## 5.2 Atmospheric Science: Untapped Career Opportunities for Persons with Visual Impairments

Imke Durre*
NOAA National Climatic Data Center, Asheville, North Carolina

**ABSTRACT**

Imagine that you are attending a seminar, and the speaker asks the familiar question, "Can everybody see this?" In most such situations, there are a few nods from the audience, and the speaker proceeds with the presentation. If you do have difficulty seeing the slides, the problem is usually taken care of with a few minor adjustments to the display. But what happens if you still cannot see and are not able to rectify the situation by moving to a different location in the room? Would you still be able to follow the presentation?

The answer depends on both the speaker and you. If the speaker is sufficiently audible and descriptive, you carefully follow what is being said, and you have the background and skills to translate the descriptions into concepts, then you are likely to leave with a good understanding of what was presented. On the other hand, the presentation becomes much more difficult to follow if the speaker's voice is too quiet to reach you or if the speaker frequently uses phrases that refer to the visuals with indefinite descriptors, such as "I am not going to talk about this," "temperatures are above normal here and below normal elsewhere," and "the relationship is described by this equation." Likewise, your comprehension might be limited if you allow yourself to be distracted by your inability to see the slides or if the speaker is sufficiently descriptive but references unfamiliar geographical locations.

While scenarios like this are rare for persons with normal vision, individuals with visual impairments encounter them on a regular basis. Types of visual impairment include total blindness, blindness with light perception, legal blindness (i.e., a severely restricted field of vision or a visual acuity of less than 20/200 on the better eye with best correction), and color blindness. Approximately 4% of Americans have red-green color-vision impairments (Olson and Brewer 1997) and 0.4% are legally blind (American Foundation for the Blind 2007). Even though statistics about the percentage of individuals with visual impairments in atmospheric science are not available, the American Association for the Advancement of Science estimates that close to 1% of all undergraduate and graduate students in science, technology, engineering, and mathematics (STEM) fields have a visual impairment (AAAS 2002).

The success of these individuals in their field of interest hinges upon a number of factors. These include early and continued exposure to science; adequate academic preparation and compensatory skills; the availability of appropriate assistive technology for reading and creating textual, mathematical, and graphical material; equal access to information and programs; and a reliable support system of mentors, role models, and assistants (Burgstahler 1994; Vermeij 1996; Holden 1998; AAAS 2002; Locke 2005). In the atmospheric sciences, concepts are often communicated by way of graphs, maps, and other images. Visual material is encountered not only in presentations and lectures, but also in textbooks, journal articles, and as a part of day-to-day research activities. In addition, common tasks such as contour mapping, viewing dynamically generated radar and satellite images, creating figures for publications and presentations, and taking field observations rely heavily on the visual sense. Consequently, for people with visual impairments pursuing a career in atmospheric science, the accessibility of material presented in visual form is of particular importance, as are their skills in interpreting visual information.

Focusing on the post secondary level, the presentation will outline commonsense adaptive strategies that make it possible for persons with visual impairments to effectively handle these issues. Of particular importance is an effective collaboration among the visually impaired student, professors, departmental staff, and disability service providers, all of whom play a role in identifying and implementing appropriate accommodations. The goal of all parties should be the student's full participation in coursework and departmental activities in a manner that is consistent with the student's needs and abilities and allows the student to develop skills equivalent to those his or her peers are expected to acquire. Similarly, in internships and post-graduation employment, it is important for the supervisor and employee to work together at determining and implementing appropriate accommodations such that the appropriately trained employee is capable of performing at the same level as his or her colleagues. For additional background as well as specific strategies, the reader is referred to Durre (2008).

* *Corresponding author address:* Imke Durre, NOAA National Climatic Data Center, 151 Patton Ave., Asheville, NC 28801; e-mail: Imke.Durre@noaa.gov

**REFERENCES**

American Association for the Advancement of Science (AAAS), 2002: *New career paths for students with disabilities: Opportunities in science, technology, engineering, and mathematics*. 28 pp. Available online at http://ehrweb.aaas.org/entrypoint/paths/index.html.

American Foundation for the Blind, cited 2007: *Blindness Statistics*. [Available online at http://www.afb.org/Section.asp?SectionID=15.]

Burgstahler, S., 1994: Increasing the representation of people with disabilities in science, engineering and

mathematics. *Information Technology and Disabilities E-Journal*, I. [Available online at http://www.rit.edu/~easi/itd/itdv01n4/article9.htm.]

Durre, I., 2008: Untapped career opportunities for people with visual impairments. *Bull. Amer. Meteor. Soc*., 89, 987-996.

Holden, C., 1998: Leveling the playing field for scientists with disabilities. *Science*, 282, 36-37.

Locke, S., 2005: White paper: The status of persons with disabilities in the geosciences. *Regional Alliance in Science, Technology, Engineering, and Mathematics*, 9 pp. [Available online at http://rasem.nmsu.edu/Pdfs/symposium/RASEM_white_paper9_28.pdf.]

Olson, J. M., and C. A. Brewer, 1997: An evaluation of color selections to accommodate map users with color vision. *Annals of the Association of American Geographers*, 87, 103-13

Vermeij, G. J., 1996: *Privileged Hands: A Scientific Life*. W. H. Freeman and Company, 308 pp.