USGS strong-motion database

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For 15 years now, the USGS has invested considerable effort - one full-time programmer for the equivalent of 5 of those years - on several prototype DBMSs. These DBMSs have had to be complicated, handling (a) central recording of structural records and records from dense arrays, and (b) changed and upgraded values of instrument "constants" and earthquake source parameters, etc. Support was not continuous, and user demand was low, so that maintenance of the DBMSs was sporadic. We do not now support a DBMS, although we were investigating the acceptance of the Lamont/NCEER system, now resident, but lacking support, at Lamont-Doherty Geophysical Laboratory. A useful DBMS resides on the recently published USGS CD-ROM, described below.

The USGS Strong-Motion CD-ROM.

The USGS has recently published a CD-ROM (Seekins and others, 1992), which contains uncorrected ("volume 1") ground level digital accelerograms recorded at permanent stations in north and central America. The catalog is complete, to the best of our ability, through 1986. The records were recorded and processed by many agencies (including the USGS), both government and private. We have amassed a data bank of 1477, mostly 3-component, strong-motion records from 500 earthquakes. Each file contains one component. Also on the disk are two database index files containing information (station location, earthquake location and magnitude, epicentral distance, and peak acceleration) from each of the acceleration files, along with a READ.ME file that describes the catalog contents in detail.

Data searches may be made by using ACATALOG, a program that is included on the disk. Searches may specify combinations of earthquake location (latitude, longitude, and depth), date, various magnitudes, station epicentral distance, and recording peak acceleration. Once a successful search is made, the names of all selected files are written to a user-defined output file. All data written on the CD are ASCII.

The minimum system requirements to use the catalog search software provided on the disk are:

+ IBM or compatible PC
+ 512 kb RAM
+ MS- or PC-DOS 3.1 or later
+ MSCDEX 2.1 or later
+ CD-ROM drive with ISO 9660 software driver
+ Hard disk drive.

Disseminated at the same time as the CD is a user manual for BAP, our Basic Accelerogram Processing program rewritten for a PC (Converse and Brady, 1992). The options are plentiful, although it is designed primarily to read data from the CD. Processing can use the same filters as were used by the USGS or CDMG (for example), to calculate the same corrected data as these agencies published and disseminated.

Another USGS CD-ROM described in Mueller and Glassmoyer (1990) contains digital recordings of aftershocks of the 1989 Loma Prieta earthquake. The recordings are from temporary sites of seismologic and engineering interest during the period 17 October 1989 to 14 March 1990. These two CD-ROMs, one of strong-motion data, the other of aftershock data, point out the usefulness of this medium in the dissemination of ever-enlarging datasets.

Methods for disseminating data currently considered by the USGS:
1. The fastest method is by means of a phone-up database and associated data bank filled immediately with processed data when these data become available.
2. A CD-ROM subsequent to our first mentioned above, can be prepared and published for dissemination within a month or two from the time data would be ready for the database in 1 above. However, a CD can hold so much data that an upgrade after each earthquake, even if multiple-recorded, would be an inefficient dissemination method. The next CD-ROM is currently planned to contain ground level accelerograms from the period 1987 to 1992.
3. Master tapes from the USGS network are currently forwarded to the National Geophysical Data Center (NGDC), a national disseminating agency, for them to disseminate copies, or floppy disks, on request, within a month or two from the time data would be ready for the database in 1 above.

The IASPEI Seismological Software Library.

The International Association of Seismology and Physics of the Earth's Interior (IASPEI) is a non-profit professional association dedicated to furthering the knowledge of seismology and solid-earth geophysics. Under the auspices of the IASPEI Working Group on Pcs and in collaboration with the Seismological Society of America (SSA), a series of seismological software volumes for IBM-compatibles is being published.

Volume 6 will contain processing programs
for strong-motion recordings, prepared by
Volume Editor Gerald Brady. Contributions
of processing software are at the present
time being requested.

References.

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