

CHAPTER 3

Communicating over the Internet: Electronic Mail, Usenet, and Email Interest Groups

Electronic mail may well be the most powerful means of using the Internet. Although the World Wide Web delivers a multimedia-rich electronic world to your desktop, electronic mail connects you to the creator of the online materials. Electronic mail isn't about connecting bits of related information like the Web or Gopher. Electronic mail connects people. Electronic mail, or email, is an enormously popular way to communicate with people across the Internet. Electronic mail is a versatile service that allows you to do a number of things other than just send messages to people. With electronic mail you can attach and send text files, binary objects such as graphic files and "rich text" (word processed files), as well as digital audio and video files. You can use electronic mail to query computer servers to locate and retrieve files. A number of professional and personal activities are supported and enhanced by using electronic mail services. For instance, you can distribute electronic newsletters and magazines and broadcast announcements of upcoming events like conferences and class assignments to large groups of people with ease. Electronic mail is an invaluable way of conducting survey research and virtual seminars. Electronic mail moves you into the world of the paperless classroom where students submit their assignments as an electronic mail attachment for review and grading. Earth scientists are making use of electronic mail by:

- keeping up with colleagues' activities through special interest discussion groups
- participating in online interest groups like GEOED, the email
- discussion list devoted to earth science education
- communicating with students online
- entering into debates over the latest news in geology on the
- sci.geo.geology Usenet group
- keeping up to date on the latest developments in geographic
- information systems through the GIS-L electronic mail interest group
- distributing electronic journals like the Electronic Green Journal to colleagues across the globe

Electronic mail is fast becoming the communication mode of choice, after face-to-face discourse, for the information age. In this chapter we will look at how you send and receive electronic mail and join electronic mail discussions, and how the earth science community

is using the Internet to conduct their everyday business.

Why Use Electronic Mail?

Electronic mail's popularity derives from the fact that users can process their communication at their leisure. Like a message machine, your electronic mailbox stores messages that come in at all times of the day and night. You can review and answer messages whenever it is convenient to do so. You eliminate the hassles of "phone tag" and the garbled images that arrive on a fax, and you aren't charged for listening to an answering machine's taped message when calling long distance. Digital media like electronic mail enable us to collect information about the sender of the message. Email messages include the sender's name, location, date of transmission and subject. With your email reader you can filter messages by the information provided, much as a secretary or administrative assistant would, and respond to them as you wish. Being in digital format you can import, copy and paste portions of the message into a word processing program for editing. Messages can be stored for an indefinite period of time, printed or forwarded to another person.

A major attraction to the use of electronic mail is the fact that communication between two people doesn't happen in real time. *Synchronous communication* like a telephone conversation happens in real time with people talking to one another. Unlike a telephone conversation, electronic mail communication between two or more individuals does not happen at the same time. Electronic mail is non-real-time messaging. We call electronic mail an *asynchronous* form of communication. *Asynchronous communication* means that people are not connected to one another with some sort of device at the same time in order to communicate with one another. One person sends a message to another who may or may not be connected to the Internet at that time. The recipient, if connected, may immediately respond, or, if not connected, respond at a later time.

Another advantage of electronic mail's digital format is that duplicate copies can be created almost instantly for wide distribution. Special electronic mail servers called *listservs* can distribute a single electronic mail message to numerous recipients at one time. Listservs are used to distribute messages to electronic mail discussion groups. Listserv discussion groups have become an enormously popular way of keeping up to date with happenings in a topic of interest. Listservs are employed to conduct virtual seminars by professional organizations or in education. Listservs are also used to distribute online newsletters and magazines.

Electronic mail bulletin boards have been created to facilitate communication between individuals using networked communications. Electronic bulletin boards are like a conventional bulletin board where you can post a message for others to read and respond to.

Bulletin board systems like Usenet are an extremely popular way to keep in touch with a

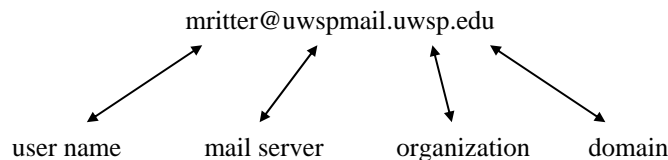
large group of people.

There are drawbacks to the use of electronic mail in spite of all the attractions. Electronic mail systems and software come in a variety of styles and types. Some systems may not be compatible with others that you want to communicate with and prevent you from taking full advantage of what electronic mail has to offer. These problems will diminish as open network systems evolve. Electronic mail systems are not 100% secure. Don't send anything that you deem to be of a sensitive nature. Many computer systems have been infiltrated by hackers, and electronic mail tampered with. In spite of these potential problems electronic mail is an extremely useful means of communication.

Using Electronic Mail

Electronic Mail Addresses

Sending and delivering a letter requires a recipient name and address, and electronic mail is no different. In order to send and receive electronic mail you must have an *electronic mail address*. Your electronic mail address uniquely defines the Internet location to which electronic messages are sent. Typically, an electronic mail address has four basic parts, a user name, a mail server name, an organization and a domain. For example, my email address is:



The user name identifies the person. In my electronic mail address, the *user name* is the first letter of my first name followed by, with no spaces, my full last name. Some user names have a sequence of letters and numbers or full names separated by a dash or underscore. User names are defined by computer system administrators to work within the requirements of their particular electronic mail system. The *mail server* is the name of the computer through which your electronic mail passes and is separated from the user name by the "at" sign (@). The third portion of the address is the organization. My organization is "uwsp," which stands for the University of Wisconsin at Stevens Point. The *domain* is the last item in the address. Domains in an electronic mail address are the same as the domains discussed in Chapter 1 concerning addressing computers on the Internet. My domain is an educational institution (edu). The last three components of the address are separated by periods or "dots." One reads the address as "mritter at uwspmail dot uwsp dot edu." The case of a letter in an address is very important to some mail servers. If you capitalize a letter in an

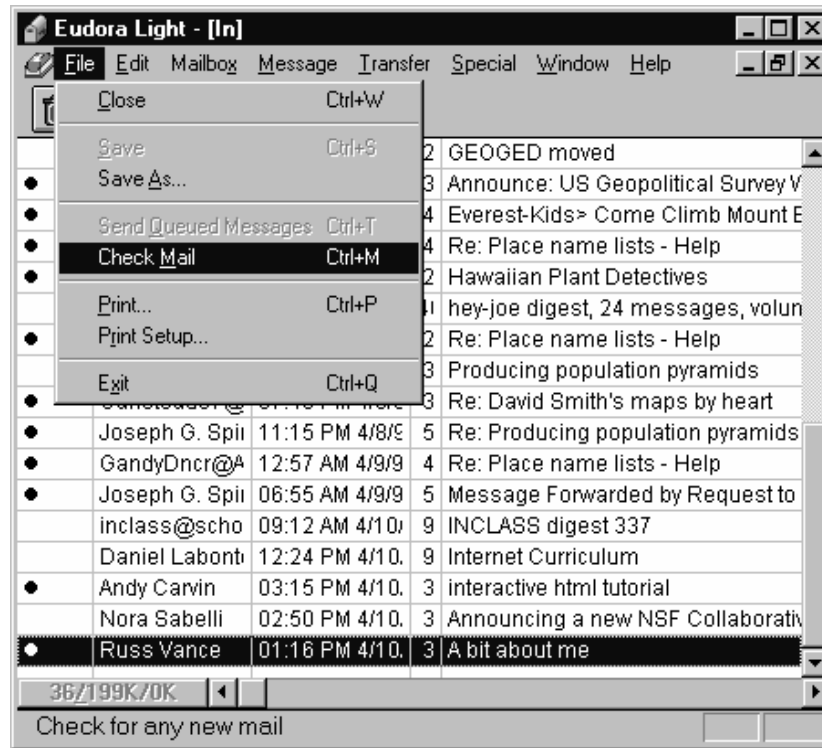


Figure 3.1 Eudora electronic mail program

email address that shouldn't be, the recipient's mail server will interpret it as somebody else's address. In all likelihood you will receive an undeliverable mail error message.

Sending and Receiving Electronic Mail

All electronic mail *client software* enable you to compose, read, receive, and send electronic mail. Email client software is the program you use to connect to your electronic mailbox on your Internet provider's computer server. Once you start the client software it will either automatically transfer or instruct you to manually retrieve any mail in your mailbox. Email programs often use a folder metaphor to identify the location your messages are stored in after they have been composed and saved or received. The "in" folder is used to receive mail, while sent messages are saved in your "out" box.

Creating Electronic Mail Messages

Several programs are available for sending electronic mail over the Internet. The popular Eudora Light mail program for Windows is shown in Figure 3.1. Common drop-down



Figure 3.2 Eudora Light inbox

menus are displayed across the top of the window. Drop-down menus are used to send, receive, edit and transfer messages, and utility buttons beneath are used for trashing (deleting) messages, creating new messages, mail forwarding, and so on.

The program window as it appears in Figure 3.2 shows an opened “in box.” To open and read a message, simply doubleclick your mouse. Figure 3.3 shows Eudora’s electronic mail form for writing messages. Type the subject and the recipient’s name in the upper lefthand corner of the window. It is proper netiquette to always include a concise subject description of your message. The body of the message is typed in the large field that occupies much of the center portion of the window. Ideally, the message can be any size, yet some Internet providers, especially commercial ones, have a particular byte size limitation. You should warn recipients at the beginning of the message or in the subject field if you are sending a particularly long message, especially if they are likely to print it. Very long messages can be broken into several messages of smaller length. It’s a good idea to indicate in the subject field where a particular message fits in a sequence of several messages. Manuscript-length document files should be compressed and attached to an

email message.

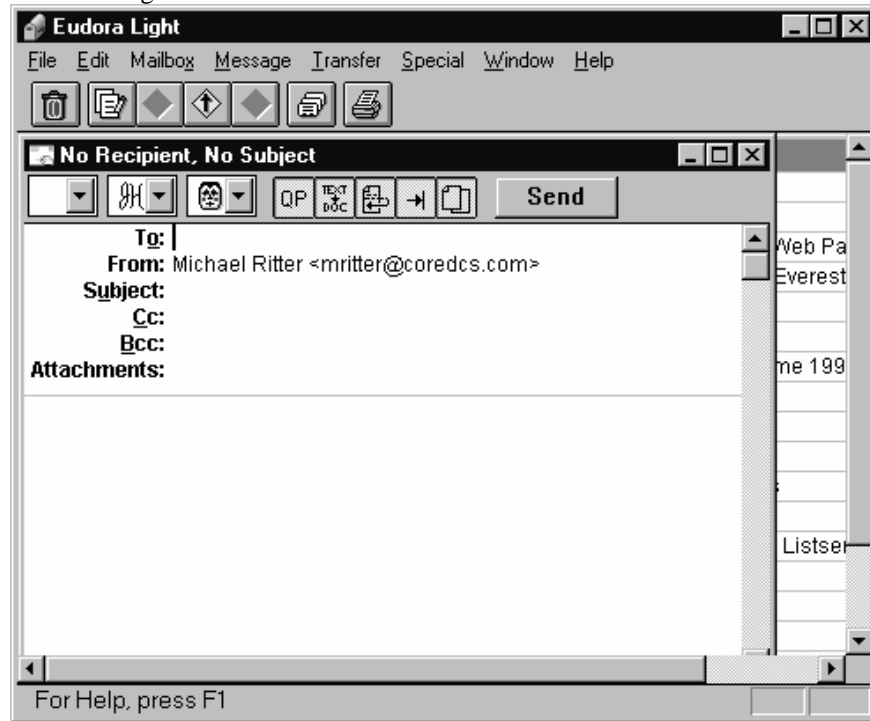


Figure 3.3 Electronic mail form

Recipients can detach the file, uncompress it and import it into their word processing software to read.

Notice that the “From” field is already filled out. This is automatically done by the program when you start a new message. The program will attach an address and time to the message when it is sent. Your email software will likely provide a field for you to send a “carbon” copy of the message to additional recipients, or you can flag it as a “special attention” message. Depending how your program is configured, it may also attach your phone number to the electronic mail header. Use the “Message” menu to send your completed message or click the send button. Some electronic mail programs hold your messages in queue until you tell the program to send it or you check your mail.

An actual electronic mail message is shown in the message display window in Figure 3.4. The two parts of the message can clearly be seen. At the top is the header with the sender’s name, date, phone, subject and list of other people the message was sent to. In the center is the body of the message. The drop-down message-handling menu (Figure 3.5) enables the user to answer the sender’s message with or without a copy of the original

message. Avoid responding to someone's message by including the sender's entire message

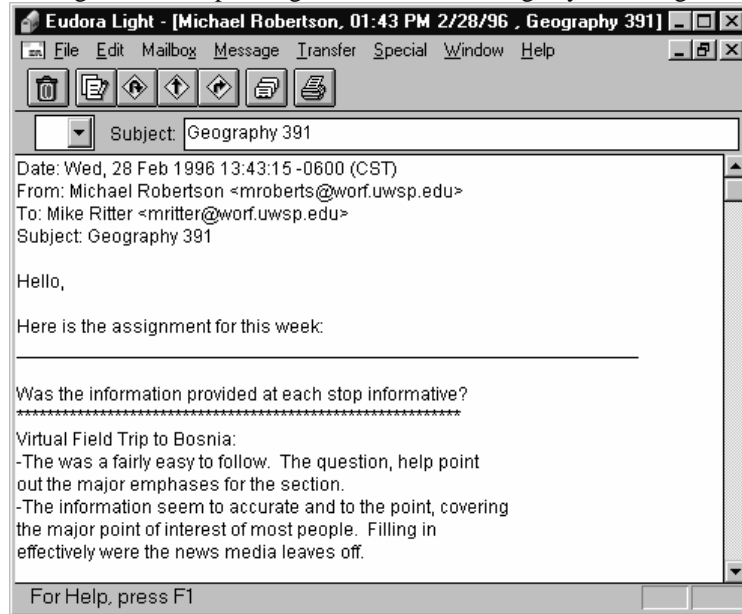


Figure 3.4 Electronic mail message

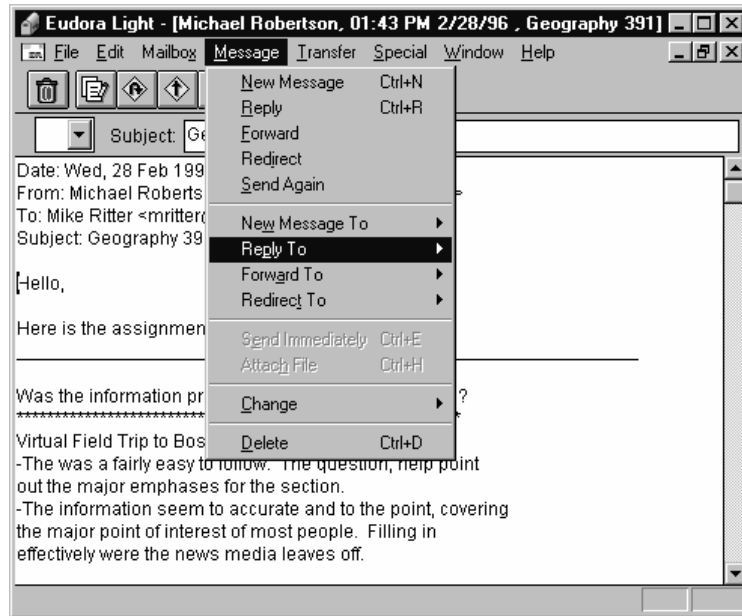
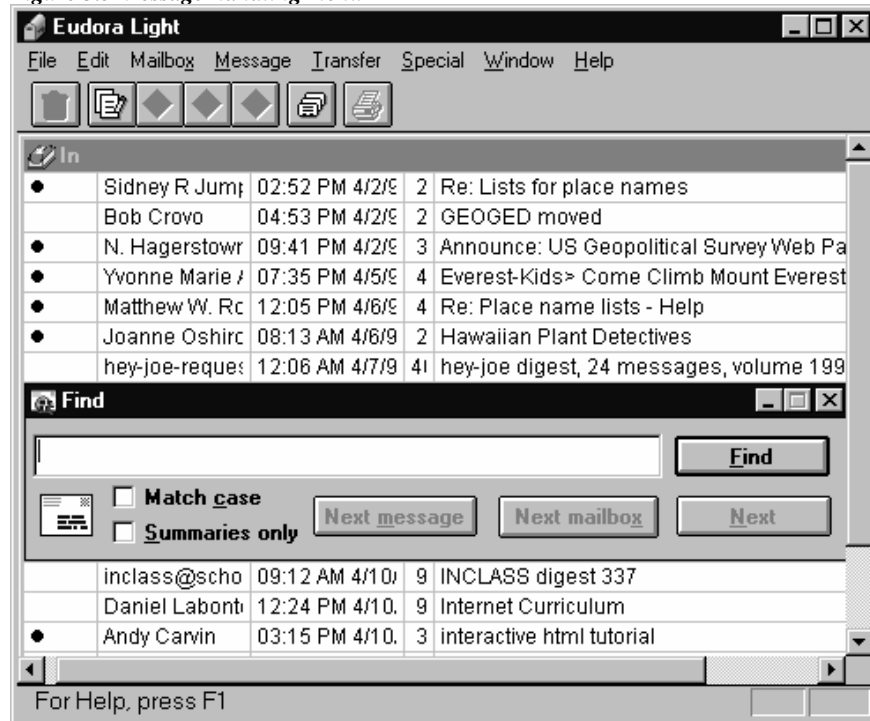


Figure 3.5 Message-handling menu**Figure 3.6** Email search option

in the body of your response. It's a waste of bandwidth and storage space to do so. Also avoid copying, and simply refer to the message in the subject field. Even if you feel a need to copy the sender's message, take some time to edit the sender's message to critical phrases that require a response.

The email client in Figure 3.6 permits you to search for text in your messages by filling in a search form and specifying what part of an email message the program will look through.

Earth Online Tip: Regularly clean out your electronic mailbox to conserve space on your Internet provider's hard disk. Delete old messages or move them to your hard drive or off to a floppy diskette. Compress messages to conserve disk space.

Emoticons and Acronyms

Face it, email is a pretty emotionless medium unless you add some sort of emphasis to your

writing like capitalization or a bold font style. Ever see those funny-looking symbols like :- (in an email message and wonder what they mean? They are called *emoticons* and are used to indicate an emotion behind your written message. Rotate the page to see that the emoticon in the preceding sentence shows a frown. Here's a few other examples:

:-)	A generic Smiley
:- (A frown
:-	Indifferent
% -)	Confused
:- /	Skeptical
:- 0	Surprised

Acronyms are a useful shorthand substitute for text strings or phrases. Some of the common acronyms in use are:

BTW	By the way
BBL	Be back later
CUL8er	See you later
FYI	For your information
F2F	Face to face
<g>	Grin, used like a smiley
IMO	In my opinion
IMHO	In my humble opinion
IOW	In other words
TNX	Thanks

Electronic Mail Communities: Email Discussion Lists and Usenet

The ability to easily distribute the same message to several people at once enables the earth science Internet community to conduct online discussions about topics of common interest to them. Electronic mail listservs and Usenet newsgroups are two Internet services that accomplish this task.

Electronic Mail Listservs

Electronic mail listservs are computer servers running software that enables you to send one message to a group of people at the same time. Email listservs provide the means to

engage in electronic mail discussions, also known as *interest groups*. Email interest groups are

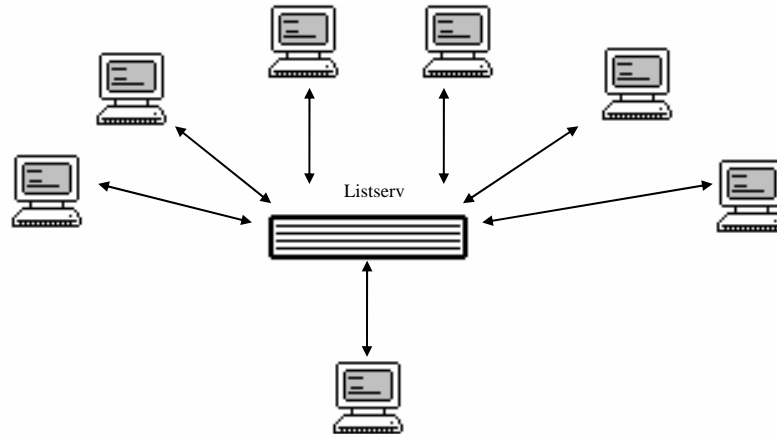


Figure 3.7 *Electronic mail routing to a discussion list*

composed of people who share a common interest in a particular topic, like geomorphology for example. People discuss the latest developments in their respective fields, ask questions, and share ideas through the interest groups. Hundreds of interest groups have been created over the last few years addressing just about every topic imaginable. You join one of these discussion groups by subscribing to a list. You do this by sending a special subscribe message to the listserv computer. Once your subscription has been accepted you can send messages to the list. When your message arrives at the list address, it is copied and sent out to each member of the discussion list (Figure 3.7). Likewise, you will receive all messages posted by other subscribers to the list. Depending on the listserv used, you will either get each message sent to you individually or receive all the day's postings in digest form. Some discussion lists do not give you a choice in the way messages are delivered. Having them in digest form reduces the clutter in your email in folder.

Electronic mail discussion lists are either moderated or unmoderated. Moderated lists have a person in charge who filters messages that are sent to the list. In theory, the moderator passes along only those messages that pertain to the subject of the list. Profane, obnoxious, or personal messages are filtered out before they get to the subscribers. Unmoderated lists are more freewheeling and may pass along inappropriate messages. Regardless, subscribing to such a list is a good way of getting to know like-minded individuals, discussing topics of common interest, solving problems and discovering new ideas.

To join a listserv you first send an email message to the listserv telling it that you would like to join. Typically this involves sending a subscribe command in the body of the message like:

SUBSCRIBE <LISTNAME YOUR NAME>

For example, to subscribe to the Geographic Information Systems Topics electronic mail list known as GIS-L, you send an email message to the listserv at **URL - listserv@ubvm.cc.buffalo.edu** with the following in the body of the message:

SUBSCRIBE GIS-L Michael Ritter

Shortly after you send your subscription message, the listserv will respond with a confirmation message. Keep a copy of the confirmation message in a safe place. The confirmation message will commonly provide instructions on how to send a message to the list or the administrator of the list, to unsubscribe, and to get other information about the list. To facilitate communication with other subscribers, email messages are sent to the *list address* and not the listserv address. In our example above the listserv address is:

listserv@ubvm.cc.buffalo.edu

but the list address is:

GIS-L@ubvm.cc.buffalo.edu.

If you are new to electronic mail interest groups you'll undoubtedly make a few mistakes along the way. Be careful when responding to a message posted to a special interest group. Posting a response to the entire list rather than the individual who posted the original message is a common mistake. There are some cases when your response may benefit the entire group, so use your best judgment. Don't send personal messages to the entire list either. Remember, your messages ultimately end up on someone else's computer; misdirected messages waste readers' time. Another common mistake is sending an administrative message to the entire mailing list rather than to its moderator or administrator. The last thing that list participants want to receive are people's unsubscribed requests.

There are an extraordinary number of listservs, and their numbers are growing each day. Likewise there are a number of ways to retrieve a "list of lists." You can send an electronic mail message to

listserv@bitnic.bitnet

Leave the subject line blank, and in the body of the message type:

LIST GLOBAL

Beware! This is an extremely large file, on the order of 350 pages or more. The DeSilva List of Lists, which is broken into several smaller parts can be retrieved via File Transfer

Protocol at rtfm.mit.edu/pu/usenet/news.answers/mail/mailling-lists/Part 1.

Network News and Usenet: The Internet's Electronic Bulletin Board

Electronic mail listservs allow people to join in a discussion about a particular topic by subscribing to each discussion list they are interested in. Electronic bulletin boards let you participate in multiple discussion groups without having to subscribe to any particular one. Instead, you connect to a bulletin board service and peruse the various interest groups available. Then you choose which ones you would like to participate in. Where the listserv automatically sends messages to your mailbox, you must connect to the bulletin board to keep abreast of the discussion.

Bulletin board services share many of the same attributes of conventional information services. Like a conventional bulletin board you can post a message to a group of people. With an electronic bulletin board you can distribute information to a number of subscribers, much the way a newspaper or magazine distributes the same information to its subscribers. Like a newsletter, an electronic bulletin board distributes news and information focused on a particular topic. Like an electronic mail service, electronic bulletin boards send messages quickly and efficiently to large numbers of people. The major electronic bulletin board service on the Internet today is called network news or netnews for short. The netnews system is composed of many newsgroups, each devoted to a particular subject. Articles that look very much like an electronic mail message are posted to a newsgroup for all to see. Like an email message, an article has a header that includes fields for the sender's name, subject of the article and date. The most popular network news service on the Internet today is Usenet.

Usenet is not the Internet; it is an entirely different system. Internet sites can carry Usenet, but many non-Internet computers do too. Because of the multiple ways that network news can find its way to its users, Usenet collectively refers to all sites that participate in the exchange of network news regardless of the network connection or dial-up server (Internet, Bitnet, etc.) they use. Messages sent to an interest group are forwarded to your Internet provider so long as they have a Usenet service feed. Instead of everyone interested in a particular topic receiving individuals messages as an email discussion list, you login to the bulletin board service to see all the messages posted there. You pick and choose the messages to read from the list of archived messages that have come into the Usenet interest groups.

Each newsgroup has a unique name that describes the subject of the group. The name consists of alphabetic character strings separated by periods. The first part of the newsgroup name identifies the type of group followed by the subject of the group and a particular topic within the subject. For instance,

sci.geo.fluids

is a science group (sci.) dealing with geophysical (geo.) fluid dynamics (fluids).

There are seven major news categories:

comp Devoted to computer science-related topics, including information on hardware (e.g., comp.mac) and software systems (e.g., comp.infosystems.gis) and source codes, programming and the like. This is a good place for those in the earth sciences to look for answers to questions concerning software that they are using for education (e.g., courseware) and research (spreadsheets and databases). Questions about discipline-specific software are best directed to subcategories under the sci netnews categories.

misc Includes groups that don't fit any of the other top-level newsgroup categories. Job postings, legal issues, and books fall into this category. This is a good category for recent graduates and those looking to change jobs or occupations (e.g., misc.jobs.offered, misc.jobs.resumes). Job announcements are found in discipline-specific groups too (e.g., sci.geo.geology, sci.geo.meteorology).

news Groups devoted to the news network and news software. Subcategories include announcements of news reader software, new groups, and network news administration issues.

rec Discussions devoted to recreational activities including travel, hiking and skiing. This is not your typical place for the earth scientist, but it might be a good place to make some contacts. Besides, you know how the old saying goes: "All work and no play . . ."

sci Includes groups interested in science, science research, and engineering, excluding the computer sciences. A number of groups of interest to earth scientists are found here (e.g., sci.astronomy, sci.geo.geology, sci.geo.hydrology, sci.geo.meteorology, sci.geo.oceanography, etc.). See Chapter 10 for a complete listing of network newsgroups of interest to the earth scientist.

soc Groups devoted to culture, politics and social issues. Earth and environmental scientists interested in human/environment interactions might look into groups found here.

talk Groups that are a forum for debating controversial topics. Groups like talk.environment are a good place to share opinions and ideas.

Like electronic mail discussion groups, network newsgroups come in moderated and unmoderated flavors. In the moderated groups a person acts as a filter through which articles pass in order to remove articles irrelevant to the subject of the group. Some moderators take their jobs quite seriously while others let most anything pass through to the

group.

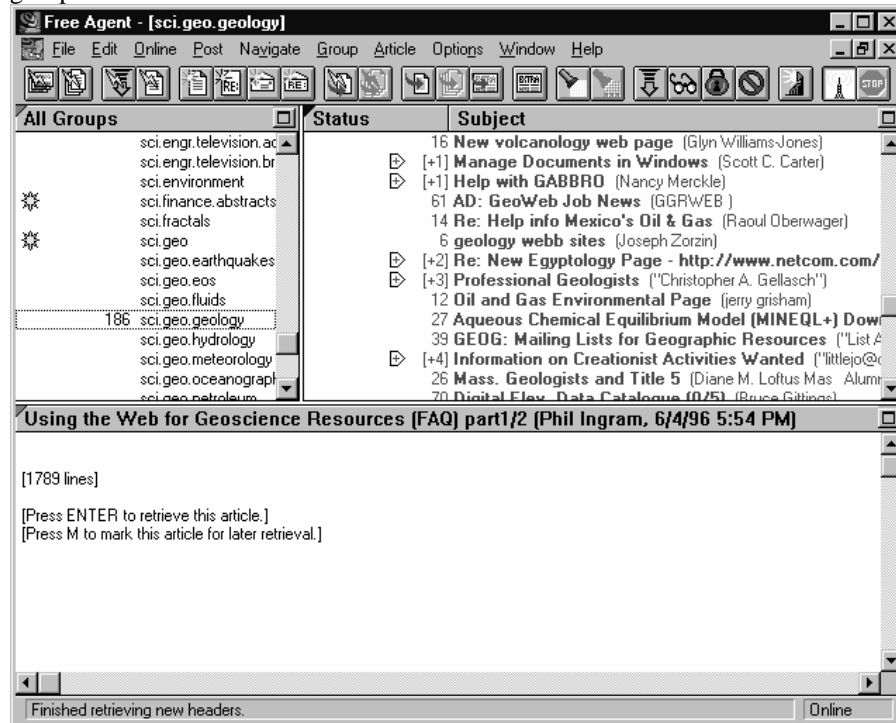


Figure 3.8 Free Agent Usenet news reader software

To read network news you first need to access a computer that participates in a network news service. You'll also need software to decode and read the messages. In most cases your organization or Internet provider obtains a connection to the network news system. Check with your system administrator to see if you have a connection to network news. If not, push to get a connection because network news is an invaluable source of information. News reader programs are available for a variety of computer systems. You can retrieve a shareware news reader from many popular FTP shareware sites. The Free Agent shareware news reader program is shown in Figure 3.8. The program window is split into three smaller windows. On the upper left is the list of newsgroups the news server currently receives. To the upper right is a list of the posting to a particular newsgroup chosen by the user, in this case postings to the sci.geo.geology newsgroups. At the bottom is the message display window. When users click on a message title in the news posting window, it is displayed in the bottom window. See Chapter 10 for sites where news readers are available for downloading. Many World Wide Web browsers like Netscape have built-in network news readers.

Once you connect to a network news server, your news reader program will obtain a

listing of all newsgroups available from the news server. The initial processing of available groups could take a while depending on how many groups your network news server has available. Your news reader software will allow you to browse through the titles of groups and subscribe to any number of them. The news reader software saves the subscribed groups' information and uses it to retrieve new articles for future sessions.

Unlike electronic mail discussion groups, Usenet groups do not notify you when new articles are posted to a newsgroup. You must check from time to time on the activity of a group. Once connected to the news server, your news reader software will scan the various groups that the user has been reading and notify you that new articles have been posted to a group. Your news reader program keeps track of previously read articles. Due to the amount of storage space they require, articles are kept on the netnews system for a length of time specified by a computer system administrator. You should check for new articles on a regular basis for this reason alone. Most news reader programs permit you to download messages and save them on your local computer.

A good example of Usenet at work is shown in a portion of a Usenet posting replicated below. An earlier request to the **sci.geo.hydrology** Usenet group asked for information about vegetation and stream sedimentation. The requester graciously compiled the results of the newsgroup query in another posting to share with the newsgroup. The posting is actually from another member who pointed out the value of Usenet for professional growth.

From: John Griffith Evans <John@jgevens.demon.co.uk> Newsgroups: sci.geo.hydrology
Subject: Vegetation and its Relationship to Flood Control/Channel Maintenance.

Date: Wed, 27 Dec 95 20:35:47 GMT Organization: Civil Engineer Lines: 74 Message-ID:
<820096547snz@jgevens.demon.co.uk> Reply-To: John@jgevens.demon.co.uk X-NNTP-Posting-
Host: jgevens.demon.co.uk X-Mail2News-Path: jgevens.demon.co.uk Status: N

The following posting from <gershmanm@ci.boulder.co.us> is a model for conduct on any professional newsgroup - it acknowledges the assistance received and follows by recording the responses so that readers generally may benefit from his enquiry. Thank you 'gershmanm' for setting such a good example of standards.

quote_____

I thank all of you who contributed. Here is the information which I received in response to my request.

_____. 1984. Determination of Roughness Coefficients for Streams in Colorado. United States Department of the Interior. US Geological Survey. Water Resources Investigations Report 85-4004.

_____. 1987. How to Control Streambank Erosion. Iowa Department of Natural Resources, USDA Soil Conservation Service. 25pp.

_____. Use of vegetation in civil engineering. 1990 eds. N.J. Coppin, I.G. Richards. Boston. Butterworths xviii, 292 p. : ill. 24 cm.

An excellent starting place for discovering electronic mailing lists is the Clearing House for Subject-Oriented Resource Guides (**URL - <http://www.lib.umich.edu/chhome.html>**). As the name implies, this World Wide Web site is a clearinghouse of linkages to resource guides developed by the Internet community. These guides contain information about electronic mailing lists, as well as Gopher and World Wide Web resources, and Usenet newsgroups.

Other Uses of Electronic Mail

Electronic mail is much more flexible than one might expect. Electronic mail is a good way to search for files archived on File Transfer Protocol (FTP) servers (described in Chapter 4). A user can interactively query FTP archives by connecting to an Archie server. However, Archie servers are often hard to log on to because of the enormous burden placed on their systems by people looking for programs and files. If you're not in a hurry send an email message to an Archie server to process and it will send the results back via electronic mail (see Chapter 6, "Searching the Internet," for details).

Electronic mail is used to fetch files too. There are two ways to do this; by sending email to an FTPmail server or to a listserv. An *FTPmail server* accepts a request for file transfers via electronic mail, processes the request, and sends the requested file out. To do this, you send the FTPmail server a list of the commands you would otherwise use with an FTP client program. The FTPmail server connects to the FTP archive you're interested in, retrieves the file and sends it to you. You can also use electronic mail to ask a listserv to send you a file located on the server. To retrieve a file send an electronic mail message to the listserv address and in the body of the message type your request. Common requests for the FTPmail servers are of this form:

connect <site>	To open a connection to an FTP server
chdir <directory>	To change to a directory
delete <jobid>	To delete the given job
dir	To obtain a directory listing
help	To obtain help information from FTPmail server
get <filename>	To retrieve a file
quit	To disconnect or end an FTP session

As an example, I'll send an email request to the FTPmail server located at **ftpmail@ftpmail.ramona.vix.com** to retrieve sources.zip, a document describing online sources of weather and climate data. To do so I'll send the following message:

```
connect vmd.cso.uiuc.edu
chdir wx
get sources.zip
```

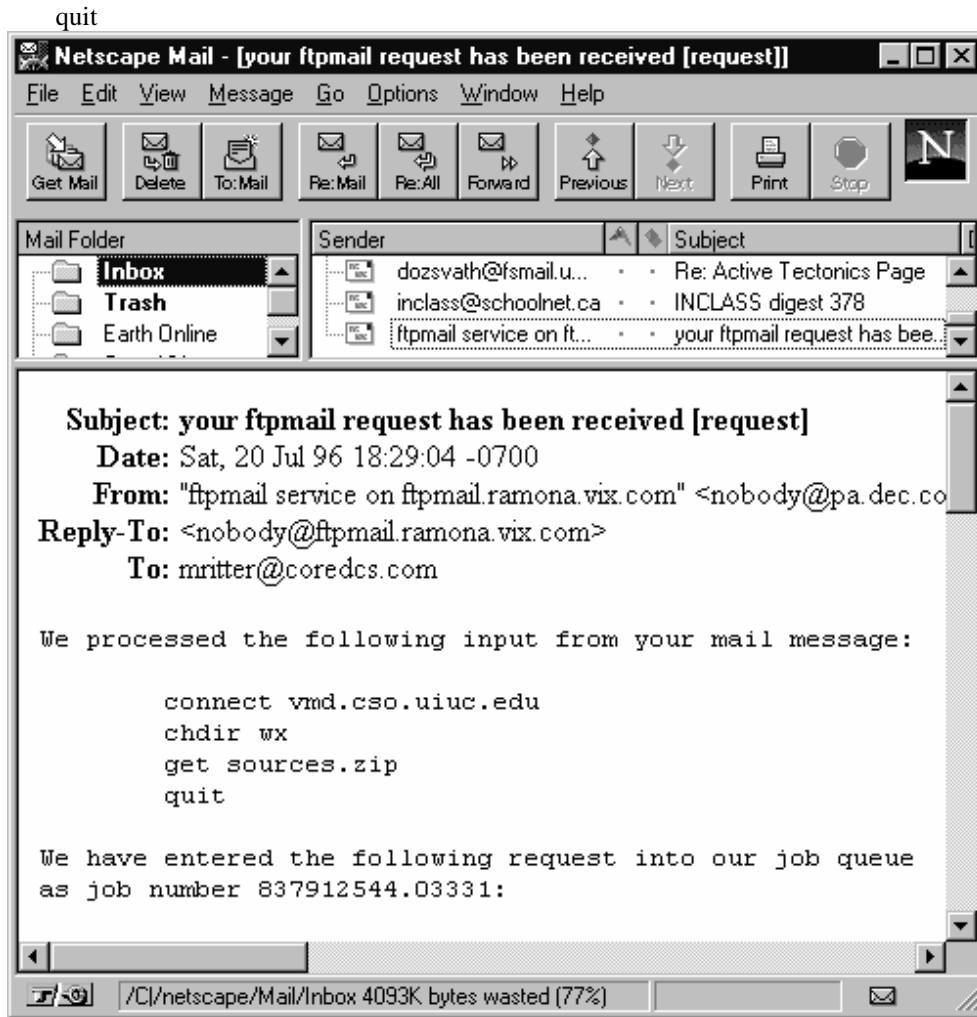


Figure 3.9 Response from FTPmail server

After a short period of time I receive the message from the FTPmail server shown in Figure 3.9. Finally, the request is processed and the requested file is sent.

Several sites on the Internet offer an FTPmail service, and anyone with access to email can use them. Users are requested not to make use of FTPmail services at sites remote from them. Another list of FTPmail servers and links to software can be found at [URL - http://src.doc.ic.ac.uk/ftpmail-servers.html](http://src.doc.ic.ac.uk/ftpmail-servers.html). Table 3.1 shows a sample of FTPmail servers.

Table 3.1 Sample of FTPmail servers and countries

Address	Country
ftpmail@ftpmail.ramona.vix.com	USA
ftpmail@cs.uow.edu.au	Australia
ftpmail@ftp.uni-stuttgart.de	Germany
ftpmail@grasp.insa-lyon.fr	France
ftpmail@doc.ic.ac.uk	Great Britain
ftpmail@ieunet.ie	Ireland

Earth Science and Electronic Mail

Earth scientists are enthusiastically embracing electronic mail to support and conduct research, keep abreast of the latest developments in their disciplines, and instruct students. One of the most effective ways earth scientists are using the Internet is through electronic mail discussion lists and Usenet interest groups. For instance, recent postings to the **sci.geo.geology** Usenet group reveal several different topics of discussion and requests for information:

- a group member asked how to effectively dry soil samples
- a teacher requested employment information for an upcoming job fair
- a group member asked for help in locating a an EPA software manual, which elicited a quick response by another member of the group who could set up a file transfer of both the manual and the software

A number of Usenet groups have sprung up devoted to the geosciences. Table 3.2 lists a few of these.

University departments are setting up their own network newsgroups to keep their students and faculty informed about the developments in their programs. For example, the Geology Department at Indiana University-Bloomington created the `iu.geosci` newsgroup to disseminate program information and announcements of upcoming events in their department. (Access to this particular newsgroup is restricted to Indiana University faculty and students, however.)

Electronic mail listservs devoted to earth science are far more numerous because it is much easier to get one started and maintain it. The wide variety of earth science-related listservs is show in Table 3.3.

Earth science teachers are finding electronic mail a good way to keep in contact with their students. Educators have used electronic mail to send and receive class assignments.

This is accomplished by setting up a class electronic mail discussion list on a local server. The teacher posts the assignment to the list, which is distributed to all the students. When

Table 3.2 Sample Usenet Interest groups

(compiled from Thoen, 1994; Ramshaw, 1995)

Group	Topic
comp.infosystems.gis	Graphic information systems
sci.geo.eos	NASA's Earth Observation System (EOS)
sci.geo.fluids	Geophysical fluid dynamics
sci.geo.geology	Solid earth sciences
sci.geo.hydrology	Surface and groundwater hydrology
sci.geo.meteorology	Meteorology topics
sci.geo.oceanography	Oceanography and marine science
sci.geo.petroleum	Petroleum exploration, industry, etc.
sci.geo.satellite-nav	Satellite navigation, esp. global positioning systems
sci.image.processing	Scientific image processing and analysis
sci.techniques.mag-resonance	Magnetic resonance imaging and spectroscopy
sci.techniques.microscopy	Discussions of microscopy
sci.techniques.spectroscopy	Spectrum analysis
sci.techniques.xtallography	Discussions of crystallography

the assignment is completed the student emails the paper to the teacher for review and comment. The teacher can import the assignment directly into a word processing program to correct it. After grading the paper the teacher can email the assignment back to the student. Educators are using electronic mailing lists to serve as a virtual seminar "room." Each week a new topic or question is placed on the electronic mailing list, and students have a specific amount of time to respond to the posting. Educators report that participation rates in an electronic discussion, whether required or not, tend to be higher than in discussions attempted during a conventional class. Students who tend not to participate in class feel less intimidated and respond more often. A much larger discussion group is embraced if the class email list is opened up to the entire Internet community.

Electronic mail is a good way for students and teachers to keep in touch. I've found email to be a wonderful way of communicating with students with whom I might never otherwise have had the opportunity to. Some students feel intimidated by an instructor and won't ask questions during class and occasionally are too embarrassed to come by during office hours for consultation. These students find it easier to send their questions and concerns over email, maintaining some degree of anonymity.

⊕ Focus on the Internet: *Education and Research with Electronic Mail*

The rapid and flexible exchange of information that electronic mail enables over computer networks is changing the face of education and research at all levels. The earth scientist

Table 3.3 Sample geoscience electronic mail list

(compiled from Thoen, 1994; Ramshaw, 1995)

List	Listserv Address
Arc/Info Support List (ESRI)	listserv@esri.com
Cartography, sci.visualization (Ingrax)	listserv@psuvm.psu.edu
Climatology (CLIMLIST)	listserv@psuvm.psu.edu
Coastal Management and Resources (COASTNET)	lisserv@uriacc.uri.edu
Conservation Biology and GIS (CONSGIS)	listserv@uriacc.bitnet
Computer Modeling in Geosciences (geo-computer-models)	mailbase@mailbase.ac.uk
Dinosaurs (dinosaur)	listproc@lepomis.psych.upenn.edu
Earthquake Preparedness (QUAKE-L)	listserv@nodak.edu
Energy Discussion List (ENERGY-L)	listserv@taunivm.bitnet
Generic Mapping Tools (gmthelp)	listserv@soest.hawaii.edu
Geoscience Information Society (Geonet-L)	listserv@iubvm.ucs.indiana.edu
Geography (GEOGRAPH)	listserv@searn.sunset.se
Geology (GEOLOGY)	listserv@ptearn.bitnet
Geographic Information Systems (GIS-L)	listserv@ubvm.cc.buffalo.edu
Geoscience Information Group (geo-gig)	mailbase@mailbase.ac.uk
GIS, Coastal (COASTGIS)	listserv@irlearn.ucd.ie
GIS, Temporal Subjects (TGIS-L)	listserv@ubvm.cc.buffalo.edu
GIS, User Interface Issues (UIGIS-L)	listserv@ubvm.bitnet
GIS, Virtual Worlds Interfaces (VIGIS-L)	listserv@uwavm.bitnet
Global Positioning Satellite systems (GPS-L)	gps-request@tws4.si.com
Groundwater issues (AQUIFER)	listserv@ibacsata.bitnet
Idris Support List (IDRIS-L)	mailserv@toe.towson.edu
Maps and Air Photos (MAPS-L)	listserv@uga.cc.uga.edu
Remotely Sensed Data and Digital Image Processing (IMGRS-L)	listserv@csearn.bitnet
Seismology Discussion (SEISMD-L)	listserv@bingvmb.cc.binghampton.edu
Soils (Soils-l)	listserv@unl.edu
Statistics and Quantitative Methods in Geosciences (STAT-GEO)	LISTSERV@UFRJ.BITNET
Urban Planning (URBAN-L)	listserv@trearn.bitnet
US National Spatial Data Infrastructure (NSDI-L)	listproc@grouse.umesve.maine.edu
Volcano Discussion List (VOLCANO)	AIJHF@ASUACAD.BITNET

Message body syntax: 1) grass lists: <sub firstname lastname> 2) listserv: <sub listname firstname

lastname> 3) listproc: <subscribe listname> 4) mailbase: <join listname firstname lastname> 5)
majordomo: subscribe listname

today has a new research and educational tool in the form of electronic mail. Electronic mail enhances educational and research experiences because:

- it is a more time-saving and cost-effective form of communication
- it provides a flexible way of exchanging information in a variety of different electronic formats (e.g., text graphic, digital sound, etc.)
- it improves communication between people
- it enables you to communicate with a group of people as easily as with one person

Electronic mail can make your research time more effective and productive. During the course of your research you will undoubtedly communicate with colleagues, exchange notes and documents, review written reports, and elicit data and information from people. Electronic mail makes communication with individuals more timely and expedient. An electronic mail message is delivered almost immediately, and the response can be transmitted nearly as fast depending on the reaction time of the recipient.

Electronic mail enhances collaborative review of manuscripts because the text is already in computer-readable form or the software enables the attachment of word processing files for distribution. Recipients need only detach the word processing document, open it in their word processing program, and make the changes they wish. The new version is attached to an electronic mail response and returned to the sender. All of this is done without using paper resources or printer ribbons or incurring postage expenses. Delivery time is much faster than even the speediest courier or conventional mail service.

Electronic mail represents a unique way to conduct survey research, but issues not inherent to conventional mail survey enter into the picture. Tach (1995) synthesized the advantages and disadvantages of using electronic mail for survey research. Conducting a survey via electronic mail is less expensive for the researcher and easier for the participant to return. Being in an electronic format makes editing questions and sorting the data much easier. Questionnaires can be distributed much faster, and lost questionnaires replaced within seconds or minutes. Response rates are 20 to 50% higher for electronic mail surveys than conventional paper questionnaires (Sproull, 1986). Studies also show that people will provide more honest answers to questions submitted by electronic mail than by hard copy or face-to-face interviews. Electronic mail surveys potentially have faster response times and wider audiences. Answers can be generated within minutes of the receipt of the survey, with worldwide coverage.

Conducting surveys by electronic mail presents new challenges to the researcher. Most notable is the demographic limitations on samples. The population and sample of survey respondents is limited to those who have access to electronic mail and an online network connection. The relative insecurity of online networks cannot guaranty confidentiality. As

many email systems automatically include one's email address in the header of the message, anonymous surveys are virtually impossible. Additional instructions concerning the use and submission of an electronic mail survey may be required for those unfamiliar with the use of electronic mail. Last but not least is the ever present potential problem of incompatible electronic mail systems.

Today's educational environment is changing in ways that reflect the changes in our modern culture. There are more nontraditional students returning to campuses who, in many cases, have restrictive schedules, making it hard to fit advanced educational experiences in between work and family obligations. A highly competitive work environment is requiring students to equip themselves with many more skills than have been expected of them before. Educational institutions face downsizing of faculty and services as resources become more scarce. Education continually turns toward technology to meet the challenges that face educational institutions, teachers and students. Educators, earth science educators included, see computer-mediated communication as a way of handling some of these problems. Using computer-mediated communication to enhance or deliver instruction provides flexibility in the instructional process. Conducting class discussions over networked communication systems like electronic mail liberates student and teachers from the confines of classroom walls. Neither are required to go to a particular place at a fixed point in time to engage in academic discourse. Instead, the educator can post a question to an electronic mailing list that goes to all members of the class. Students respond at their convenience, whether this is 9:00 in the morning or 12:30 in the evening. Such flexibility relieves the students from the stress of responding immediately to a questioning teacher. Answers can be more carefully examined, researched and communicated. Educators are not constrained by the clock to have topics discussed within the temporal confines of a class period. Having a degree of "anonymity" provided by electronic communication, shy students feel more comfortable responding to questions than with a classroom full of eyes watching.

The ease of sending and receiving electronic mail makes it a good way to introduce students to Internet technology and begin establishing their own professional network of contacts. There is no better way to do this than by having students join an electronic mailing list or keeping track of the postings to a professional Usenet group. Electronic mail interest groups are populated by professionals in their respective fields and serve as a great well of collective knowledge waiting to be tapped. Earth science educators have assigned students to post questions related to a class research project to a Usenet group and monitor the response they received (Butler, 1995).

What You Have Learned

- Electronic mail is a fast and efficient way of communication.
- Electronic messages can be sent to an individual or group at the same time.

- Email's asynchronous form of communication lets you control how and when you respond to messages.
- Electronic mail special interest groups or discussion lists are a useful way of communicating with people who share a common interest in a particular subject.
- Electronic mail is a flexible service and can be used to interact with other systems like Archie, FTP and listserv to query and retrieve files over the Internet.

Apply It!

The strength of the Internet is its electronic mail access to the earth science Internet community. In Chapter 2, the World Wide Web and Gopher provided excellent background information on the greenhouse effect and global climate change. Answers to very specific questions are not easily obtained with the Internet, largely because its chaotic nature and lack of systematic organization. Human experience with the Internet is often the best resource. Those in the Internet community interested in the greenhouse effect discuss their ideas over Usenet newsgroups or electronic mail listservs. You can join in on the discussion by using the Netscape mail facility.

Many World Wide Web browsers have an electronic mail accessibility built into them. However, you must configure the browser to point to your Internet electronic mail server for sending and receiving messages. In Netscape this is done by going through the "Options" menu to the "Mail and News Preference" submenu. Here you'll find fields to enter in the address of your email server. Once these fields have been properly configured you're ready to send electronic mail.

To send an electronic mail message, simply go to the "File" menu and the "New Mail Message" pick, which brings up the message creation window (Figure 3.10). The new message window looks a lot like that of any other electronic mail program, with fields to enter the recipient's name, address, copies of the message to others and subject.

With Netscape Navigator, you can do many of the same things that any other mail program can do. You can attach files, forward messages, defer delivery to a later time, and so on. A great feature of Netscape Navigator's email program is the fact that URLs typed into a message will appear as a hyperlink or icon on the recipient's message. If recipients are using Netscape email, they simply click on the embedded hyperlink to view it in Netscape. Newer electronic mail programs, like Microsoft Exchange, have this hyperlinking function built in.

A few listservs are devoted to, or occasionally discuss, topics of climate change. ATMOSLIST is a moderated electronic mail distribution list for Australian atmospheric scientists and those working in closely related fields. It is used to disseminate information about notices regarding conferences, workshops, data availability, calls for papers, and positions available, as well as requests for information. To subscribe to ATMOSLIST, send

an email request to the Internet address:

mailserv@cc.monash.edu.au

The body of the message (not subject line) should contain one line (Figure 3.11):

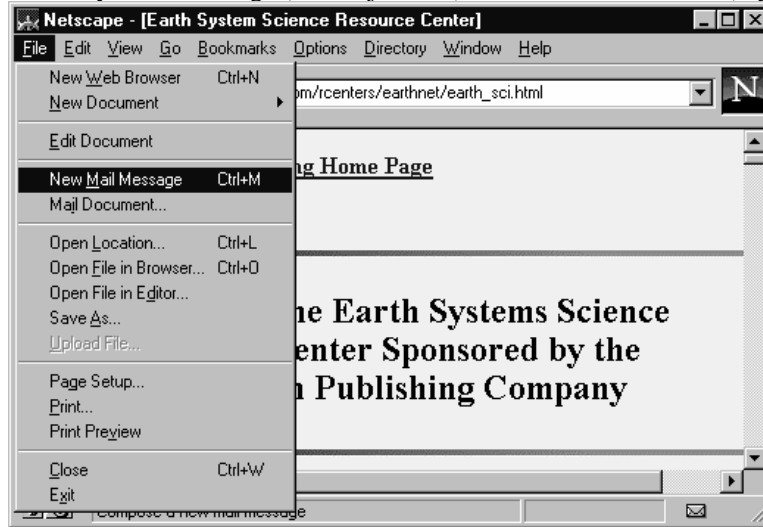


Figure 3.10 Opening a new mail message in Netscape Navigator

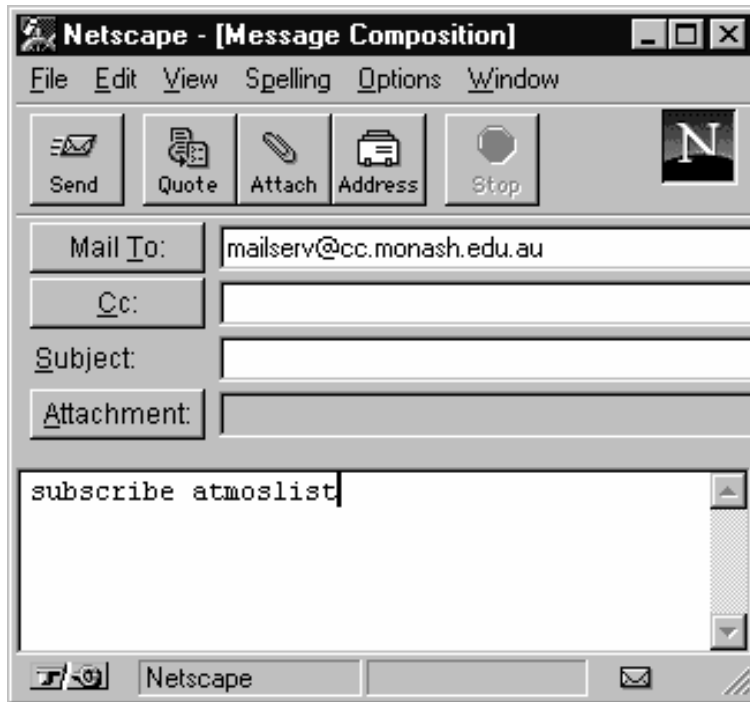


Figure 3.11 Netscape email message composition window

subscribe atmoslist

Like ATMOSLIST, CLIMLIST is a moderated electronic mail distribution list for those working in climatology or a closely related field. Its primary role also is to disseminate notices regarding conferences and workshops, data availability, calls for papers, and positions available, as well as requests for information. It is not intended for “chatting.” To subscribe to the list contact:

John Arnfield
 Department of Geography
 Ohio State University
 John.Arnfield@osu.edu
 John.Arnfield@OHSTMAIL.BITNET

Usenet news is an important source of timely information relating to climate change. A number of newsgroups routinely discuss topics of global change. A few of those are:

bit.listserv.geograph
 ca.earthquakes

ca.environment
comp.infosystems.gis
sci.agriculture
sci.bio.conservation
sci.bio.ecology
sci.bio.fisheries
sci.bio.paleontology
sci.environment
sci.geo.earthquakes
sci.geo.eos
sci.geo.fluids
sci.geo.geology
sci.geo.hydrology
sci.geo.meteorology
sci.geo.oceanography
sci.geo.rivers+lakes

To send a message to a Usenet newsgroup from Netscape, you invoke the Netscape news reader by using the “Window” menu and choosing the “Netscape News” menu option. Netscape Navigator’s news reader is divided into three windows, one for viewing newsgroups, one for listing newsgroup postings, and one for reading a news posting. The news server window shown in Figure 3.12 displays the news servers and newsgroups you have configured Netscape Navigator to point to. Once you click on a server address, Netscape opens a connection with the server and retrieves the list of available newsgroups. Netscape uses the folder metaphor to collect newsgroups at lower levels in a newsgroup

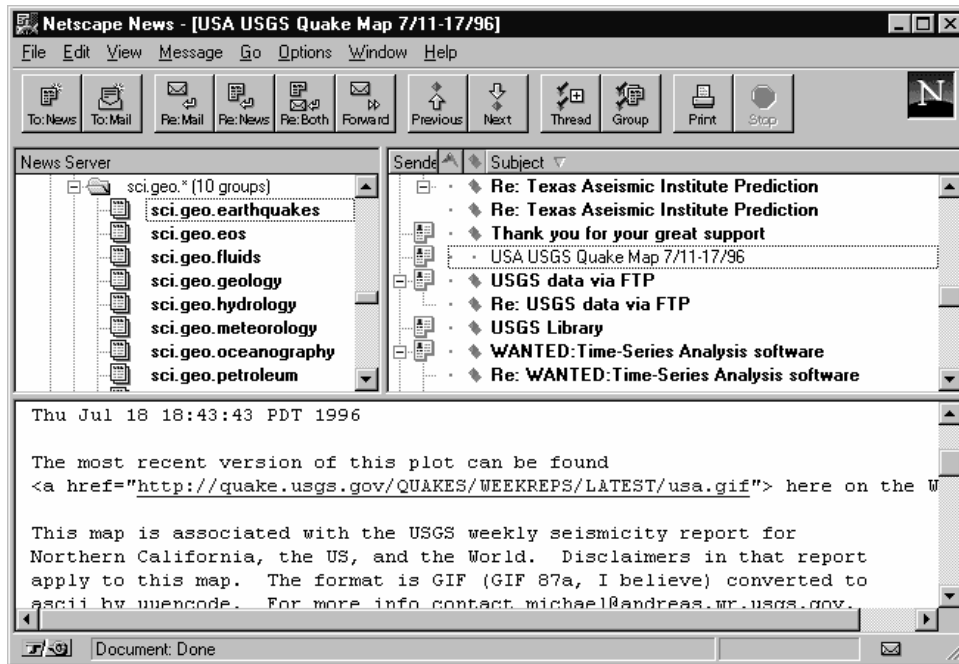


Figure 3.12 Netscape Navigator news server

hierarchy. Scroll down the list of newsgroups until you reach sci.geo. Most news servers will have the sci.geo.geology newsgroup. Use your mouse to click on a message that appears in the message-listing window.

To send a message to a newsgroup click the “To:Mail” button and the email creation window will appear. Make sure that newsgroups is one of the fields that is displayed above the message creation field. If it’s not, go to the “View” menu and choose “Newsgroups” to display the newsgroups field to fill in (Figure 3.13). Type in the name of the newsgroup you want a message posted to. You don’t need to fill in the “Mail To:” field. Make sure to include a subject and then click “Send” and its’ on its way. You will likely need to wait a day or so to get many responses as Usenet postings disseminate news server to news server.

You have three choices when responding to a newsgroup posting. You may reply to the sender, the newsgroup as a whole or both by clicking any of their respective buttons on the toolbar. Doing so will automatically fill out the appropriate sender and subject fields; you then can type in your message.

Having email capability integrated into a browser simplifies your life online. With this function, there is little need to have separate electronic mail for many users.

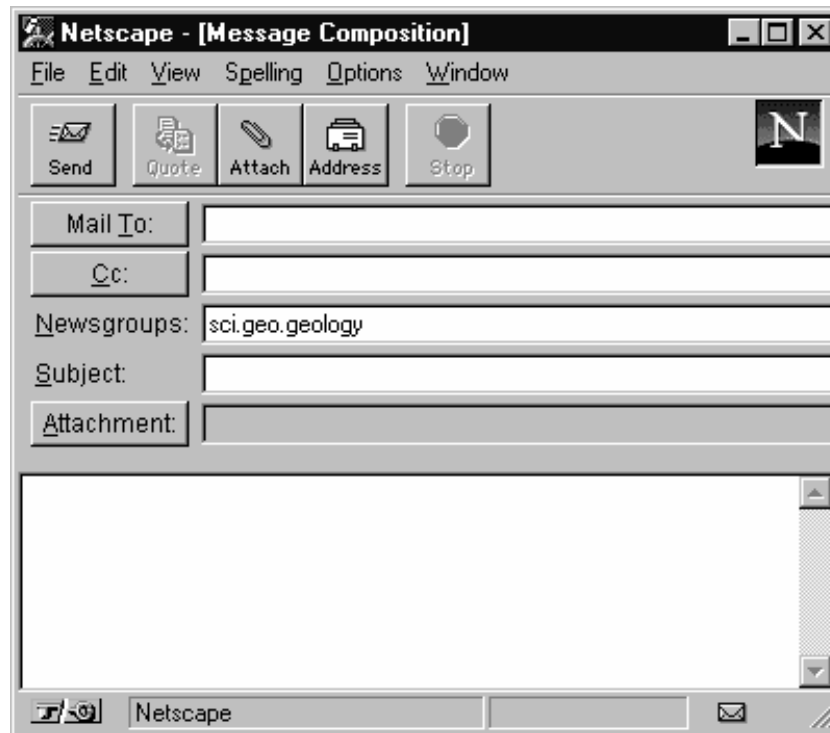


Figure 3.13 Netscape message composition window

Try It Out!

1. Send me an electronic mail message. My email address is:

mitter@uwspmail.uwsp.edu

In the subject field type: “*Earth Online* Email.” Write anything you wish in the body of the message: what you like or dislike about *Earth Online*, suggestions for changes, new Try It Out! exercises or interesting earth-science-related Internet sites.

2. Join an electronic mail discussion list or Usenet interest group. Scan through Tables 3.2 and 3.3 for a discussion list or group of interest and join. You might want to “lurk around” for a few days to get an idea of the topics that are currently being discussed before sending your first posting. It’s nice to introduce yourself to the list or group in your first posting. Let the group know who you are, what you do, and what particular interests you have; maybe ask a question too. Tell the list you found them in *Earth Online*!

3. Look up a friend or colleague and say hello. See Chapter 5, “Remote Login to the Internet with Telnet,” for remote login instructions, and Chapter 6 for details about the Netfind service. In addition to the names of the persons you are trying to contact, you will need to know where they connect to the Internet from and what city and state they live in. Make sure to review the example Netfind search before you do your own.
4. **EDUCATORS:** Check with your system administrator about setting up an electronic mail list. Even though you might not have listserv capabilities on campus, your electronic mail service may be able to create a mailbox for your class. An electronic discussion is a good way to get students “talking” to one another about class material or other matters outside the classroom. It will also keep you in touch with your students. You can post a message or a discussion question to your entire class by “carbon copying” it. Some electronic mail software allows you to create a list of individuals under a single group name. You then address the message to the group name and the message is automatically copied to all members of the list. You can employ this method in your online class discussions. Once a student responds to a question you can forward the message to the class (group).
5. **PROFESSIONALS:** Check into setting up a listserv for a specialty group with your professional organization. Specialty group listservs are a good way to distribute newsletters, give out information about professional meetings, organize paper sessions at an upcoming meeting and just keep in contact with one another.