

ASTUTI (Alerta Sísmica Temprana Utilizando Teléfonos Inteligentes; Earthquake Early Warning Utilizing Smartphones) – Costa Rica
Accelerometer Data Archive
2019-12-01 through 2020-06-30

As presented and described in:

Brooks, B.A., Protti, M., Ericksen, T., Bunn, J., Vega, F., Cochran, E., Duncan, C., Avery, J., Minson, S.E., Chavez, E., Baez, J.C., Foster, J., & Glennie, C.L. . Robust Earthquake Early Warning at a Fraction of the Cost: ASTUTI Costa Rica. *AGU Advances*.

DATA FILE FORMAT AND DATA VALUES

This archive consists of text files in comma-separated-value (CSV) format with unix-style (linefeed-only) line endings and no header row. Each file contains all accelerometer data received from the data server for a single device during a single day, one sample per row, in the following format:

timestamp, x, y, z

where *timestamp* is the on-device sample time expressed as the number of milliseconds since 1970-01-01 00:00:00 UTC, and *x, y, z* are the raw accelerometer values in units of m/s^2 along each of the device coordinate axes. The devices are not installed in any standard orientation and do not necessarily have any axis parallel to earth's gravity vector. Samples are in as-received order: due to the UDP transport protocol used by the devices to send data to the data server, on rare occasions messages in the archive were received and stored out-of-sequence.

DIRECTORY STRUCTURE AND FILE NAMING

The CSV files are each compressed using gzip. The archive uses the following directory- and file-naming convention:

yyyy/doy/qed_cr_yyyy_doy_deviceid.csv.gz

where *yyyy* is the four-digit year, *doy* is the zero-padded 3-digit day-of-year, and *deviceid* is a unique 15-digit device identifier.

DATA RATES AND DATA COMPLETENESS

For most of the period of record, most of the devices were configured to sample and send accelerometer data at an approximate rate of 10 Hz, but other rates were in effect on some devices at some times, and there were varying periods of device downtime and internet service interruptions, and a data server outage from mid 2020-05-10 to mid 2020-05-12; therefore, the as-received archive message rates vary from device to device and from time to time. All data received for a device are present in the archive; if a file for a particular device id is absent from the archive for a particular day, it means no data were received from the data server for that device on that day.

DEVICE LOCATIONS

A separate CSV file named *qed_cr_device_locations_2019-12-01_2020-06-30.csv* resides in the same directory as this README file and gives the device coordinates for all stations present in the archive in the following format, with unix-style line endings and no header row:

deviceid, lon, lat