TECHSIGHTING
SOFTWARE

# Worldwide Weather Watcher

Amateur meteorologists wanting easy access to global weather conditions will find that the WeatherTracker program meets their needs at an affordable price. Using resources from Internet sites around the world, WeatherTracker samples current weather information for specified locations and displays it in several formats. The software is easy to use and works without a browser. The program can access an impressive number of weather stations—more than 8000 worldwide. The data supplied by the stations—temperature, relative humidity, barometric pressure, wind direction, and current conditions—are the figures most commonly sought by amateurs. This information can be shown in small "digital" windows or larger "analog" windows, and users can choose from English and metric units.

**WeatherTracker**
**Trexar Technologies, Inc.**
Alpharetta, GA.
$24.95.
770-442-8045
www.trexar.com

In addition to standard measurements, WeatherTracker can also retrieve the local forecast, climate data (such as time of sunrise and sunset), and marine data, as well as the dewpoint, wind chill, and heat indices. Information availability, however, varies considerably among sites.

Unfortunately, the software cannot provide live data, so users can only get hourly updates, and access to information on cities outside North America may have a lag time of several hours. Also, the program is unable to provide a simple interface for tracking and displaying climate data over time. With the default mode of the program, the user will see current conditions only. However, the program will track data if the preferences are set to "data logging," which will file data in a log folder. This folder is stored in the same location on the computer as the program, but the WeatherTracker cannot directly access the data. The data are saved in a comma-delimited format, which must be imported by a spreadsheet program for analysis and plotting. Adding a spreadsheet function to WeatherTracker would certainly simplify data analysis.

The WeatherTracker is handy for monitoring weather conditions at remote sites, and amateur meterologists will welcome this comprehensive, easy-to-use, inexpensive program. Professional meteorologists, however, will not find WeatherTracker useful because they have access to more climate information than this program can provide. WeatherTracker is available for both Macintosh and Windows-based computers.

—KEVIN AHERN

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# Data Tool

PSI-Plot version 6 for Windows is a spreadsheet data analysis and graphing program from Poly Software. This latest version adds new features to an established scientific research and presentation software tool, accomplishing the difficult task of linking powerful statistical analysis with a well-designed graphical interface on a desktop computer.

The principal strength of PSI-Plot is its ability to handle large data sets and produce annotated graphs, both of which require ample memory and processor speed. The spreadsheet can organize data like Microsoft Excel, but on a much larger scale: Each of the program's "sheets" can handle 1024 columns and 100,000 rows of data. With an automatic converter, homogeneous data sets can be easily imported from standard text or from Excel. Importing complex data is more difficult and may require copying and pasting data, or saving subsets of the data from the source application.

PSI-Plot makes available a comprehensive set of data editing and statistical analysis functions. Blocks of cells may be easily selected and edited. Cells or blocks can be filled with uniform or Gaussian random numbers, simple functions, or user-defined data. However, the program does lack a macro language for conditional or branching calculations.

Several statistical tools are available such as Student's *t* test and F test, which measure the significance of statistical differences between two data sets; one- and two-way analysis of variance (ANOVA), linear regression, and interpolation; and nonparametric calculations for data distributions, including chi-squared test and Kendall's tau rank correlation and sign test, which evaluate the probability that two samples were drawn from the same set. Some mathematical analysis functions, such as an equation solver and matrix manipulations, are available, although these nonstatistical functions do not perform as well as in other math software packages.

**PSI-Plot**
**Poly Software International**
Sandy, UT.
$299.00
(academic, $99.99).
801-553-3557
www.polysoftware.com

The program's graphing is intuitive and generally the first-time user won't need the help files. Numerous plot formats include two- and three-dimensional scatter plots, line graphs, and surface mesh graphs. A rich set of options for drawing axes is available, as is a toolbox for making annotations. PSI-Plot produces publication-quality hardcopy and can be saved in many file formats.

The included manual contains a thorough tutorial section, which explains most of the program's features adequately. Science students will find PSI-Plot easier to use and more robust in statistical functions than Excel.

The program is shipped on four 3.5-inch disks and runs under Windows 95, 98, or NT. In addition to individual licenses, network licenses are available for providing PSI-Plot to users via a server.

—WILLIAM SEFFENS

Department of Biology and Center for Theoretical Study of Physical Systems, Clark Atlanta University, 223 Brawley Drive SW, Atlanta, GA 30314, USA. E-mail: wseffens@cau.edu

TECHSIGHTING
SOFTWARE

# A Picture is Worth a Thousand Words

Production of two of my favorite old volumes, illustrated with painstakingly constructed graphical data, would surely have been simplified by use of the Noesys software suite. In *The 1900 Statistical Atlas of the United States*, millions of megabytes worth of data on the population by year, by county, and by state are displayed with all the precision that engravers and watercolorists could muster. In 1960, barely a decade into the computer age, MIT press published a beautiful large-format book

**Noesys 2.0**
**Fortner Software**
Boulder, CO.
Noesys, $495;
Noesys Plus, $795;
Noesys+IDL, $2390.
800-252-6479
www.fortner.com

that depicted demographics of all types, overlaid on maps of the major metropolitan areas. Each of those books must have required many years of effort to produce. Each was obsolete by the time it was published.

Multidimensional data plots are essential for illustrating concepts as diverse as jet streams, weather maps, and voter preference polls. Noesys is an important advance in analysis and visualization of such complex data with a Windows-based PC or a Macintosh computer. It enables the rapid input, analysis, and output of massive multidimensional data sets by taking advantage of the hierarchical data format (HDF), a common format for data interchange, and HDF-EOS, a convention used by NASA for earth science data. The program allows quick and easy analysis, display, manipulation, and organization of large amounts of multidimensional data. It has translators to import the essential file formats in common use such as ASCII text, binary, DTED, netCDF, CDF, SDTS, TIFF, GeoTIFF, PICT, and BMP.

Noesys allows editing of data, data tables, grids, color palettes, map projections, and all other attributes of the HDF format. Matrix data can be manipulated and visualized in the form of raster images, contour plots, vector plots, polar plots, and surface plots. Three-dimensional surface plots can be created, rotated, and labeled. Volumetric data can be visualized as slices, isosurfaces, volumes, and cutouts. Standard color palettes are available, or custom palettes can be created.

Different versions of Noesys vary in their implementation of IDL (Interactive Data Language). In the entry-level program, one can enter simple IDL commands with a command-line interface. In Noesys Plus, IDL macros can be created, saved, and executed. At the highest level, Noesys+IDL, multiline commands can be compiled to manipulate data and display the results graphically, which is particularly useful when a standard analysis and display protocol is used repeatedly.

The design of this program is excellent and appears to be bug-free. Most menu commands are intuitive. The manual includes several real-world examples, which exercise all the important features of the program, including mapping. The examples are well-chosen; they are understandable to anyone working with quantitative data but not so esoteric as to apply to only one specialty.

This program will be a welcome addition to anyone who needs to interpret and create visual images of large data sets.

Noesys 2.0 for Windows 95, 98, or NT 4.0 requires at least 125 MB disk space. For Macintosh OS 8.1 or higher, the program requires 154 of MB disk space.

—EMILE M. BELLOTT

Pharm-Eco Laboratories, 128 Spring Street, Lexington, MA 02421–7800, USA. E-mail: ebellott@pharmeco.com

TECHSIGHTING

SEISMOLOGY

# Where the Ground Shakes

Seismologists can determine the location and magnitude of an earthquake within minutes. But before local authorities can initiate an effective emergency response to reduce fatalities and injuries, they need to know where the most intense ground shaking has occurred. Such information is valuable in identifying and evacuating hazardous structures, repairing vital infrastructure (such as water supplies and telephone lines), and shutting down or rerouting utilities (such as gas, electric, or nuclear power) that pose a secondary hazard. A dense array of seismometers and strong ground-motion instruments near the event can be used to determine the intensity of ground shaking, but, unfortunately, many areas do not have these monitoring networks, and intense ground shaking does not always occur near the epicenter.

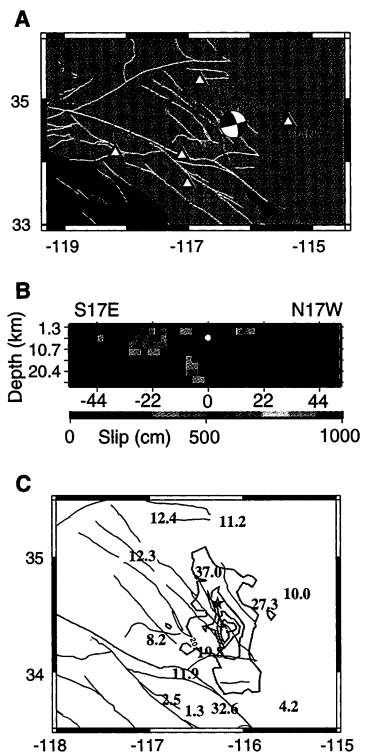


**Fig. 1.** (A) Map showing the locations of TriNet broadband and strong motion stations (triangles) used to determine the source characteristics of the 16 October 1999 earthquake shown by the focal mechanism. The bold red line shows the surface rupture of the 1992 Landers earthquake (magnitude 7.3). (B) Slip map showing fault slip distribution on a planar fault. White circle, hypocenter. (C) Predicted peak horizontal ground velocity (PGV) shown as blue contours in intervals of 20 cm/s. Red numbers, observed PGV values at TriNet stations. Red line, surface rupture of the 16 October 1999 event; black lines, nearby faults.

Douglas Dreger and Asya Kaverina of the University of California at Berkeley have developed a technique to rapidly determine the strong ground motion in sparsely monitored areas. They applied the method to the Hector Mine earthquake (magnitude 7.1) that occurred in the Mojave Desert on 16 October 1999 (*1*). Dreger and Kaverina used the southern California TriNet and the Berkeley Digital Seismic networks to determine the earthquake's location, magnitude, and mechanism, including a clear fault plane. They calculated the amount and direction of the rupture away from the hypocenter and derived a "shakemap" (*2*), which predicts the location and intensity of strong ground motions, with only five three-component seismometers rather than the usual 10 or more. These instruments were within an 80- to 200-km radius from the epicenter, and Dreger and Kaverina identified a region of peak ground motions 10- to 50-km southeast of the epicenter. Their shakemap was complete within hours of the event, but the entire process could be automated in the future to provide a shakemap within 30 min.

Thus, their technique pinpoints the locations of strong ground motions with a minimum number of instruments to quickly provide information that is crucial for local emergency response. The technique can be combined with existing seismic networks and automated to increase the accuracy and speed of shakemap production in areas of sparse instrument coverage. Although the technique is most useful for regions without many instruments, it can also be effective in those that are well-instrumented because earthquakes can damage the instruments or sever the lines of communication, creating delays in accessing or processing seismic data.

—LINDA ROWAN

**References and Notes**

1. D. S. Dreger and A. Kaverina, in preparation. May also be downloaded from http://seismo.berkeley.edu/~dreger/hectorweb/hectweb.htm
2. A shakemap is a data-driven map of strong shaking parameters. D. J. Wald *et al.*, *Earthquake Spectra* **15**, 537 (1999).

CREDIT: D. S. DREGER