When Science Communication Becomes Difficult: Advice From The Battlefields

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My thoughts on science communication

- It usually goes really well ☺
- It sometimes goes badly wrong (e.g., being misquoted) ☹
- It is often very hard (e.g., debating sceptics) 😐
- But it is always worth it!
- Caution: simplify the science but don’t oversimplify it

An example of when it went really well

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LETTERS
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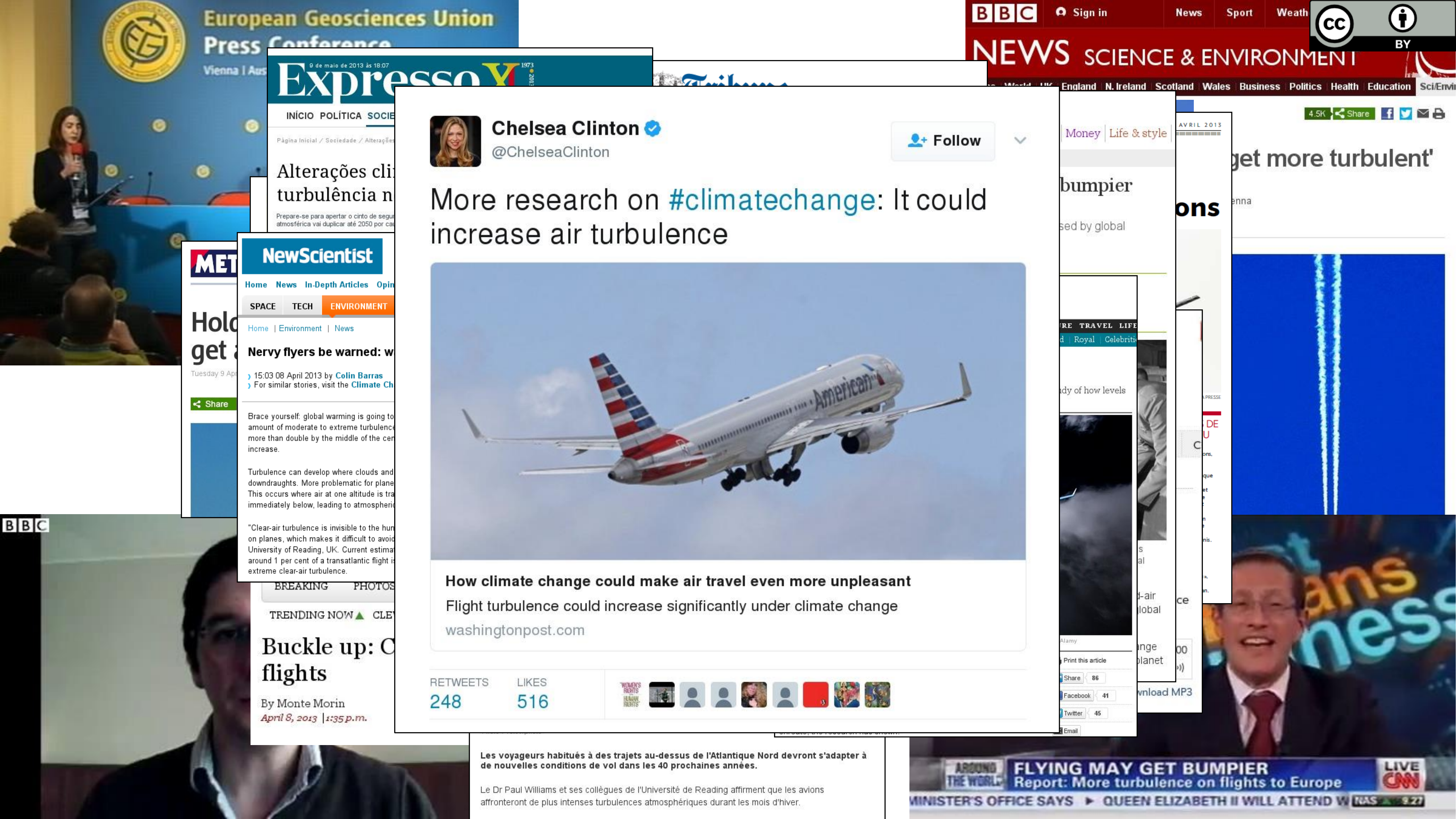
nature climate change

Intensification of winter transatlantic aviation turbulence in response to climate change

Paul D. Williams[1]* and Manoj M. Joshi[2]

Atmospheric turbulence causes most weather-related aircraft incidents[1]. Commercial aircraft encounter moderate-or-greater turbulence tens of thousands of times each year world-wide, injuring probably hundreds of passengers (occasionally fatally), costing airlines tens of millions of dollars and causing structural damage to planes[1-3]. Clear-air turbulence is especially difficult to avoid, because it cannot be seen by pilots or detected by satellites or on-board radar[4,5]. Clear-air turbulence is linked to atmospheric jet streams[6,7], which are projected to be strengthened by anthropogenic climate change[8]. However, the response of clear-air turbulence to projected climate change has not previously been studied. Here we show using climate model simulations that clear-air turbulence changes significantly within the transatlantic flight corridor when the concentration of carbon dioxide in the atmosphere is doubled. At cruise altitudes within 50–75° N and 10–60° W in winter,

The impacts of clear-air turbulence on aviation are reduced by the regular issuance of operational forecasts predicting when and where it will strike. At present, it is not computationally feasible to forecast turbulent eddies on horizontal scales of 100 m–2 km through explicit simulation with a global model of the troposphere and lower stratosphere. Instead, clear-air turbulence is forecast by computing various diagnostic measures derived from simulations of the larger-scale flow. Examples are the Colson–Panofsky index[14], the Brown index[15] and the Ellrod indices[16]. The instabilities diagnosed by these indices are necessary but not sufficient conditions for clear-air turbulence[17]. The second Graphical Turbulence Guidance (GTG2) algorithm, which is an optimally weighted linear combination of nine or ten diagnostics, validates well against pilot reports of turbulence[1]. New diagnostics, inspired by laboratory observations of the generation of gravity waves[18,19], are still being developed and seem to hold promise for improving clear-air



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By Monte Morin
April 8, 2013 | 1:35 p.m.
Les voyageurs habitués à des trajets au-dessus de l'Atlantique Nord devront s'adapter à de nouvelles conditions de vol dans les 40 prochaines années.
Le Dr Paul Williams et ses collègues de l'Université de Reading affirment que les avions affronteront de plus intenses turbulences atmosphériques durant les mois d'hiver.
FLYING MAY GET BUMPIER
Report: More turbulence on flights to Europe

An example of when it went wrong

What I said in the interview:

"The top priority in weather and climate science for the next 10 years is to reduce uncertainty in model predictions."

'THE CLIMATE CHANGE DEBATE IS ESPECIALLY VOCIFEROUS. **I HAVE FOLDERS MARKED "HATE MAIL".** I KEEP A RECORD OF ALL THE CLIMATE SCEPTICS' THREATS'

What they printed:

PAUL WILLIAMS, 33, WEATHER AND CLIMATE, READING UNIVERSITY

My inbox and filing cabinet have folders marked "hate mail". I keep a record of all the climate sceptics' threats, partly to provide a list of suspects if I ever disappear, but mainly because it's funny to read how many times someone can call you a "caulkhead". It's a strange insult: it means someone for whom three generations of parents have lived on the Isle of Wight.

The climate-change debate is especially vociferous because everyone feels they know the weather. Climate scientists are the first to admit that the prediction models we use aren't perfect, which makes the sceptics jump up and down with delight.

My greatest idea for improving climate modelling came to me when I was walking along a beach in California. A model is millions of lines of computer code containing the laws of physics applied to the atmosphere, ocean and ice. In real life, as we know, time flows continuously, but in computer models, time has to be divided into discreet chunks. The model makes predictions by "leapfrogging" rhythmically from one chunk to the next, a process that's inherently unstable, but I've found a way to stabilise the leapfrogging which is being tested around the world.

Within 10 years, I think we'll see a model that predicts the weather and climate change exactly — it's the only way to resolve the debate.

You get a bit desensitised to your own gloomy predictions. It's true the oceans and the atmosphere are getting hotter. If we do nothing and it gets more than two degrees warmer than before the industrial revolution, ice will melt and we'll be in big trouble. We're basically conducting a massive experiment with our planet. But humanity is enormously impressive. We're quite capable of averting disaster. It's a question of whether we choose to.

What really bothers me is flying to conferences. I've been told you can't micromanage these things, so I fly all over the world for my career, despite the irony of it.

An example of when it was hard

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IV. Climate Change and Climate Modelling

8:30 - 9:30 Richard Lindzen, MIT Boston, USA, "A critical assessment of Climate Modelling"

9:30 - 10:30 Paul Williams, University Reading, UK, "Climate science from a climate scientist"

10:30 - 11:00 Coffee

~11:00 - 12:30 Concluding discussions

13:00 Lunch and end of meeting

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Reasons not to oversimplify the science

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Theoretical/research paper

P | U | S

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When science becomes too easy: Science popularization inclines laypeople to underrate their dependence on experts

Lisa Scharrer, Yvonne Rupieper, Marc Stadtler and Rainer Bromme
University of Muenster, Germany

Abstract
Science popularization fulfills the important task of making scientific knowledge understandable and accessible for the lay public. However, the simplification of information required to achieve this accessibility may lead to the risk of audiences relying overly strongly on their own epistemic capabilities when making judgments about scientific claims. Moreover, they may underestimate how the division of cognitive labor makes them dependent on experts. This article reports an empirical study demonstrating that this "easiness effect of science popularization" occurs when laypeople read authentic popularized science depictions. After reading popularized articles addressed to a lay audience, laypeople agreed more with the knowledge claims they contained and were more confident in their claim judgments than after reading articles addressed to expert audiences. Implications for communicating scientific knowledge to the general public are discussed.

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EDITORIAL

The Death of Expertise

Norman G. Lederman · Judith S. Lederman

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Recently, Nichols (2014) bemoaned the idea that in today's US democracy any assertion of expertise results in strong, and often angry, reactions emphasizing that such claims are "appeals to authority, sure signs of elitism, and an obvious effort to use credentials to stifle the dialogue required by a "real" democracy" (p. 1). He further elaborates that, although the public possesses rights equal with the government, it does not mean that all citizens have equal talents, abilities, or knowledge, and it doesn't mean that everyone's opinion about anything is as good as anyone else's. In the end it is concluded that we may be contributing to the "death" of expertise.

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