Development of on-site technologies for rapid recovery / reconstruction from sediment disasters and for the maintenance of a safe living environment after disasters

Sabo Department

To cope with sediment disasters, we are striving to clarify the mechanism of slope failure and develop technologies to respond to them. Research results are compiled into manuals and guidelines, while work is implemented by local governments and regional development bureaus of MLIT, etc. We also provide technical support upon request in the event of a sediment disaster, thereby contributing to rapid recovery / reconstruction of the region and the maintenance of a safe living environment.

Social background and issues

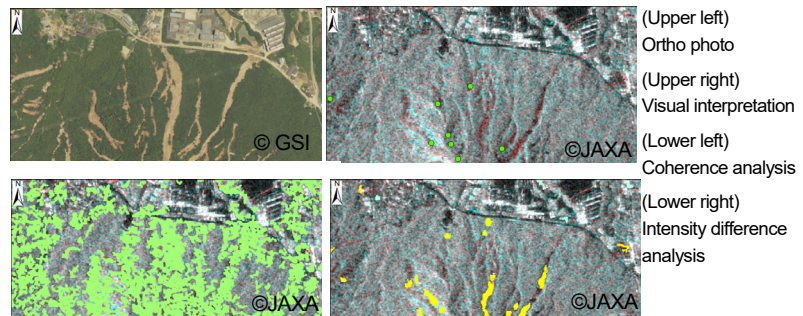In order to carry out rapid warning / evacuation and recovery / reconstruction projects:
➢ (i) It is necessary to improve the technology for interpreting satellite-mounted synthetic aperture radar (SAR) images, which can acquire information over a wide area even at night or in bad weather, so that the site of sediment disaster can be identified in a short time after occurrence.
➢ (ii) It is necessary to develop technologies that clarify the mechanism of large-scale sediment transport caused by deep-seated landslide, etc., and to identify in advance dangerous sites where large-scale sediment transport could occur.

Research contents

Quickly grasp the sites of sediment disasters using satellite SAR images.

The amount of data processed by the Advanced Radar Satellite "Daichi-4" (Advanced Land Observing Satellite 4 : ALOS-4) will increase as its observation range expands, so it is necessary to streamline the process of interpreting SAR images.
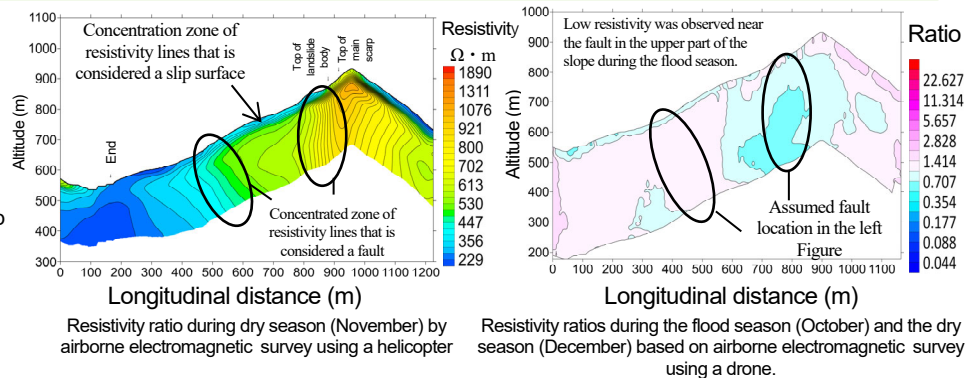Therefore, we compared the reliability in estimating the sites of sediment disaster between multiple methods that excel in processing SAR data observed over a wide area and methods based on visual interpretation.

(Upper left) Ortho photo
(Upper right) Visual interpretation
(Lower left) Coherence analysis
(Lower right) Intensity difference analysis

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Example of estimation results for each method (Torrential rainfall in July 2018, in Higashihiroshima City)

Visualize subsurface geology and hydrology with geophysical exploration technology to identify slopes at high risk of deep-seated landslide.

The risk of deep-seated landslide can be assessed with high accuracy by identifying deformed slopes from topographic maps and aerial photographs, and by investigating the presence of slip surfaces and faults within the slope and their relationship with groundwater behavior by airborne electromagnetic survey technology using a helicopter or drone.

Resistivity ratio during dry season (November) by airborne electromagnetic survey using a helicopter

Resistivity ratios during the flood season (October) and the dry season (December) based on airborne electromagnetic survey using a drone.

Risk assessment of sediment disasters and support for rapid recovery / reconstruction from sediment disasters

Development of on-site technology and technical support to local governments and Regional Development Bureaus

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☞See the following for related articles.
- Research on the advancement of sediment disaster monitoring methods using remote sensing (p. 59)
- Development of technology for identifying slopes with particularly high risk of deep-seated landslide using geophysical exploration technology (p. 147)