



New Directions: Flying in the face of the climate change convention ☆

Around the world, runways are extending and airports expanding. The skies of Northern Europe and the US are permanently criss-crossed by aircraft contrails and, around the clock, plane after plane queues to take off or land from London, Paris and New York. Flying has become a part of everyday life, with budget airlines making even relatively short journeys by air more attractive than travel by road or rail. Many scientists too have become routine 'jet-setters', with international conferences being a common feature of a scientist's working year.

The ease of international air travel and the fact that, for most of us, the costs are met by our employers, means that such globe trotting conference travel is often regarded as a perk of the job. There's a big problem with all this air travel though, and that's its contribution to climate change. Global emissions of carbon dioxide (CO₂) from air travel are increasing rapidly, the IPCC predicting that, by the year 2050, annual aircraft emissions will have reached well over a billion tonnes of greenhouse gas (GHG).

With most international conferences having hundreds if not thousands of participants, and the bulk of these usually travelling by plane, conference travel is an area where significant reductions in air-travel-related GHG emissions could be made. Indeed, through efforts to cut their own air-travel-related GHG emissions the scientific community can set an example to the wider world, not least the international business community.

So, what are the options available to each of us to limit our air-travel-related GHG emissions? The most effective option for conference delegates is not to travel to the conference venue in the first place. This does not mean non-attendance, but rather involves 'virtual participation'. The potential for such virtual conferencing has grown rapidly in the last few years, as the supporting technology has improved. One very significant technological advance, which makes virtual participation a realistic option for many conference

delegates, is 'Access Grid' (Reay, 2003 Nature 424, 251). Access Grid enables groups from a host of different locations around the world to communicate together at one time. Essentially, Access Grid overcomes the major drawback of traditional video conferencing, that of a lack of interaction with other delegates, by allowing all participants to see and hear one another while at the same time being able to view the main presentation. The Access Grid technology has already been successfully used to host several international conferences, with the number of locations able to use Access Grid growing rapidly.

An example of the GHG savings that can be achieved through the use of virtual conferencing is provided by the annual 'Virtual Conference on Genomics and Bioinformatics'. This international conference makes use of Access Grid to host a meeting attended by several hundred delegates. Fig. 1 shows the large amounts of GHG emission avoided by delegates from each of the participating countries through their virtual participation.

In all, this saving amounted to about 900 tonnes of GHG for this one conference. For large international conferences, such as the United Nations Framework Convention on Climate Change's 'Conference of the Parties' (COP), air-travel-related GHG emissions can be huge. For the 2002 COP (COP 8) for instance, where delegates from across the world discussed efforts to mitigate climate change, air-travel-related GHG emissions from the 1500 governmental delegates alone totalled nearly 3000 tonnes.

If virtual attendance at a conference is impossible, then a range of other options present themselves. For relatively short haul travel (<800 km) your GHG emissions can be drastically reduced by using rail or coach travel. For example, an average short-haul return flight from Edinburgh to London Heathrow results in the emission of about 100 kg of GHG for each passenger, whilst the same journey by train or coach results in emissions of just 30 kg per passenger (IPCC, Aviation and the Global Atmosphere, 1999).

For many international conferences though, air-travel remains the only practical option and it is in these situations that various trade-off schemes can be made

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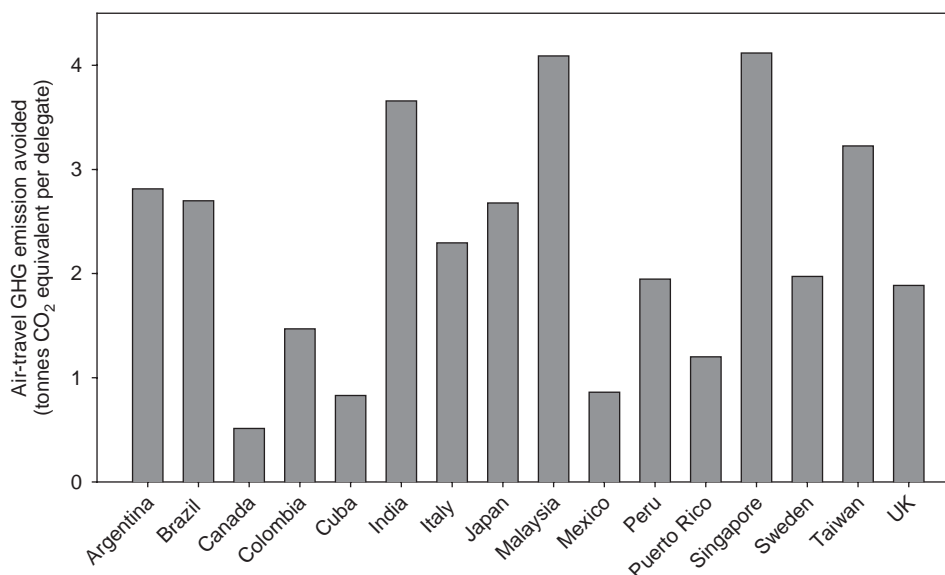


Fig. 1. Greenhouse gas emissions avoided by virtual participation at a conference in North Dakota, USA, in 2001. Figures based on roundtrip air-travel from delegate's capital city and an emission factor of $40 \text{ g CO}_2\text{-C person}^{-1} \text{ km}^{-1}$.

use of. Initiatives such as 'Trees for Travel' in the Netherlands (www.treesfortravel.nl) and 'Future Forests' in the UK (www.futureforests.com) allow individuals to calculate the GHG emissions arising from their air-travel, and then to off-set these emissions by paying for a tree to be planted in one of several managed forests. These and other schemes also allow for larger scale mitigation of air-travel-related GHG emissions, such as those of an entire company or conference. Apart from tree planting, some schemes are designed to off-set GHG emissions by funding specific GHG reduction schemes, such as improved energy efficiency, but all essentially provide a low-cost way for individuals to mitigate their air-travel-related GHG emissions.

In conclusion then, though conference meetings are a vital part of research co-ordination, dissemination and

progress, their environmental impact should not be ignored. There exist a number of straightforward ways by which individuals can mitigate their own air-travel-related GHG emissions. Academics, and atmospheric scientists in particular, now have the chance to take a lead in embracing environmentally friendly conference organisation and attendance.

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