Geophysical Research Abstracts
Vol. 15, EGU2013-3907, 2013
EGU General Assembly 2013

IAGA Geomagnetic Data Analysis format - Analysis_IAGA

Victorin - Emilian Toader and Alexandru Marmureanu
National Institute for Earth Physics, MAGURELE, Romania (asyst@asystech.ro)

Geomagnetic research involves a continuous Earth's magnetic field monitoring and software for processing large amounts of data. The Analysis_IAGA program reads and analyses files in IAGA2002 format used within the INTERMAGNET observer network. The data is made available by INTERMAGNET (http://www.intermagnet.org/Data_e.php) and NOAA – National Geophysical Data Center (ftp://ftp.ngdc.noaa.gov/wdc/geomagnetism/data/observatories/definitive) cost free for scientific use. The users of this software are those who study geomagnetism or use this data along with other atmospheric or seismic factors. Analysis_IAGA allows the visualization of files for the same station, with the feature of merging data for analyzing longer time intervals. Each file contains data collected within a 24 hour time interval with a sampling rate of 60 seconds or 1 second. Adding a large number of files may be done by dividing the sampling frequency. Also, the program has the feature of combining data files gathered from multiple stations as long as the sampling rate and time intervals are the same. Different channels may be selected, visualized and filtered individually. Channel properties can be saved and edited in a file. Data can be processed (spectral power, P / F, estimated frequency, Bz/Bx, Bz/By, convolutions and correlations on pairs of axis, discrete differentiation) and visualized along with the original signals on the same panel. With the help of cursors/magnifiers time differences can be calculated. Each channel can be analyzed separately. Signals can be filtered using bandpass, lowpass, highpass (Butterworth, Chebyshev, Inver Chebyshev, Eliptic, Bessel, Median, ZeroPath). Separate graphics visualize the spectral power, frequency spectrum histogram, the evolution of the estimated frequency, P/H, the spectral power. Adaptive JTFA spectrograms can be selected: CSD (Cone-Shaped Distribution), CWD (Choi-Williams Distribution), Gabor, STFT (short-time Fourier transform), WVD (Wigner-Ville Distribution). A special filter eliminates spikes over a threshold amplitude / duration without modifying the rest of the signal. File discontinuities (missing data, samples with the same timestamp, and overlapping periods of time) are signaled and corrected by repeating the last value. Data can be saved in the IAG2002 format (corrected file, files concatenated in time for the same station), SAC bin – Unix (a file for every channel) and PC – SUDS (one file with all channels). This feature allows other software to analyze geomagnetic data associated with other atmospheric phenomena.
Analysis_IAGA is a LabVIEW application with GNU (General Public License) license.