

Evaluating the scientific credentials of the supporters of public petitions denying anthropogenic climate change

By STEFANO CASERINI^{1*}, SYLVIE COYAUD², GIULIA PERSICO³, and GABRIELE MESSORI^{4,5}, ¹*Dipartimento di Ingegneria Civile e Ambientale, Politecnico di Milano, Milan, Italy;* ²*Science Journalist, Milan, Italy;* ³*RFF-CMCC European Institute on Economics and the Environment (EIEE), Milan, Italy;* ⁴*Dept. of Earth Sciences and Centre of Natural Hazards and Disaster Science (CNDS), Uppsala University, Uppsala, Sweden;* ⁵*Dept. of Meteorology and Bolin Centre for Climate Research, Stockholm University, Stockholm, Sweden*

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ABSTRACT

Notwithstanding the extensive media coverage of topics related to climate change, communication initiatives in open contradiction with the scientific understanding of climate change as a primarily anthropogenic phenomenon are still widespread. We focus here on a recent such initiative, which gained notoriety between the second half of 2019 and the first half of 2020. We show that its promoters and signatories generally display an extremely low level of scientific activity within the field of climate change. We use this as a basis to reflect upon the scientific credentials of those behind climate change misinformation and the broader context of the communication of climate change.

Keywords: climate change communication, climate change denial, climate change miscommunication

In mid-2019, a group of self-defined “men of science” signed a petition on the anthropogenic origin of climate change (hereafter referred to as “Petition”; ASTRI, 2019). The Petition was originally national in scope, and was sent to several high-ranking government officials of a large European country. In the text, the authors deny the role of human activities in driving climate change and invite politicians to avoid “policies for an acritical reduction of carbon dioxide emissions in the atmosphere with the illusory pretence of governing the climate”.

The same theory – and many of the same signatories – reappeared only a few months later in a European and then Global Declaration denying that climate change may pose a serious threat to humanity (hereafter “Declaration”; ECD, 2019). The Declaration gathered signatories from across the world, but when it was made public, the “men of science” from the Petition constituted the numerically largest national group in the list of signatories. In late 2019, the Declaration was sent to the Secretary General of the United Nations, European Governments and other political actors. While the original Petition was largely ignored by media outlets, the

Declaration garnered international – albeit often critical – coverage, including ABC in Australia (ABC, 2020), The Washington Times in the U.S.A. (The Washington Times, 2019), The Times in the U.K. (The Times, 2020), CBC/Radio Canada in Canada (CBC/Radio Canada, 2020) and others.

The theses expounded in the Petition and in the successive Declaration are hardly novel, and partly paraphrase early initiatives denying anthropogenic climate change, such as the “Leipzig Declaration on Global Climate Change” (SEPP, 1995) and the “Oregon Petition” (Global Warming Petition Project, 1998). While it may be easy to dismiss the 2019 Petition and the follow-up Declaration as amateurish disinformation attempts, experience shows that some political actors may leverage such initiatives to prioritise short-term gain over long-term sustainability (Mann and Toles, 2016), and that perceived scientific consensus is a key factor in steering public opinion (Lewandowsky et al., 2013). It is therefore crucial to expose the lack of credibility of these documents. There is a vast literature discussing how to debunk theories denying anthropogenic climate change (e.g. Van der Linden et al., 2017; Lewandowsky et al., 2020), as well as many initiatives which fact-check and debunk

*Corresponding author. e-mail: stefano.caserini@polimi.it

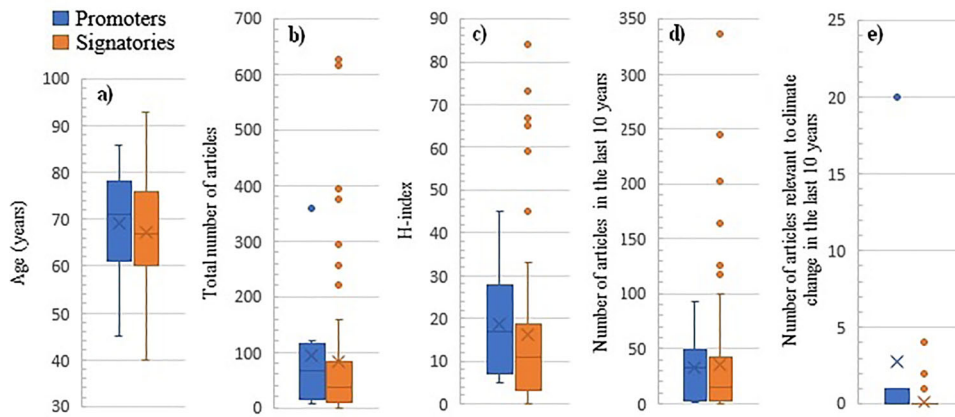


Fig. 1. Demographic and bibliometric data for the Promoters (P, in blue) and Signatories (S, in orange) of the Petition. (a) Age (years); (b) total number of articles per capita; (c) H-index; (d) number of articles in the last 10 years per capita; (e) number of articles relevant to climate change in the last 10 years per capita (see text for details). The box-and-whisker plots show the median, first and third quartile and outliers. Crosses show mean values. In panels (b), (d) and (e), articles authored by several of the promoters or signatories are counted multiple times.

specific misinforming statements or texts as they are made public (e.g. the Skeptical Science Blog: www.skepticalscience.com). Here, we chose a complementary approach and opt to conduct a demographic and bibliographic survey of those supporting the Petition and the Declaration. In both cases, there was a small number of “promoters” which contributed to formulating and publishing the texts and a larger number of “signatories”. While several sources have highlighted that the vast majority of those denying the anthropogenic origin of climate change do not conduct climate research (e.g. Skeptical Science, 2010; Van der Linden et al., 2017), bibliographic analyses of their scientific production are seldom to be found. The rare exceptions (e.g. Petersen et al., 2019), often focus on media visibility. A caveat of our approach is that bibliometric data does not necessarily reflect the quality of scientific output. We wholeheartedly agree with this, yet believe that in extreme cases, such as university Professors not having published any peer-reviewed article over the course of several years, bibliometric data does provide a useful indication of the lack of scientific activity in a given field. We further analyse in detail part of the articles included in the bibliometric analysis, to understand what responses they elicited within the research community.

We base our bibliographic analysis on the Scopus database (www.scopus.com). Data was retrieved during July 2020. We consider separately all publications and peer-reviewed research articles pertaining to climate change. We select the latter based on the scope of IPCC working groups 1 and 2, namely the physical science basis of climate change and the impacts, adaptation and vulnerability to climate change. We exclude articles focussing on

timescales beyond those of anthropogenic climate change and articles focussing on mitigation. Indeed, both the Petition and the Declaration challenge the very existence of human-caused climate change, rather than the preferable options for mitigation. Finally, we exclude articles published in journals included in the list provided by <https://predatoryjournals.com>. We draw information on journal impact factors from the Clarivate Analytics database (<https://jcr.clarivate.com>), using the categories “Meteorology and Atmosphere”, “Environmental Science” and “Geoscience”, and information concerning the volume of published articles in each journal from Haunschild et al. (2016). Demographic information on the 8 promoters and 83 signatories was retrieved from publicly available data on the web. In 7 cases, age was estimated based on the year of graduation; in 4 cases we were unable to retrieve any information on age.

The outcome of our analysis for the promoters and signatories of the Petition are summarised in Fig. 1. It is immediately evident that their demographic is centred at or beyond retirement age, and no one in the group is under 40 years old. Only 10 amongst the 91 promoters or signatories are women.

The median number of articles published until 31st December 2019 is 68 for the promoters and 30 for the signatories (Fig. 1b). 16 of the signatories do not appear in the Scopus database, indicating a lack of internationally published scientific production. A small number of promoters and signatories has published more than 100 articles, with a signatory reaching 627 articles. The median H-index of the promoters is 17, while that of the signatories is 8. Again, a small number of signatories and promoters emerge as having extremely high H-

index values (Fig. 1c). When focussing on the last 10 years, almost a quarter of the signatories (24%) has no scientific publications, and close to half (43%) has published less than an article a year (Fig. 1d). In this same period, 38% of the promoters have published less than 3 articles.

When limiting the analysis to the climate change literature in the last 10 years (2010–2019, a very long period in fast-developing fields such as climate science), the numbers change drastically (Fig. 1e). The total output of the promoters and signatories amounts to 24 unique articles, or to 0.026 articles per capita per year. 63% of the promoters have no relevant publications. Only 5 of these 24 articles appear in the top 10 journals for number of published articles or impact factor in categories relevant to climate change. The 24 articles have been cited 652 times, of which 235 (36%) are self-citations.

An analysis of the promoters of the Declaration highlights an even lower scientific output in the field of climate change. Only 14% have published articles related to climate change within the last 10 years, for a total of 14 publications. This equates to 0.1 articles per capita per year.

We next focus on the promoter (Px) and the signatory (Sx) of the Petition that have the numerically largest scientific production in the field of climate change in the last 10 years. This amounts to 20 and 4 articles, respectively. For 7 of the 20 articles authored by Px, self-citations account for at least 50% of the total citations. 10 of the 20 articles have been published in peer-reviewed journals whose core topics – based on the descriptions provided by the journals themselves – do not include those covered by IPCC working groups 1 and 2. 7 of the articles authored by Px have been subjected to harsh criticism by other authors, in the form of commentaries or research articles confuting their methodological approaches and results. Indeed, in a number of their publications, Px and Sx have attributed part or all of the ongoing global warming to changes in solar irradiance due to astronomical cycles, and have predicted a global cooling starting before 2020 or a stable climate until 2040.

There is robust evidence for an overwhelming consensus on the anthropogenic origin of climate change amongst climate scientists (e.g. Cook et al., 2013; 2016), yet this has not prevented repeated public disinformation campaigns on the topic. The 2019 Petition and follow-up Declaration are some of the latest instances. Our demographic and bibliometric analysis of the promoters and signatories of the Petition and the promoters of the Declaration, highlights some key factors that help explain the apparent discrepancy between scientific consensus on

the one hand, and “men of science” signing documents in open contrast with such consensus on the other hand.

We find that the promoters and signatories of the Petition are largely near or past retirement age, and none of them is under 40 years old. While this sample may not allow drawing robust generalisations, an optimistic interpretation is that young scientists, who will become the next generation of established researchers, do not share the views expressed in this and similar documents. We further find that, while some of the promoters and signatories authored a rich bibliography in disparate fields of science (those with the 10 highest H-indices and number of articles were active in the fields of: particle physics (3), astronomy (2), seismology, oncology, geomechanics, cardiology and materials physics), they collectively have an exceptionally limited production of peer-reviewed scientific articles on climate change. Overall, this amounts to 24 articles over the last 10 years. Several of these were published in journals whose core scope does not include climate change and/or have been repeatedly criticised by the scientific community. Similarly, 86% of the promoters of the Declaration have not authored a single peer-reviewed article on climate change in the past 10 years. While the number and quality of publications are often uncorrelated quantities, we believe that the staggering numbers we highlight, coupled with our in-depth analysis of a selected group of articles, are indicative of an extremely low level of scientific activity and acceptance within the field of climate change. As a general term of comparison, a recent bibliometric summary conducted on 224 climate scientists found an average of 57 scientific articles per capita – albeit not limited to the latest 10-year period – almost 4 times more than the production of a corresponding set climate change contrarians (Petersen et al., 2019).

Notwithstanding the lack of scientific credibility of the promoters and signatories of the two disinformation texts analysed here, such initiatives should not be dismissed as irrelevant. While the vast majority of European Union citizens (79%) believe that climate change is a “very serious problem” (Eurobarometer, 2019), a recent global survey highlighted an 8% drop in the fraction of respondents agreeing that “human activities contribute to climate change” between 2014 and 2020 (IPSOS Global Advisor, 2020). It is natural to ask if and to what extent this decrease may be ascribed to disinformation initiatives, echoing the sentiment of previous authors who lamented the lack of research on such themes (e.g. Capstick et al., 2015).

We conclude that the self-defined “men of science” behind two recent disinformation initiatives on the anthropogenic origin of climate change largely lack scientific credibility in the field of climate change, in

agreement with previous investigations on the topic (e.g. Skeptical Science, 2010; Van der Linden et al., 2017). Our bibliometric analysis points to a lack of research activity either in general, or within the field of climate change specifically, and highlights the meagre scientific impact and level of acceptance of their few publications on the topic. While this explains the apparent discrepancy between the overwhelming consensus of climate scientists on the anthropogenic origin of climate change and the repeated public initiatives challenging this viewpoint, it does not mean the latter should be dismissed. On the contrary, it highlights the need for a greater understanding of the drivers of trends in public perception of climate change, and a concerted effort to align public perception to scientific consensus.

Disclosure statement

No potential conflict of interest was reported by the authors.

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