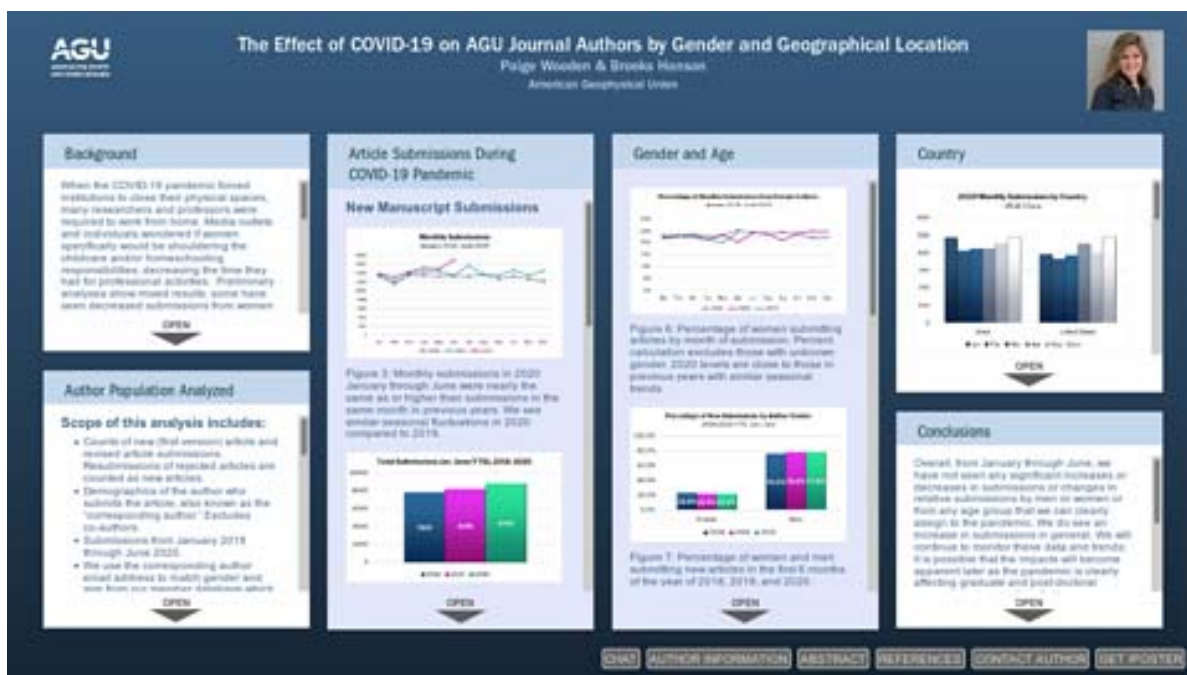


The Effect of COVID-19 on AGU Journal Authors by Gender and Geographical Location



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American Geophysical Union



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For a Borderless World of Geoscience

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BACKGROUND

When the COVID-19 pandemic forced institutions to close their physical spaces, many researchers and professors were required to work from home. Media outlets and individuals wondered if women specifically would be shouldering the childcare and/or homeschooling responsibilities, decreasing the time they had for professional activities. Preliminary analyses show mixed results: some have seen decreased submissions from women (Vincent-Lamarre et al., 2020 (<https://www.natureindex.com/news-blog/decline-women-scientist-research-publishing-production-coronavirus-pandemic>); Del Boca et al., 2020 (<https://voxeu.org/article/women-s-work-housework-and-childcare-and-during-covid-19>)), with at least one other showing an increase in submissions from women (Dolan & Lawless, 2020 (<https://ajps.org/2020/04/20/it-takes-a-submission-gendered-patterns-in-the-pages-of-ajps/>)); and another suggests the rate of male-authored submissions to preprint archives are growing faster than those from women (Frederickson, 2020 (<https://github.com/drfreder/pandemic-pub-bias>)). AGU has been monitoring our monthly submission data to understand how the pandemic and stay-at-home orders are affecting our submissions from specific demographics—based on author gender, age, and country.

Our analysis finds that the pandemic so far has not resulted in a decrease in submissions to AGU journals; nor has there so far been a decrease in the participation of women as submitting authors. Instead, we have seen an increase in submissions from most author groups compared to year-to-date numbers in previous years.

We had provided an initial update based on data through April of 2020 (Wooden, 2020 (<https://doi.org/10.1029/2020EO144630>)). Here we provide a more complete data set analyzing submissions and revisions through June 2020. During this period, nearly all countries have been affected by high number of cases and shut down or stay at home orders for several months. Most education systems worldwide were affected, and field work has been curtailed.

AUTHOR POPULATION ANALYZED

Scope of this analysis includes:

- Counts of new (first version) article and revised article submissions. Resubmissions of rejected articles are counted as new articles.
- Demographics of the author who submits the article, also known as the “corresponding author.” Excludes co-authors.
- Submissions from January 2018 through June 2020.
- We use the corresponding author email address to match gender and age from our member database which has ~165,000 records with gender and ~160,000 records with age.
- We used Gender-API.com to guess the authors with unknown gender. From the Gender API results, we included ~3300 additional distinct authors’ gender in our analysis.

Author Population Demographics

Gender

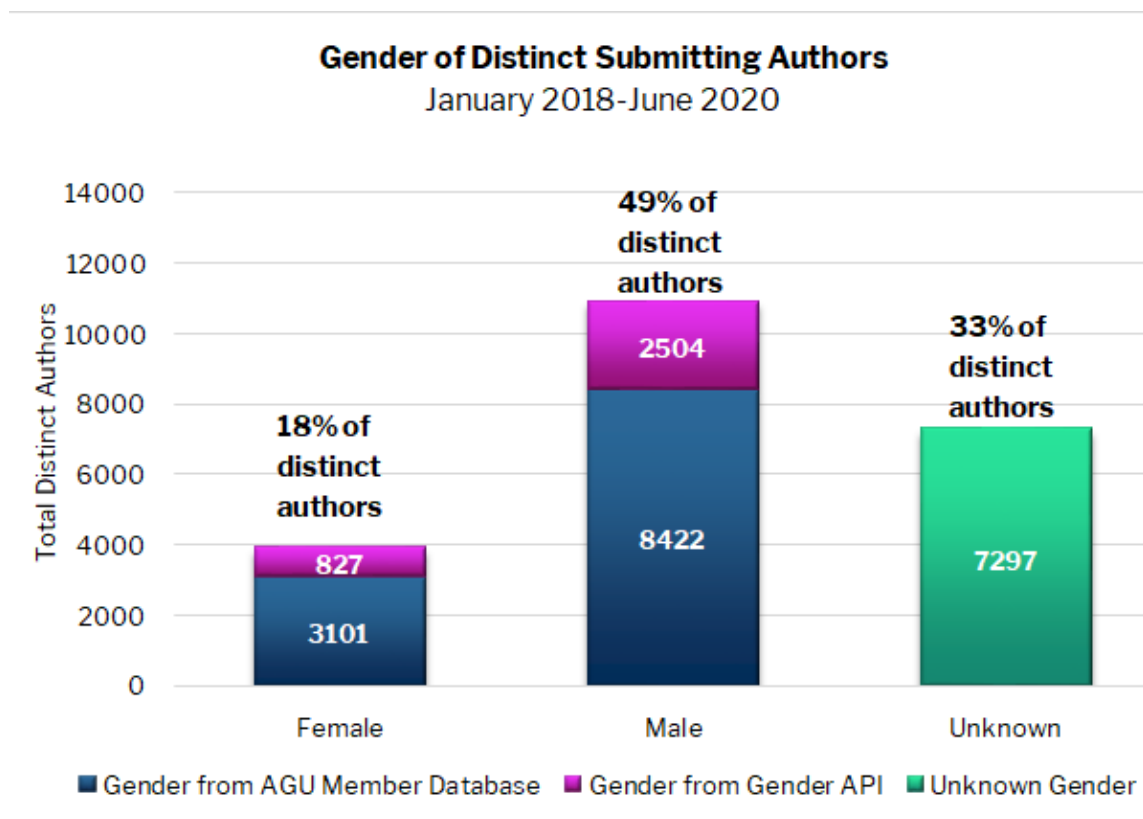


Figure 1a: Distinct author population who submitted articles includes ~22,000 individuals: 18% women, 49% men, and 33% unknown gender.

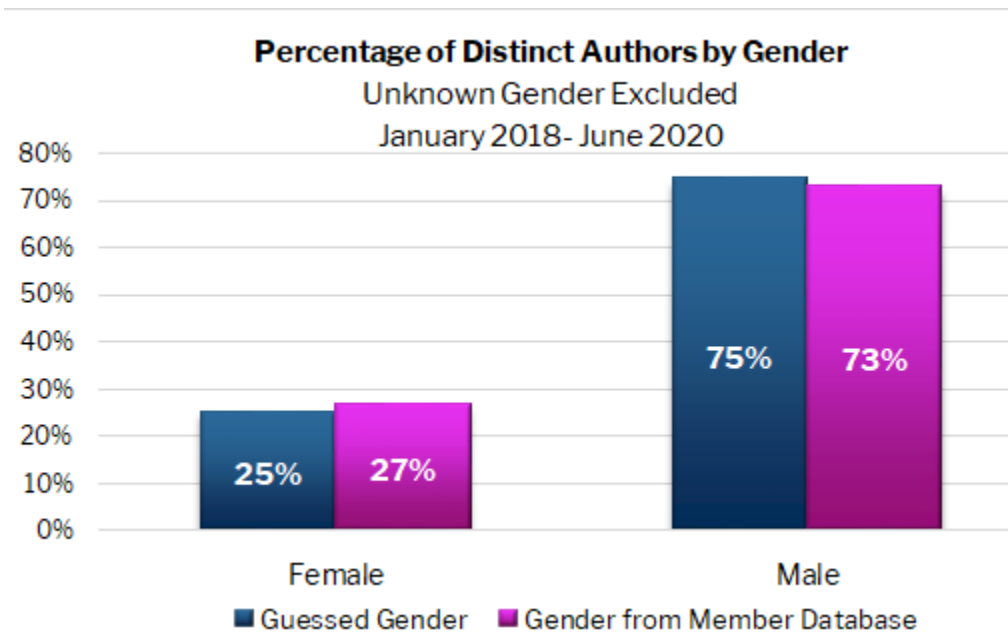


Figure 1b: Percentage of distinct male and female submitting authors (January 2018- June 2020) showing that the known and guessed gender individuals are proportionally similar.

Geographical Location

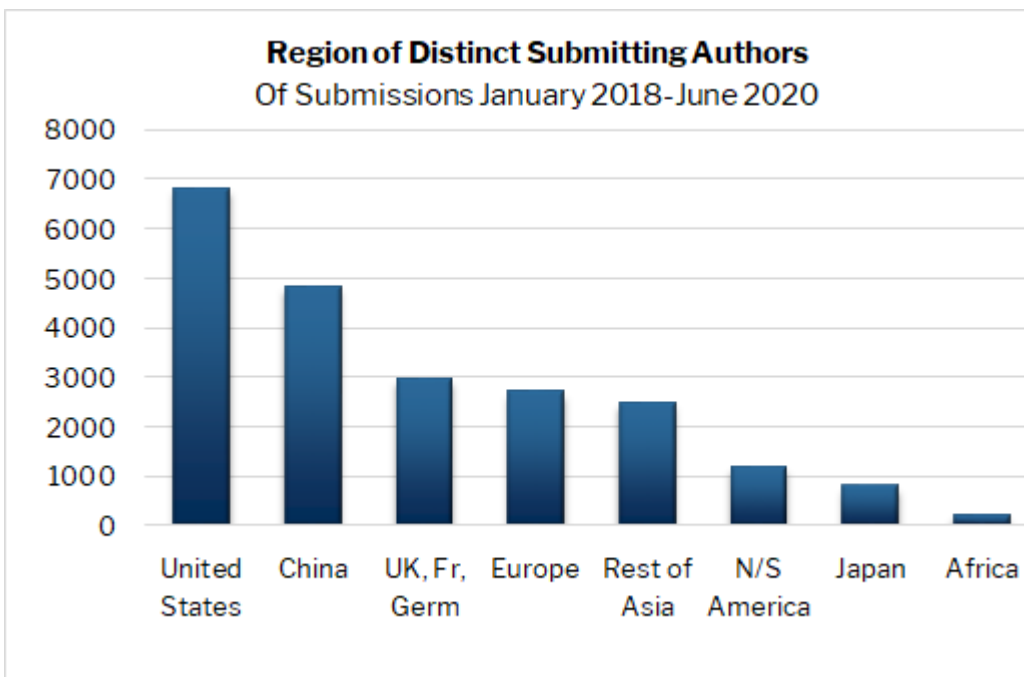


Figure 2: Country/region of distinct authors in this analysis.

ARTICLE SUBMISSIONS DURING COVID-19 PANDEMIC

New Manuscript Submissions

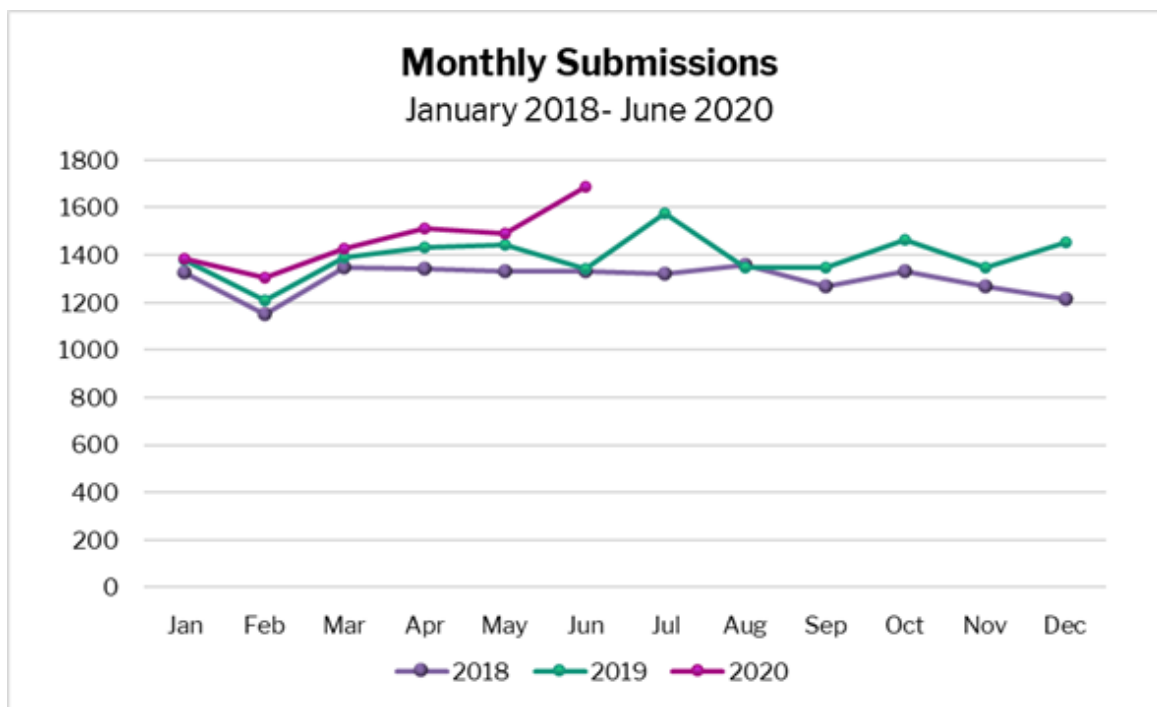


Figure 3: Monthly submissions in 2020 January through June were nearly the same as or higher than submissions in the same month in previous years. We see similar seasonal fluctuations in 2020 compared to 2019.

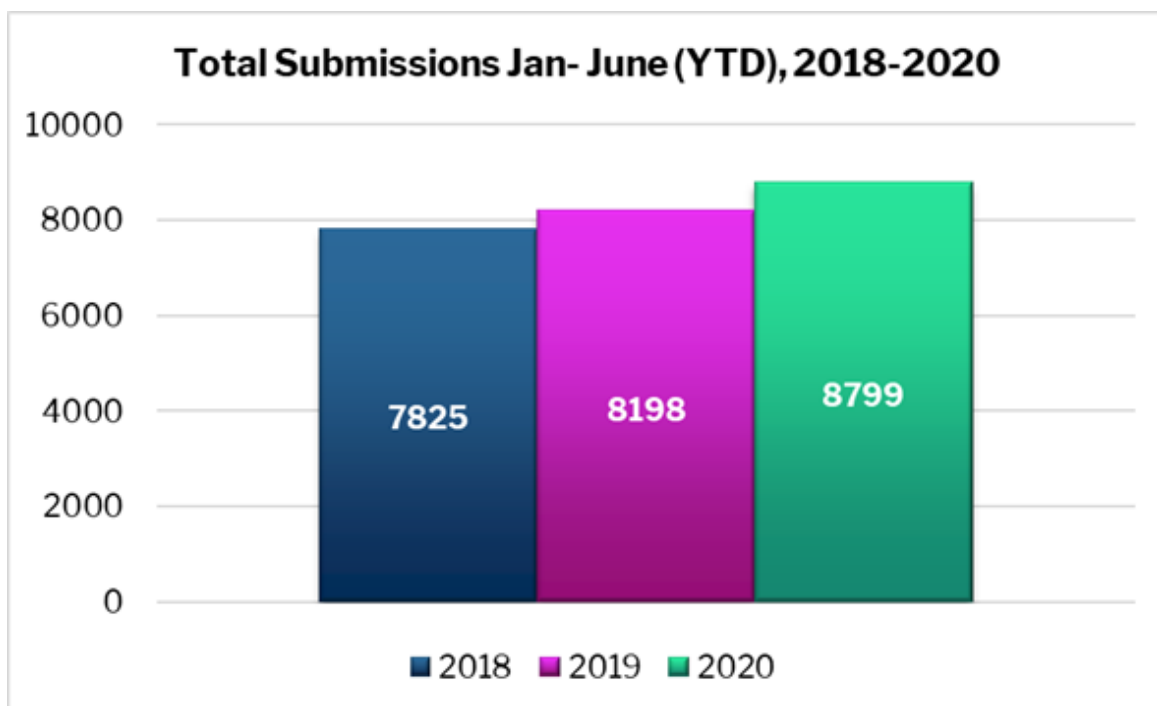


Figure 4: Year-to-date submissions of 2020 and the previous two years.

Overall, the COVID-19 pandemic has not led to a decrease in the number of submitted articles for review, and June 2020 had the highest monthly submissions in many years, which has contributed to an increase in total submissions this year to date. This may indicate that overall, people have more

time to write and submit articles or that AGU journals continue to be relatively attractive. The increase in submissions in June may also reflect the end of many university terms.

Revised Manuscript Submissions

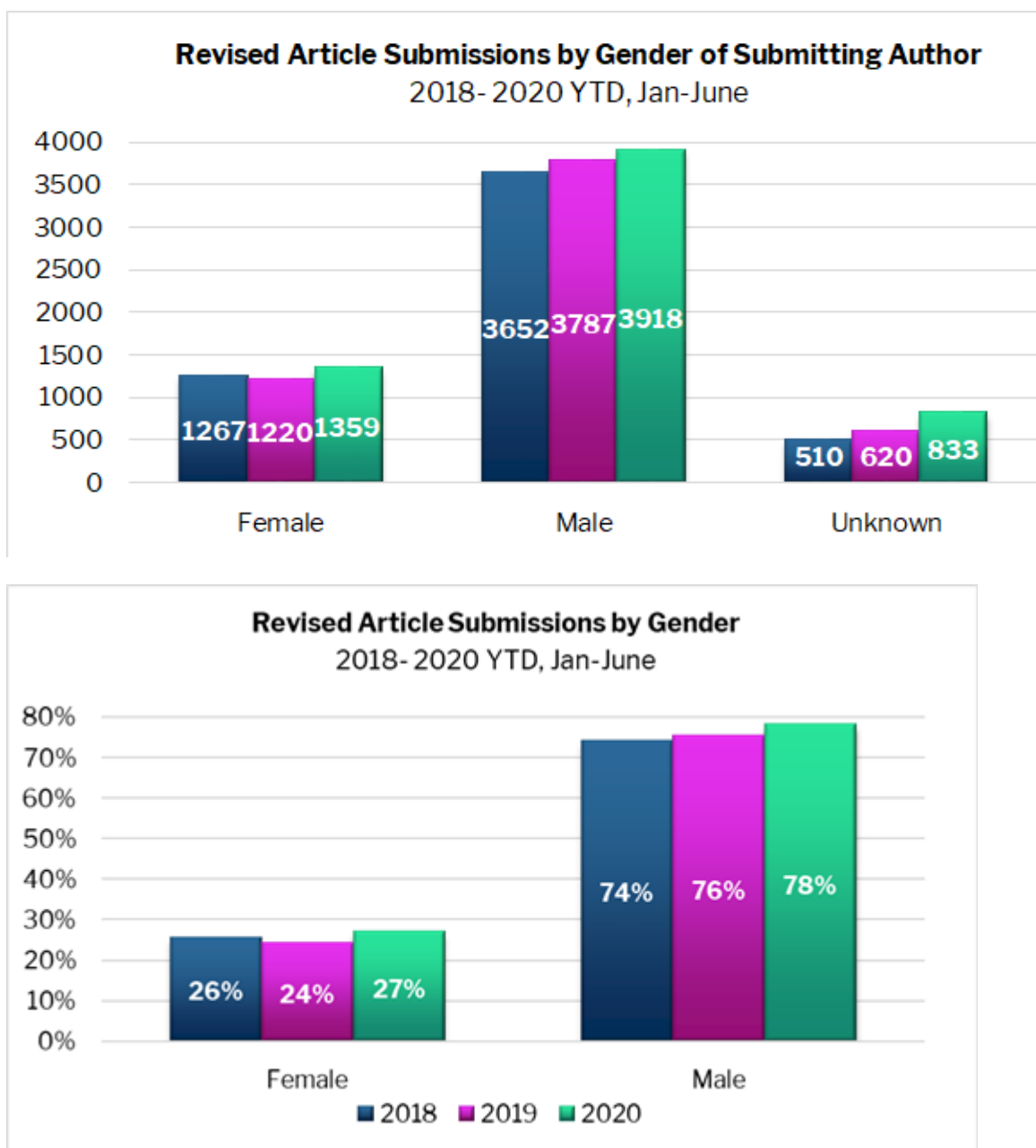


Figure 5a: Year-to-date counts of revised article submissions by gender including unknowns.

Figure 5b: Percentage of men and women submitting revisions year-to-date 2020 compared to 2 previous years with unknowns excluded. The higher revision rates by women reflect their higher acceptance rates.

The increase in revised article submissions this year among all genders suggests the stay-at-home orders did not prevent many authors from submitting revisions. However, the inability to accomplish more complex tasks such as field and laboratory work and data analysis may manifest itself in the coming months and years.

GENDER AND AGE

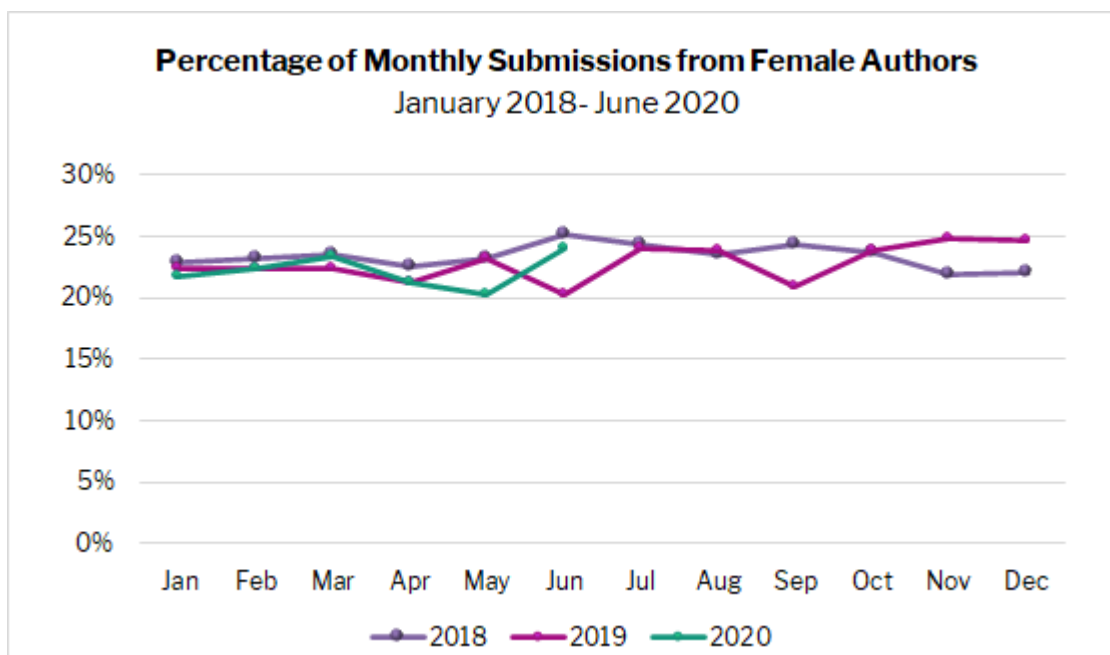


Figure 6: Percentage of women submitting articles by month of submission. Percent calculation excludes those with unknown gender. 2020 levels are close to those in previous years with similar seasonal trends.

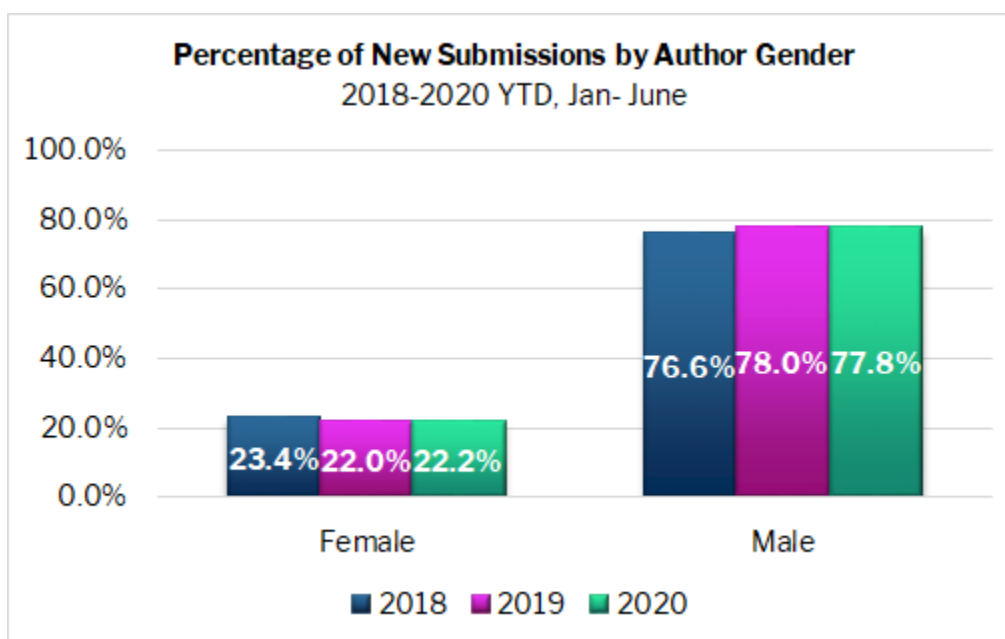


Figure 7: Percentage of women and men submitting new articles in the first 6 months of the year of 2018, 2019, and 2020.

We see no strong differences in submission rates of men or women in this period.

Age Groups

Figures 8 and 9 show the percentages of submitting authors by age group at the time of submission. The percentages are based on total non-unique submitting authors with known age and gender (~50%

of submitting authors) during the month indicated.

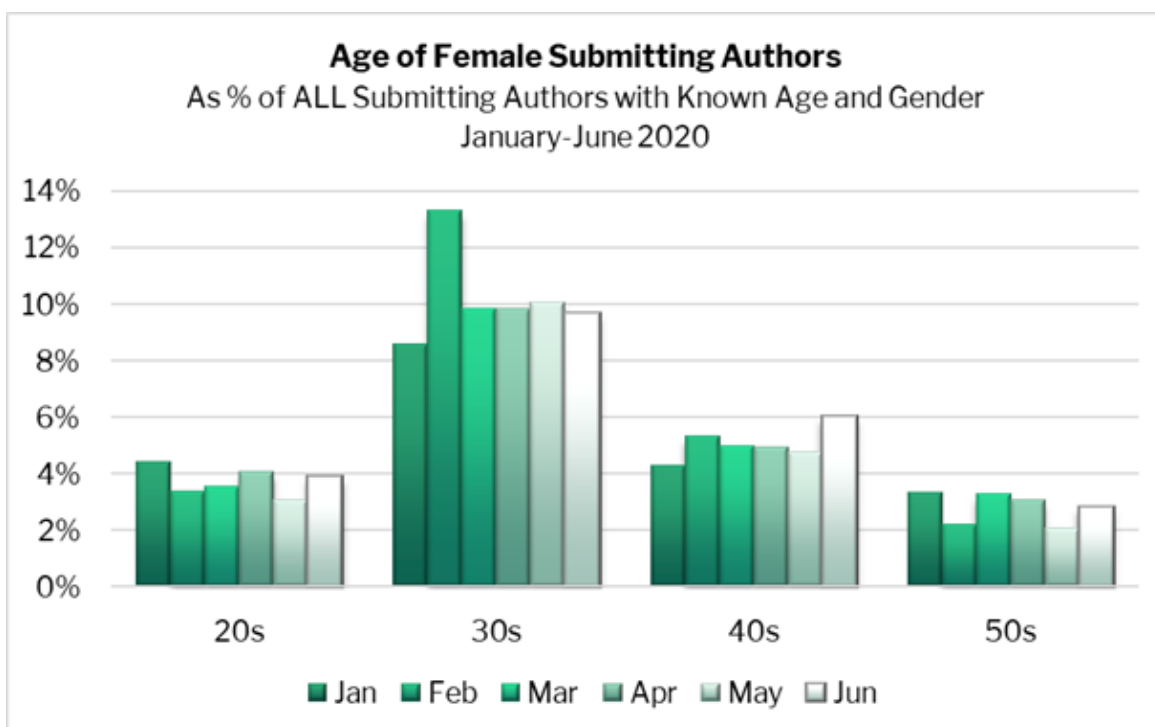


Figure 8: Age of non-distinct female submitting authors shown as a percentage of all non-distinct submitting authors with known age and gender during indicated month. Age groups 60s and 70s not shown (<1%). We see a relative increase in women in their 30s submitting in February but otherwise no notable events.

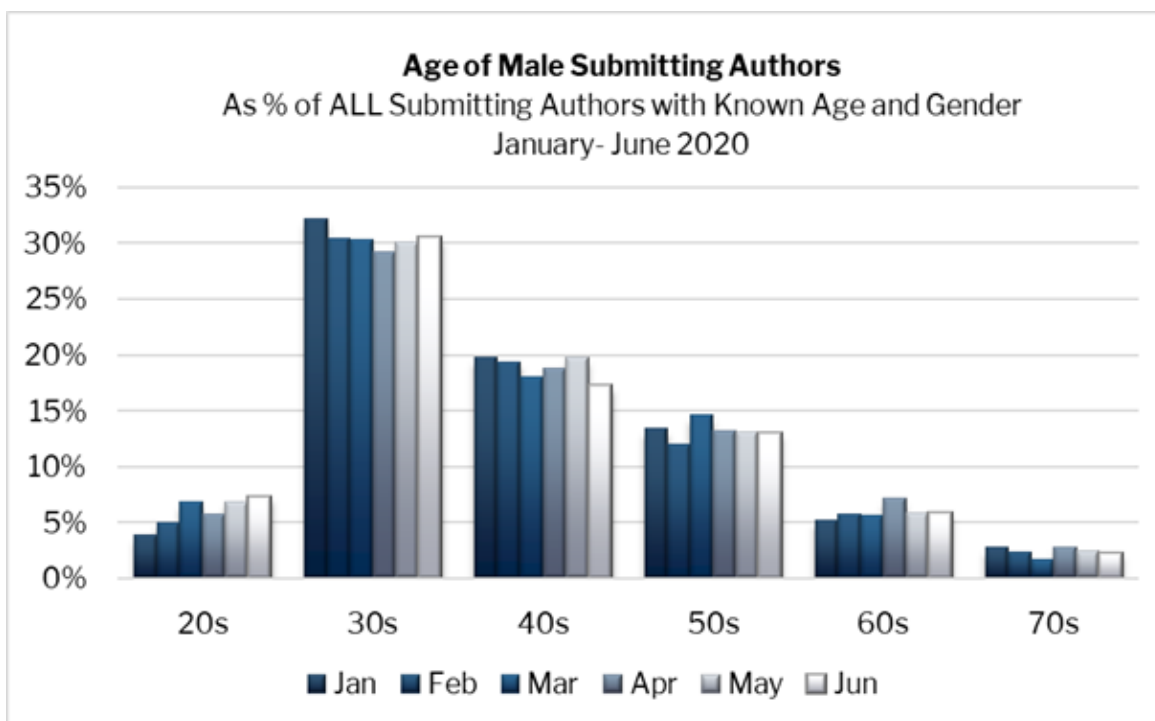
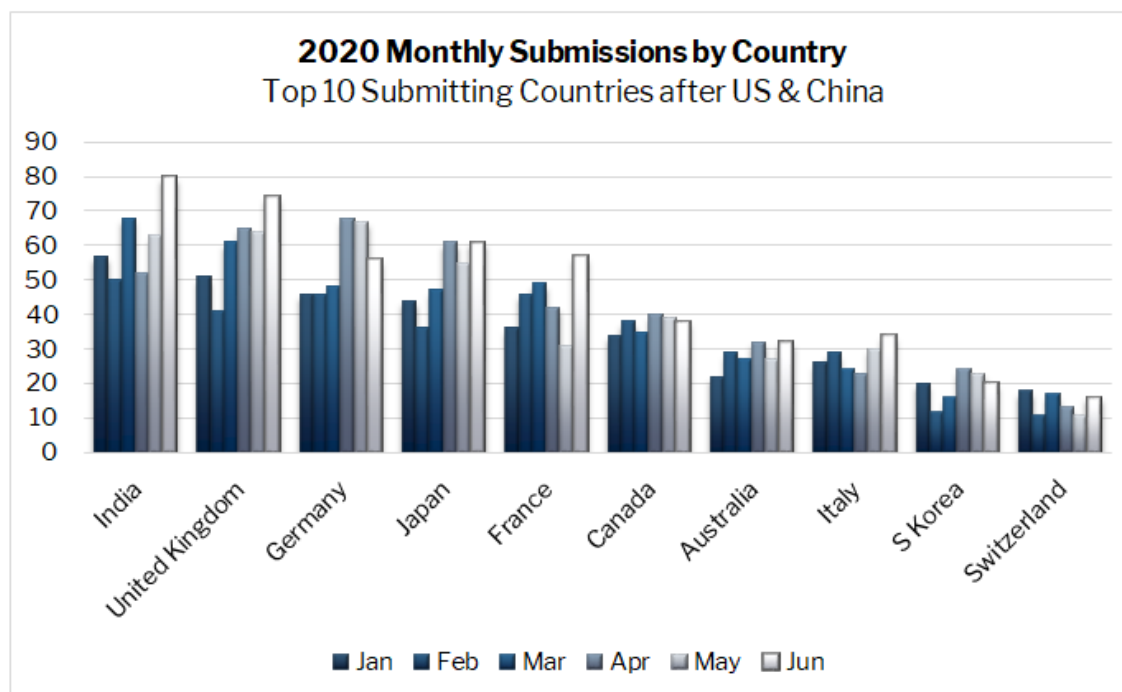
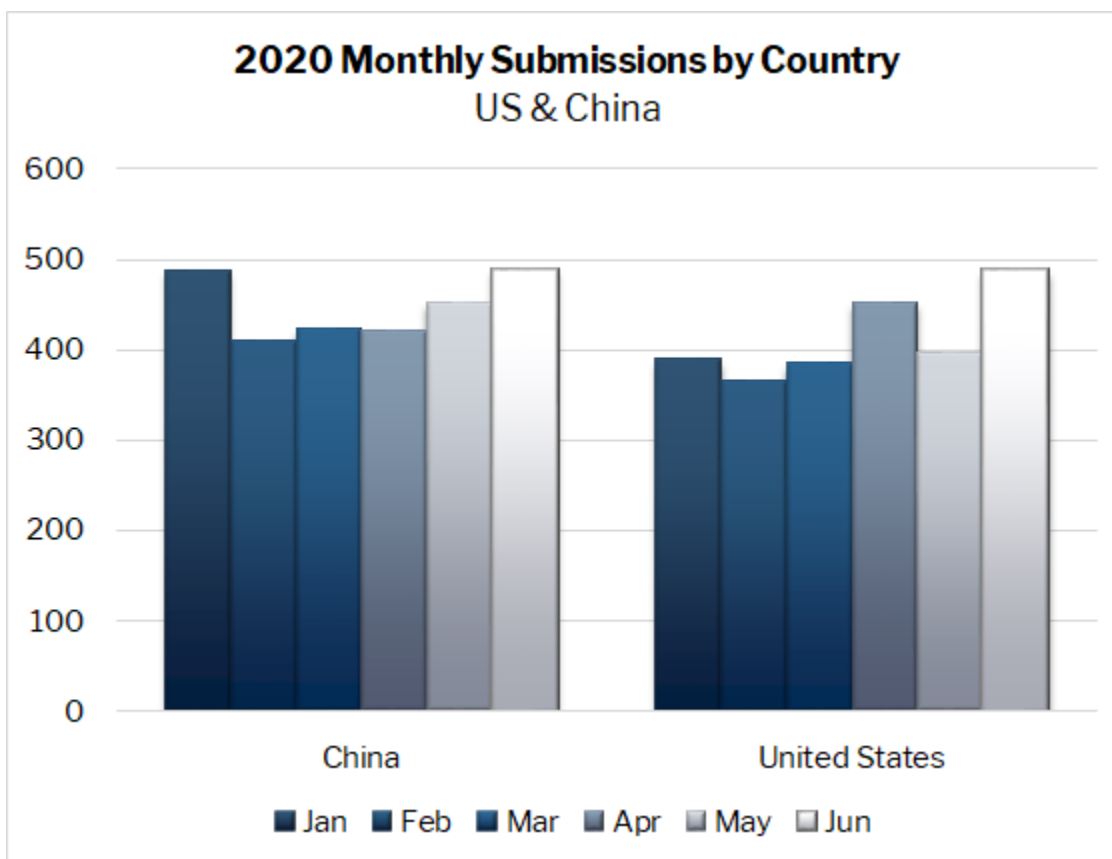


Figure 9: Age of non-distinct male submitting authors shown as a percentage of all non-distinct submitting authors with known age and gender during indicated month. Age group 80s not shown (<1%).

Since we're looking at percentages, the increase in women in their 30s submitting in February

necessitates decreases in submissions from other age and gender groups. We do see small decreases in submissions from men in their 30s and 50s and women in their 20s and 30s in February; however, within each age cohort, differences between adjacent months are small.

COUNTRY



Figures 10a & 10b: Submissions by country of submitting author with those from the China and US separated for scale.

We did see a drop in submissions from most countries from January to February but as seen in overall submissions (Fig. 1), February submissions were lower than surrounding months in previous years as

well. After March, we have seen a steady monthly increase in submissions from most countries. For June specifically, we saw an increase in submissions from the US, India, the UK, and France.

Year-to-Date Cumulative Comparison

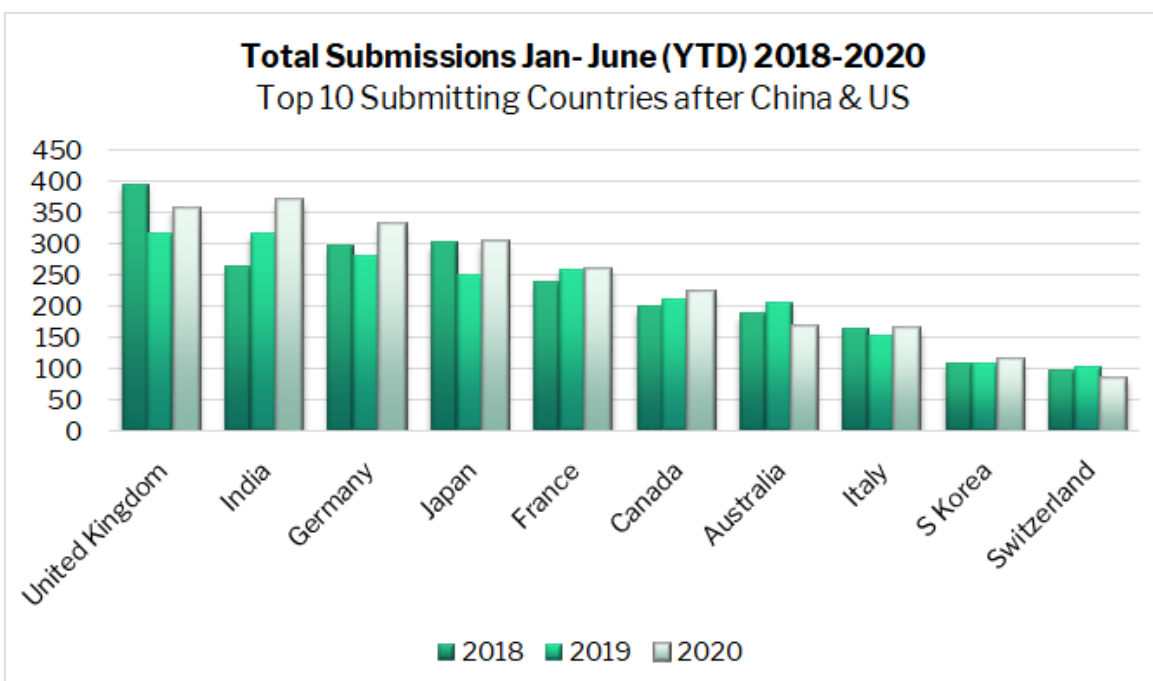
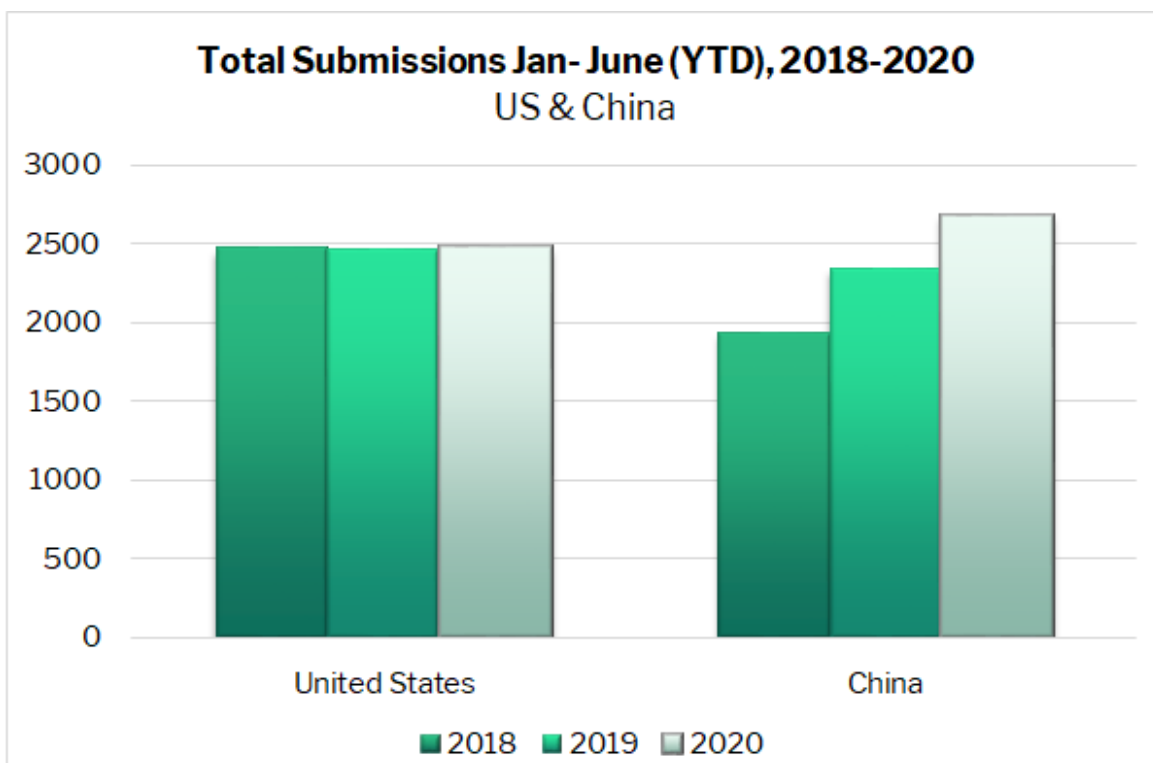


Figure 11a & 11b: Compares the submissions of the first 6 months of 2020 to the first 6 months of the previous 2 years showing the country of submitting author (only top 12 countries shown) with those from the China and US separated for scale.

We have seen no increase in the submissions from the US compared to previous years, but significant monotonic increases in papers from China and India. Authors from the UK, Germany, Japan, Canada, and Italy have also submitted more papers in 2020 compared to 2019.

CONCLUSIONS

Overall, from January through June, we have not seen any significant increases or decreases in submissions or changes in relative submissions by men or women or from any age group that we can clearly assign to the pandemic. We do see an increase in submissions in general. We will continue to monitor these data and trends; it is possible that the impacts will become apparent later as the pandemic is clearly affecting graduate and post-doctoral research and education, field campaigns and more (Gonzales & Keane, 2020). And although the data doesn't show a decrease in submissions from specific demographics, we should still be sensitive to the individual needs of our authors as they deal with additional stresses imposed by the pandemic.

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DISCLOSURES

AUTHOR INFORMATION

Paige Wooden (<https://orcid.org/0000-0001-5104-8440> (<https://orcid.org/0000-0001-5104-8440>)) serves as Senior Program Manager, Publication Statistics for at American Geophysical Union (AGU). She works on data projects on editorial operations, post-publication metrics, and member data to inform department and enterprise strategy. She has held various positions in the Publications department at AGU in the past 10 years of her tenure. She holds a Master of English Literature from University of Maryland, College Park, and a BA in English from University of California, Berkeley.

Brooks Hanson (<https://orcid.org/0000-0001-6230-7145> (<https://orcid.org/0000-0001-6230-7145>)) serves as the Executive Vice President for Science for the American Geophysical Union (AGU). He's responsible for overseeing AGU's publications, meetings, and ethics programs and Thriving Earth Exchange and coordinating science activities across these. He served previously as Sr. Vice President for Publications at AGU, responsible for AGU's portfolio of many books and 20 journals and their editorial operations, helping set overall editorial policies, and leading future developments. Before arriving at AGU, he served as the Deputy Editor for Physical Sciences at Science and earlier as an editor at Science. Brooks has a Ph.D. in Geology from UCLA and held a post-doctoral appointment at the Department of Mineral Sciences, Smithsonian Institution. His main areas of research and publications span the tectonics of the western U.S., metamorphic petrology, modeling magmatic and hydrothermal processes, and on scholarly publishing. He is a fellow of the Geological Society of American and Mineralogical Society of America.

ABSTRACT

AGU's commitment to building and supporting a diverse group of Earth and space scientists impels us to monitor the data we have on our constituents. When the COVID-19 pandemic forced institutions to close their physical spaces, many researchers and professors were forced to work from home. Media outlets and individuals wondered if women specifically would be shouldering the childcare and/or homeschooling responsibilities decreasing the time they had to for professional and research duties. AGU has been monitoring the effect that the stay-at-home orders have had on our journal authors by analyzing our monthly submission data. We focused specifically on gender, age, and geographical region of individuals submitting manuscripts ("corresponding author"). We found that there have been no statistically significant monthly fluctuations in the number of women across all age groups submitting articles in 2020 and compared to their monthly submissions of 2018 and 2019. We did see some decrease in submissions in February from certain countries but as of June 2020, most countries have returned to their normal submission rates and even increased compared to year-to-date in previous years. The relative stability of new submissions from various groups may indicate a few things: 1) that stay-at-home orders may afford some more time to submit an article while others less, 2) article submission itself is a relatively simple and straightforward task if the research, analysis, and writing is complete, and 3) we may see decreased submissions later in the year or next year if there is a sustained lack of access to research subjects/materials and analytical tools.

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