Supply and Demand for Atmospheric Sciences Professionals: A Rejoinder to Vali and Anthes

The response of Vali and Anthes (2003) to my essay in the February issue of *BAMS* begins with a mischaracterization and ends leaving one to wonder why the fuss over considering *both* supply and demand for atmospheric sciences professionals. Vali and Anthes mischaracterize my essay as follows: "Pielke (2003, *BAMS*, p. 170–173) argues that market demand for scientists should be the 'first focus' in considering quantity and type of graduate education of scientists." They have pulled out of context the two words "first focus" from a 57-word sentence that takes no position on priorities. The phrase "first focus on" simply refers to the temporal ordering of elements of a particular methodological approach.

In contrast, I say 3 times just prior to that sentence that supply and demand should always be considered together.

> First and foremost, [experience] suggests the importance of discussing supply and demand together . . . one recommendation for the atmospheric sciences community is that any effort to assess supply should be done in the context of also seeking to assess demand. Specifically, UCAR and the AMS should ensure that any

future surveys that they undertake include characterization of demand, as well as supply.

If the primary objection of Vali and Anthes to my essay is that they "disagree with [my] emphasis on demand as the primary basis for graduate student recruitment," then there is in fact no disagreement. In no place do I recommend prioritizing one over the other.

But it seems that Vali and Anthes object to more than just their mischaracterization of my essay—they appear to object to *any* systematic consideration of demand for atmospheric sciences professionals. They justify this position based on data from the National Science Foundation (NSF), indicating that the "underutilization" and unemployment of science and engineering Ph.D.s was near 3% in the late 1990s. But a more complete picture is presented with companion statistics from NSF that show in 1999 an additional 5.7% for Ph.D. recipients in the earth, atmospheric, and oceanic sciences 1–3 years past degree reported being "involuntarily out of field." These figures are excluded from NSF tabulations of science and engineering unemployment rates and reflect the "percent of employed individuals who reported they were working part time, exclusively because suitable full-time work was not available and/or working in an area not related to the first doctoral degree (in their principal job) at least partially because suitable work in the field was not available" (see information online at www.nsf.gov/sbe/srs/nsf03310/pdf/tab4.pdf). Also, recent Ph.D. recipients in postdoctoral position report "other employment not available" as the reason for taking a postdoctoral positions at rates of 20.5% (engineering), 18.3% (mathematics), and 28.4% (chemistry); data for the atmospheric sciences are not presented (see the article by E. Jones, "Beyond Supply and Demand: Assessing the Ph.D. Job Market," in the Occupational Outlook Quarterly, Bureau of Labor Statistics, 2002–2003, at www.bls.gov/opub/ooq/2002/winter/art03.pdf). NSF also reports that 13.5% of all science and engineering postdocs are more than 6 years past receiving their Ph.D. These and other data prompt Jones to echo concerns about oversupply of scientists and engineers with respect to demand.

Are such concerns relevant to the atmospheric sciences? No one knows because no one is collecting the data on what happens to atmospheric sciences Ph.D.s after they graduate or the labor market that they enter. Hence, it is easy to assume that business as usual is working just fine and to imagine that ever more atmospheric sciences graduate students would be even better.

Of course, the reason for considering both supply and demand in the atmospheric sciences is not to issue "predictions" as Vali and Anthes suggest, but to collect information that might help leaders in the atmospheric sciences to make more informed decisions about research and education in ways that contribute to societal needs (such needs *of course* include knowledge for knowledge sake). Consideration of the demand function for professionals is established practice in many fields, including those in the sciences. Leaders in these fields view such data to be extremely useful in shaping the evolution of both research and education. For example, the Bureau of Labor Statistics publishes and Occupational Outlook Handbook for virtually all professions and concludes in its 2002–03 edition for atmospheric sciences graduates that, "applicants may face competition for jobs if the number of degrees awarded in atmospheric science and meteorology remain near current levels" (available online at www.bls.gov/oco/ocos051.htm). It should not be surprising that decisions about how to make research and education more relevant to the needs of society can be made more effectively with robust information about the demand for (and supply of) atmospheric sciences professionals. It is surprising only that some in the atmospheric sciences community resist collecting this information.

Ultimately, the values of a profession and its leaders are expressed in the actions that they take, not by the words that they speak. Collecting information on the demand for atmospheric sciences professionals is no more challenging than collecting information on supply; hence, it is notable that there is support for the latter but not the former. So long as the atmospheric sciences community emphasizes the supply of graduate students in the complete absence of concern for the broader societal demand for their knowledge, skills, and training, we risk not only the consequences of uniformed decisions about research and education, we risk that others will perceive the atmospheric sciences to be more interested in professional self-service than our professions's service to society.

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