

Spatial monitoring of GPS coordinates using 3-hour data in the Tokai area

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JMA is monitoring the variations in lengths and relative heights of baselines using 3-hour GPS coordinates data obtained by GSI in the Tokai area since 1998. However, it is very difficult to analyze all of the combination of baseline data quickly in order to grasp the whole activity in the Tokai area. Therefore we propose a new method of monitoring the displacement and the strain field automatically in real-time.

In the method we first obtain the dual representative values in a short and a long time spans for the time series of the coordinates at each station. The combination of the dual time spans are, for example, a month and a half year, a week and a month, a day and a week, which are selected by taking into accounts the sampling interval and other features of the data of GPS coordinates. Then we smooth the representative values obtained for all the GPS stations in the Tokai area and make the smoothed values into grid data using the function of GMT. In this study we use horizontal and vertical displacements and dilatational and rotational strain for monitoring.

In the new method it becomes easier to seek more essential slow variation. And even if there are defect of data, the resultant smoothed data is not influenced so much. The influence of extraordinary data of a reference station can be rejected by using median as the representative values.