

MIS036-P136

Room:Convention Hall

Time:May 27 14:15-16:15

## Earthquake damage tracking using multi platform satellite images and simulation analysis of eastern Japan

Noritoshi Kamagata<sup>1\*</sup>, Yukio Akamatsu<sup>1</sup>, Yoichi Murashima<sup>1</sup>, Sakae Mukoyama<sup>1</sup>

<sup>1</sup>KOKUSAI KOGYO CO., LTD.

In March 11, 2011, at 2:46 p.m., a great earthquake with a magnitude of 9.0 hit eastern Japan and caused unprecedented damages. It was reported that the hypocenter of this earthquake was located at 38.0 degrees north in latitude, 142.9 degrees east in longitude, and at a depth of approximately 24 km. Tsunamis that were generated by this great earthquake also caused great damage to an approximately 700 km of areas between Aomori and Chiba prefectures on the Pacific coast.

Remote sensing technology plays a powerful role to investigate damages of the disaster. The great earthquake and tsunamis devastated a wide range of region. It is certain that a fair amount of time will be required to conduct an aerial survey of the widespread disaster region. Further, due to influences of serious damages to the Fukushima nuclear plants, no-fly zone was enforced, and an aerial survey is not allowed in some regions. On the other hand, satellites can make observations for a wide range of region and remain unaffected by the flight ban. Therefore, remote sensing technology using satellites play a critical role to quickly monitor a wide range of damaged area and uncover the whole truth of the great disaster. Since the earthquake occurrence, a wide range of the devastated area has been observed using many earth observation satellites. It is important to select a combination of satellite resources that are appropriate for various conditions such as elapsed time after the disaster occurrence and surveyed types of damage and areas after giving adequate consideration to features of each satellite and sensor.

Simulations are also useful in the damage investigations. Generally, it is difficult to monitor situations in the event of tsunamis generated by the earthquake and figure out areas of inundation damages where outflows of property did not occur in a timely manner and in time series using the remote sensing technology. In addition, due to unfavorable weather conditions, observations using high resolution optical satellites, which are needed to monitor in-depth disaster situations, are commonly delayed in many regions. On the other hand, simulations can estimate a range of disaster areas, and make it possible to understand circumstances of tsunamis' arrival, as well as tsunamis and inundations height without satellite data or airborne data of damaged areas. Therefore, the combination use of the estimation of a range of inundation area using tsunami simulations and the satellite data analysis results will play a important role to gather accurate data early and provide appropriate information in a timely manner.

It was implemented to monitor the situation of the disaster using the multi platform optical and SAR satellites and estimate a range of damaged area by the tsunami simulation. The combination use of these satellites enabled for quasi-real-time, accurate data acquisition and analysis about situation of the damage. The combination use of these satellites also enabled for putting the whole picture together and understanding details of the damage quickly and accurately. This situation also made it possible to provide appropriate information to related organizations or agencies in a timely manner. It is critical to continue to gather relevant data and provide appropriate information using the geospatial information technology and help the re-establishment of the disaster area.

Keywords: Multi platform satellite images, Simulation analysis, Earthquake damage tracking, Optical imagery, SAR imagery