TECHSIGHTING
SOFTWARE

Visualizing a Changing World

Last year's El Niño and record temperatures worldwide focused the interest of teachers and students in the Earth and life sciences on global climate change. Numerous reports on the greenhouse effect appear in the media, but understanding the complexity of climate information is a challenge for almost everyone. WorldWatcher is a new (and free) software package that brings hard-to-grasp concepts of atmospheric science to life and helps students visualize and understand large sets of climate-related data.

WorldWatcher
SSciVEE: Supportive Scientific Visualization Environments for Education
Northwestern University
Evanston, IL
www.worldwatcher.nwu.edu

WorldWatcher was developed by researchers at Northwestern University with support from the National Science Foundation. The software contains a large library of Earth and atmospheric science data. Students may also enter their own data, although, according to the manual, the file import for raw data is somewhat complex and requires "advanced computer skills." The package is designed to provide students with easy-to-use tools to analyze and view large sets of planet-wide data.

The capabilities of WorldWatcher have been expanded from primarily creating climate visualization maps (Fig. 1) to include the display of line- and scattergraphs and the performance of calculations on data sets. Simple mathematical operations allow for analysis of the effects of climate changes on surface and water temperatures or on precipitation over the past several years. Data sets for many planetary phenomena have been added since the program's first release in 1996. These range from cloud cover, evaporation, and wind speed data to population density, carbon emissions, and political boundaries. Ecologists may have students plot vascular plant distribution and diversity, solar energy absorbed by plants, dominant vegetation, or chlorophyll concentrations in the oceans. Atmospheric data allow students to observe the greenhouse effect; incoming, absorbed, and reflected energy; and surface temperatures over recent time. Users may find it cumbersome that some of the data are displayed in the English measuring system. The data conversion function does allow the user to convert data into metric values, but it requires that the operator have a basic knowledge of the appropriate conversion equations.

WorldWatcher allows the user to customize output by altering the color of the map, its resolution, and the magnification of the displayed region. The interface is user-friendly and most operations are easy to perform. The Web version comes with a printable 140-page manual that is concise and well written. One important feature of WorldWatcher is the Information button on the toolbar, which gives the user access to an extensive glossary explaining the use and meaning of variables displayed at a given time. The program also contains files of references that were used to compile the data stored in its library. Some of these data can be viewed by simply following the links in the WorldWatcher background sections.

Additional assets to the software include the Notebook function, which allows instructors to create worksheets or problem sets about global warming, rising sea levels, or the greenhouse effect. Worksheets can be designed to contain links to sample data, to the appropriate section of the manual, or to detailed background information about a given problem in the worksheet. New projects and data sets are available for download from the WorldWatcher Web page on a regular basis.

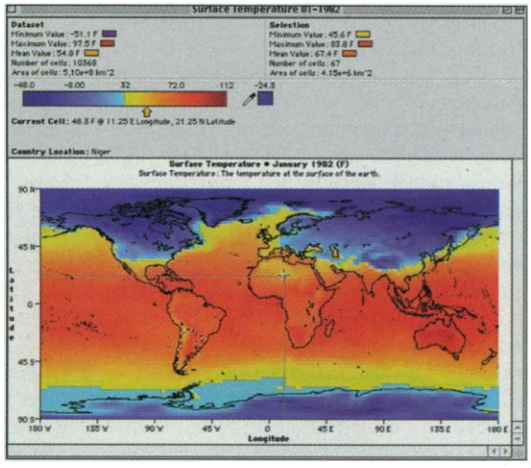

Fig. 1. Visualization created by WorldWatcher.

WorldWatcher's strength lies in providing an easy way to superimpose data or analytical results on world maps. The program is suitable for use by Earth science classes from high school through college. WorldWatcher can be obtained through the Internet or installed from a single CD-ROM, which is available free of charge from the Institute for the Learning Sciences at Northwestern University. Although WorldWatcher runs on both Macintosh and Windows platforms, only the Macintosh version can currently be downloaded directly from the Internet. The Web version runs best on PowerMacs with OS 7.0 or later (OS 7.5 is recommended), and requires QuickTime 2.5 or later.

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TECHSIGHTING
NET TIPS

Project Yourself!

A growing number of scientists are abandoning overhead transparency or slide presentations for computer-based ones, and with good reason. There are a number of advantages for running a presentation directly from the computer: the quality of the presentation is higher, the content can be modified right up to the last minute, there is no wait for the slides to be printed, and animation or sound (or both) can be added. But with new technology comes new hurdles to jump, and many scientists are facing such problems already.

Previously, we have covered ways to use graphics and animation to impress an audience (*1*, *2*). What we have not yet covered is that a computer-based presentation must run on a computer that plugs into a liquid crystal display (LCD) projector. Thus the major drawback of computer-driven presentations is that such projectors are expensive and may not always be available at the facility where you will be presenting your work. There is, perhaps, nothing more frustrating (and stressful) than arriving in the seminar room to find that there is no projector to plug your computer into, or that the available projector is not compatible with your laptop!

One way around this is to bring your own LCD projector. Until recently, however, this alternative was not viable for most of us because these projectors cost nearly $10,000. In addition, the projectors were bulky and heavy, making you feel like your travel plans had been turned into an expedition to Africa. The heft of those projectors was necessary because they needed space for adequate ventilation and cooling of the lamp and display engine, and decreasing size of the lens would distort projected images.

Thanks to a number of technical advances and design changes, a number of lightweight portable LCD projectors have