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To Whom It May Concern:

Re: Support for Dr. Quentin Coopman's CNRS application (19-02-CRCN)

Dr. Quentin Coopman, a young scientist whose work I have followed closely, is applying for a CNRS position and I am very pleased to provide some input.

By way of introduction, I have been a research scientist in the Chemical Sciences Laboratory of the Earth System Research Laboratory, NOAA since 1991 and lead a program on Clouds, Aerosol, and Climate. My research interests focus on model studies of the interactions of aerosol particles, clouds and precipitation at different spatial scales. Aerosol effects and, in particular, aerosol-cloud interactions have been identified as the largest uncertainty in radiative forcing by the Intergovernmental Panel on Climate Change, the United Nations body for assessing the science related to climate change. Dr. Coopman's work on aerosol-cloud interactions in the Arctic is a very important aspect in this context, as the Arctic is a highly sensitive component of the climate system and clouds play an important role in regulating the Arctic system.

Dr. Coopman is best known for his excellent analysis of the influence of long-range transport of pollution on Arctic clouds. In two high profile Geophysical Research Letter papers, he demonstrated the high sensitivity of these clouds to pollution aerosol. In the first paper, he and colleagues showed that the response of low-level clouds in the Arctic to anthropogenic aerosol is between 2 and 8 times higher than has been observed elsewhere. To reach this result they had to pay careful attention to untangling the effects of the aerosols themselves, from the effects of meteorology, something often neglected, or poorly done, by other researchers.

In the second paper, Dr. Coopman analyzed the impact of these plumes on the ease with which liquid clouds over the Arctic Ocean freeze. They found that liquid clouds in polluted air switch to their ice phase at temperatures that are 4 °C higher they would in clean air. This has the potential to reduce the lifetime of Arctic clouds because ice precipitate more readily than liquid clouds. This could have really important impacts for the Arctic system.

Both papers demonstrate very clear insights into a complex system, and the ability of Dr. Coopman to handle large remote sensing data sets and model output. His subsequent work with Prof. C. Hoose at KiT further demonstrates his facility with satellite remote sensing and radiative transfer models. His publication record over the past year has been stellar (3 first author papers in the past year). He is also taking an active role in advising young scientists (Bachelors through PhD).

As an Associate Editor of the Copernicus journal Atmospheric Chemistry and Physics (ACP), I frequently call on Dr. Coopman to review manuscripts associated with aerosol-cloud interactions. Having not collaborated directly with him, this is my best window into his capabilities. I always find his reviews insightful and thoughtful. I especially like the fact that he pays close attention to statistical significance of results, a topic that is often neglected in a rush to publish (seemingly) exciting results.

In closing, I have a *very* positive impressions of Dr. Coopman in terms of his professional rigour, accomplishments as a young scientist, and his pleasant nature. I look forward to a positive outcome of his application.

Sincerely

Graham Feingold