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Activities about The Subcommittee for Analysis of Satellite Data

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The Earthquake Research Committee

The Earthquake Research Committee classifies and analyzes research and observation results, as well as study outcomes, in order to evaluate seismic activity comprehensively in monthly meetings and to publish evaluation results.

The Subcommittee for Analysis of Satellite Data

The Subcommittee for Analysis of Satellite Data was established in July 2007 for advances in seismic activity evaluation in the Earthquake Research Committee.

The subcommittee evaluates the seismic activity analyses using SAR data, and examines utilization of the data.

Seismic activity and SAR

The characteristic crustal movements caused by the strain accumulation process, the earthquake rupture process, and the post-seismic process are basic data for an understanding of seismic activity.

It is important to advance technologies for dense observations of crustal movement, like SAR, and the analysis method.

Recently, many satellites equipped with SAR were launched. Using the regularly observed SAR data, technology to observe crustal movements caused by seismic activity have progressed rapidly. Especially, Japanese Advanced Land Observing Satellite launched in January, 2006 have caught the clear crustal movements on many parts of the world just after the operation, which showed big possibilities of SAR data in advancement of the understanding of the seismic activity.

The report

The outcomes of the subcommittee listed below will be published as a report. In the lecture, they are introduced in detail.

1.The standard method of analysis and the standard expression for the Earthquake Research Committee

The analysis technique for SAR interference analysis and pixel offset were standardized. For the SAR interference analysis, not only analysis of data observed in the normal strip-map mode but analysis of data observed by ScanSAR was challenged, and then the crustal movement was successfully detected. The expression of the analysis result has varied between organizations, which confused about the interpretation of figures in the Earthquake Research Committee. Therefore a standard expression for the Committee was decided.

2.Estimation of the cause of the observation error.

In SAR interference analyses, errors of the orbit estimates, refractions of the radio wave by vapor, and refractions of the radio wave by the ionosphere cause the estimate error. The features of these errors and reduction measures were introduced.

3.The development of the detection method for regular crustal movement in the wide area.

Because the postseismic deformation and crustal movement caused by a strain accumulation process are very small compared with coseismic displacement, it has been difficult to detect the crustal movement using the SAR. However, the subcommittee have reduced an error using a lot of interference images and successfully extracted only minute crustal movements. A trial and problems for the detection of the strain accumulation for the prospect of subduction-zone earthquakes along the Nankai trough were introduced.

4.Evaluated reliability.

Examples of SAR interference analysis results evaluated in the Earthquake Research Committee were introduced.

Keywords: SAR, Earthquake, crustal movement, Headquarters for Earthquake Research Promotion