SVC50-P17　　　　　　　Room:Convention Hall　　　　　　　Time:May 24 15:30-17:00

MaGCAP-V (5) - Upgrade for strainmeter data

KOKUBO, Kazuya[1]*, FUKUI, Keiichi[2], ANDO, Shinobu[3], TAKAGI, Akimichi[1], ONIZAWA, Shin'ya[1], SHIMBORI, Toshiki[1], YAMAMOTO, Tetsuya[1], Hiroshi, OHSUGA[4]

[1]Meteorological Research Institute, JMA, [2]Kakioka Magnetic Observatory, [3]MEXT, [4]VisCore Corp.

We developed the software MaGCAP-V (Magnetic and Geodetic data Computer Analysis Program for Volcano) to evaluate the magmatic activity from ground deformation data and geomagnetic changes observed at volcano. MaGCAP-V can handles both geodetic and geomagnetic data, and can do modeling the source of change through trial and error or inversion method by using GUI on Windows PC (Churei et al., 2002; Fukui et al., 2005).

MaGCAP-V Version 1.3 (released in 2011) handles the following data, 1) GPS (X,Y, Z, latitude, longitude, and ellipsoid high), 2) displacement (also leveling data), 3) EDM, 4) tilt, 5) In-SAR, 6) gravity, 7) magnetic total intensity, 8) atmospheric pressure, temperature, humidity, precipitation, and 9) hypocenter. DEM data (GSI DEM or user's DEM) are used for the modeling and drawing the topography. And also users can use the vector data to display the lakeshore and fault, etc.

It is possible to plot data in any combination of observation items as time series graph and as distribution map. Distribution map shows marks and vectors on observation points, or draws as color map created from interpolated grid data. GPS and displacement data can be processed as a difference between two-period or displacement speed calculated from data. The effect of the regional stress field can be removed from GPS and displacement data.

The following models are used, 1) Mogi model, dislocation model, spheroidal model (Sakai et al., 2008), and composite source for ground deformation, 2) thermal demagnetization model for sphere, column, conical, box, and composite source, 3) piezo magnetism which makes the multiple Mogi models. In order to reduce the effect of topography, we use a simple mode such as the modified Mogi model (Fukui et al., 2003). And modeling of volcano deformation by using a FEM simulation database (Fukui et al., 2006) are used to remove the effect of topography, heterogeneity structure and the shape of source. A kind of dynamic analysis is available (Fukui et al., 2010).

MaGCAP-V runs on personal computers and has improved for multi-threading CPU and double buffer to get higher performance (Fukui et al., 2010).

It was upgraded for the application to borehole type strainmeter data to estimate changing process of pressure source toward eruption. In Izu-oshima Island, JMA has one volumetric strainmeter and we are installing a new strainmeter which has sensors in different directions to observe horizontal strain tensor. MaGCAP-V can process and analyze these data and apply them to those crustal deformation models of volcanoes.

Keywords: software, volcano monitoring, ground deformation, geomagnetic change, model analysis, strain