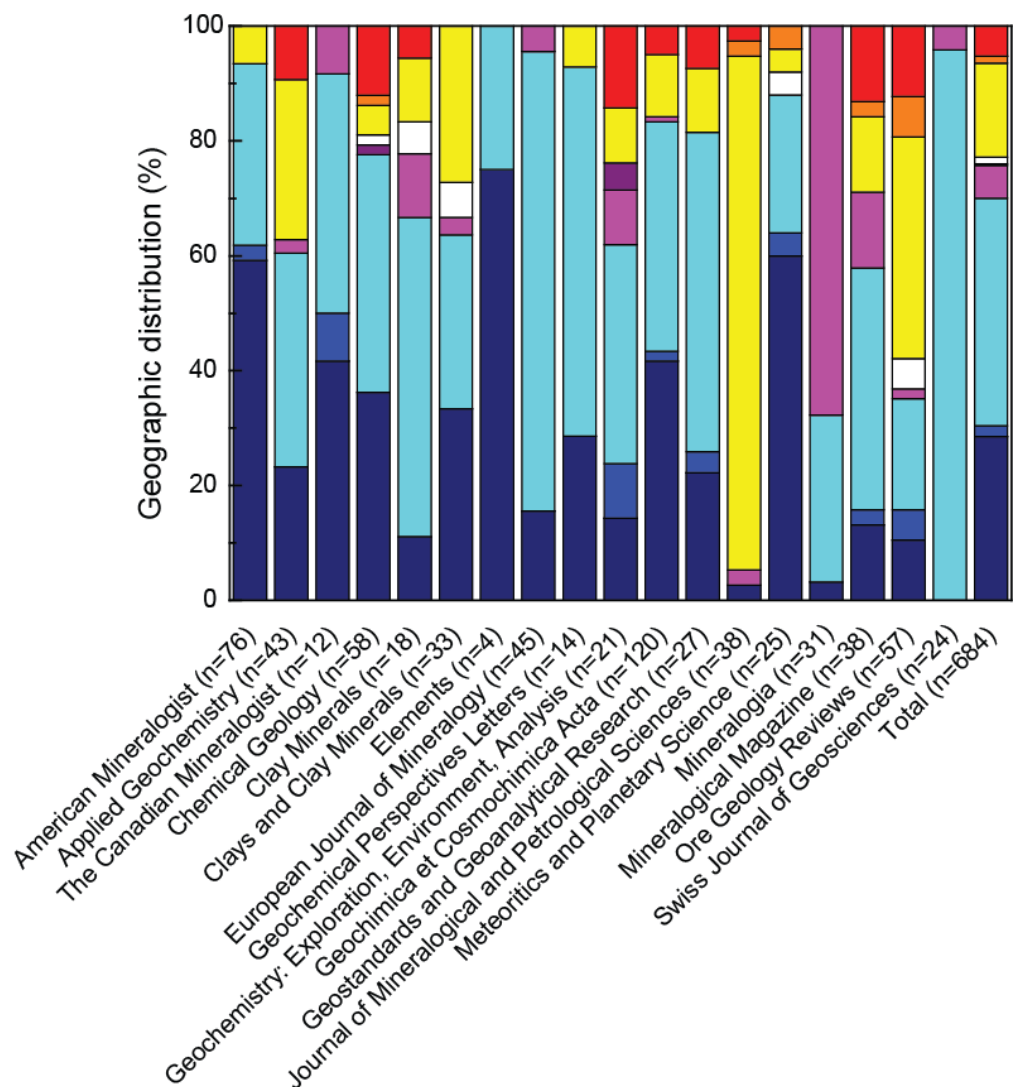
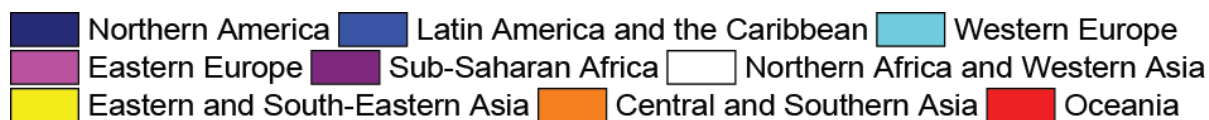


Figure 2 Geographic distribution of editorial board members by journal (regional grouping based on Sustainable Development Goals indicators; data accessed on journal websites on 8 April 2021). Editorial board members were assigned a region using the country of their affiliation, n stands for the number of editorial board members.

The results presented in this article show the same and persisting imbalance of diversity in the editorial boards compared to the research community as a whole as was

identified by Mukasa (2009) more than a decade ago. This inequitable representation is exacerbated because our community demographics do not demonstrate gender or racial parity (Bernard and Cooperdock, 2018; Pourret et al., 2021) and women are also under-represented as first authors relative to their representation in the field of geoscience (Pico et al., 2020). Scientific excellence may suffer as a consequence of this imbalance. The reality is that until there are more women and under-represented groups in the field (which is happening, albeit slowly), or there is an equity lens used for assigning workloads that reflects different service loads, early, mid-career and senior scientists from these under-represented groups are being asked to carry heavy loads in order to fill the diversity quotas for committees and editorial boards. It is not uncommon for invitations to serve on an editorial board to be rejected by white women and scientists of other under-represented groups because they are already too busy with other service activities that may provide more immediate professional benefit.

To improve scientific excellence and diversity, journals could implement the following:

- (i) Set up a diversity working group that can help identify potential qualified editorial board members and Editors-in-Chief, while also targeting an increase in diversity.
- (ii) Editors-in-Chief may invite identified people (see previous point) to join their editorial board when a position is available (no necessity of expansion, but expansion may accelerate the changes). They should emphasise their results and efforts toward diversity/equity/inclusion at the journal's society meetings to educate members about editorship diversity.
- (iii) Individual editorial board members may give personal encouragement, and act as mentors, to potential editors who are women or of diverse backgrounds.

(iv) Ask scientists from under-represented groups how they could be supported in order to participate in an editorial board, for example through workloads that are set using principles of equity.

(v) Journals are suggested to present an infographic of diversity of the editorial board and/or the geographical scope of the published articles. This may attract the attention from diverse researchers, as well as raising the awareness of diversity/equity/inclusion in the scientific publishing space.

One-time actions to tackle diversity are not enough. Journals must monitor the impact of new diversity efforts to ensure real change is happening on their boards.

Recent shifts towards more equal gender and geographic representation for *Elements*, *Geochemical Perspectives Letters* or *Geochimica et Cosmochimica Acta* are very encouraging, but this is not the case for all participating societies journals. Achieving representative diversity on editorial boards needs sustained effort. Further, we recommend that the editorial boards of the journals published by participating societies linked to *Elements* consider prioritizing and establishing a mentoring approach to address negative and unconstructive critique for articles. Additionally, minimizing barriers to publishing is particularly important now, given the unequal impacts of the COVID-19 pandemic on submissions by men and women and geographical location.

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