MITIGATING THE CLIMATE IMPACT OF THE ASOR ANNUAL MEETING

Final Report of the *Ad Hoc* Committee on Climate Impact

Ad Hoc Climate Impact Committee: Virginia R. Herrmann (Co-Chair), Andy Vaughn (Co-Chair), Stephanie Budin, Antonietta Catanzariti, Helen Dixon, Ömür Harmanşah, Craig Harvey, Morag Kersel, Alex MacAllister, Lucas Proctor

November 13, 2022

Recommended citation: Herrmann, V.R., Vaughn, A.G., Budin, S., Catanzariti, A., Dixon, H., Harmanşah, Ö., Harvey, C., Kersel, M., MacAllister, A., Proctor, L. 2022. Mitigating the Climate Impact of the ASOR Annual Meeting. Final Report of the ASOR *Ad Hoc* Climate Impact Committee. American Society of Overseas Research.

Table of Contents

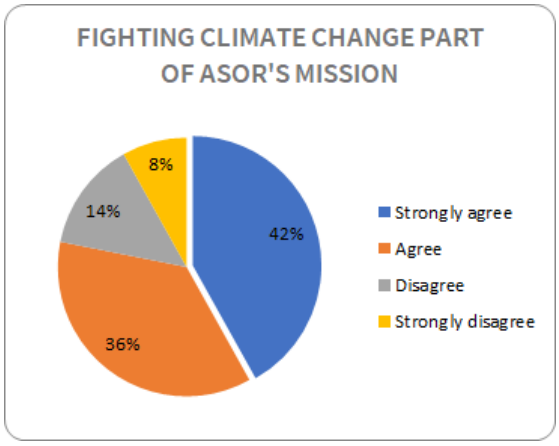
EXECUTIVE SUMMARY

Introduction

In the face of a climate emergency that threatens not only contemporary life but also the record of our shared past, how will ASOR respond? The ad hoc Climate Impact Committee encourages the ASOR Board to adopt concrete actions toward the goal of making the Annual Meeting carbon neutral. ASOR's leadership in academic decarbonization would not only advance the public good, but would be a motivating factor in attracting and retaining the new generation of ASOR members. Reducing the carbon footprint of the Annual Meeting is the most visible and immediate action ASOR can take to reduce its climate impact.

Key Findings

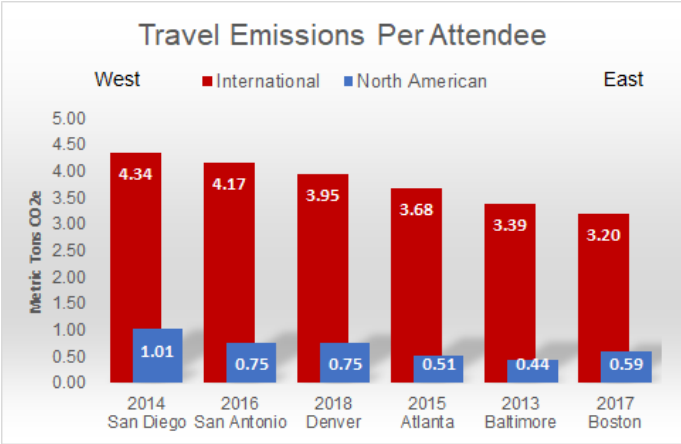
Why We Must Act



Left: An Iraqi man walks past a canoe sitting on dry, cracked earth in the Chibayish marshes near Nasiriyah, Iraq (AFP). Right: A large majority of ASOR members surveyed strongly agreed or agreed that fighting climate change is part of ASOR's mission.

- The accelerating climate crisis has a **disproportionately harmful** effect on the people and cultural heritage of the MENA region.
- Combating climate change is **part of ASOR's mission** to "protect, preserve, and present to the public the historical and cultural heritage of the Near East and Mediterranean and to raise awareness of its degradation," as 78% of ASOR members surveyed agreed.
- Given the historical connection of Near Eastern archaeology with **colonialism** and **fossil- fuel extraction** and the ongoing imbalance between the climate change impact of North America and MENA, archaeologists who live in North America carry particular responsibility for decarbonizing our practices.

Carbon Emissions of the ASOR Annual Meeting



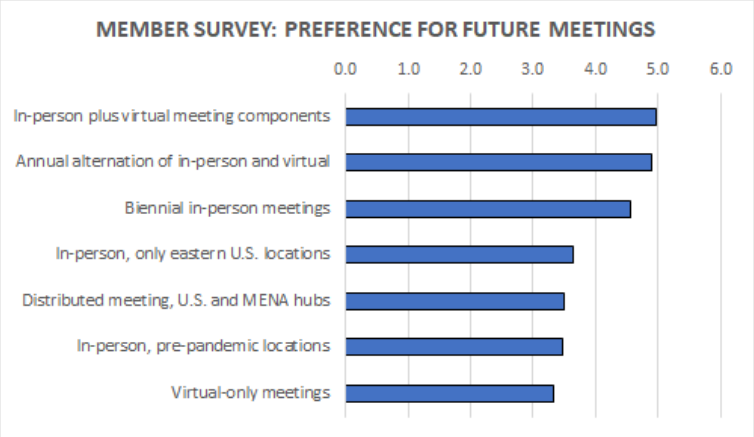
Estimated total CO_2 emissions from travel to and from the ASOR AM from 2013 to 2018, in metric tons. Host cities are ordered geographically from west to east.

- Carbon emissions of the average traditional ASOR AM total ca. **1266 metric tons CO_2**.
- Average per capita emissions for AM attendance, at **1.38 metric tons CO_2**, are incompatible with the annual personal carbon budget of 2.0-2.5 tons CO_2 needed to prevent global warming of more than 1.5° C by 2030; and inequitable, being equivalent to more than a third (ca. 38%) of annual per capita carbon emissions in ASOR's core study countries.
- Travel produces ca. **97%** of the AM's carbon footprint, with overseas flights contributing **61%** of the travel emissions. Mitigation strategies should therefore focus on reducing the necessity for and/or distance of travel to the meeting site.
- Travel emissions are up to **46% lower** per capita when the AM is sited in the **Mid-Atlantic region**, the center of the ASOR AM's geographic network.
- Long-distance and international travel also present the greatest barriers to meeting attendance by lower-income, disabled, caregiver, and international scholars. Strategies for the AM that allow participation without long-haul travel would mitigate its climate impact while making it more **accessible and inclusive**.

Member Views on Future AM Formats

The *ad hoc* Committee polled ASOR members on a number of issues related to the AM and climate impact.

- The top-ranked preferences for the future AM format among those surveyed are: 1) hybrid or dual-component meetings; 2) annual alternation of in-person and virtual meetings; and 3) biennial in-person meetings. Virtual-only meetings and returning to the pre-pandemic status quo ranked lowest. **A majority supports continuation of a virtual option for meeting participation**, while a format that allows both in-person and virtual attendance will satisfy the most people.



Potential formats for future ASOR Annual Meetings, ranked from most to least desirable in a 2022 survey of ASOR membership (higher score indicates higher average ranking).

Evaluation of Potential Mitigation Strategies

- A number of **lower-carbon possibilities for academic exchange** beyond the traditional in-person conference are available, including virtual meetings, hybrid or dual-component meetings, distributed meeting locations, geographically-optimized meeting locations, and biennial meetings.
- Absolute ***reduction*** of meeting-related emissions should be prioritized, as **carbon offsets** do not reduce overall atmospheric CO_2 concentrations and are often unreliable. Carbon offset programs must be carefully vetted, and high-quality offsets currently cost $15–45 per metric ton CO_2.
- To evaluate the effectiveness and feasibility of several potential meeting formats, **we modeled emissions from a hypothetical ASOR AM of 1000 people in each format**, calculated the resulting reduction in carbon emissions from the baseline of the traditional in-person meeting format (business-as-usual, or BAU), and estimated potential effects on participation, engagement, inclusivity, costs, and revenues, as well as the cost to offset remaining emissions. The results of this analysis are summarized in the chart below:

Description	Meeting City	Avg. Annual Emissions (t CO_2)	Change from BAU	Engage-ment	Inclus-ivity	Member Survey Ranking	Costs	Reve-nue	Carbon Offset ($30/t CO_2)
A. Virtual-only, every year	N/A	19	-99%	↑↓↓	↑↑↑	7	↓↓↓	↓↓	$570
G. Alternating years, in-person/no meeting	Chicago	659	-50%	↓	—	3	↓↓	↓↓	$19,758
B. Alternating years, in-person/virtual	Chicago	668	-49%	↑↓	↑↑	2	↓	↓	$20,043
D2. Hybrid (in-person, with live-streamed contributions from remote participants): *40% virtual-only participation*	Chicago	726	-45%	↑	↑↑	1	↑↑↑	↑	$21,773
C2. Dual-component (in-person and virtual components held at separate times): *25% virtual only participation*	Chicago	904	-31%	↑↓	↑	1	↑	↑	$27,105
D1. Hybrid (in-person, with live-streamed contributions from remote participants): *20% virtual-only participation*	Chicago	959	-27%	↑↑	↑↑	1	↑↑↑	↑	$28,777
F2. Distributed (US + MENA hubs): *Separate meetings, US in fall, MENA in summer*	Chicago+ Amman	985	-25%	↑↓	↑↑	5	↑↑	↑	$29,557
F1. Distributed (US + MENA hubs): *Held simultaneously & partly live-streamed*	Chicago+ Amman	1042	-21%	↑	↑↑	5	↑↑	↑	$31,254
C1. Dual-component (in-person and virtual components held at separate times): *10% virtual-only participation*	Chicago	1080	-18%	↑↓↓	↑	1	↑	↑	$32,347
E. In-person, held only in geographically central locations	Baltimore	1112	-16%	—	↑↓	4	—	↑	$33,345
BAU. In-person only (pre-pandemic status quo)	Chicago	1317	0%	—	—	6	—	—	$39,515

Recommendations

The committee makes the following recommendations to the Board regarding strategies for making the ASOR Annual Meeting carbon neutral:

1. **Meeting Format**: The following four meeting formats should be considered for adoption:
   - **Hybrid meeting** (in-person, with live-streamed remote participation)
   - **Annual alternation of in-person and virtual meetings**
   - **Dual-component meeting** (in-person and virtual components held separately)
   - **Distributed meeting with U.S. and MENA hubs** (simultaneous and partly live-streamed).
2. **Meeting Location**: Limiting in-person meetings to the eastern U.S., in particular the Mid-Atlantic region (e.g., Washington, Philadelphia, Baltimore, Cleveland, Newark, and New York City), should be strongly considered, as this offers significant further reduction to travel emissions compared to cities such as San Diego, Denver, and San Antonio.
3. **Meeting Operation:** ASOR staff should continue the practice begun this year of discussing sustainability requests with hotel management. Catered meals should prioritize plant-based and locally-sourced foods, and hotels should be well connected with public transportation. ASOR should also continue to reduce or even eliminate the distribution of paper programs and tote bags.
4. **Promoting and Incentivizing Sustainable Choices:** ASOR should encourage AM attendees to make more sustainable choices for travel and practices at the meeting through promotional work and incentives. ASOR should also prominently promote the environmental advantages of remote meeting attendance.

5. **Carbon Offsets:** The production of carbon emissions by the AM should be reduced as far as possible before resorting to carbon offsets. ASOR should partner with an established program that can help it calculate and identify high-quality offsets for the AM's estimated remaining emissions and commit operating funds for their purchase. The feasibility of establishing a micro-grants program to sponsor the integration of sustainability and climate mitigation efforts with cultural heritage projects in the MENA region should be explored further.
6. **Climate Impact Subcommittees:** Subcommittees focused on the decarbonization of various areas of ASOR's activities should be formed within various standing committees, especially the Program Committee, CAP or Cultural Heritage, and Publications.
7. **Public and Transparent Sustainability Policies:** ASOR should publicize the actions it is taking clearly and prominently on the website and make this report, future reports monitoring meeting emissions, and further best-practice resources easily accessible.

Conclusion

Given its history and mission, as well as MENA's particular vulnerability to the harms of climate change, ASOR can and should lead similar learned societies in strong advocacy for disciplinary decarbonization. We are in a moment of transformative opportunity for rethinking the status quo and making academic gatherings simultaneously more sustainable, more accessible, and more inclusive. Taking serious steps to reduce the carbon emissions of the ASOR Annual Meeting and making it carbon neutral by offsetting remaining emissions can set an influential example of action in line with the organization's values. This should be a first step in a broader strategy to remediate ASOR's climate impact and marry environmental and heritage protection in collaboration with local partners.

1. INTRODUCTION

In the face of a climate emergency that threatens not only contemporary life but also the record of our shared past, how will ASOR respond? The *ad hoc* Committee encourages the ASOR Board to adopt concrete actions so ASOR can be a leader in addressing climate impact.

Academics normally have a higher personal carbon footprint than the global average, due to frequent conference and research travel (Achten et al. 2013; Fox et al. 2009). Learned societies like ASOR can organize and facilitate collective behavioral change toward less carbon-intensive practice among their membership and help set new disciplinary norms for sustainable research.[1]

ASOR can lead peer learned societies in advocacy for academic decarbonization. Our analysis of peer organizations found that ASOR lags behind some, but is ahead of others in addressing climate impact (see Appendix 1). Many organizations have established committees to examine climate impact, but few have announced concrete steps toward mitigation. By making the goal of achieving carbon neutrality for the Annual Meeting part of its strategic plan and forming the *ad hoc* Committee to study this question, ASOR has already had a broader influence: in January 2022, Committee Member Ömür Harmanşah, reporting on our work to the AIA Governing Board (of which he is an academic trustee), persuaded the AIA Board to form a Task Force on Climate Change to pursue best practices in fighting climate change as an academic community. By taking significant action on the goal of carbon neutrality and publicizing these efforts widely, ASOR can expect an even broader influence. Such leadership would not only advance the public good, but this type of stance would be a motivating factor in attracting and retaining the new generation of ASOR members.

All of ASOR's activities produce greenhouse-gas (GHG) emissions and warrant serious examination (see Appendix 4). Yet, reducing the carbon footprint of the Annual Meeting is perhaps the most visible and immediate action ASOR can take to reduce its climate impact. The COVID-19 pandemic and resulting experimentation with new forms of scholarly exchange has created a transformative opportunity for rethinking the status quo of academic conferences and making them not only more sustainable, but also more accessible and inclusive (Middleton 2019; Foramitti et al. 2021; Sarabipour et al. 2021). This is therefore an excellent place to begin a longer-term effort.

Following a Board recommendation in November 2021, ASOR President Sharon Herbert created an *ad hoc* Climate Impact Committee with the following charge:

1) To assess the carbon footprint of the Annual Meeting (AM) and ASOR's other activities;

2) To evaluate the feasibility of the goal to make the AM carbon neutral by 2025, as articulated in ASOR's 2021-2025 strategic plan; and

---

[1] On individual versus institutional responsibility and the question of efficacy, see Robertson 2021. On the impact of social movements versus political institutions in climate change mitigation, see Büchs et al. 2015; Thiri et al. 2022.

3) To make recommendations to the Board of Trustees on how this might be achieved.

The committee met monthly between November 2021 and November 2022. In this report, we present our findings on the significance of the climate crisis for ASOR (Section 2); the carbon emissions of the traditional AM (Section 3); available options for reducing the AM's carbon footprint (Section 4); the results of a member survey on this issue (Section 5); and the potential impact and effects of these strategies (Section 6). Finally, we summarize our key findings and offer recommendations for achieving carbon-neutrality for the Annual Meeting (Section 7).

2. WHY WE MUST ACT: THE CLIMATE CRISIS AND ASOR'S MISSION

2.1. Why Must We Act?

In this section we summarize the background of the planetary climate crisis and its specific effects on Middle East and North African (MENA) countries and communities. We also discuss the impact of climate change on cultural heritage, including archaeological sites, historic and contemporary monuments of cultural significance, and heritage landscapes, since the ecological crisis brings with it an increased magnitude of heritage destruction. We understand heritage destruction as a form of environmental injustice. Climate change and cultural heritage destruction directly impact the scholarly work of various academic disciplines supported by ASOR, especially archaeological fieldwork, access to archaeological sites, archives, and museums, and heritage conservation. We conclude this section with comments on why combating climate change should be understood as part of ASOR's mission.

2.2. Climate Change Basics

Global climate change is primarily associated with fossil fuel extraction and resulting greenhouse gas (GHG) emissions (e.g., carbon dioxide [CO_2], methane [CH_4] and nitrous oxide [N_2O]) since the beginning of the Industrial Revolution and has accelerated from the middle of the twentieth century onwards (Maslin 2021:7). The greenhouse effect is the result of the entrapment of greenhouse gasses in the atmosphere and their absorption of long-wave radiation, resulting in the warming of Earth's atmosphere, land, and oceans.

According to the Intergovernmental Panel on Climate Change (IPCC 2018), over 85% of global CO_2 emissions come from energy production, industrial processes and transport, i.e., burning fossil fuels. Responsibility for the extraction and burning of fossil fuels is not evenly distributed across the globe **(Fig. 2.1**). Ninety percent of this activity comes from North America, Europe, and Asia. The U.S. is the second largest emitter, responsible for 15% of global emissions in 2021 (Maslin 2021:10). An atmospheric carbon threshold of 400 ppm was surpassed in 2016 (up from the pre-industrial levels of 280 ppm), and this is considered a historic moment, not seen in 2.5 million years (**Fig. 2.2**). Nicola Jones wrote"[a]t the current rate of growth in CO_2, levels will hit 500 ppm within 50 years, putting us on track to reach temperature boosts of perhaps more than 3° C" (Jones 2017). Climate scientists have offered a variety of scenarios and models of the warming of the planet up to 6°C by the year 2100, which would be catastrophic for world communities.

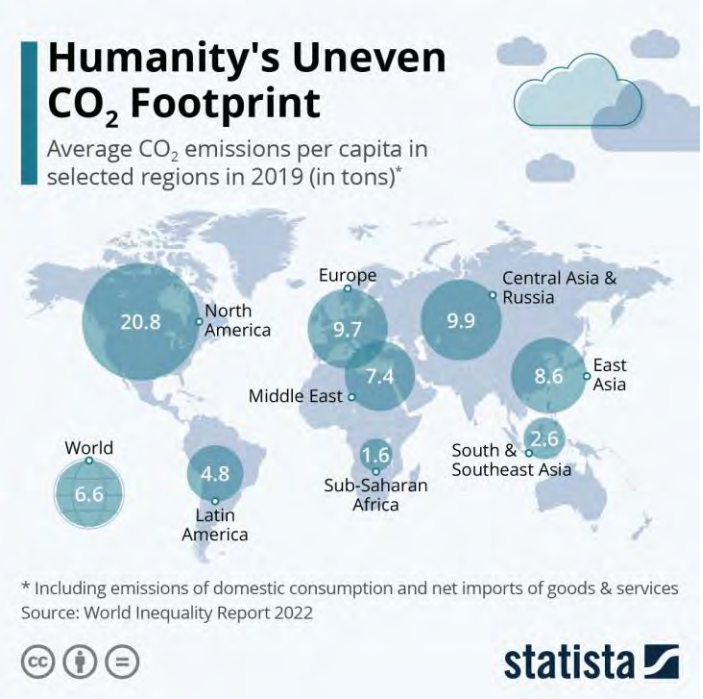


Figure 2.1. *Average CO_2 emissions per capita in North America (20.8 tons CO_2) are nearly three times those of the Middle East (7.4 tons CO_2) (Zandt 2021).*

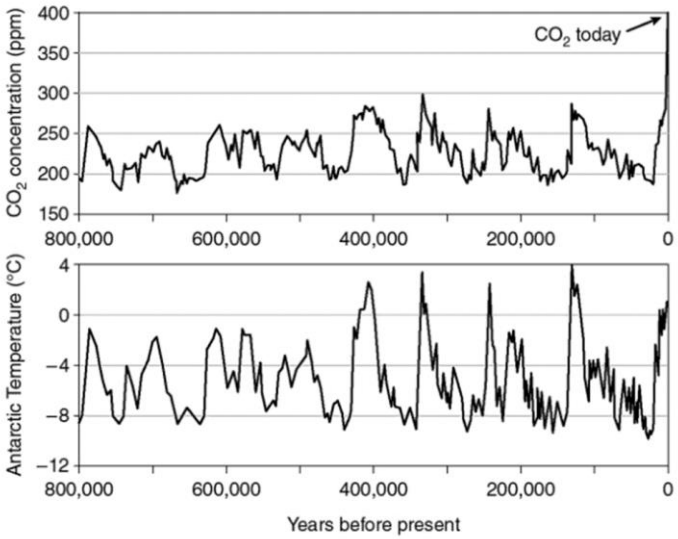


Figure 2.2. *CO_2 concentration (ppm) and Antarctic Temperature (°C) in planetary climate history for the last eight glacial cycles, as recorded in ice cores. A 2.5-million-year high in atmospheric carbon was passed in 2016 (Maslin 2021:5 and Ellis 2018: 23).*

Climate change is further coupled with wide-scale environmental degradation, destruction of agricultural and heritage landscapes, an explosion of social inequalities, the sixth mass extinction event (comparable

in loss of species to the latest one 65 million years ago), and the onset of a newly proposed geological epoch known as the Anthropocene (Zalasiewicz et al. 2019; Ellis 2018). Although archaeologists and climate/vegetation historians have shown that climate fluctuations have been a constant player throughout the history of the Holocene, the scale of dramatic change since the Industrial Revolution proves that what we are experiencing is incomparable to any episode within the Holocene **(Fig. 2.3)**.

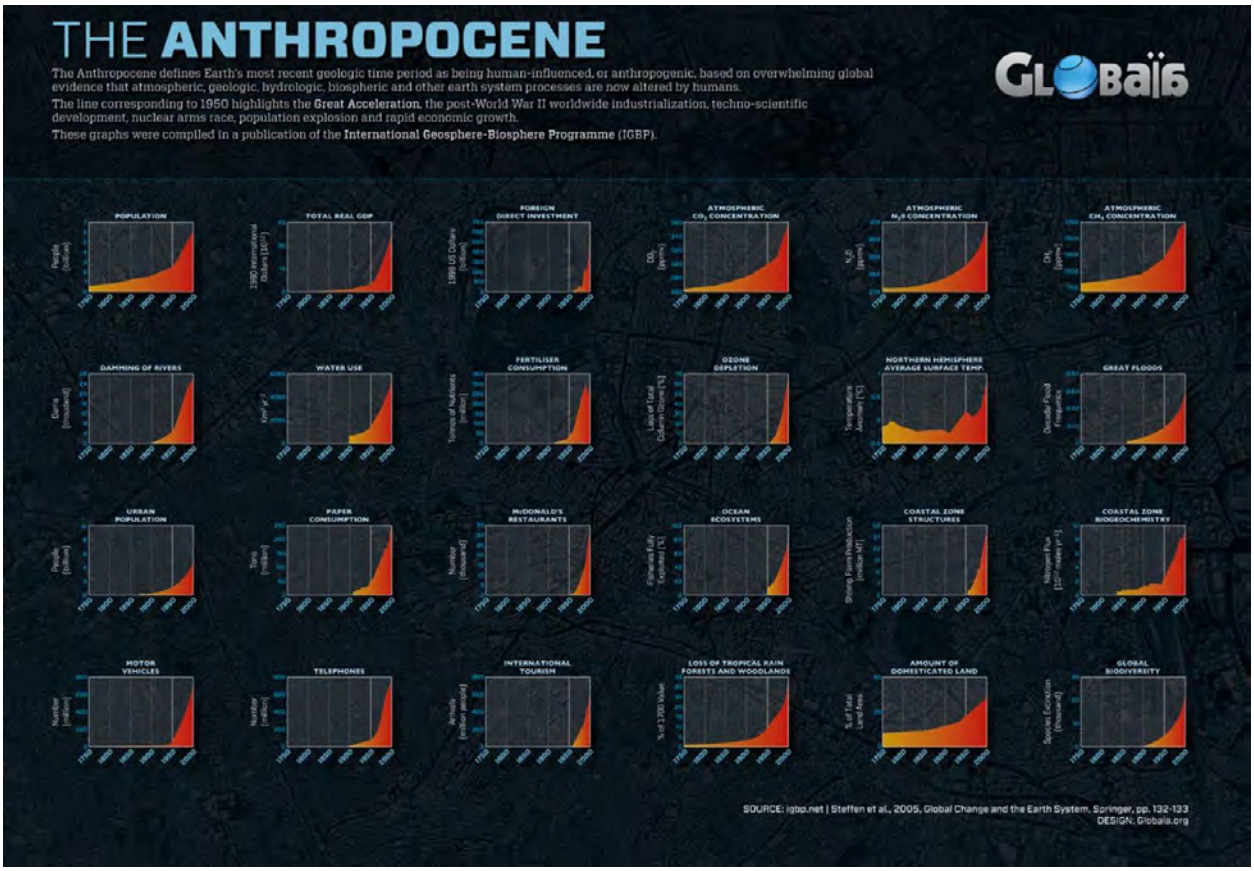


Figure 2.3. *Visualizing the Anthropocene: the scale of change 1750-2000 (Steffen 2005: 132-133).*

2.3. Climate Change and Heritage in the MENA Region

The intimate relationship between climate change and the destruction of cultural heritage as yet another form of environmental injustice has become increasingly clear (Porter, in press). Cultural heritage is always entangled with the politics of the environment, and heritage is understood as a resource at risk (Rico 2015). Climate change and ecological degradation, as well as economic, cultural, and social crises clearly linked to climate change, often have severe physical effects on the state of cultural heritage (Townshend 2020).

As has been well demonstrated, the effects of climate change and the global ecological crisis have not been evenly distributed across the planet, and the MENA region's local ecologies have been among the world's most vulnerable and fragile (Thompson and Zakhirova 2022).

According to Manfred Lange, "[c]limate modeling studies clearly indicate that more severe climatic changes are expected in the Mediterranean Basin and the MENA region compared to other parts of the globe," consisting especially of heat waves, long droughts, flooding, and coastal change (Lange 2019: 455). Climate change also leads to more social conflict and violence, as rural communities are pushed to settle in cities, increasing unemployment.

Figure 2.4. *Water scarcity and aridity worsened by climate change take an increasingly heavy toll on lives, livelihoods, and heritage landscapes in MENA. Left: An Iraqi man walks past a canoe sitting on dry, cracked earth in the Chibayish marshes near Nasiriyah, Iraq (AFP). Right: A sandstorm in eastern Baghdad's al-Futheliyah district (Ahmed Saad/Reuters).*

As an outcome of these trends, we have seen failures of agricultural production in fragile arid zones, depletion of water sources, and immigration and displacement of communities as environmental refugees. A striking example of this change is illustrated by sinking water levels in Middle Eastern and North African countries, where there is already less and less reliance on groundwater (**Fig. 2.4**). Civil conflict and abandonment of heritage landscapes lead to increased vulnerability of local archaeological sites, monuments, museums, and landscapes which have been targeted by global terrorist organizations such as ISIS and looting networks. Unplanned development, infrastructure construction, and urbanization further threaten heritage landscapes (**Fig. 2.5**). The work of archaeologists and heritage specialists are deeply affected under this new climate regime, resulting especially in the difficulty of access to carry out new fieldwork and the far greater challenges they face in preserving cultural heritage. Faced with pressing infrastructure and development projects, archaeologists are often forced to focus their energies on salvage and rescue archaeology rather than innovative research.

Figure 2.5. *Mengefe antique site threatened by the Muğla-Milas Hüsamlar open pit coal mine (Turkey) (Büçkün 2013: Appendix 1, Fig. 1).*

2.4. How Combating Climate Change is Part of ASOR's Mission

What, then, are some of the specific impacts of climate change on the work of archaeologists and ancient historians? First, climate change has a major impact on archaeological fieldwork. Accessing field sites and regions in order to carry out fieldwork has become increasingly more difficult over the years. Military conflict and the displacement of local communities, political instability, and forced and undocumented migration are intimately tied to the ecological decline associated with climate change. The current pandemic and the possibility of new global epidemics to come have also been linked to conditions resulting from the new climate regime. Finally, increased destruction of cultural heritage and archaeological landscapes, massive looting operations, and unfettered development play a major role in making archaeological research more and more difficult for ASOR researchers. The increasing focus on salvage and rescue archaeology does not present ideal conditions for scientific research. On the positive side, debates about climate change and the Anthropocene have brought new research methodologies and questions about climate and vegetation in the ancient past. Questions of the resilience of past societies, the concept of deep time, the breakdown of the distinction between prehistory and history, and collaboration with local communities are new research perspectives enrich ASOR researchers and give archaeology and ancient history contemporary relevance.

ASOR's mission statement includes a commitment to "supporting and participating in efforts to protect, preserve, and present to the public the historic and cultural heritage of the Near East and the wider Mediterranean and to raise awareness of its degradation" (ASOR 2021). As any archaeologist working in the MENA Region well knows, the history of archaeological research here is deeply entangled with

fossil-fuel extraction, as the missions and funding bodies behind colonial extraction and archaeological research have overlapped substantially (e.g., Havrelock 2015). As part of a larger effort to reconcile the entangled histories of extracting "treasures of archaeology and energy" (Havrelock 2015:54), ASOR should take a leadership role in advocating for decolonizing and decarbonizing,[2] i.e., combating climate change and heritage destruction at the same time. This begins with the work of this *ad hoc* Committee and subsequent long-term measures to remediate the organization's carbon emissions. These efforts can extend to encouraging increased collaboration and outreach to MENA communities, supporting public and collaborative archaeology and heritage preservation, and making research available to local communities. Fighting climate change can be one major platform of such collaboration.

[2] Decolonizing refers here to the process of undoing the harms and injustices of the colonial past, while decarbonizing (literally, removing or slowing down carbon deposition) connects us to the invaluable work of corrective action against environmental injustices of the present.

3. THE CARBON EMISSIONS OF THE ANNUAL MEETING

3.1. Setting the Benchmark for Carbon Neutrality

Assessing the climate impact of the traditional ASOR AM and devising strategies for making the meeting carbon neutral first requires a well grounded estimate of the AM's typical carbon emissions. Here, we consider the carbon emissions of the traditional AM format before the COVID-19 pandemic, consisting of an annual four-day conference hosted at a four-star hotel and rotating among several U.S. cities, chosen at that time according to the location of the meetings of the Society for Biblical Literature (SBL) and American Academy of Religion (AAR) that immediately followed the ASOR AM. During the pandemic, ASOR has experimented with completely virtual (2020) and dual-component (in-person and virtual) meeting formats (2021 and 2022) (**Fig. 3.1**). As many or most learned societies are considering returning to the traditional in-person meeting format now that the severity of the pandemic has subsided, we will treat the pre-2020 meeting format as the benchmark for the goal of carbon neutrality. This will represent the business-as-usual (BAU) model against which various mitigation strategies are measured in Section 6.

Below, we estimate the annual carbon emissions from attendees' travel to and from the meeting (3.2) and from the operation of the meeting and hotel stays of attendees (3.3).

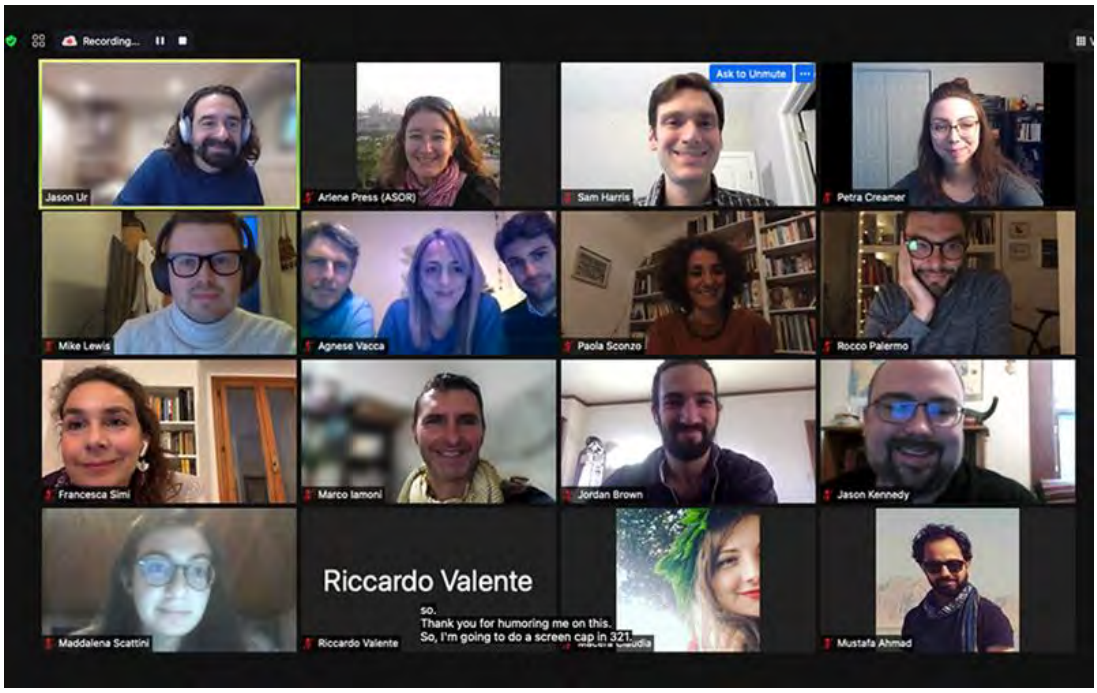


Figure 3.1. *ASOR members shared research and ideas virtually at the 2020, 2021, and 2022 Annual Meetings. (Screenshot from a virtual session at the ASOR 2021 AM).*

3.2. Emissions from Travel

Estimation of carbon emissions from ASOR AM-related travel was carried out by Dr. Lucas Stephens (Environmental Protection Agency), updating the methodology and results of his earlier study (Stephens and Herrmann 2019) on the basis of anonymized AM attendance data from 2013 to 2018. See Appendix 2 for further details about the methodology.

Carbon emissions from travel for the six ASOR AMs analyzed average an estimated **1227 metric tons CO_2**, or **1.34 tons per attendee** (average attendance 916 people) (see **Figs. 3.2** and **3.3**). The annual total and per capita amounts varied considerably, however, according to two factors: 1) the **location** of the host city, and 2) the number of **international** attendees.

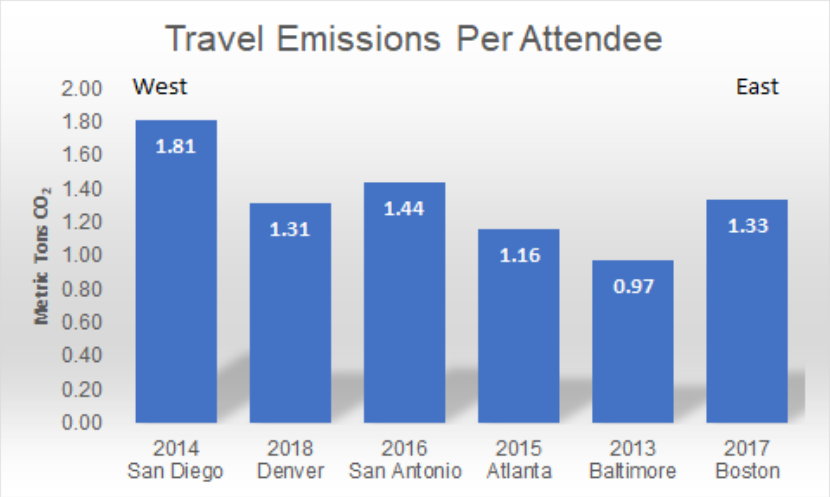


Figure 3.2. *Estimated CO_2 emissions per attendee from travel to and from the ASOR AM from 2013 to 2018, in metric tons.* ***Note: Host cities are ordered geographically from west to east.***

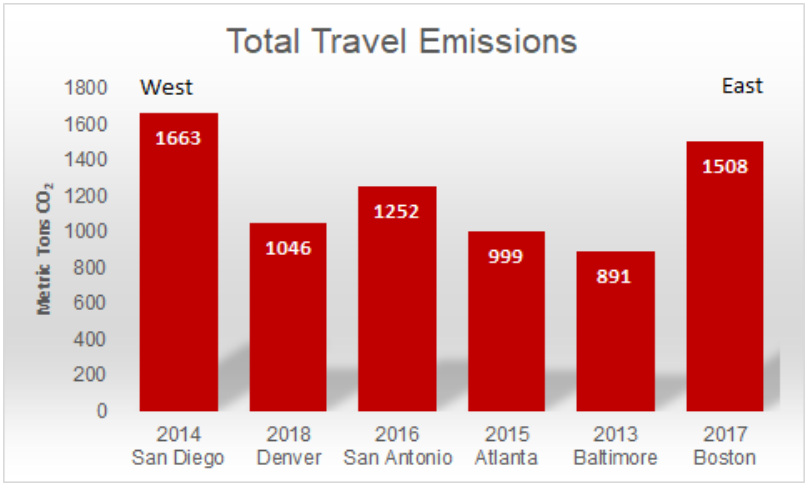


Figure 3.3. *Estimated total CO_2 emissions from travel to and from the ASOR AM from 2013 to 2018, in metric tons.* ***Note: Host cities are ordered geographically from west to east.***

The effect of **location** can be perceived most clearly when the per capita emissions are calculated separately for North American and international attendees (**Fig. 3.4**). Per capita emissions for both groups decline as the meeting city moves from west (San Diego) to east (Boston).[3] As we will show in section 4.2, this is because North American attendees are concentrated in the eastern U.S., particularly the Mid-Atlantic zone, and international attendees come predominantly from Europe and MENA, making eastern U.S. destinations considerably closer than western ones.

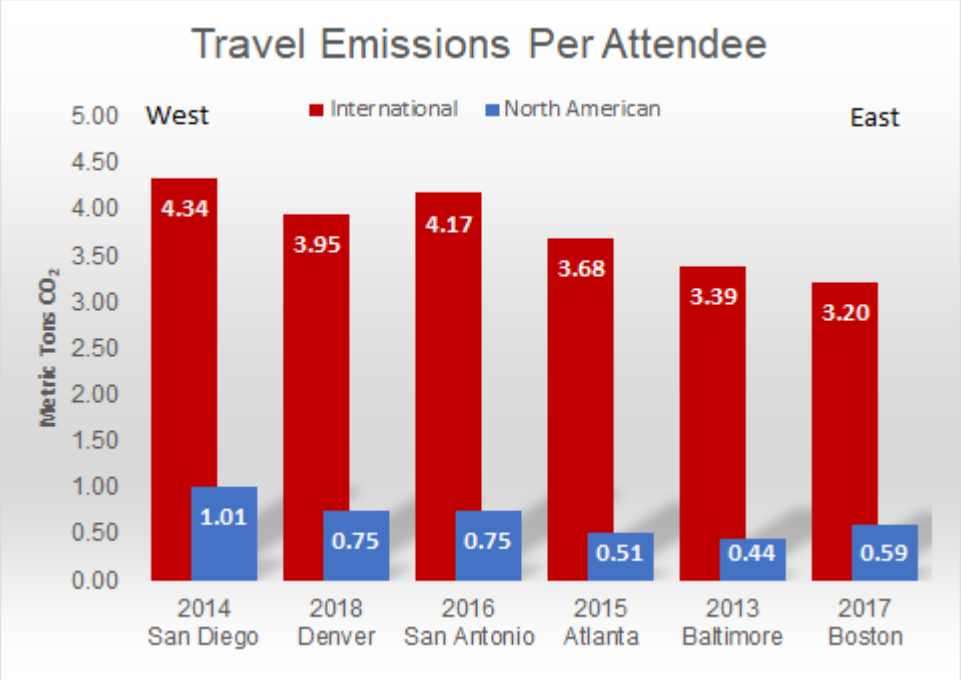
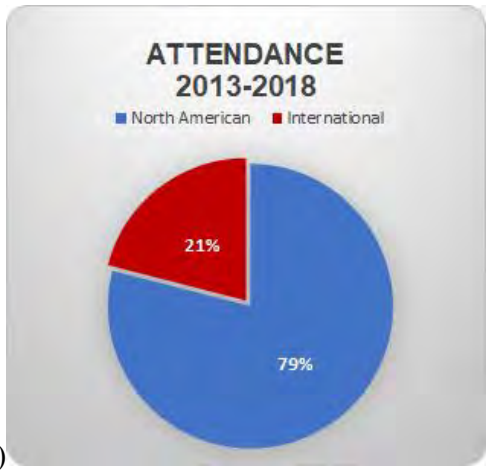


Figure 3.4. *Estimated CO_2 emissions per attendee arriving at the 2013–2018 ASOR Annual Meetings from North American (blue) and international (red) locations, in metric tons.* ***Note: Host cities are ordered geographically from west to east.***

Figure 3.4 shows that the travel emissions of **international** attendees are, per capita, four to seven times larger than those of North American attendees, due to the long-haul intercontinental flights required to reach the U.S. from these locations. Therefore, while on average only 21% of ASOR attendees came from outside North America (**Fig. 3.5a**), international attendance accounts for the majority (61%) of the AM's estimated travel emissions (**Fig. 3.5b**).

[3] In Figs. 3.2 and 3.2, relatively high per-capita and total emissions from the 2017 Boston AM seem to defy the west-to-east trend. However, this is because Boston had 30% higher attendance than average and 42% higher international attendance. In Fig. 3.4, Boston has the lowest emissions per capita for international attendees.

a) 

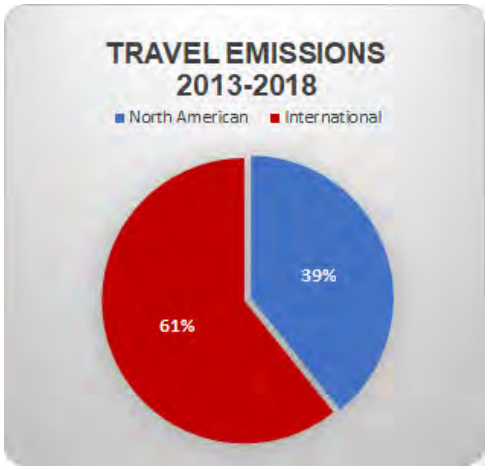
b) 

Figure 3.5. *a) Average proportion of North American (blue) versus international (red) attendees at the ASOR AM, 2013–2018. b) Average proportion of estimated carbon emissions contributed by North American (blue) versus international (red) travel to the AM, 2013–2018.*

See section 3.4 below for the implications of these data for the goal of making the AM carbon neutral.

3.3. Emissions from Meeting Operations and Hotel Stays

We identified several major sources of carbon emissions from the meeting itself, but to catalog and measure every source is beyond the scope of this report. We consider here emissions from the use of conference space and attendees' hotel stays.[4] Several freely available tools exist online for calculating carbon emissions from in-person conferences and hotel stays, but these only provide a rough estimate of emissions, and the results range widely.

To calculate the on-site meeting emissions, we used the GreenView Hotel Footprint Tool, which allows the user to enter conference-specific values such as location, attendance, duration, and size of event space. Assuming 40,000 square feet of event space, used for 33 hours, and assuming that the number of hotel rooms equals 60% of the number of attendees for four nights. We estimate the average emissions from the 2013-2018 ASOR AM conference hotels at **39.2 metric tons CO_2** or 0.04 metric tons per capita. The most carbon-intensive meeting city was Denver (46.1 tons, 0.06 tons per capita) and the least was Boston (35.0 tons, 0.03 tons per capita) (**Fig. 3.6**).

[4] Emissions resulting from attendees' meals are also likely significant in scale. It proved difficult, however, to estimate the difference in emissions between the meals eaten at the conference and meals the attendees would have eaten at home. Also left out of account here are emissions from the production of conference materials, such as paper products, tote bags, and badges. Nevertheless, suggestions to partly mitigate both of these sources are found in Section 4.3 below.

Figure 3.6. *Estimated CO_2 emissions from the conference hotel at the ASOR Annual Meeting, 2013-2018.*\

3.4. Estimated AM Emissions Total and Implications

In summary, we estimate the total average carbon emissions of the ASOR Annual Meeting at ca**. 1266 metric tons CO_2**. This is the benchmark for the emissions reduction and offsetting required to make the meeting carbon neutral. In addition, this analysis demonstrates three important points:

1) **Travel to and from the AM produces the vast majority (ca. 97%) of its total carbon emissions.** Therefore, while efforts to make the meeting itself more sustainable are certainly worthwhile, mitigation of the AM's climate impact should focus on reducing the necessity for or distance of travel to and from the meeting site.[5]
2) The data showing that international flights contribute the majority of the AM's travel emissions also suggest that limiting the necessity of long-haul and overseas flights in particular has the greatest potential to significantly reduce the meeting's carbon footprint. At the same time, long-distance flights and international travel present the greatest barriers to meeting attendance in the form of higher cost, visa requirements and restrictions, and physical accessibility, leading to less attendance by lower-income, disabled, caregiver, and developing-country scholars (Waruru 2018; Sarabipour et al. 2021; Bellows 2022). Internationalization and diversification of the AM is highly beneficial to ASOR as an academic community, especially as a U.S.-based organization focusing on the MENA region in a field that long excluded MENA scholars. This means that **future strategies for the AM that allow participation without the requirement of long-haul**

[5] Likewise, reducing carbon-heavy travel is one of the most impactful ways that individuals can cut their personal emissions (Wynes and Nicholas 2017).

travel could not only mitigate the organization's climate impact, but produce co-benefits of greater accessibility and equity.

3) The average per capita emissions for travel to the Annual Meeting, at **1.38 metric tons CO_2**, are incompatible with the annual average carbon budget of 2.0-2.5 tons CO_2 per person needed to prevent global warming of more than 1.5° C by 2030 (IPCC 2018). In addition, **the average trip to the Annual Meeting is equivalent to more than a third (ca. 38%) of the annual per capita carbon emissions in ASOR's core study countries**.[6] This comparison highlights the disproportionate contribution to climate change caused by relatively carbon-intensive academic activities compared to lifestyles in these scholars' research area (see also **Fig. 2.1**).

[6] This calculation is based on the 2020 average per capita CO_2 emissions of Egypt (2.3 t), Israel (7.3 t), Lebanon (3.9 t), Jordan (2.5 t), Cyprus (6.1 t), Iraq (5.7 t), Syria (1.8 t), and Turkey (4.8 t), according to the Global Carbon Atlas (2021). Particularly high emitters like the Gulf countries inflate the Middle Eastern regional average of 7.4 t per capita depicted in Figure 2.1.

4. MITIGATION STRATEGIES FOR THE ANNUAL MEETING'S CLIMATE IMPACT

4.1. Emissions Reduction and Carbon Offsets

A number of lower-carbon possibilities for academic exchange beyond the traditional in-person conference are available (see, e.g., Klöwer et al. 2020; Sarabipour et al. 2021; Tao et al. 2021; Bellows 2022), and certain choices can reduce the emissions of in-person meetings or meeting components as well. ***We recommend that the absolute reduction of meeting-related emissions as much as possible should be the first priority, but carbon offsets are a potential secondary strategy for mitigating the remainder.*** Below, we outline strategies for reducing the emissions from travel to the meeting (4.2) and from the meeting itself (4.3). We then describe the potential and problems of purchasing carbon offsets for remaining meeting-related emissions, and best practices for ensuring that they have the desired effect (4.4).

4.2. Reducing Travel Emissions

In Section 3, we showed that travel to and from the AM makes up 97% of the estimated meeting emissions. Overseas travel (i.e., long-haul flights) contributes the majority (61%) of travel-related emissions. Strategies that reduce the necessity for or distance of travel (especially air travel) will therefore be the most effective way to mitigate the AM's climate impact.

Figure 4.1. *In November 2020, during the first year of the COVID-19 pandemic, ASOR held its first entirely virtual meeting.*

4.2.1. Virtual Meeting Components

The COVID-19 pandemic forced a dramatic expansion of possibilities for online remote ("virtual") meetings, both in terms of technological infrastructure and comfort with this method of interaction among participants. This format offers dramatic reduction of carbon emissions and increased accessibility (see Section 6.2 for the calculation of emissions from virtual meetings). ASOR now has experience organizing both completely virtual meetings (2020 AM) (**Fig. 4.1**) and dual-component (in-person and virtual) meetings (2021 and 2022 AMs). As such some possibilities for reducing AM carbon emissions are:

A. Virtual-only meetings, every year:

ASOR would forgo a regular in-person meeting, and instead all content would be presented in a virtual format (on a platform like Open Water), with synchronous discussions of research and asynchronous opportunities for watching recorded content.

B. Virtual-only meetings, alternating with in-person meetings:

The ASOR annual meeting would be held annually, but the format would alternate between in-person only and virtual-only (as described above).

C. Dual-component meetings

This model would follow the dual-component experience of the 2021 and 2022 annual meetings, in which an in-person annual meeting is either followed or preceded by a virtual annual meeting (hosted on a platform like Open Water). The two components are held at different times to allow ASOR staff to dedicate their full time to both, and members can decide whether to attend one or both of the meetings.

D. Hybrid meetings

This proposal would present a truly hybrid conference experience in which in-person sessions could be live-streamed to a virtual platform, and presentations at the in-person meeting could include remote presentations played live in the hotel venue. Both remote and in-person attendees could participate in live question periods and discussions.

4.2.2. Meeting Location Changes

Changes to the location of in-person meetings that reduce the distance attendees travel can also lower emissions substantially.

E. In-person meetings at U.S. locations central to ASOR's geographic network

In this strategy, in-person meetings or meeting components would rotate among cities in the Mid-Atlantic U.S. As discussed in Section 3.2, total and per capita travel emissions vary significantly according to the AM's location, with eastern U.S. locations producing significantly less than western ones (see also Fig. 6.6). Network analysis of the locations of affiliation of AM attendees from 2013 to 2018 by Lucas Stephens showed that ASOR's domestic geographic network centers on the Mid-Atlantic region

(Stephens and Herrmann 2019). He identified the following six cities as optimally located and connected to reduce the overall distance of travel required for attendance at an in-person meeting and to facilitate train travel, thereby reducing the carbon emissions from travel to the meeting: **Washington, D.C., Baltimore, Philadelphia, Cleveland, Newark, and New York City** (**Fig. 4.2**).

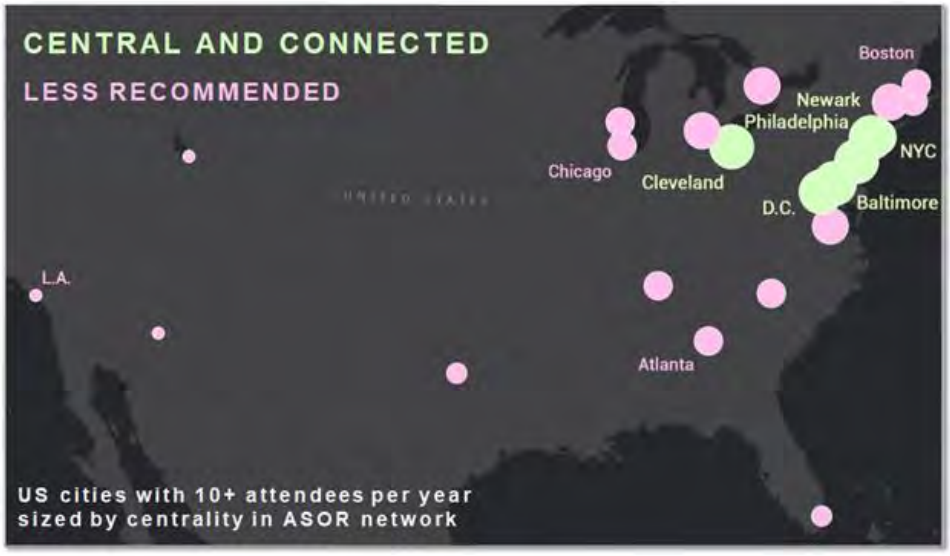


Figure 4.2. *Network analysis of travel emissions suggests the six cities indicated in green are optimally located to reduce the total travel required for AM attendance and thus carbon emissions produced by this travel (Stephens and Herrmann 2019).*

F. Distributed meeting with U.S. and MENA hubs

Due to the disproportionate contribution of international flights to the AM's total emissions, reducing the need for intercontinental travel has a high potential to limit carbon emissions. In order to continue to promote international collaboration while reducing intercontinental flights to the meeting, the ASOR meeting could be organized into two regional hubs for in-person attendance: one meeting hub would be located in the U.S., as usual, and the other hub would be located in a MENA country (see Klöwer et al. 202, Tao et al. 2021 for discussion of such "distributed meetings"). This would allow scholars attending from the Eastern Hemisphere, and in particular MENA countries, to reap the benefits of in-person conference attendance while cutting travel emissions and lowering the barriers of travel costs and visa restrictions. The meetings at the ASOR-US and ASOR-MENA hubs could be held simultaneously, with the two locations virtually connected for a selection of live-streamed events (e.g., keynote speeches, discussion panels, etc.), while making a wider array of recorded talks and posters available for on-demand viewing by participants in both locations. Potential host locations for the ASOR-MENA hub include the

ASOR-Affiliated Overseas Research Centers CAARI (Nicosia, Cyprus), ACOR (Amman, Jordan), and the Albright Institute (Jerusalem), or another center such as ARIT (Istanbul or Ankara, Turkey).[7]

Another possibility would be to hold the ASOR-MENA meeting in the summer, when many North American and European researchers have already traveled to the region for fieldwork. The advantage here is that, for those coming from abroad, the trip and its emissions would do double-duty, while scholars attending from MENA would be able to meet in-person with North American and European colleagues and vice versa.

4.2.3. Meeting Frequency Changes

Reducing the frequency of the AM would significantly lower emissions:

G. In-person meetings, alternate years

This proposal would see the AM occurring only once every other year. In years when the meeting does take place, this strategy could be combined with any of the proposals mentioned above.

B. (redux). Virtual-only meetings alternating with in-person meetings

See description above.

4.2.4. Incentivizing Sustainable Travel Choices

When the AM is held in-person, regardless of location, meeting attendees should be encouraged to choose the most sustainable mode of transportation to and from the meeting.

On the Travel Information page for the 2022 AM,[8] attendees have been provided with information on ways they can reduce the carbon emissions associated with their travel to and from the AM (Amtrak, public transportation, and carpool). Beyond simply promoting these more environmentally friendly travel options, ASOR could incentivize their use. Options include financial incentives (such as reduced registration rates, offers of ASOR Bucks, or hotel credits through partnerships) or recognitions ("Green" badges or pins). ASOR could also look into joining the Amtrak Corporate Incentive Program to provide additional benefits to meeting attendees.[9]

---

[7] Considering travel restrictions within the region, it is most advisable to locate the meeting in Turkey, Jordan, or Egypt.

[8] "Travel Information." 2022. *ASOR*, https://www.asor.org/am/2022/travel-info-2022/.

[9] "Amtrak Corporate Incentive Program." Amtrak, https://www.amtrak.com/corporateprograms. Last accessed October 7, 2022.

4.3 Reducing Meeting Emissions

4.3.1. Greener Hotels

ASOR could consider a **hotel's sustainability initiatives** and willingness to support net-zero meetings among the selection criteria when choosing conference venues.[10] The committee has developed a list of sustainability requests to ask of potential venues during negotiations (e.g., composting programs, elimination of single-use toiletries, plant-based catering, etc.) (see Appendix 5).

Ideally, hotels should be easily reached via public transportation from the airport and train station without multiple transfers and long walks. Such means of transport should be posted on the ASOR website. Hotels located in an urban area that provides food and amenities within easy walking distance are also preferable for avoiding the use of cars and taxis. ASOR-sponsored events not on-site would also preferably be reachable by walking or public transportation from the conference hotel.

Finally, ASOR can create a list of "green hotel practices" for AM attendees to be included in the meeting materials.

4.3.2. Plant-Based Meals

As at least 14% of GHGs come from animal agriculture (Blue Horizon Corporation 2020), ASOR can reduce meeting emissions by prioritizing plant-based food at events. For the daily coffee table, this can be as simple as providing soy and oat creamers instead of dairy. For larger events, plant-based haute-cuisine has become quite trendy and provides many excellent options. Recommendations for plant-based dining options can be included in the list of "best practices" provided to attendees, as mentioned above.

4.3.3. Promotional Items

In place of the traditional tote bags, ASOR could provide promotional metal cups or tumblers that accommodate hot and cold beverages. These can then be used for the daily coffee table as well as at the water cooler, eliminating emissions and waste from plastic cups and dishwashing. Durable metal drinking vessels can be engraved with the ASOR logo and reused for years.

[10] Planners could, e.g., ask to see an emissions calculator report such as that of the Hotel Carbon Measurement Initiative (HCMI) and compare this with local and national averages according to the Cornell Hotel Sustainability Benchmarking Tool dataset.

4.4 Carbon Offsetting as a Supplementary Strategy

The *ad hoc* Committee agrees that ASOR should attempt to reduce the meeting's carbon emissions as much as is feasible before turning to carbon offsets, as reduction must be central to long-term sustainability strategies. Carbon offset programs must furthermore be chosen with care for effectiveness, additionality, and sustainability.

4.4.1. Why Carbon Offsets Are a Last Resort

Many companies, organizations, and individuals today attempt to mitigate their climate impact by buying carbon offsets, sometimes called carbon credits or climate credits. Offsets should compensate for emissions by funding emission reductions or carbon removal through forestation, renewable energy development, and the reduction of greenhouse-gas projects. However, there are substantial risks involved with this strategy (**Fig. 4.3**).

Some experts argue that carbon offsets can be detrimental to our fight against carbon emissions as they give people a sense that all that is needed is to pay an amount of money to resolve the problem and foster complacency (Kotchen 2009, Broekhoff 2019; McAfee 2022). Many projects do not achieve the benefits they promise or rely on the presumption of future efficiencies that may not emerge. Only by reducing emissions at the source or removing carbon can we lower overall atmospheric GHG concentrations and stop global warming. Other experts, however, believe that offsets, although not 100 percent effective, are still a useful way to combat climate change, at least in the short-to-medium term, until we reach the final goal of switching to renewable sources. According to *The Oxford Offsetting Principles Guidelines,* "carbon offsetting, if done properly, can contribute to net zero strategies but if not done well, it can result in greenwashing and create negative unintended impacts for people and the environment" (Myles et al. 2020).

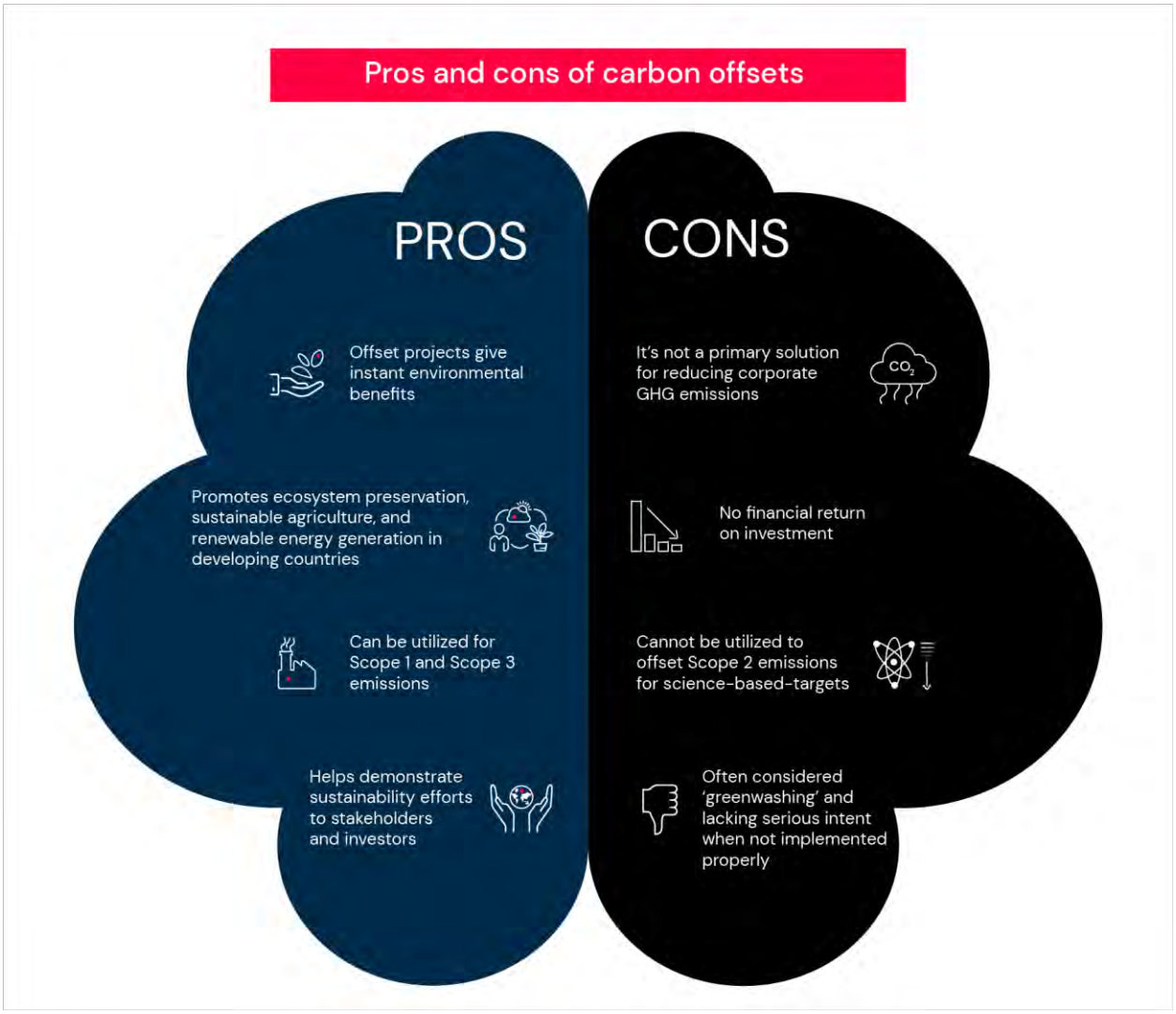


Figure 4.3. *Pros and Cons of Carbon Offsets. (Source: https://www.ecoideaz.com/expert-corner/the-pros-and-cons-of-carbon-offsetting-programs).*

4.4.2. Carbon Offset Best Practices

In recent years, there has been an increase in the demand for carbon offset programs, and studies have shown that many of these cannot meet the demand or are unreliable.[11] Tackling transparency and quality issues in this growing field has become a priority in recent years.

[11] https://www.atmosfair.de/en/standards/good_offsetting_practices/

When partnering with a program that promises to offset carbon emissions, consumers or organizations should seek high-quality offset projects with the following criteria:[12]

1. Real (offsets must represent emission reductions that have already occurred)
2. Additional (the emissions reduction or mitigation would not have happened without the offset)
3. Quantifiable (must be reliably measured or estimated)
4. Durable (offsets must represent emission reductions that are non-reversible or continue for the stated lifespan)
5. Enforceable (offset ownership is undisputed and enforcement mechanisms exist to ensure that all program rules are followed and the market's environmental integrity is maintained)
6. Absence of leakage (reduced or mitigated emissions do not then occur elsewhere)
7. Verified by third parties

4.4.3. Choosing a Program

ASOR could find a partner program that helps businesses and organizations calculate, reduce, and offset their carbon emissions, identifying certified offsets. There are numerous brokerages of varying quality and reputation offering these services.

1. Existing Programs
    a. One example is the Carbonfree Partner Program. This and similar programs could provide ASOR with options to offset the meeting and attendees' emissions by supporting certified projects, the proceeds of which benefit developers directly.
    b. Another option is partnering with a non-profit foundation such as Gold Standard, Cool Effect, or Atmosfair, which provide a selection of certified projects that can be supported through the purchase of carbon credits. Projects at Gold Standard support renewable energy initiatives, local businesses and communities, including programs to provide safe drinking water, protect forests, and create local jobs. Gold Standard allows organizations to submit a project and get it certified according to their standards[13] for sustainable development goals, stakeholder accountability, etc. (**Fig. 4.4**).
2. Creating a Micro-Grants Program for Direct Climate Mitigation

While existing programs and offset brokers can offer ready-made solutions for managing carbon offsets, ASOR is well-situated to take direct action in offsetting activities. As a funding organization, ASOR could seize this opportunity to establish micro-grants in support of:

1. Environmentally sustainable projects related to ASOR's core mission in the MENA regions. Such projects should be designed to follow the best-practice criteria above and could also be

[12] Criteria based on: Berkeley Carbon Trading Project, Oxford Offsetting Principles and Carbon Offset Guide, Kim and Pierce 2018, and The International Emissions Trading Association (IETA).
[13] https://globalgoals.goldstandard.org/101-par-principles-requirements/

subsequently submitted to Gold Standard for certification and further funding as carbon-offset programs.

2. Supporting the development and implementation of eco-friendly practices in fieldwork/research projects to reduce carbon emissions derived from archaeological fieldwork in MENA regions.

Figure 4.4. *Equivalencies of 1 metric ton CO_2 and the Sustainable Development Goals (SDGs) supported by Gold Standard carbon offset projects (Source: Gold Standard, https://www.goldstandard.org/articles/what%E2%80%99s-ton-good-worth),*

4.4.4. Costs

Calculating the costs of carbon-offsetting an Annual Meeting is necessarily complex and depends on a number of different factors, including the type, quality, and cost of a particular offset program, the format and location of the AM, the expected number of participants, and the amount of mitigation/reduction activities employed by ASOR. Currently listed prices for projects available from Gold Standard range from $15 to $45 per metric ton CO_2.[14] However, these prices are subject to change as new projects are added. Other highly rated marketplaces, including Cool Effect[15] and atmosfair[16] tend to cluster around similar price points.

4.4.5. Possibilities for Funding

Many companies give the consumer the option to buy credits to offset their carbon emission, making the consumer the main decision-maker in offsetting their carbon emissions. In order to implement this strategy for mitigating unavoidable carbon emissions, ASOR would need to consider one or more of the following fundraising avenues:

- Raising registration rates

[14] https://marketplace.goldstandard.org/collections/projects
[15] https://www.cooleffect.org/
[16] https://www.atmosfair.de/en

This option would entail an increase of the ASOR AM registration fee. The new rate should be large enough to offset the AM's remaining emissions following the application of emission reduction strategies. Based on the results of the membership survey (Section 5 and Appendix 3), 61% of the respondents indicated that they would be willing to contribute an extra $5 to a carbon offset program. Though this would not cover our cost estimates for offsetting the AM at current emission rates, it indicates a willingness by the membership to consider this avenue. An important argument against this strategy, however, is that it is inequitable. The AM is often attended by students, early career scholars, and scholars who do not have financial support for conference attendance. Attendees also incur differing travel costs for meeting attendance and their travel and lifestyle may produce greatly varying amounts of GHG emissions.

- Voluntary registration add-on

This option would allow individuals to decide whether they feel able to act against climate change and offset their carbon emission; it would entail having an add-on option fee to the registration payment. This strategy would be more equitable and take better account of differences among attendees, but may not raise sufficient funds to offset emissions.

- Fundraising

ASOR could start a fundraising campaign in the form of gathering voluntary contributions from donors or members to support ASOR's goal to fight climate change. ASOR is also well-situated to develop projects in MENA countries geared towards sustainability, carbon mitigation, and cultural heritage, for which it could directly fundraise (see Section 4.4.3 above).

5. RESULTS OF A SURVEY OF ASOR MEMBERSHIP

5.1. Introduction to the Survey and Responses

In September-October 2022, an online survey of ASOR's membership was conducted to understand better the attendance and demographics of the Annual Meeting, and to gather opinions on various meeting formats for future meetings that would help ASOR reduce the AM's carbon emissions. ***This data is crucial for predicting how ASOR members might react to changes the Board might make to reduce the AM's climate impact.*** The survey consisted of twelve questions, and 520 people responded (23.6% of total membership). The full dataset of responses (and summary graphs) are available in Appendix 3.

The majority (65%) of respondents were "regular academic members" who live in North America (77%). 80% of respondents had attended an Annual Meeting between 2017 and 2021, and each AM in that timeframe was attended by ca. 45% of respondents.

5.2. Meeting Attendance Factors

When asked about the most important factors that affected the decision to attend an AM, respondents ranked the following four factors most highly: **1: Academic engagement, keeping up to date on research. 2: Distance, cost, or accessibility of travel to meeting location. 3: Socializing with friends and colleagues; 4. Professional networking** (**Fig. 5.1**).

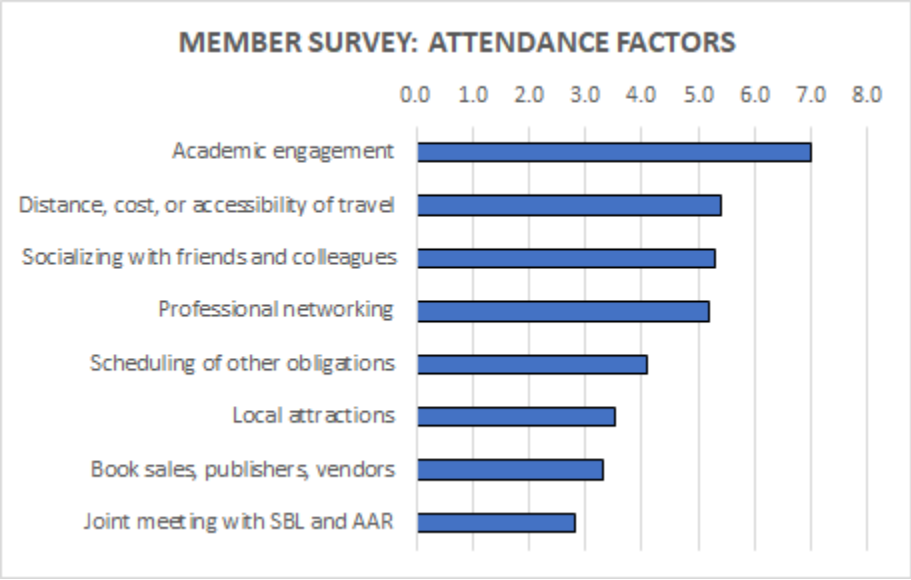


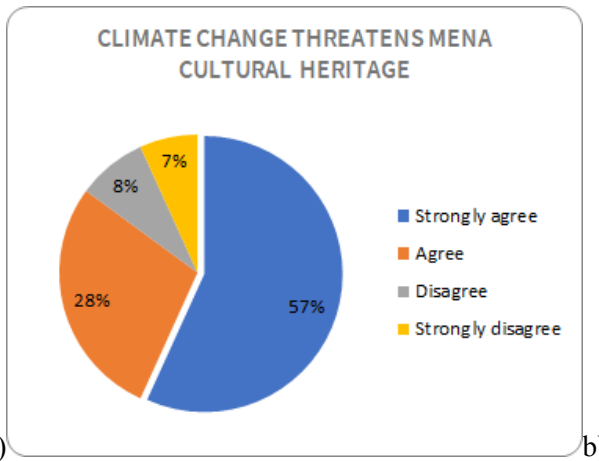
Figure 5.1. *Factors affecting the decision of whether to attend the ASOR AM, ranked from highest to lowest impact in the member survey (higher score indicates higher average ranking).*

5.3. Perspectives on Climate Change and ASOR's Mission

85% of respondents strongly agreed or agreed with the following statement: Climate change and its broader social, economic, and political impacts are major threats to the cultural heritage of the Middle

East and North Africa (**Fig. 5.2a**). 78% of respondents strongly agreed or agreed with the following statement: Fighting climate change is part of ASOR's mission to "protect, preserve, and present to the public the historic and cultural heritage of the Near East and the wider Mediterranean and to raise awareness of its degradation" (**Fig. 5.2b**).

a)



b)

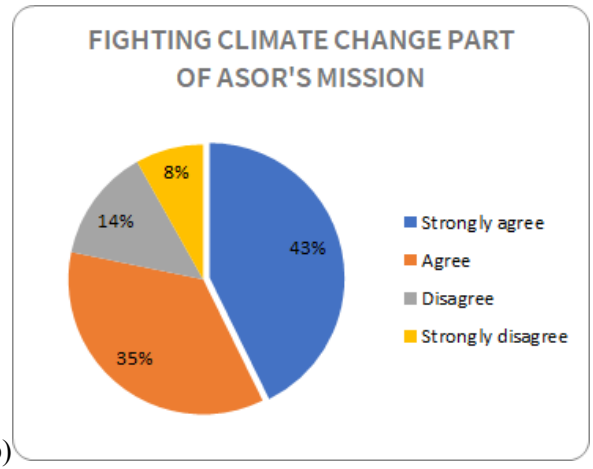


Figure 5.2. *Large majorities of survey respondents strongly agreed or agreed that a) climate change is a major threat to MENA's cultural heritage, and b) fighting climate change is part of ASOR's mission.*

5.4. Annual Meeting Format Preferences

When asked about which conference formats they had found most successful during the COVID-19 pandemic, respondents were fairly evenly divided, but the **most preferred was the virtual meeting with live (synchronous) presentations and discussion** (score 2.81), while the least preferred was the virtual meeting with pre-recorded presentations and live (synchronous) discussion (score 2.01) (**Fig. 5.3**).

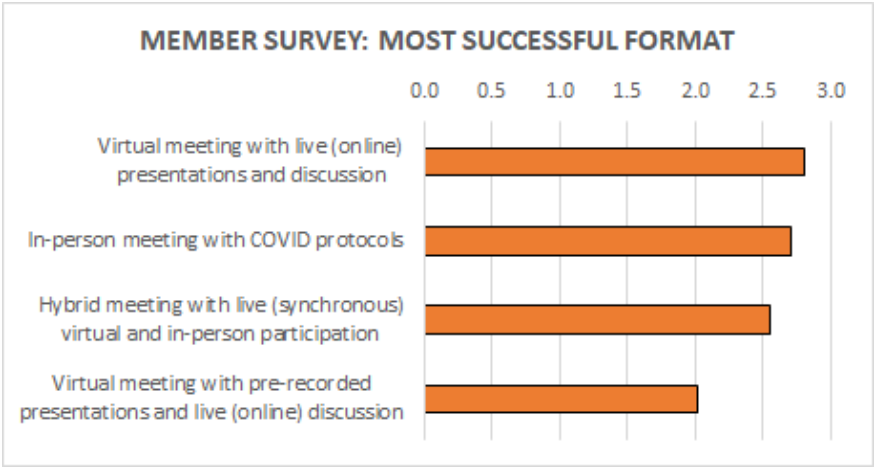


Figure 5.3. *Conference formats commonly used during the COVID-19 pandemic, ranked from most to least successful in the member survey (higher score indicates higher average ranking).*

When asked to rank options for the format and frequency of future AMs, respondents picked these as the top three formats:

1. In-person plus virtual meeting components, asynchronous or synchronous.[17]
2. Annual alternation of in-person and virtual meeting formats.
3. In-person meetings held every other year; no meeting, virtual or in-person, in alternative years (i.e., biennial in-person meetings).

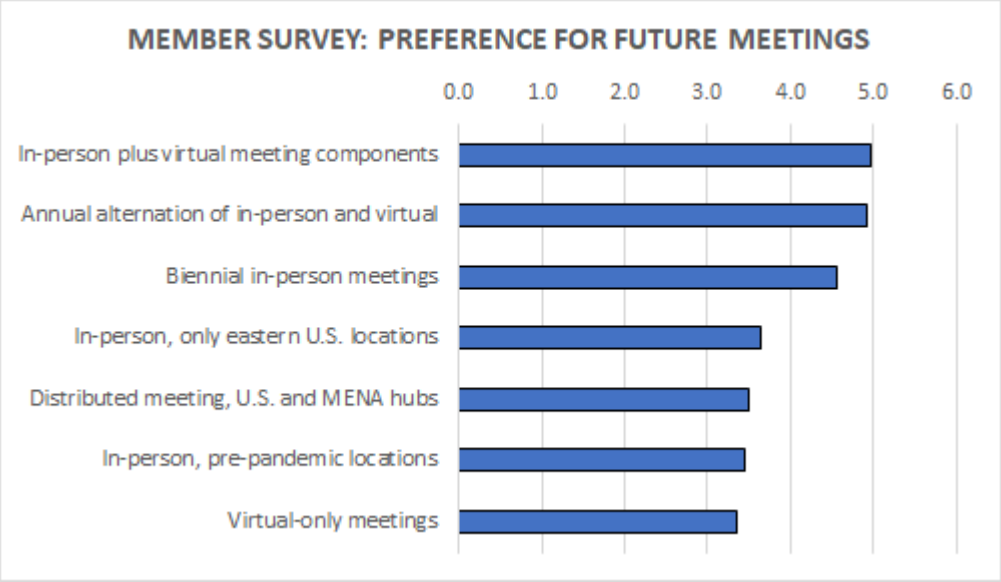


Figure 5.4. *Potential formats for future ASOR AMs, ranked from most to least desirable in the member survey (higher score indicates higher average ranking).*

While opinions were by no means unanimous, 59% of respondents ranked a format that included a virtual component as their first choice. Meanwhile, virtual-only meetings and returning to the pre-pandemic status quo were the two lowest-ranking options (**Fig. 5.4**) and each was ranked last in over one-third of responses. Finally, a distributed meeting with the ASOR-MENA meeting held during the summer to coincide with fieldwork in the region had a surprising amount of support, with 42% of respondents indicating that they would be likely or very likely to attend (Appendix 3). However, the distributed meeting only came fifth in the overall rankings.

[17] Note that hybrid (simultaneous in-person and virtual components) and dual-component (separate in-person and virtual components) were not distinguished in the question.

5.5. Support for Other Emissions Reduction Methods

When asked which other strategies for reducing the AM's carbon emissions they would support, over 80% of respondents were willing to give up the printed abstract booklet and the tote bag. Over 75% were willing to forgo a printed program, and just over 50% were willing to have plant-based comestibles at the AM. There was less enthusiasm for car-pooling (only 48% positive) (**Fig. 5.5**).

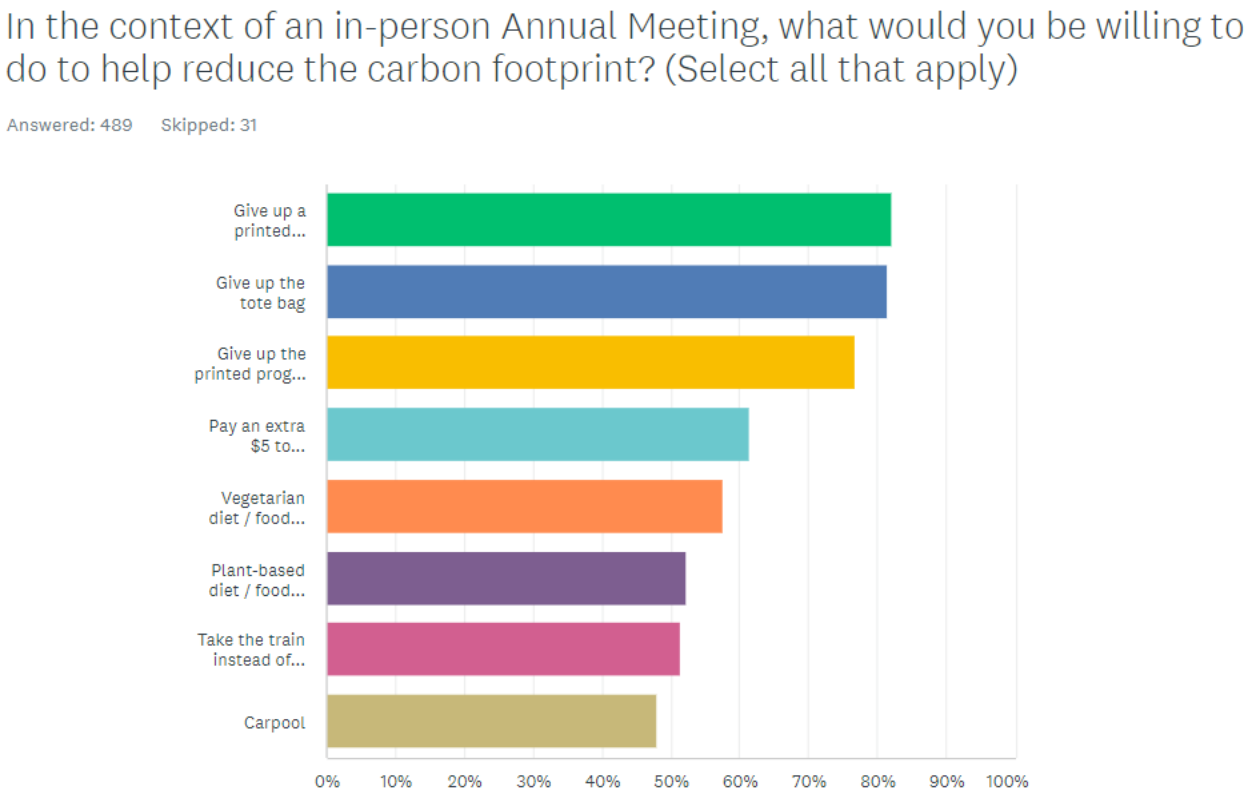


Figure 5.5. *Survey respondents' willingness to reduce the AM's carbon emissions through other means than changing the format.*

While taking the train rather than flying and paying a small amount for a carbon offset received some enthusiasm (51% and 61% respectively), both induced concerns in the comments section. As noted (rightly), the U.S. does not have a convenient rail system, and even in the Northeast Corridor it is relatively time-consuming and expensive to get even to large cities such as Boston. While the will to use rail instead of air exists, that may be more theoretical than practical in the end. Likewise, the narratives revealed a distrust of the efficacy of carbon offset plans. While attendees might be willing to pay for one, they want to see copious data indicating that the money is being well spent and not a form of greenwashing. This will involve some additional effort on ASOR's part.

5.6. Takeaways from the Survey Results

The 2022 survey on the ASOR AM and its climate impact provided valuable insight into members' views on this topic. We consider the following to be the most important takeaways for the purpose of determining the best strategy for making the AM carbon neutral:

1. Large majorities strongly agreed or agreed that climate change is a major threat to MENA's cultural heritage and that fighting climate change is part of ASOR's mission (**Fig. 5.2**).
2. The top two requisites for AM attendance–academic engagement and distance, cost, and accessibility concerns (**Fig. 5.1**)–are fulfilled equally well or better by virtual meeting formats compared to in-person ones. The third and fourth priorities–socializing and professional networking–are better served by meeting in-person.
3. Members' preference for live over pre-recorded papers in virtual meeting formats (**Fig. 5.3**) should be considered in planning for future AMs.
4. Survey respondents were most willing to give up physical paraphernalia of the AM (**Fig. 5.5**). Interest was also shown in plant-based foods, greener transportation methods, and carbon offsets, but more reservations about the feasibility and effectiveness of the latter two were expressed in the comments.
5. Most importantly, a majority of respondents support the continuation of a virtual option for meeting participation, while a format that allows both in-person and virtual attendance is likely to satisfy the most people (**Fig. 5.4**).

6. EVALUATION OF DIFFERENT MITIGATION STRATEGIES

6.1. Introduction

There is significant variability in the reduction of emissions by the different mitigation strategies for the ASOR Annual Meeting as outlined in Section 4, ranging from massive (virtual-only meetings) to miniscule reductions (e.g., encouraging the use of public transportation). Of course, these strategies would also have important effects beyond climate mitigation: on equity, engagement, and inclusivity in the meeting and the society and on costs and revenues. Below, we estimate the anticipated effect of changes to the meeting format on the AM's carbon footprint and discuss other factors that should be considered in decision-making about the future of the AM and how best to achieve carbon neutrality.

6.2. Emissions Reduction

To estimate the potential effectiveness of the meeting formats proposed above at reducing carbon emissions from the baseline of the traditional in-person-only meeting format (business-as-usual, or BAU), **we modeled emissions from a hypothetical ASOR AM of 1000 people in each format** (see **Fig. 6.1** for results). See Appendix 2 for full methodological details.

To model travel and on-site emissions for meeting formats that included in-person components (options B-D, F-G in Fig. 6.1), we set the meeting location to Chicago, except for the meeting located centrally within ASOR's geographic network (option E), for which the meeting was set in Baltimore (see **Fig. 4.2**). To model a distributed meeting (options F1-F2), the ASOR-MENA meeting site was set to Amman.

For the dual-component meeting, where participants would have the option to attend in-person, online, or both, we separately modeled virtual-only attendance rates of 10% (option C1 in Fig. 6.1) and 25% (option C2). For the hybrid meeting, we modeled 20% (option D1) and 40% (option D2) virtual-only attendance rates. It should be noted that based on the most recent evidence (see Section 6.3 below), the lower ends of these virtual-only attendance estimates are more likely.

Description		Meeting City	Travel Emissions ($t CO_2$)	Meeting Site Emissions ($t CO_2$)	Online Emissions ($t CO_2$)	Avg. Annual Emissions ($t CO_2$)	Change from BAU
A. Virtual-only, every year		N/A	0	0	19.0	**19**	-99%
B. Alternating years, in-person/virtual		Chicago	1238/0	79.4/0	0/19.0	**668**	-49%
C. Dual-component (in-person and virtual components held at separate times)	1. 10% virtual-only participation	Chicago	1002	71.5	7.3	**1080**	-18%
	2. 25% virtual only participation	Chicago	835	59.6	9.3	**904**	-31%
D. Hybrid (in-person, with live-streamed contributions from remote participants)	1. 20% virtual-only participation	Chicago	890	64.8	4.2	**959**	-27%
	2. 40% virtual-only participation	Chicago	668	50.2	7.9	**726**	-45%
E. In-person, only geographically central locations		Baltimore	1071	40.2	0	**1112**	-16%
F. Distributed (US & MENA hubs)	1. Held simultaneously and partly live-streamed	Chicago+ Amman	957	84.3	0.5	**1042**	-21%
	2. Separate meetings, US in fall, MENA in summer	Chicago+ Amman	898	87.7	0	**985**	-25%
G. Alternating years, in-person/no meeting		Chicago	1238/0	79.4/0	0	**659**	-50%
BAU. In-person only (pre-pandemic status quo)		Chicago	1238	79.4	0	**1317**	0%

Figure 6.1. *The Annual Meeting formats considered have the potential to reduce the meeting's carbon footprint by 16% to 99% compared to the traditional in-person-only meeting (BAU). Estimates are based on modeling a 1000-person ASOR AM in each format in the location listed. See Appendix 2 for more details of the methodology.*

6.3. Participation, Engagement, and Equity

During the COVID-19 pandemic, many people realized that virtual meetings can effectively reproduce many of the functions of the traditional academic conference; nevertheless, many also missed the networking, socializing, and sightseeing opportunities provided by in-person events (Raby and Madden 2020) (see Section 5.2 on ASOR members' priorities for conference attendance). On the other hand, virtual meetings are providing new professional and academic opportunities for people who have previously been excluded from conference participation by prohibitive travel costs and requirements (e.g., visa approvals) and physical accessibility constraints (Sarabipour et al. 2021). One study also showed that participants found that virtual conferences improved inclusivity, power dynamics, and the quality of feedback compared to in-person ones (Foramitti et al. 2021). Below, attendance data from the natural experiment of the virtual-only (2020) and dual-component (2021) ASOR Annual Meetings help us evaluate the effects of these formats on participation, engagement, and equity.

Meeting registrations actually grew 19% over previous years at both the 2020 Virtual AM (1088) and the 2021 dual-component AM (1085) (**Fig. 6.2**). In 2021 (after the advent of COVID-19 vaccines, but during the rise of the omicron variant), 49% of registrants attended the in-person Chicago meeting. We do not have attendance figures for the remaining 51% of registrants, but presumably a majority of these attended the online meeting. The final number of registrations for the 2022 dual-component AM (911 as of Nov.

12, 2022, with a few more registrations anticipated on-site) may end up nearly equal to 2020 and 2021. With the subsiding severity of the pandemic, however, the proportion of virtual-only registrations (currently 13%, possibly falling to 11% with additional on-site registrations) has dropped dramatically in 2022. Nevertheless, almost 50% of paper presenters still wished to present their research virtually in addition to in-person.

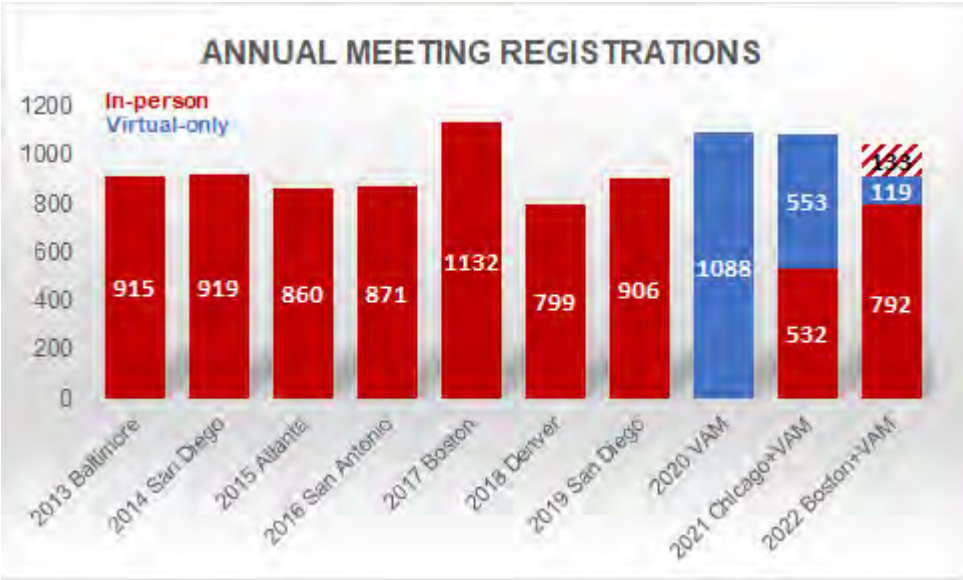


Figure 6.2. *AM Registrations increased 19% in 2020 and 2021 over average. While 49% of registrants attended the 2021 dual-component AM in person, this proportion increased considerably at the 2022 AM, demonstrating the reduced enthusiasm for the current form of virtual-only participation now that the severity of the COVID-19 pandemic had decreased.*

International participation grew almost 30% in 2021 (2020 data unavailable) over the 2013-2018 average with a 33% increase in the number of countries represented (**Fig. 6.3**) and a 65% increase in the number of participants from MENA countries (**Fig. 6.4**). This is a clear demonstration of the potential of virtual meetings to expand the AM's accessibility,[18] especially to people living in the countries where ASOR members' research is concentrated, an important step toward making the discipline more equitable and inclusive.[19] ASOR staff are aware that more than a few attendees from outside of North America were not able to attend the in-person component of the 2021 and 2022 AMs, so having the virtual option was important for those members. As mentioned above, a distributed meeting with a MENA hub (option F) could have a similar benefit of boosting participation by MENA and other international residents.

[18] On less accessible aspects of virtual meetings, however, see Vasquez 2021.

[19] Other demographic data that would allow analysis of the format's effect on other aspects of accessibility, inclusivity, and equity were not collected in this study.

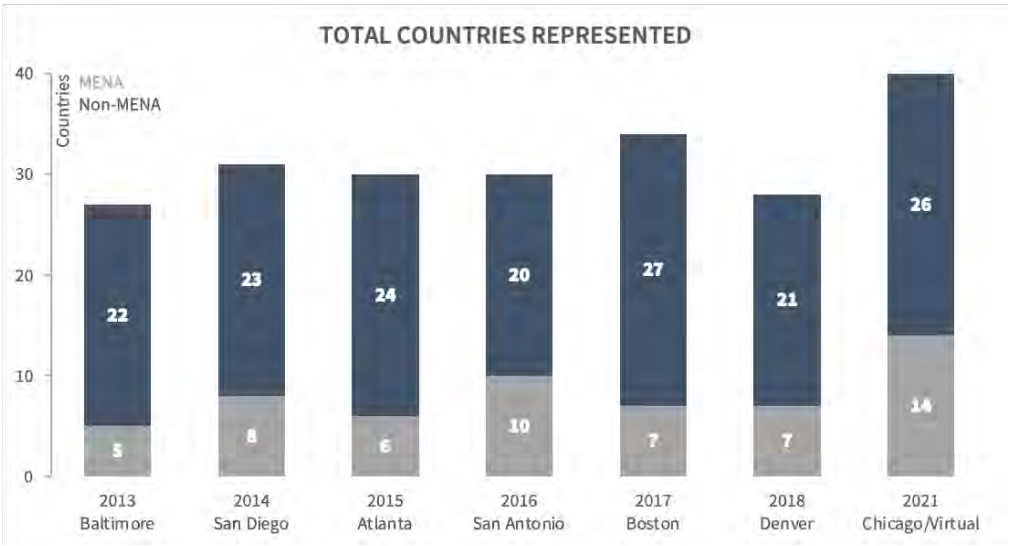


Figure 6.3. *The number of countries represented among ASOR Annual Meeting attendees at the 2021 dual-component meeting increased 33% overall over the 2013-2018 average.*

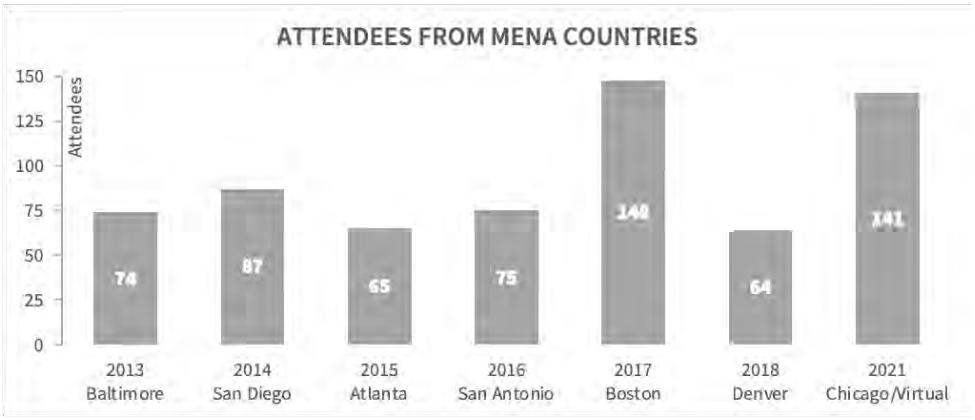


Figure 6.4. *The number of ASOR meeting attendees from countries in the Middle East and North Africa increased 65% over the 2013-2018 average at the 2021 dual-component meeting.*

Participation data from the virtual meeting components gives a different view. At the 2020 VAM, about 800 people attended at least one session, but only 25% of these attended five or more sessions. At the 2022 dual-component AM, about 450 people attended at least one virtual session, but 80% of attendees only logged into three or fewer sessions—50% logged into only a single session.[20] Further, the vast majority of 2022 virtual sessions had 15-25 attendees, and only two sessions had more than 40 attendees (the maximum was 44 attendees). These data indicate that a large majority only attended sessions that were directly related to their research or interests. It also suggests less engagement with the asynchronous

[20] 5% of virtual attendees (about 20 people) logged into 10+ sessions in 2022.

meeting format and less ability to dedicate time to the virtual meeting in the home or office setting, where many other tasks are competing for attention. According to anecdotal feedback, some in-person registrants found it very difficult to find time to attend both components and thus prioritized the in-person meeting, resulting in less attention and feedback for virtual-only presenters.

In summary, ASOR registration numbers and virtual attendance data point to a strong desire among most attendees for an in-person meeting. At the same time, the dual-component model has clearly been successful in increasing participation and accessibility by scholars in the MENA region. The member survey data (see Section 5.4) show majority support for continuing to provide a virtual option, as 59% of respondents ranked a format that included a virtual component as their first choice for the AM's future. It is possible that "Zoom-fatigue" may in future fade, and virtual-only registrations may rebound somewhat as a money- and time-saving convenience. If a virtual format is retained in future meetings, new strategies may be needed to increase engagement and replicate the networking and community-building opportunities of in-person events, however (Rogers et al. 2018; Raby and Madden 2020; Foramitti et al. 2021; Othman et al. 2021; Shetty et al. 2022). It is probable that enthusiasm and participation would be greater for hybrid meetings with simultaneous and integrated virtual and in-person components (Placket 2022) where all attendees can participate equally, and for live-streamed rather than pre-recorded papers that are less demanding on attendees' time (see survey results in Section 5.4).

6.4. Costs and Revenues

Different meeting formats will have different costs, effects on revenue, and impact on membership engagement. Most significantly, while holding a virtual meeting component with pre-recorded papers has significant IT costs, live-streaming of content in a hotel conference center costs much more. Revenue from memberships and registrations offsets the Annual Meeting's cost to ASOR, and the Annual Meeting is a major driver of membership revenue. Up to 400 people a year join or renew their ASOR membership based on Annual Meeting attendance, such that registration increases and decreases also affect revenue from memberships. Some meeting formats (such as hybrid, dual-component) might boost membership and registrations by making the meeting more accessible. Other formats (e.g., virtual only, every other year) might cause revenue to decline.

The following is an estimate by Andy Vaughn (based on staff feedback and data gleaned from past meetings) for the financial impact of various meeting options proposed above for the reduction of the AM's carbon emissions:

- **Virtual-only meetings:** Andy estimates that membership and registrations could drop by 300-400 per year (based on virtual registrations in 2020, 2021, and 2022). This model could be sustainable if ASOR moved away from a larger staff and returned to a volunteer model to oversee fellowships, publications, and a virtual meeting. This model would have the most favorable impact on the climate.
- **Alternating years (in-person one year, virtual the next year):** Potential loss of 300-400 members in the off-years, and risk of losing engagement. This model could work financially, but it might necessitate changing ASOR's management model.

- **Dual component (separate in-person and virtual meeting [without pre-recorded papers]):** Registration numbers would likely be consistent with the 2022 Meeting. The pre-recorded meeting in 2022 cost about $25,000, but ASOR staff estimate that those costs may be reduced to $10,000 if the pre-recorded papers were removed. Staff time would also be dramatically reduced without pre-recorded papers.
- **Hybrid meetings (in-person with live-streaming of remote contributions):** Membership and registration numbers would likely experience some increase. Based on provisional AV quotes, Andy estimates that a hybrid meeting would cost $60,000 - $75,000 more than our standard AV contracts. Arlene Press's estimate was about $100,000. Andy and Arlene are seeking further quotes from vendors so that we can have a more precise estimate by the time of the November Board meeting. Andy conferred with AIA staff, and these estimates are in the same ballpark as costs at the upcoming AIA/SCS meeting.
- **In-person only, held only in eastern U.S. locations:** Membership and registration numbers would likely experience some increase because meetings on the East Coast draw more attendees. AV costs would be similar to the status quo.
- **Distributed meeting (US & MENA hubs) (held simultaneously & partly live-streamed):** Membership numbers would likely stay stable. AV costs would be more, but much less than hybrid because only select events would be live-streamed.
- **Distributed meeting (US + MENA hubs) (separate meetings, US in Nov., MENA in summer):** Membership and registration numbers from the U.S. meeting would remain stable. AV costs would be status quo. Memberships would likely grow from the MENA meeting, but increased staff costs might offset increased revenues.
- **Alternating years, in-person meeting / no meeting:** Potential loss of 400 members in the off-years. Same consequences for staffing as above.
- In-person only, pre-COVID roster of locations: No change from the status quo.

6.5. Comparison and Evaluation of Major Mitigation Strategies

Analysis of potential changes to the ASOR Annual Meeting's traditional format and/or locations shows that there are several ways to significantly reduce its carbon footprint and climate impact before turning to carbon offsets. A change to virtual-only meetings would almost entirely eliminate emissions (99% reduction), while enabling academic exchange, increasing accessibility, and cutting costs (**Fig. 6.5**). The last-place position of this format in the member survey (see Section 5.4) suggests that many members would be very reluctant to give up the benefits of in-person interaction, however, which many have come to value all the more in the wake of two years of pandemic restrictions. Such a change might have broader effects on the character and size of the society. Considering this, other options deserve a closer look.

Description	Meeting City	Avg. Annual Emissions (t CO_2)	Change from BAU	Engage-ment	Inclus-ivity	Member Survey Ranking	Costs	Reve-nue	Carbon Offset ($30/t CO_2)
A. Virtual-only, every year	N/A	19	-99%	↑↓↓	↑↑↑	7	↓↓↓	↓↓	$570
G. Alternating years, in-person/no meeting	Chicago	659	-50%	↓	—	3	↓↓	↓↓	$19,758
B. Alternating years, in-person/virtual	Chicago	668	-49%	↑↓	↑↑	2	↓	↓	$20,043
D2. Hybrid (in-person, with live-streamed contributions from remote participants): *40% virtual-only participation*	Chicago	726	-45%	↑	↑↑	1	↑↑↑	↑	$21,773
C2. Dual-component (in-person and virtual components held at separate times): *25% virtual only participation*	Chicago	904	-31%	↑↓	↑	1	↑	↑	$27,105
D1. Hybrid (in-person, with live-streamed contributions from remote participants): *20% virtual-only participation*	Chicago	959	-27%	↑↑	↑↑	1	↑↑↑	↑	$28,777
F2. Distributed (US + MENA hubs): *Separate meetings, US in fall, MENA in summer*	Chicago+ Amman	985	-25%	↑↓	↑↑	5	↑↑	↑	$29,557
F1. Distributed (US + MENA hubs): *Held simultaneously & partly live-streamed*	Chicago+ Amman	1042	-21%	↑	↑↑	5	↑↑	↑	$31,254
C1. Dual-component (in-person and virtual components held at separate times): *10% virtual-only participation*	Chicago	1080	-18%	↑↓↓	↑	1	↑	↑	$32,347
E. In-person, held only in geographically central locations	Baltimore	1112	-16%	—	↑↓	4	—	↑	$33,345
BAU. In-person only (pre-pandemic status quo)	Chicago	1317	0%	—	—	6	—	—	$39,515

Figure 6.5. *The annual meeting formats considered are ordered here from most (99%) to least (16%) effective at reducing the meeting's emissions compared to the traditional in-person-only meeting (BAU), highlighted in orange. Possible effects on engagement, inclusivity, costs, and revenues are indicated with up (increase) and down (decrease) arrows, doubled or tripled to indicate relatively greater changes, and colored green or red to indicate, respectively, favorable or unfavorable change. Mixed effects are indicated by a combination of up and down arrows. The ranking of these options according to the member survey is also given–where numbers are the same, these variants were not distinguished in the survey questions. The cost to buy carbon offsets for the residual meeting emissions are given at $30 per metric ton CO_2 (see Section 4.4).*

Weighing the balance of emissions reduction, accessibility, inclusivity, member engagement, and financial and logistical feasibility, the committee voted on which meeting strategies to recommend for serious consideration by the Board (see Section 7.2). The following four meeting formats were most highly ranked by the committee. Each has advantages and disadvantages to consider:

1. **Hybrid meeting** (in-person, with live-streamed contributions from virtual participants)
    - *Pros*: Moderate to significant emissions reduction, depending on the ratio of in-person to virtual participants; attendees have the opportunity to participate *fully* in the manner of their choice; greater accessibility and inclusion might grow membership; highest ranking in the member survey.
    - *Cons*: Very expensive audio-visual and IT costs and logistical complexity; payoff for this investment in remote participation and accompanying emissions reduction depends on attendees' unpredictable choices; switching to a university host to cut costs might require significant changes to the organization of ASOR and the AM.

2. **Alternating in-person and virtual meetings**
    - *Pros*: Significant emissions reduction; greater simplicity and much lower cost of implementation than hybrid; ranked second in the member survey; everyone gets what they prefer or need at least half the time; all attendees have an equal experience and opportunity for feedback and networking in a given year's AM, thereby increasing inclusivity.
    - *Cons*: Memberships and registrations may drop overall, probably more significantly in virtual-meeting years, causing a loss of revenue; reduced staff needs in the virtual years might entail restructuring.
3. **Dual-component meeting** (in-person and virtual components held separately)
    - *Pros*: Small to moderate emissions reduction; proven logistically and financially feasible in 2021 and 2022; attendees have the opportunity to participate in the manner of their choice; greater accessibility and inclusion might grow membership.
    - *Cons*: Dramatic drop in virtual-only participation in 2022 means the gains in the AM's sustainability, accessibility, and inclusivity are likely to be relatively small going forward; lower professional benefit for virtual-only participants, as their talks or posters receive less attention and they have no access to in-person talks.
4. **Distributed meeting with U.S. and MENA hub**s: held simultaneously and *partly* live-streamed
    - *Pros*: Moderate emissions reduction; North American and international attendees can equally access the professional benefits of meeting in-person; greater accessibility and inclusion might grow membership.
    - *Cons*: Significant increase in costs and logistical challenge; less accessible and inclusive for those who cannot travel.

It should be noted in addition that limiting in-person meetings to the eastern U.S., in particular the Mid-Atlantic region, is an additive strategy that can be combined with any variant in Fig. 6.5 that includes an in-person meeting. This strategy should be strongly considered, as it offers significant further reduction in average per capita travel emissions compared to cities such as San Diego, Denver, and San Antonio, where SBL/AAR will continue to meet (**Fig. 6.6**). ***In fact, hosting the meeting in these western cities can actually cancel out any emissions reduction from adding a virtual component.*** As attendance of SBL/AAR ranked last in the member survey as a factor in ASOR meeting attendance (see **Fig. 5.1**) and was considered a top-three factor by only 82 people, desire to meet together with SBL/AAR should not outweigh the significant increase in carbon emissions caused by the western meeting sites.

Description	Meeting City	Avg. Annual Emissions (t CO_2)	Change from BAU
Hybrid (in-person, with live-streamed contributions from remote participants), 20% virtual-only participation	San Diego	1299	-1%
	Chicago	958	-27%
	Baltimore	791	-40%
Alternating years, in-person/virtual (averaged over two years)	San Diego	892	-32%
	Chicago	668	-49%
	Baltimore	565	-57%
Dual-component (in-person and virtual components held at separate times), 10% virtual-only participation	San Diego	1463	+11%
	Chicago	1078	-18%
	Baltimore	810	-39%
Distributed (US & MENA hubs), held simultaneously and partly live-streamed	San Diego	1382	+5%
	Chicago	1042	-21%
	Baltimore	834	-37%
In-person only (pre-pandemic status quo)	Chicago	**1317**	**0%**

Figure 6.6. *Comparison of the estimated emissions for the four recommended meeting formats when sited in a western (red), central (yellow), and eastern (green) U.S. city, demonstrating the significant effect of location.*

7. KEY FINDINGS AND RECOMMENDATIONS

7.1. Key Findings

Below, we reiterate the most important findings of the committee's study:

7.1.1. Why We Must Act

- The accelerating climate crisis has a disproportionately harmful effect on the people and cultural heritage of MENA.
- Combating climate change is part of ASOR's mission to "protect, preserve, and present to the public the historical and cultural heritage of the Near East and Mediterranean and to raise awareness of its degradation," as 78% of ASOR member survey respondents agreed.
- Given the historical connection of Near Eastern archaeology with colonialism and fossil fuels and continuing imbalances between the climate-change contributions of North America and MENA, archaeologists who live in North America carry particular responsibility for decarbonizing our practices.
- ASOR can and should lead peer learned societies in advocacy for disciplinary decarbonization. Such leadership would not only advance the public good, but this type of stance would be a motivating factor in attracting and retaining the new generation of ASOR members. Reducing the carbon footprint of the Annual Meeting is perhaps the most visible and immediate action ASOR can take to reduce its climate impact.

7.1.2. Carbon Emissions from the ASOR Annual Meeting

- Carbon emissions of the average traditional ASOR AM total ca. **1266 metric tons CO_2**.
- Average per capita emissions for AM attendance, at **1.38 metric tons CO_2**, are:
    - Incompatible with the personal annual carbon budget of 2.0-2.5 tons CO_2 needed to prevent global warming of more than 1.5° C by 2030; and
    - Inequitable, being equivalent to more than a third (ca. 38%) of annual per capita carbon emissions in ASOR's core study countries.
- Travel produces ca. **97%** of the AM's carbon footprint, and overseas flights contribute **61%** of the travel emissions. Mitigation strategies should therefore focus on reducing the necessity for and/or distance of travel to the meeting site.
- Travel emissions are up to **46% lower** per capita when the AM is sited in the eastern U.S., specifically the **Mid-Atlantic region**, the center of ASOR attendees' geographic network.
- Long-distance and international travel likewise present the greatest barriers to meeting attendance by lower-income, disabled, caregiver, and international scholars. Strategies for the AM that allow participation without long-haul travel could mitigate its climate impact while making it more accessible and inclusive.

7.1.3. Member Views on Future AM Formats

- The top factors affecting survey respondents' AM attendance are: 1) academic engagement; 2) distance, cost, or accessibility of travel; 3) socializing with friends and colleagues; and 4)

professional networking. The first two are fulfilled equally or better by virtual meetings, while the third and fourth are better served by meeting in person.

- Survey respondents preferred virtual meetings with **live (synchronous) presentations and discussion** to those with pre-recorded presentations and live (synchronous) discussion.
- The top-ranked preferences for the future AM format among those surveyed are: 1) hybrid or dual-component meetings; 2) annual alternation of in-person and virtual meetings; and 3) biennial in-person meetings. Virtual-only meetings and returning to the pre-pandemic status quo ranked lowest. A majority supports continuation of a virtual option for meeting participation, while a format that allows both in-person and virtual attendance will satisfy the most people.

7.1.4. Evaluation of Potential Mitigation Strategies

- Analysis of various potential meeting formats and/or frequencies found that these will reduce the AM's carbon emissions from the traditional in-person-only model by the following amounts:
    - Dual-component meeting with 10% virtual participation: ca. **-18%**
    - Distributed meeting with U.S. and MENA hubs, held simultaneously: ca. **-21%**
    - Distributed meeting with U.S. and MENA hubs, separate meetings: ca. **-25%**
    - Hybrid meeting with 20% virtual participation: ca. **-27%**
    - Alternating years, in-person/virtual meetings: ca. **-49%**
    - Alternating years, in-person/no meeting (biennial meeting): ca. **-50%**
    - Virtual-only meeting: ca. **-99%**.
- Analysis of 2020 virtual AM and 2021 dual-component AM attendance during the COVID-19 pandemic shows that these formats increased registrations and made the AM more accessible to international scholars, particularly from MENA. However, enthusiasm for the stand-alone virtual component has waned, and competing time demands have a significant dampening effect on engagement with and professional benefit from it.
- Estimation of the costs of potential meeting formats and their effects on registration and membership revenues suggests that the formats presenting the smallest to largest changes from the financial status quo are:
    - Dual-component meeting (changing to live papers)
    - Alternating years, in-person/no meeting (biennial meeting)
    - Alternating in-person/virtual meetings
    - Dual-component meeting (with pre-recorded papers)
    - Virtual-only meeting
    - Distributed meeting with U.S. and MENA hubs, partly live-streamed
    - Hybrid meeting (in-person, with live-streamed virtual contributions)

  The reduced staffing requirements of the virtual-only, alternating in-person/virtual, and biennial models might have further significant organizational effects.
- ASOR should attempt to reduce the meeting's carbon emissions as much as is feasible before turning to **carbon offsets**, as they do not reduce overall atmospheric CO_2 concentrations and are often unreliable. Carbon offset programs must be carefully vetted, and high-quality offsets currently cost \$15–45 per metric ton CO_2. The cost of offsetting the AM's emissions decreases in parallel with the amount of direct emissions reduction offered by different meeting formats (from \$39,500 for the pre-pandemic status quo to \$570 for a virtual-only meeting).

7.2. Recommendations to the Board of Trustees

The committee makes the following recommendations to the Board regarding strategies for making the ASOR Annual Meeting carbon neutral:

1. **Meeting Format**: The following four meeting formats present a good balance of emissions reduction, accessibility, inclusivity, and feasibility and should be considered for adoption, with additional costs being covered through a combination of operating funds and contributions (see Section 6.5):
    - **Hybrid meeting** (in-person, with live-streamed contributions from virtual participants): ca 27% emissions reduction, given 20% virtual-only participation
    - Alternating in-person and virtual meetings: ca. 49% emissions reduction
    - **Dual-component meeting** (in-person and virtual components held separately): ca. 18% emissions reduction, given 10% virtual-only participation
    - **Distributed meeting with U.S. and MENA hubs** (held simultaneously and partly live-streamed): ca. 21% emissions reduction, given 11% MENA attendance

    Pandemic conditions have transformed academic gatherings and a hybrid model with live-streaming is the future (Bellows 2022).[21] The additional cost of a live-streamed hybrid meeting may be beyond current ASOR budget allocations. However, we encourage the Board to think ambitiously and creatively about how this format, which we find to have the best balance of emissions reduction, member appeal, and inclusivity, could be attained, either now or in the future, when technologies and costs may change. If the dual-component format is retained, we recommend changes to its design that will enhance interest in the virtual component and create engagement opportunities more comparable to the in-person component. Alternating in-person and virtual formats is a popular, low-cost, simple, and effective solution, while a distributed meeting would be a major step forward for the inclusion of MENA colleagues.

2. **Meeting Location**: Limiting in-person meetings to the eastern U.S., in particular the Mid-Atlantic region, should be strongly considered, as this offers significant further reduction to travel emissions compared to cities such as San Diego, Denver, and San Antonio, where SBL/AAR will continue to meet (see Section 6.5 with Fig. 6.6).

3. **Meeting Operation:** ASOR staff should continue the practice begun this year of discussing sustainability requests with hotel management during the negotiation process that decrease waste and single-use items (see Appendix 5). Catered meals should prioritize plant-based and locally-sourced foods, and hotels should be well connected with public transportation. ASOR should also continue to reduce or even eliminate the distribution of paper programs and abstract books and tote bags (see Section 4.3).

---

[21] As *Chronicle* reporter Kate Bellows put it, "if the possibility of online options fades with time, associations may find themselves characterized the way they hate most: as elite, homogenous clubs that are out of touch" (Bellows 2022).

4. **Promoting and Incentivizing Sustainable Choices:** ASOR should encourage AM attendees to make more sustainable choices for travel and practices at the meeting through promotion (e.g., on the AM travel webpage and in best-practice guides on the website and digital program) and incentives (e.g., small discounts and "green badges") (see Sections 4.2 and 4.3). ASOR should also prominently promote the environmental advantages of remote attendance.

5. **Carbon Offsets:** Every effort should be made to reduce the production of carbon emissions by the AM as far as possible before resorting to carbon offsets, whose efficacy in the fight against climate change is debatable. ASOR should partner with an established program that can help it calculate and identify high-quality offsets for the AM's estimated remaining emissions and commit operating funds for their purchase (see Section 4.4). The feasibility of establishing a micro-grants program to sponsor the integration of sustainability and climate mitigation efforts with cultural heritage projects in the MENA region should be explored further (see point 6 below).

6. **Climate Impact Subcommittees:** In order to continue the work of this *ad hoc* committee, subcommittees focused on the decarbonization of various areas of ASOR's activities should be formed within various standing committees. A Program Committee subcommittee should monitor progress in the reduction of the AM's emissions over time and develop the promotion and incentivization of sustainable practices by attendees; a CAP or Cultural Heritage subcommittee can research the above-mentioned micro-grants program for decarbonization in the field; and a Publications subcommittee can research the decarbonization of this area (see Appendix 4).

7. **Public and Transparent Sustainability Policies:** In order to be a leader in climate-impact mitigation among learned societies, ASOR should publicize the actions it is taking clearly and prominently on the website and make this report, future reports monitoring meeting emissions, and further best-practice resources easily accessible.

APPENDIX 1: Review of Peer Societies' Approach to Climate Impact

In order to investigate what ASOR could be doing to adjust its carbon footprint we conducted a non-exhaustive, non-systematic survey (N=27) of how peer organizations (AAA, AIA, EAA, SAA, AAR/SBL, WAC, and others) were engaging with climate impact and annual meeting carbon footprints. We polled a cross-section of different associations with which we were familiar, ranging from large meetings to smaller societies of a few hundred people. This included archaeological organizations, societies in fields adjacent to archaeology/Near Eastern studies, and broader academic societies and professional organizations from North America and worldwide. This survey of peer organizations suggests that ASOR is behind some organizations in some ways, but ahead of others. Acknowledging that their various memberships want in-person meetings, also true of the ASOR constituency, several of our peer institutions have established committees to examine climate impact but not many have stated concrete steps towards mitigation. Several common threads emerged in our survey of peer institutions:

1) There is not yet a consensus about how and what learned societies and academic meetings should do to respond to the climate crisis, but many recognize that it is an issue that will need to be addressed in the coming years. To that end, other organizations that have taken action have either formed committees to explore the issue and/or issued statements on the impact of climate change (ex. the American Anthropological Association Statement on Humanity and Climate Change).

2) Almost all have sessions at meetings (some standing, some special) applying the topics of climate change, sustainability, Anthropocene, etc. to their particular research focus.

3) Several have particularly good resources on ways to protect heritage from climate change/mitigate climate destruction of heritage. While not a specific goal of our committee, the development of a set of comparable resources by ASOR, perhaps on the website, on this topic ought to be a priority more broadly.

4) Statements released by organizations tend to focus on the broad dangers of climate change to contemporary society, or to the specific area of their expertise. For example, the SAA and CAA both discuss the dangers of climate change to the preservation of cultural heritage. These statements tend not to assess the climate impact of organizations activities or their meetings.

5) Of the 27 examples, only three had specific committees listed (that we could find) that were charged with addressing the climate impact of the organization and/or coordinating climate action more broadly.

6) None mentioned the ways in which reducing carbon footprints can have positive impacts on equity and inclusivity of meetings.

7) Information regarding the climate impact and mitigation efforts of most societies is, in general, not readily available online. Few organizations list the steps they are taking to reduce their carbon impact, if any. Only one of the surveyed organizations, the Ecological Society of America, has a specific FAQ

available listing their efforts to reduce the climate impact of their meeting and providing guidelines to their membership for further steps individuals can take to reduce their climate impact.

8) Several organizations list reduced climate impact as one of the advantages to their (usually temporary) switch to virtual meetings due to the COVID-19 pandemic.

9) Only one of the surveyed organizations has currently funded carbon offsets or other similar mitigation activities. The ESA donated over $22,000 in 2017 to a sustainable forestry program in Oregon, as part of its efforts to offset its 2017 annual meeting in Portland (https://www.esa.org/sustainable-northwest-receives-environmental-offsets-esa2017/). It also lists steps taken to reduce the impact of their meeting locally, including encouraging the use of reusable cups/mugs, selecting carbon-conscious venues, and partnering with local environmental programs.

More broadly, the carbon impact of academic conferences is a topic of increasingly vigorous scholarly discussion. It has already resulted in publications of meta-analyses and surveys in top journals (e.g. Sarabipour et al., 2021; Jordan and Palmer, 2020; Sanz-Cobena et al., 2020), discussion in public spaces like Twitter, and increasingly will contribute to the building of resources by associations themselves. In a useful study of 270 academic meetings from a wide variety of disciplines, Sarabipour et al. (2021) suggest that 35% of an average researcher's overall carbon footprint is from conference travel and participation. In addition to issues of diversity, inclusivity, ECR promotion, networking and career development, venue accessibility, etc. they focus on reducing carbon footprints of meetings as a major area of necessary reform. This research found that meetings could be improved significantly in reducing the meetings' carbon footprint while also contributing to greater equity. In 2016, scholars at UCSB put together a template for a "nearly carbon neutral conference" that focused on a virtual format (https://hiltner.english.ucsb.edu/index.php/ncnc-guide/). A continually updated document by R. Kim, and B. Pierce (2018) gives a useful summary of carbon offsetting for professional organizing, including recommendations on carbon marketplaces to use, and examples of multiple academic professional organizations that have employed offsetting in the past.

The work of this Ad Hoc Committee is already making an impact in the work of other professional organizations. Committee member Omur Harmansah serves as an academic trustee on the Governing Board of the Archaeological Institute of America. In the latest Governing Board Meeting of the AIA in January 2022, Harmansah reported on the work of ASOR's Ad Hoc Climate Impact Committee and urged AIA leadership to follow suit, to take a leadership role in addressing the climate impact of annual meetings, and adopt best practices towards fighting climate change as an academic community. The response was enthusiastic from the entire board, and the AIA Governing Board resolved that a Task Force on Climate Change be established in 2022.

Based on our survey, we conclude that relatively few organizations, particularly large academic conferences and organizations in fields related to archaeology and cultural heritage, have taken concrete steps to mitigate the carbon impact of their meetings. ASOR therefore has an opportunity to be a leader through concrete action and transparent communication of efforts to reduce the climate impact of its meetings to its membership and the public. We believe that ASOR will already outpace peer organizations simply by producing clear, accessible guidelines and action items (both institutional and

individual) for reducing the carbon footprint of the meeting, listed in a FAQ on the Annual Meeting webpage.

Useful resources from peer organizations, including statements on climate change:

- Final report by AAA Changing the Atmosphere taskforce (https://www.americananthro.org/ParticipateAndAdvocate/CommitteeDetail.aspx?ItemNumber=12918)
- GSA Position Statement on Climate Change (https://www.geosociety.org/documents/gsa/positions/pos10_climate.pdf)
- Statement presented by EAA on climate change from 2021 meeting (https://www.e-a-a.org/2021Statement)
- Social Science Perspectives on Climate Change workshop (https://www.globalchange.gov/content/social-science-perspectives-climate-change-workshop) - interagency report by the Social Science Coordinating Committee (SSCC) of the U.S. Global Change Research Program (USGCRP), in cooperation with the AAA, AAG, ASA, SAA
- ARWA: Ethical guidelines for archaeological research (https://arwa-international.org/arwa-ethics-charter/). Includes recommendation that members comply "to the best of their ability with the values it promotes, even in situations of conflict." This includes calls for protection of heritage and environment, protection of human rights, sustainable local development, and others."
- Kim, R. and B. C. Pierce 2018. Carbon Offsets An Overview for Scientific Societies. Version 1.2. https://www.cis.upenn.edu/~bcpierce/papers/carbon-offsets.pdf
- Broad set of helpful resources on climate change for scientists, including outreach, etc. (https://www.aaas.org/news/aaas-climate-change-resources)

APPENDIX 2: Calculating the Carbon Emissions of the Annual Meeting

Calculating Carbon Emissions from Travel to the 2013-2018 ASOR Annual Meetings

Estimation of carbon emissions from AM-related travel from 2013 to 2018 was carried out by Dr. Lucas Stephens (EPA), updating the methodology and results of his earlier study (Stephens and Herrmann 2019). ASOR staff provided anonymized attendance data from the 2013 through 2018 AMs that included the city of each attendee's institutional affiliation. The 2019 AM in San Diego also followed the traditional in-person format. However, since San Diego was already represented in the dataset by the 2014 meeting and produced the highest emissions of all locations considered, including the 2019 meeting in this study would have unduly skewed the annual average upward.

We assumed that attendees had flown from the busiest airport in each state/province (for the U.S. and Canada) or country (for international locations) to the airport at the meeting location and calculated the round-trip air miles between these airports. Information about the air miles between airports was derived from www.greatcirclemapper.net. Multiplying by 1.15078, these were then converted from air miles to statute miles. For attendees coming from fewer than 300 miles from the meeting location, we assumed that 90% had travelled by car and 10% by train. We used an average occupancy for car travel of 1.59 (U.S Department of Transportation 2009).. The carbon emissions of each trip were then calculated using the constants in Table A2. The results were then totaled for each year, and per capita statistics for all attendees and attendees with domestic (U.S. and Canadian) and international affiliations were computed.

Travel mode	CO_2 emissions, kg per km	Source
Air	0.202 kg	Carbon Independent 2022
Train	0.062 kg	Carbon Independent 2022
Car (with 1.59 passengers)	0.158 kg	US EPA 2022

Table A2. *Constants used in the calculation of carbon emissions from travel to the AM.*

Many complexities of the real-life travel to these meetings could not be accounted for here, including departure locations differing from the city of attendees' affiliation, additional stops in their itineraries, and the efficiency of the particular aircraft flown. The results should be considered ball-park estimates;

however, using a consistent methodology allows us to discern relative differences among meeting locations (see results in Section 3.2) and the relative effect of different meeting formats on overall emissions (see Section 6.5).

Modeling Carbon Emissions for Alternative Meeting Formats

Travel Emissions

To estimate the potential effectiveness of the meeting formats proposed in Section 4 at reducing carbon emissions from the baseline of the traditional in-person-only meeting format (business-as-usual, or BAU), we modeled emissions from a hypothetical ASOR AM of 1000 people in each format with different specifications, as follows (see Fig. 6.1 for results).

To model travel and on-site emissions for meeting formats that included in-person components (options B-D, F-G in Fig. 6.1), we set the meeting location to Chicago (except where specified below) and used the estimated per capita travel emissions for, respectively, North American (0.63 metric tons CO_2) and international attendees (3.47 metric tons CO_2) based on attendance data from the in-person component of the 2021 Chicago meeting (calculated according to the methodology described above for the 2013-2018 meetings). At the hypothetical meeting, attendance was assumed to be 79% from North America and 21% international, based on the 2013-2018 average split (except where specified below).

To model a meeting in a location central to ASOR's geographic network (option E), we set the meeting site to Baltimore (see Fig. 4.2) and used attendance data from the 2013 meeting there to estimate per-capita travel emissions (0.44 metric tons for North American, 3.39 metric tons for international attendees). The distributed ASOR-MENA meeting site was set to Amman (options F1-F2). For the simultaneous ASOR-US and ASOR-MENA meeting (option F1), 50% of the typical international attendees (proportionally distributed among countries represented at both in-person and virtual components of the 2021 AM) were rerouted to Amman and their airmiles and emissions calculated. For the separate ASOR-US and ASOR-MENA meetings (option F2), 5% of the usual North American attendees and 65% of the typical international attendees were assumed to attend ASOR-MENA instead of ASOR-US.[22]

For meeting formats where participants would have the option to attend in-person or online (or both, in the case of the asynchronous dual-component format), we used ranges of 10% (option C1) to 25% (option C2) virtual-only attendance for the dual-component meeting and 20% (option D1) to 40% (option D2)

[22] We expect that a significant number of international AM attendees would still attend ASOR-US instead of ASOR-MENA in order to meet with North American colleagues in person, among other reasons. If a number of North American members attended the summer ASOR-MENA meeting in model F2, presenting a chance for European and MENA colleagues to meet them there, a somewhat higher proportion of international attendees might choose this option than in the case of simultaneous US-MENA meetings (model F1). The additional North American and international attendees traveling to the Amman meeting from within the Eastern Hemisphere were added using the per-capita values established in the calculation of model F1.

virtual-only attendance for the hybrid meeting. For both, we also assumed a 5% reduction in the proportion of international in-person attendees (as seen in the 2021 attendance data).

Meeting and Hotel-Stay Emissions

To calculate the on-site emissions for models B-G, we used the online GreenView Hotel Footprint Tool for each model's location. We estimated the number of hotel rooms at 60% of the number of attendees for four nights and assumed 40,000 square feet of event space (reduced proportionally by attendance for models with fewer in-person attendees, i.e., C, D, and F) over 33 hours.

Virtual Meeting Component Emissions

Even entirely virtual conferences result in carbon emissions, which are mostly caused by the transfer of network data and use of electricity. For example, a recently published study in the *International Journal of Environmental Studies* calculated that a one-day virtual conference with 200 participants emits 1.324 metric tons of carbon emissions (Faber 2021). There is no clear industry standard for calculating carbon emissions produced by virtual conferences, although multiple freely available online calculators do exist, such as the Digital Event Carbon Calculator, the calculator provided by CarbonFreeConf., and a detailed and highly transparent calculator developed by Grant Faber. For our calculations, we found Faber's calculator (Faber 2021) most useful, and for the baseline, entirely virtual conference we used the program from the 2020 AM (i.e., 23 hours long).

We assumed that 20% of in-person attendees at the dual-component meeting would also attend the virtual meeting, but would spend only one-third as much time logged in as virtual-only attendees.

APPENDIX 3: Results of a Survey of Membership

In September-October 2022, an online survey of ASOR's membership was conducted to understand better the attendance and demographics of the Annual Meeting, and to gather opinions on various meeting formats for future meetings that would help ASOR reduce the AM's carbon emissions.

ASOR staff sent out an email to all members asking them to complete the survey. The text of the email was as follows:

"Dear [name],

The ASOR *Ad Hoc* Climate Impact Committee wants to hear from you about your annual meeting attendance (both virtual and in-person), and what you think ASOR should do to reduce its contribution to climate change at the Annual Meeting and beyond. Your input will help the Ad Hoc Committee formulate recommendations to the Board of Trustees for reducing ASOR's carbon impact. Please take 5-10 minutes to let us know your opinions by clicking here or the button below.

Take Survey Now

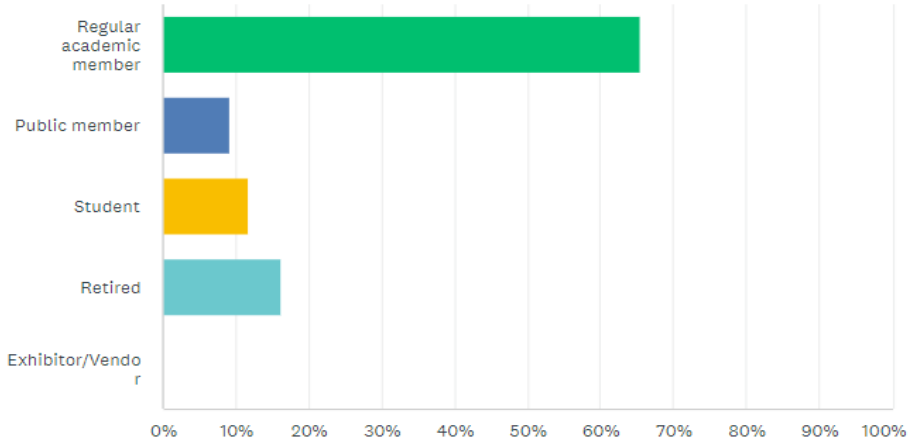
Thank you for taking the time and effort.

The ASOR *Ad Hoc* Climate Impact Committee"

The survey was administered using Survey Monkey. It consisted of twelve questions, and 520 people responded (23.6% of total membership). Response data for each question is given below. There was also an opportunity to provide comments on the questions. Out of concern for respondents' privacy, the comments are not reproduced here.

Describe your role as an ASOR Member

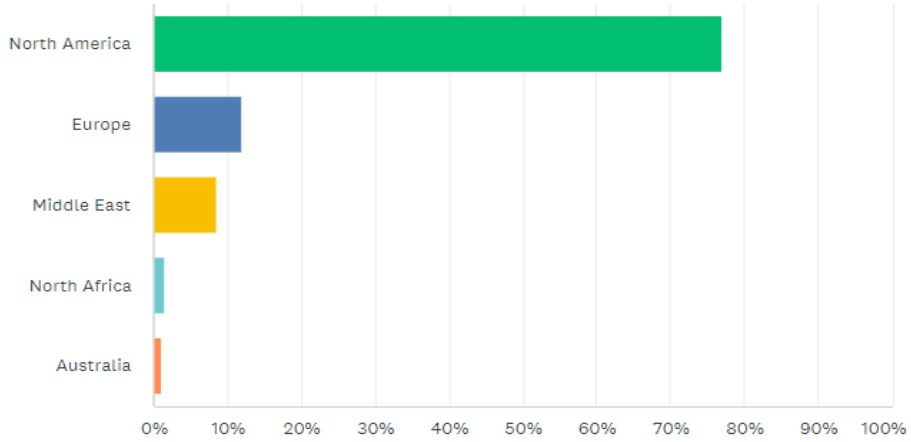
Answered: 508 Skipped: 12



ANSWER CHOICES	RESPONSES	
Regular academic member	65.35%	332
Public member	9.25%	47
Student	11.81%	60
Retired	16.14%	82
Exhibitor/Vendor	0.00%	0
Total Respondents: 508		

Where do you currently reside?

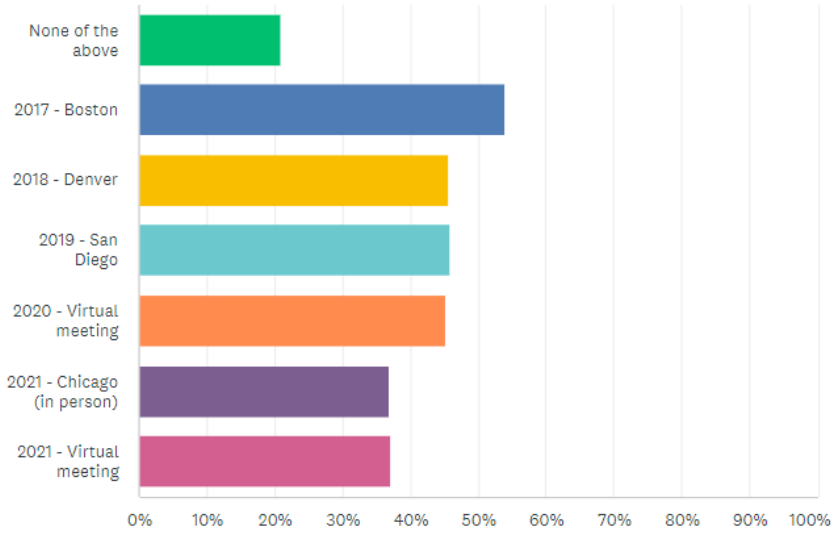
Answered: 516 Skipped: 4



ANSWER CHOICES	RESPONSES	
North America	76.94%	397
Europe	12.02%	62
Middle East	8.53%	44
North Africa	1.55%	8
Australia	1.16%	6
Total Respondents: 516		

Which past ASOR Annual Meetings did you attend (select all that apply)

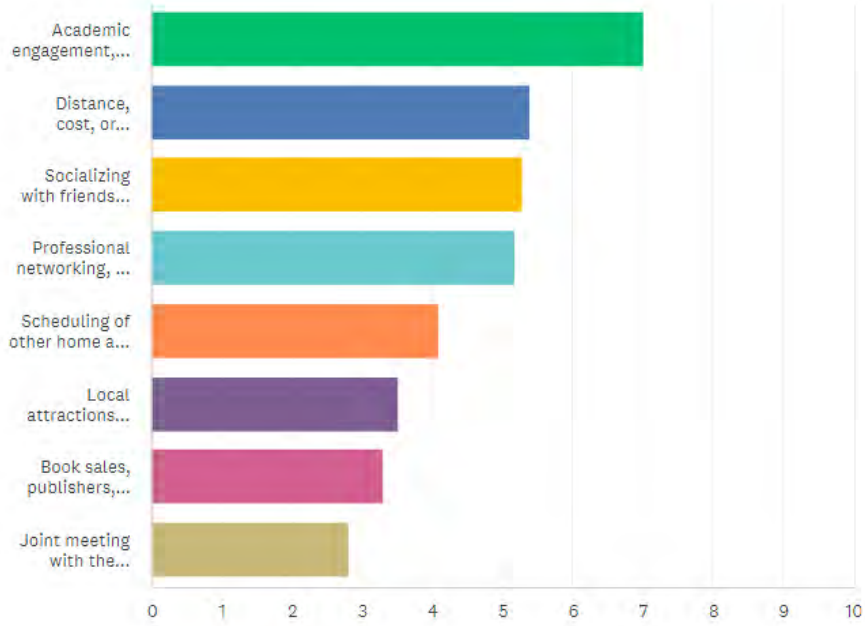
Answered: 517 Skipped: 3



ANSWER CHOICES	RESPONSES	
None of the above	20.89%	108
2017 - Boston	53.97%	279
2018 - Denver	45.65%	236
2019 - San Diego	45.84%	237
2020 - Virtual meeting	45.26%	234
2021 - Chicago (in person)	36.94%	191
2021 - Virtual meeting	37.14%	192
Total Respondents: 517		

Please rank the following factors in order of their impact on your decision whether or not to attend the ASOR Annual Meeting, from highest (#1) to lowest (#8). (You can drag and drop the options to rank them, or use the drop down box to select numbers)

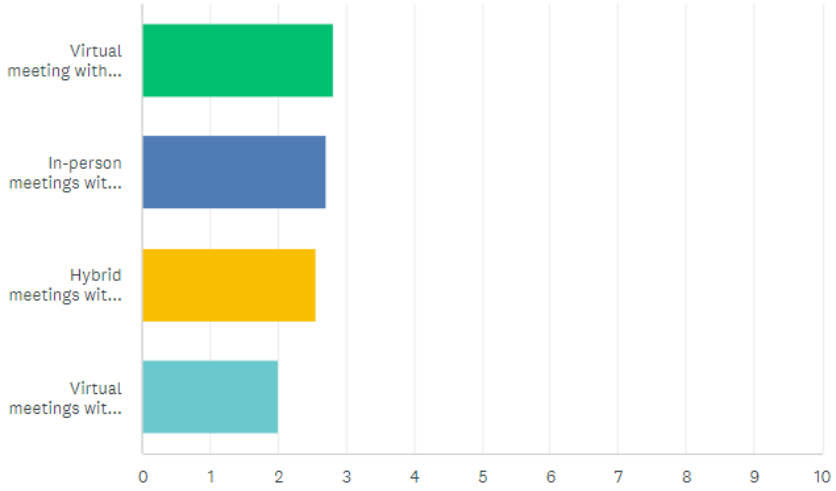
Answered: 508 Skipped: 12



	1	2	3	4	5	6	7	8	TOTAL	SCORE
Academic engagement, keeping up to date on research	52.55% 247	23.19% 109	11.28% 53	5.96% 28	2.77% 13	1.91% 9	1.49% 7	0.85% 4	470	7.01
Distance, cost, or accessibility of travel to meeting location	19.75% 93	16.35% 77	16.56% 78	13.59% 64	14.44% 68	8.70% 41	6.16% 29	4.46% 21	471	5.40
Socializing with friends and colleagues	7.20% 34	18.22% 86	23.94% 113	18.86% 89	16.53% 78	10.38% 49	3.18% 15	1.69% 8	472	5.28
Professional networking, job search, interviews	12.03% 54	20.71% 93	20.49% 92	11.80% 53	10.69% 48	9.13% 41	9.13% 41	6.01% 27	449	5.18
Scheduling of other home and work obligations	7.02% 33	12.13% 57	9.57% 45	12.98% 61	14.04% 66	13.40% 63	19.15% 90	11.70% 55	470	4.10
Local attractions such as museums, cultural scene, natural scenery etc...	1.55% 7	4.66% 21	8.65% 39	14.63% 66	15.52% 70	23.50% 106	18.18% 82	13.30% 60	451	3.52
Book sales, publishers, vendors	0.43% 2	3.64% 17	6.00% 28	13.92% 65	15.63% 73	21.20% 99	30.84% 144	8.35% 39	467	3.31
Joint meeting with the Society of Biblical Literature and American Academy of Religion	6.48% 30	5.18% 24	6.05% 28	7.13% 33	7.34% 34	7.78% 36	7.99% 37	52.05% 241	463	2.81

During the COVID pandemic, professional organizations and academic institutions used alternative formats for conferences and symposia. Based on your experiences, please rank these new formats for most successful (#1) to least successful (#4) (You can drag and drop the options to rank them, or use the drop down box to select numbers)

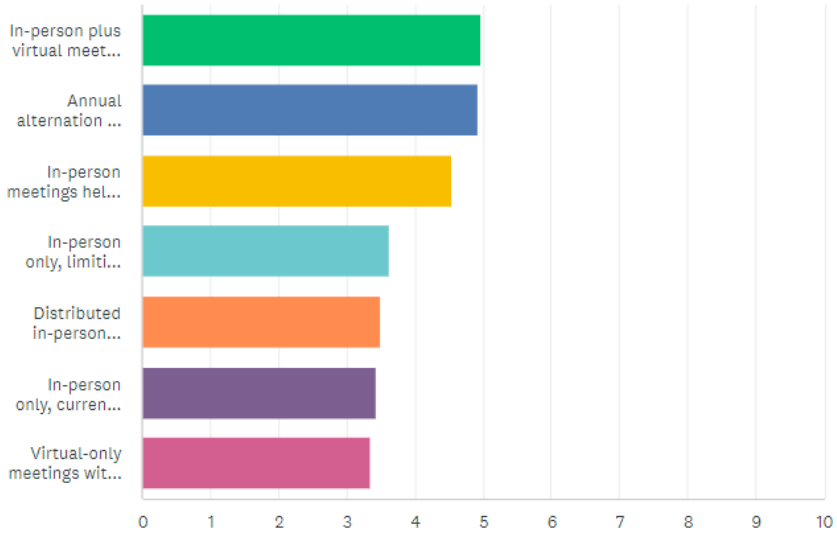
Answered: 492 Skipped: 28



	1	2	3	4	TOTAL	SCORE
Virtual meeting with live (online) presentations and discussion	31.03% 144	28.23% 131	31.25% 145	9.48% 44	464	2.81
In-person meetings with enforced COVID protocols (masked, proof of vaccination)	43.82% 209	14.26% 68	11.53% 55	30.40% 145	477	2.71
Hybrid meetings with live (synchronous), virtual, and in-person participation	19.44% 91	34.83% 163	27.35% 128	18.38% 86	468	2.55
Virtual meetings with pre-recorded presentations and live (online) discussion	9.13% 43	22.93% 108	27.81% 131	40.13% 189	471	2.01

Please rank the following options for the format and/or frequency of future ASOR meetings from most desirable (#1) to least desirable (#7). The estimated reduction of carbon emissions compared to the pre-pandemic meeting format is given in parentheses. (You can drag and drop the options to rank them, or use the drop down box to select numbers)

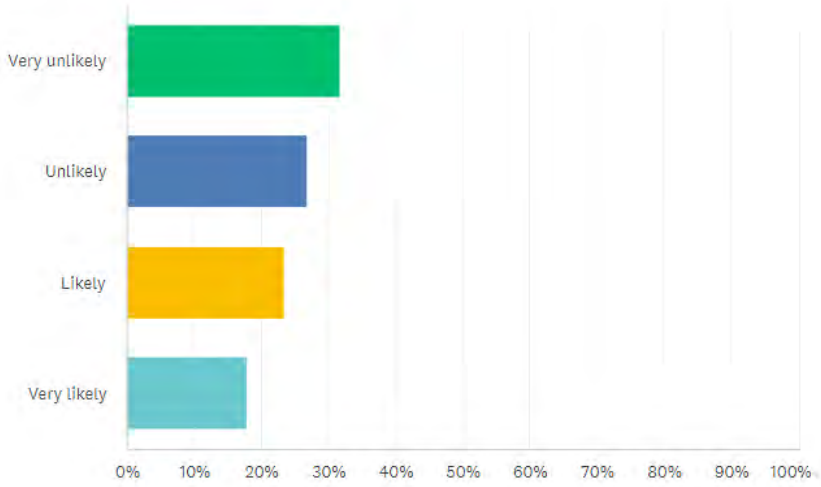
Answered: 499 Skipped: 21



	1	2	3	4	5	6	7	TOTAL	SCORE
In-person plus virtual meeting components, either asynchronous (e.g. 2022 meeting format) or live/synchronous (est. 20-30% reduction)	22.73% 105	17.10% 79	19.48% 90	23.81% 110	10.61% 49	4.33% 20	1.95% 9	462	4.97
Annual alternation of in-person and virtual meeting formats (est. 48% reduction)	19.53% 91	23.18% 108	20.60% 96	13.52% 63	14.38% 67	7.30% 34	1.50% 7	466	4.92
In-person meetings held every other year; no meeting, virtual or in-person, in alternative years (est. 50% reduction)	15.60% 73	22.86% 107	16.88% 79	12.82% 60	13.89% 65	13.03% 61	4.91% 23	468	4.55
In-person only, limiting meeting locations to the Eastern US to reduce the average travel distance and improve accessibility by train (est. 15% reduction)	7.03% 32	16.26% 74	11.43% 52	11.21% 51	14.95% 68	30.11% 137	9.01% 41	455	3.63
Distributed in-person meeting (linked, parallel meetings in 2 locations), with one location in the U.S.A. and one location in the Middle East (e.g. Amman, Ankara, Jerusalem, Nicosia etc...) (est. 23% reduction)	5.78% 26	8.44% 38	11.78% 53	16.00% 72	29.33% 132	18.67% 84	10.00% 45	450	3.49
In-person only, current list of meeting locations (0% reduction)	19.15% 90	6.81% 32	9.57% 45	9.57% 45	7.66% 36	12.98% 61	34.26% 161	470	3.44
Virtual-only meetings with pre-recorded or live (online) presentations and discussion (est. 97% reduction in carbon emissions vs in-person meeting)	16.45% 75	7.68% 35	10.09% 46	10.53% 48	7.02% 32	10.53% 48	37.72% 172	456	3.34

International flights contribute the majority of the annual meeting's travel-related carbon emissions. One possibility for reducing the number of transatlantic flights and increasing accessibility for Middle Eastern/North African (MENA) residents is to organize an alternative ASOR meeting in the MENA region during the months of archaeological fieldwork when many North American/European ASOR researchers are already there. How likely would you be to attend an ASOR @MENA meeting organized somewhere like Amman, Ankara, Jerusalem, or Nicosia, instead of (not in addition to) attending the Annual Meeting in the US?

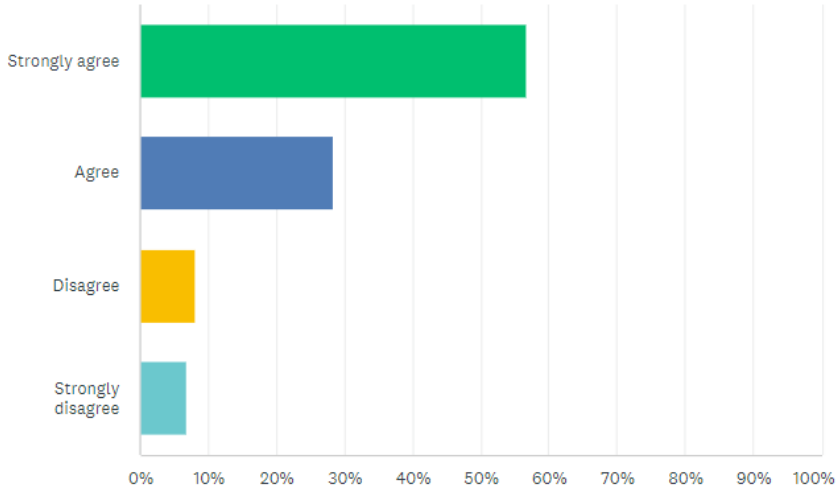
Answered: 514 Skipped: 6



ANSWER CHOICES	RESPONSES	
Very unlikely	31.71%	163
Unlikely	26.85%	138
Likely	23.54%	121
Very likely	17.90%	92

Please indicate how much you agree with the following statement: Climate change and its broader social, economic, and political impacts are major threats to the cultural heritage of the Middle East and North Africa.

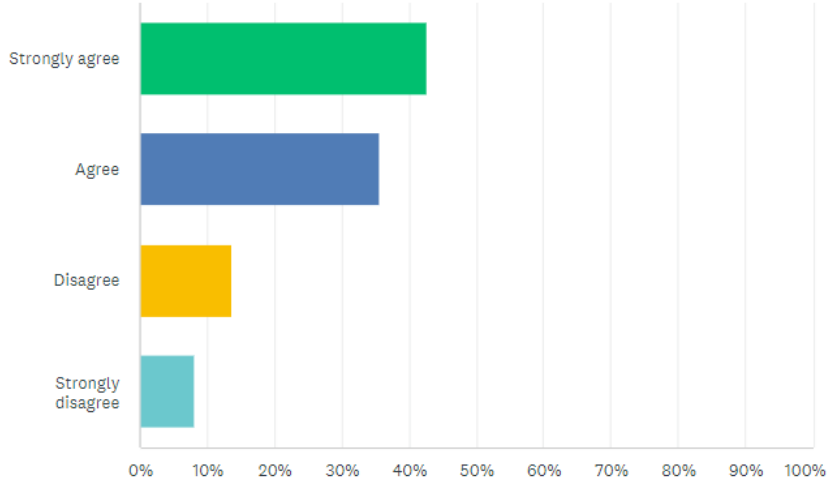
Answered: 516 Skipped: 4



ANSWER CHOICES	RESPONSES	
Strongly agree	56.78%	293
Agree	28.29%	146
Disagree	8.14%	42
Strongly disagree	6.78%	35
TOTAL		516

Please indicate how much you agree with the following statement: Fighting climate change is part of ASOR's mission to "protect, preserve, and present to the public the historic and cultural heritage of the Near East and the wider Mediterranean and to raise awareness of its degradation."

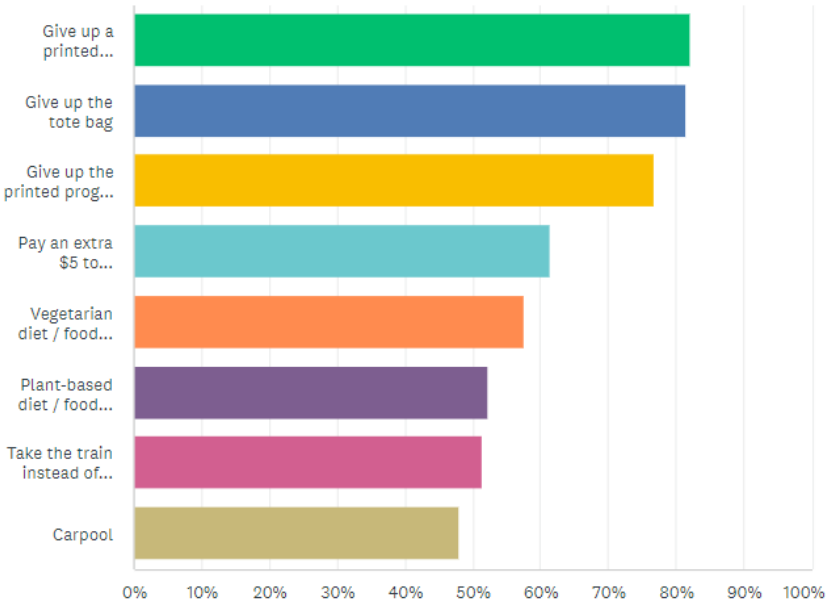
Answered: 515 Skipped: 5



ANSWER CHOICES	RESPONSES	
Strongly agree	42.72%	220
Agree	35.53%	183
Disagree	13.59%	70
Strongly disagree	8.16%	42
TOTAL		515

In the context of an in-person Annual Meeting, what would you be willing to do to help reduce the carbon footprint? (Select all that apply)

Answered: 489 Skipped: 31



ANSWER CHOICES	RESPONSES	
Give up a printed abstract booklet	82.00%	401
Give up the tote bag	81.39%	398
Give up the printed program and printed ads	76.69%	375
Pay an extra $5 to contribute to a carbon offset	61.35%	300
Vegetarian diet / food options	57.67%	282
Plant-based diet / food options	52.15%	255
Take the train instead of flying	51.33%	251
Carpool	48.06%	235

APPENDIX 4: Other Contributors to ASOR's Climate Impact: A First Look at the Carbon Emissions of Publications

ASOR's Climate Impact Beyond the Annual Meeting

Beyond the Annual Meeting, several other areas of activity contribute to ASOR's climate impact, including the operation of the James F. Strange Center, ASOR's publications, and staff travel. Fieldwork by ASOR members also produces a large amount of carbon emissions, but is not directly under the society's control. Following on this *ad hoc* committee's proposals for making the ASOR AM carbon neutral, climate impact subcommittees of several ASOR standing committees (see Recommendation 6 in Section 7.2) should further investigate the climate impact of these activities and formulate recommendations and best-practice guides for their mitigation. Such continued commitment would strengthen ASOR's leadership on climate action.

ASOR Publications: Carbon Emission Impact

Below is a preliminary study of ASOR's carbon emissions for publications, both print and digital (e-journals, e-newsletters etc.). Recently, major publishing houses have added as part of their strategic plan and goals the reduction of their carbon emissions; therefore, ASOR, with its extended publication output (both print and digital publications) should consider adopting greener publication practices. This study shows that there is space for improvement and possible solutions, not only for print publications, but also for ASOR digital output.

It has been shown that the total carbon emissions of the publishing industry reach 12.4 million metric tons CO_2 equivalent for the 4.15 billion books produced in the U.S. in 2006, or around 3 kg CO_2 equivalent per book (Wells et al. 2012). Online publications also have an impact. Digital publications are stored in servers that require energy use. The internet is responsible for 2% of global CO_2 emissions. The average website produces 1.76g of CO_2 for every page viewed. Concerns about climate change and the need to reduce greenhouse gas emissions have created pressure on industries in the publication sector to show some commitment to resolve this crisis. The International Publishers Association - an international industry federation representing all aspects of book and journal publishing - has laid out its commitment to reduce publishing's carbon footprint and recognizes the need for change even in the publishing field. Publishing houses such as Cambridge University Publications, Elsevier, Bloomsbury Publishing Plc., and Penguin have adopted strategies to reduce their carbon emissions, and this is clearly stated on their websites. Every year, ASOR prints 7,001 publications between journals and books, while the online publications account for 902,383 page-views.

Format	Publications	Frequency	Print 2021	E-print 2021
Journals (Oriental Institute Publications)	JCS	Yearly	193	1,208
	BASOR	Biannual	1,376	2,416
	NEA	Quarterly	4,664	6,860
Online Publications*	ANE Today newsletter	Weekly	-	840,372
	News-ASOR	Bi-monthly	-	51,528
Monographs (ISD Press)	Annual of ASOR	Yearly	368	-
	Archaeological Reports Series	Yearly	400	
TOT			**7,001**	**902,383**
*Levantine Ceramic Project Database was not included in this calculation				

Figure A3. *ASOR Publications (data is based on ASOR 2021 output publications and subscribed membership).*

The carbon emissions of ASOR's print publications are estimated at **186.66 metric tons CO_2e.** This is calculated based on the cost of JCS, BASOR, NEA, and BASOR Annual Monograph, using the online Carbon Footprint Calculator. For online publications the carbon emissions are calculated based on the server used. Overall, consulting an online article (JCS, BASOR and NEA) on the Chicago University Press website emits about 0.66g CO_2e, while reading ANE Today and News-ASOR emits about 1.04 g CO_2e. Hence, at the moment, ASOR's online publications produce 1.7 g CO_2 for every page visited.

This preliminary study does not account for the additional carbon emissions produced during the preparation phases of journals and books or during their shipment.

Recommendations:

Moving forward, ASOR could reduce its publishing carbon emissions by:

- Using lighter paper
    - Lighter paper reduces the amount of fiber that goes into each book and the weight of materials being transported is diminished.
- Using recycled paper

- Printing on demand
- Choosing a publishing house that manufactures books and journals from renewable resources. Some publishing houses provide paper and other core materials that are 100% ethically and sustainably sourced
- Choosing a sustainable online publishing and e-format. This should also be eco-published, that is, published in accordance with the principles of sustainability
- Choosing an eco-friendly online platform
- Using eco-friendly shipping supplies
- Adopting green shipping practices.

APPENDIX 5: Sustainability Requests for Hotels

As a means of reducing on-site emissions from the AM, the committee put together a list of potential requests that could be made to hotels and conference venues. Many of these practices are being implemented by the major hotel chains, but by requesting additional changes, further emission reductions could be achieved.

Waste Reduction:

- Zero waste receptions & coffee/tea breaks through composting and use of reusable dishes
- Implementation of expanded recycling programs
- Eliminating single-use toiletries in hotel rooms
- Option to opt out of towel change/room cleaning
- Making water refill stations available
- Remote Check-in/check out can minimize use of paper or plastic key cards

Energy-related Emissions Reduction:

- Encourage Hotels to use sustainable energy sources
- HVAC limits for rooms to limit the energy spent on warming/cooling the room
- Other energy saving devices and programs

Food-related Emissions Reduction:

- Encourage hotels to go as plant-based as possible for the AM
- Request locally sourced food from sustainable business and farms

Transportation-related Emissions Reduction:

- Request shuttle service to reduce use of taxis from airports
- Request reduced parking fees for attendees opting to car-pool

Other:

- Encourage use of cleaning supplies with minimal impact to the environment

REFERENCES

Achten, W. M.J., J. Almeida and B. Muys. 2013. "Carbon Footprint of Science: More Than Flying." *Ecological Indicators* 352–55. https://doi.org/10.1016/j.ecolind.2013.05.025.

Allen, M. et al. 2020. "The Oxford Principles for Net Zero Aligned Carbon Offsetting." https://www.smithschool.ox.ac.uk/sites/default/files/2022-01/Oxford-Offsetting-Principles-2020.pdf

Amtrak. 2022. "Amtrak Corporate Incentive Program." https://www.amtrak.com/corporateprograms. Last accessed October 7, 2022.

ASOR. 2021. "ASOR Mission Statement." https://www.asor.org/about-asor/mission/. Last accessed November 7, 2022.

ASOR. 2022. "Travel Information." https://www.asor.org/am/2022/travel-info-2022/.

Atmosfair. 2022. "When Does Carbon Offsetting Make Sense?" 1 Aug. 2022, www.atmosfair.de/en/standards/good_offsetting_practices.

Bellows, K. H. 2022. "The Academic Conference Will Never Be the Same." *The Chronicle of Higher Education*, 11 Feb. 2022, www.chronicle.com/article/the-academic-conference-will-never-be-the-same.

Berkeley Carbon Trading Project. n.d. https://gspp.berkeley.edu/faculty-and-impact/centers/cepp/projects/berkeley-carbon-trading-project. Last accessed October 24, 2022.

Blue Horizon Corporation. 2020. "Environmental Impacts of Animal- and Plant-Based Food." https://bluehorizon.com/news-content/up-to-15-times-lower-environmental-impact-study-quantifies-game-changing-environmental-effect-if-animal-food-is-replaced-by-plant-based-alternatives/

Broekhoff, D., M.cGillenwater, T. Colbert-Sangree and P. Cage. 2019. *Securing Climate Benefit: A Guide to Using Carbon Offsets*. Stockholm Environment Institute & Greenhouse Gas Management Institute. Offsetguide.org/pdf-download/

Büchs M., C. Saunders, R. Wallbridge, G. Smith and N. Bardsley. 2015. "Identifying and Explaining Framing Strategies of Low Carbon Lifestyle Movement Organisations." *Global Environmental Change* 307–15. https://doi.org/10.1016/j.gloenvcha.2015.09.009.

Büçkün, Z. 2013. Coal Quality of the Miocene Muğla-Hüsamlar Lignite. M.S. Thesis, Dokuz Eylül University.

Carbon Footprint Ltd. n.d. "Carbon Footprint Calculator." https://calculator.carbonfootprint.com/calculator.aspx

Carbon Free Conf. n.d. "Carbon Emission Calculator." https://www.carbonfreeconf.com/carbon-calculator/

Carbon Independent. 2022. "Aviation Emissions." https://www.carbonindependent.org/22.html.

Cool Effect. n.d. "Buy Carbon Offsets | Cool Effect Carbon Done Correctly." www.cooleffect.org. Last accessed 28 Oct. 2022.

Ellis, E. C. 2018. Anthropocene: A Very Short Introduction. Oxford.

Faber, G. 2021. "A Framework to Estimate Emissions from Virtual Conferences." *International Journal of Environmental Studies*, 78(4):608-623. DOI: 10.1080/00207233.2020.1864190.

Foramitti, J., S. Drews, F. Klein, and T. Konc. 2021. "The Virtues of Virtual Conferences." *Journal of Cleaner Production* 294: 126287. https://doi.org/10.1016/j.jclepro.2021.126287.

Fox, H. E, P. Kareiva, B. Silliman, J. Hitt, D. A. Lytle, B. S. Halpern, C. V. Hawkes, et al. 2009. "Why Do We Fly? Ecologists' Sins of Emission." *Frontiers in Ecology and the Environment* 7(6): 294–96. https://doi.org/10.1890/09.WB.019.

GHG Management Institute and Stockholm Environment Istitute. "Carbon Offset Guide." https://www.offsetguide.org. Last accessed October 24, 2022.

Global Carbon Atlas. "CO_2 Emissions." www.globalcarbonatlas.org/en/CO2-emissions, Last accessed October 24, 2022.

Greening Books. 2013. "Manual de la Bona Ecoedició. Projecte LIFE+ 09 ENV/ES/000457." https://pol-len.cat/w2018/wp-content/uploads/2020/10/GREENING-BOOKS_Guia_Bones_practiques_CAT.pdf

GreenView. 2022. "Hotel Footprint Tool." https://www.hotelfootprints.org/.

Gold Standard. n.d. "Principles and Requirements." http://globalgoals.goldstandard.org/101-par-principles-requirements/.

Gold Standard. n.d. "Projects." https://marketplace.goldstandard.org/collections/projects.

Havrelock, R. 2015. "The Ancient Past that Oil Built." *The Bible and Critical Theory* 11(2):51-60.

IPCC (Intergovernmental Panel on Climate Change). 2018. "Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty." https://www.ipcc.ch/sr15/

Jones, N. 2017. "How the World Passed a Carbon Threshold and Why It Matters." *Yale Environment 360*. January 26, 2017. https://e360.yale.edu/features/how-the-world-passed-a-carbon-threshold-400ppm-and-why-it-matters.

Jordan, C.J., and A. A., Palmer. 2020. "Coronavirus Virtual meetings: A Critical Step to Address Climate Change." *Science Advances* 6: 4–6. https://doi.org/10.1126/sciadv.abe5810

Kim, R. and B. C. Pierce. 2018. "Carbon Offsets: An Overview for Scientific Societies." Version 1.2 June 24, 2018. https://www.cis.upenn.edu/~bcpierce/papers/carbon-offsets.pdf Last accessed on Oct 30, 2022.

Klöwer, M., D. Hopkins, M. Allen, and J. Higham. 2020. "An Analysis of Ways to Decarbonize Conference Travel After COVID-19." *Nature* 583:356-359. doi: https://doi.org/10.1038/d41586-020-02057-2

Kotchen, M. J. 2009. "Offsetting Green Guilt." *Stanford Social Innovation Review*, *7*(2):26–31. https://doi.org/10.48558/515J-D290

Lange, M. A. 2019. "Impacts of Climate Change on the Eastern Mediterranean and the Middle East and North Africa Region and the Water–Energy Nexus." *Atmosphere* 10. https://doi.org/10.3390/atmos10080455

Maslin, M. 2021. *Climate Change: A Very Short introduction*. Oxford.

McAfee, K. 2022. "Shall the American Association of Geographers Endorse Carbon Offsets? Absolutely Not!" *The Professional Geographer* 74, no. 1: 171–77. https://doi.org/10.1080/00330124.2021.1934879.

MeetGreen and Clear Current Consulting. 2021. "Digital Event Calculator." https://www.digitaleventcarboncalculator.com/calculator/

Middleton, Christine. 2019. "Environmental sustainability goals drive changes in conference practices." *Physics Today* 79 (9). https://doi.org/10.1063/PT.3.4291

Othman, M., M. Cormier, G. D. Barnes, S. P. Comer, J. M. Connors, F. Denorme, A. A. Khorana, et al. 2021. "Harnessing Twitter to Empower Scientific Engagement and Communication: The ISTH 2020 Virtual Congress Experience." *Research and Practice in Thrombosis and Haemostasis* 5(2): 253–60. https://doi.org/10.1002/rth2.12478.

Plackett, B. 2022. "The Right Mix: Making a Hybrid Conference Work for All." *Nature* 607, no. 7917 : S1–3. https://doi.org/10.1038/d41586-022-01797-7.

Porter, B. In press. "The Climate Crisis, Cultural Heritage, and the Future of Middle Eastern Archaeology." University of California eScholarship Preproof. https://escholarship.org/uc/item/34w048mm

Raby, C. L., and J. R. Madden. 2021. "Moving Academic Conferences Online: Understanding Patterns of Delegate Engagement." *Ecology and Evolution* 11(8): 3607–15. https://doi.org/10.1002/ece3.7251.

Rico, T. 2015. "Heritage at Risk: The Authority and Autonomy of a Dominant Preservation Framework." In *Heritage Keywords: Rhetoric and Redescription in Cultural Heritage.* Kathryn Lafrenz Samuels and Trinidad Rico (eds). University Press of Colorado: 147-162.

Robertson, C. "Reducing Personal Emissions in Response to Collective Harm." *Journal of Agricultural and Environmental Ethics* 34, no. 2 (2021). https://doi.org/10.1007/s10806-021-09848-1.

Rogers, B., M. Masoodian, and M. Apperley. 2018. "A Virtual Cocktail Party: Supporting Informal Social Interactions in a Virtual Conference." In *Proceedings of the 2018 International Conference on Advanced Visual Interfaces*, 1–3. AVI '18. New York, NY, USA: Association for Computing Machinery. https://doi.org/10.1145/3206505.3206569.

Sanz-Cobena, A., Alessandrini, R., Bodirsky, B.L., Springmann, M., Aguilera, E., Amon, B., Bartolini, F., Geupel, M., Grizzetti, B., Kugelberg, S., Latka, C., Liang, X., Milford, A.B. Musinguzi, P., Ng, E.L., Suter, H., Leip, A., 2020. "Research Meetings Must be More Sustainable." *Nature Food* 1:187–189. https://doi.org/10.1038/s43016-020-0065-2

Sarabipour, S., A. Khan, Y. F. S. Seah, A. D. Mwakilili, F. N. Mumoki, P. J. Sáez, B. Schwessinger, H. J. Debat, and T. Mestrovic. 2021. "Changing Scientific Meetings for the Better." *Nature Human Behaviour* 5(3): 296–300. https://www.nature.com/articles/s41562-021-01067-y#ref-CR8

Shetty, M., N. R. Aggarwal, P. Parwani, C. Bucciarelli-Ducci, J. Lopez-Mattei, A. Choi, and L. Grosse-Wortmann. 2022. "Social Media to Enhance Engagement and Science Dissemination during In-Person and Virtual Medical Conferences: The SCMR 2020 and 2021 Experiences: A Report of the SCMR Social Media Task Force." *Journal of Cardiovascular Magnetic Resonance* 24(1): 15. https://doi.org/10.1186/s12968-021-00837-x.

Steffen, W., Sanderson, R.A., Tyson, P.D., Jäger, J., Matson, P.A., Moore III, B., Oldfield, F., Richardson, K., Schellnhuber, H.-J., Turner, B.L., Wasson, R.J. 2005. *Global Change and the Earth System: A Planet Under Pressure*. Germany: Springer.

Stephens, L. and Herrmann, V. 2019. "Mitigating the Climate Impact of the ASOR Annual Meeting: A First Appraisal." Poster Presented at the Annual Meeting of the American Society for Overseas Research. San Diego, Nov. 20-23, 2019. https://www.academia.edu/40985370/Mitigating_the_Climate_Impact_of_the_ASOR_Annual_Meeting_A_First_Appraisal

Tao, Y., D. Steckel, J. J. Klemeš, and F. You. 2021. "Trend Towards Virtual and Hybrid Conferences May Be an Effective Climate Change Mitigation Strategy." *Nature Communications* 12(1): 7324. https://doi.org/10.1038/s41467-021-27251-2.

The International Emissions Trading Association (IETA). https://www.ieta.org.

Thiri, M. A., S. Villamayor-Tomás, A. Scheidel and F. Demaria. 2022. "How Social Movements Contribute to Staying Within the Global Carbon Budget: Evidence from a Qualitative Meta-Analysis of Case Studies." *Ecological Economics* 195. https://doi.org/10.1016/j.ecolecon.2022.107356.

Thompson, W. R. and L. Zakhirova. 2022. *Climate Change in the Middle East and North Africa: 15,000 Years of Crises, Setbacks, and Adaptation*. Routledge: Oxon and New York.

Townshend, T. 2020. "How Will Climate Change Affect Cultural Heritage? Recommendations for Mitigating Risks. *Antiquities Coalition Policy Brief* 7. https://thinktank.theantiquitiescoalition.org/how-will-climate-change-affect-cultural-heritage/

U.S. Department of Transportation. 2009. "National Household Travel Survey." https://nhts.ornl.gov

U.S. EPA (Environmental Protection Agency). n.d. "Greenhouse Gas Emissions From a Typical Passenger Vehicle." www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle. Last accessed 30 June 2022

Vasquez, Krystal. "Virtual Conferences Aren't as Accessible as You Might Think." *Scientific American*, 18 Feb. 2021, www.scientificamerican.com/article/virtual-conferences-arent-as-accessible-as-you-might-think. Accessed November 12, 2022.

Waruru, M.. 2018. "African and Asian Researchers are Hampered by Visa Problems." *Nature*, 19 September 2018. https://doi.org/10.1038/d41586-018-06750-1

Wells, J.-R., Boucher, J.-F., Laurent, A.-B. and Villeneuve, C. 2012. "Carbon Footprint Assessment of a Paperback Book." *Journal of Industrial Ecology* 16: 212-222. https://doi.org/10.1111/j.1530-9290.2011.00414.x

Wynes, S. and Nicholas, K. 2017. "The Climate Mitigation Gap: Education and Government Recommendations Miss the Most Effective Individual Actions." *Environmental Research Letters* 12(7):1-9. https://iopscience.iop.org/article/10.1088/1748-9326/aa7541

Zalasiewicz, J.; C. N. Waters; M. Williams; C. P. Summerhayes. 2019. *The Anthropocene as a Geological Time Unit: a Guide to the Scientific Evidence and Current Debate*. Cambridge and New York: Cambridge University Press

Zandt, Florian. 2021. "Humanity's Uneven CO_2 Footprint." *Statista Infographics*, 16 Dec. 2021, www.statista.com/chart/26416/average-co%25E2%2582%2582-emissions-per-capita-in-selected-regions.