

## Earth & Space

# Tourism is not a “smoke-free” industry

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### ABSTRACT

*Travel is an activity enjoyed and loved by many people globally. However, tourism is not a “smoke-free” industry. Due to its high carbon intensity and continuing growth, tourism will constitute a growing part of the world’s greenhouse gas emissions.*



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We all love travelling! It’s a beautiful process that provides us with opportunities to meet new people, learn new things and experience a range of cultures. Based on the estimation provided by the United Nations [World Tourism Organization](#) (UNWTO), more than 1.2 billion international visits were recorded in 2016, reaching a seventh consecutive year of above average growth after the 2009 Financial Crisis. Global spending on the trip has supported a tourism industry that contributes more GDP than that of banking, mining, agriculture, and automotive manufacturing. For many island country and developing states, tourism is one of their major economic pillars. While the economic contribution of tourism is well recognized, the side effect of our travel and their impact on the environment and climate change remains less quantified and acknowledged. Especially, a popular mindset exists

believing that tourism is a “smoke-free industry” and pursuing tourist number and consumption is determined as a high priority for many countries.

In a new study published in May, 2018 in the journal Nature Climate Change, we looked into the carbon footprint (CF) of global travel, addressing emissions associated with 6 greenhouse gases (GHG) as a result of providing accommodation, dining, transportation, recreational activities, and souvenirs to tourists among 160 countries from 2009 to 2013. Our scope includes direct emissions produced by tourism firms, such as hotels, airplanes, or theme parks, and the indirect emissions associated with the upstream suppliers that provide inputs to tourism industries. An example of indirect emissions can be GHG produced as a result of the Boeing Company manufacturing a 787 aircraft. In order to estimate

the global tourism CF, visitor spending reported by the national Tourism Satellite Account and UNWTO were sourced to represent the scale of global tourism consumption, which was then combined with the [EORA](#) multi-region input-output model to convert tourist spending into emissions based on the production structure of individual countries.

Our results indicated that between 2009 and 2013, tourism's global carbon footprint has increased from 3.9 to 4.5 giga tons CO<sub>2</sub>e, accounting for about 8% of global GHG emissions. This corresponds to an increase in the carbon footprint of global tourism by 3.3% annually or 14% over the period. Transport, shopping and food are significant contributors, especially the use of aviation services. The top five countries that produce the largest tourism emissions due to their residents engaging in both domestic and international travel are United States, China, Germany, India and Mexico. From a per capita basis, residents in Mauritius, New Zealand, Germany, and Maldives bear the highest amount of tourism emissions as a result of large travel activities in their country with a relatively small population. For many island destinations such as Cyprus, Mauritius, Seychelles, and Maldives, more than 70% of the national tourism emissions are contributed by international tourists.

The main driver for the growth of global tourism carbon footprint is primarily due to a strong increase in tourism consumption, at an annual 7% during the study period, which outpaced all carbon intensity reductions through technology development (– 2.7%

annually). Half of the net increase of tourism carbon footprint occurred in high-income countries and due to high-income visitors; however, middle-income countries, such as China, recorded the highest growth rate. One alarming finding of our study is that one US\$ dollar consumption in travel will lead to a carbon footprint of 1 kg CO<sub>2</sub>e, about 25% higher than the global average across all sectors (0.75 kg CO<sub>2</sub>e per US\$). This means that attracting more tourists bears a higher opportunity cost to the environment than developing other potential sectors, and this also confirms that tourism is not a “smoke-free” industry from the economic-environmental perspective.

Travel is highly income-elastic and carbon-intensive. Two challenges are identified in our study. First, as our income increases, we tend to travel more, further, demand more luxury amenities, and an increasing reliance on aviation. These factors all contribute to a higher emission intensity per journey. With a projection of 4% annual growth in global visitation, tourism will constitute a growing part of the world's greenhouse gas emissions. Secondly, the responsibility and approaches to mitigate tourism emissions are currently unclear. The following key questions remain unanswered: is the country of destination or country of departure that should step up the mitigation efforts? Should we push for a better technology improvement among tourism firms or should we instead engage more with visitor to ensure they practice sustainable travel behavior? These and many others warrant further research.