STT54-01 Room:201A Time:May 24 16:15-16:30

Ground surface deformation monitoring all over Japan by InSAR using ALOS-2 data (first report)

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The Geospatial Information Authority of Japan (GSI) monitored ground surface deformation in 66 areas of volcano, subsidence and landslide all over Japan by InSAR using ALOS SAR data from 2006 to 2011. After ALOS stopped its operation in May 2011, the regular InSAR analysis could not be continued.

ALOS-2, a successor of ALOS, was launched on 24 May, 2014 and started the basic observation on 4 August. The observed SAR data has been provided since 25 November, 2014. GSI restarts the monitoring by InSAR using ALOS-2 data. The target area is all land areas all over Japan, expanded from the particular areas in the era of ALOS. Basically all data acquired by the basic observation mode will be processed. These advancements of the monitoring strategy from the time of ALOS are achieved by the constantly short baseline of ALOS-2 and the improvement of our processing system.

InSAR results will published as one of the layers of the geospatial information library on GSI Maps, a web map provided by GSI and where various geospatial information can be shown as well as background maps. This style of publication would make it easy to interpret the InSAR results and identify the location of the deformation, and promote the use of InSAR results. The interpretation of the InSAR results will be added in the future.

In ALOS-2 Basic Observation Scenario, disaster base map observations by various observation modes and off-nadir angles are planned for one year after the start of the basic observation. Therefore the amount of the available data for InSAR analysis is not large because the InSAR analysis requires two or more data acquired by the same mode and off-nadir angle. The full operation of the monitoring will start around August 2015.

In this presentation we report the first InSAR results using a limited amount of ScanSAR data and the future plan of the monitoring.

Keywords: InSAR, ALOS-2, deformation, subsidence, landslide, volcano

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STT54-02 Room:201A Time:May 24 16:30-16:45

Crustal deformation derived from the northern Nagano prefecture earthquake detected by InSAR analysis using ALOS-2 data

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ALOS-2, launched by JAXA on 24 May, 2014, is the newest L-band SAR satellite. Applying interferometic SAR (InSAR) analysis using ALOS-2 data to the northern Nagano prefecture earthquake (Mj 6.7, occurred on 22 November, 2014), we succeeded in a mapping a coseismic ground displacement. We used ALOS-2/PALSAR-2 data acquired by both right and left look direction from descending orbits. The interferograms suggest that fault motion of the earthquake has reverse dip slip with left-lateral motion on an east dipping plane. The most concentrated crustal deformation is located in the southern part of rupture area near epicenter of the mainshock, showing displacements toward to the satellite with ˜1 m at the maximum. Clear displacement discontinuity is recognized along western margin of the large crustal deformation area, which is just on the Kamishiro fault. We invert the InSAR results with GNSS data to construct slip distribution model of the earthquake. From fringe pattern of InSAR images, we assumed that a fault plane changes dip angle at 2 km depth, low dip angle shallower than 2 km and steep dip angle deeper than 2 km. Our preliminary model shows large (over 1 m) slip on southern part of shallower segment and moderate (˜1 m) slip around hypocenter of the mainshock on deeper segment. Both segments demonstrate reverse dip slip with left-lateral motion. On the other hand, no significant slip is estimated on northern part of shallower segment.

Keywords: Northern Nagano Prefecture earthquake, ALOS-2, InSAR

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STT54-03 Room:201A Time:May 24 16:45-17:00

ALOS2-PALSAR2 Interferometry on snow covered mountaneous area in Hokkaido: Tokachidake Volcano and Vicinity

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A repeat pass interferometery using spaceborne L-band synthetic-aperture radar provides a good coherency even on a vegetated area. It has already become an indispensable geodetic tool to detect spatial distribution of crustal deformation. However, if the earth surface is covered by snow at a cold district covered, we suffer from loss of coherence mainly caused by the change of reflection conditions due to a snowpack.

A relatively large dielectric constant of dry snow brings changes of the microwave propagation velocity and traveling distance. Nevertheless, details of a phase change by snowpack were left untouched, because the basic coherence was considered to be lost when the earth surface is covered by snow or ice.

ALOS2 satellite was launched by Japanese space agency, JAXA in May, 2014. This is a satellite dedicated solely for SAR mission. It is equipped with PALSAR2 which is the next generation L band sensor. Various improvements have been implemented in this satellite. As a result it is expected to provide high coherency for repeat pass InSAR for different areas on the glove. If an observation for snow covered target is also becomes possible, it is a significant step forward for facilitation of a geodetic monitoring in winter over a volcano season where the terrestrial access is very limited.

To validate such possibility several InSAR analyses were carried out using PALSAR2 data acquired on August 14, December 4, the 18, 2014, and January 15, 2015. The target area includes Tokachidake and Taisetsu volcanic chains.

Relatively good coherence was obtained for the pair spanning December 4 and 18 despite a heavy snow fall experienced one day before the second acquisition. This indicates a possibility that a good coherence is achievable for a snow covered target, if the other conditions are favorable. It is noteworthy that the coherence was also maintained around volcano summit where the ground is mostly composed with lava and breccia and almost no vegetation is found. This is an encouraging finding for the achievement of geodetic monitoring around vents and craters of volcanoes located in cold region with similar setting. On the other hand, some interesting phase patterns having correlation with land characteristics (forest, cultivated field, and city, etc.) are found on flat regions. Those might suggest that the phase change caused by snowpack depends on bouncing mechanisms of microwave. In the presentation, more details of those findings will be covered.

The PALSAR2 data used here were acquired and provided by JAXA through the Working Group for special study on application of satellite remote sensing technology for volcanic monitoring, organized under the umbrella of the Coordinating Committee for Prediction of Volcanic Eruption.

Keywords: crustal deformation, InSAR, remote sensing, satellite, volcano, snowpack

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STT54-04 Room:201A Time:May 24 17:00-17:15

Interferometry of PALSAR-2 images for crustal deformation study

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Since the first acquisition of image in June, 2014, PALSAR-2 has been operated satisfactorily. Since the beginning of operation, earthquake and volcanic activities occurred and crustal deformations associated with these events were detected. In this paper, we examine coherence, accuracy of PALSAR-2 interferograms and observed deformations for the Ontake eruption, Northern Nagano (Mjma6.7) and Southern Tokushima (Mjma5.1) earthquakes.

For the analysis we used the RINC (developed by Dr. Ozawa, NIED) and Gamma software, and the digital ellipsoidal models or ASTER-GDEM ver.2 for coregistraion and reduction of topography phase. UBS mode images with 3-m azimuthal resolution were analyzed.

We used two pairs of PALSAR-2 images acquired on August 22 and October 3, and August 18 and October 13. Both pairs were acquired on ascending orbits with right-looking configuration. Incidence angles and perpendicular baselines are 36 deg. and 5 m, and 53 deg. and 24 m, respectively. We recognized high coherence in both interferograms despite of mountainous region. However we also recognized systematic deviation from the synthetic LOS displacements at GEONET stations in the scene and its standard deviations were estimated 4˜5 cm. LOS decrease was observed near the summit of Ontake volcano, but no significant deformation was found in the surrounding region. Therefore we can conclude that the deformation was localized in the vicinity of the summit.

We analyzed two pairs of images acquired on October 2 and November 27, and September 19 and November 28. The former pair is observed from a descending orbit with left-looking configuration, while the latter is from an ascending orbit with right-looking. Incidence angle and perpendicular baseline are 36 deg. and 6 m, 40 deg. and 112 m, respectively. We recognized high coherence but lines of low coherence on the hanging wall side of source fault. These belts might coincide with surface ruptures of subsidiary faults such as backstop. We estimated slip distribution from interferograms and obtained up to 1.3 m thrust on an ESE dipping plane in a depth range shallower than 5 km.

We also analyzed two pairs of PALSAR-2 images acquired before and after the Southern Tokushima earthquake, but did not observed any significant surface displacements.

Keywords: PALSAR-2, crustal deformation, SAR interferometry

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STT54-05 Room:201A Time:May 24 17:15-17:30

Surface deformation in the Shinmoe-dake crater detected by Pi-SAR-L2/InSAR

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Shinmoe-dake in the Kirishima volcano group erupted in January 2011. Ozawa and Kozono (2013) analyzed spaceborne SAR images and revealed that lava extruded to the crater with constant rate of 88.7m^3/sec during January 29 and 31; it was after three sub-Plinian eruptions. After that, eruption type changed to Vulcanian eruptions, and frequency of eruption occurrence decreased with time. Since last eruption of September 2011, eruption has not occurred. However, Miyagi et al. (2014) carried out InSAR analysis with RADARSAT-2 and TerraSAR-X and revealed that lava extrusion had continued. Although lava extrusion rate tended to decrease with time, extrusion rate of 50-100m^3/day was estimated in May 2013.

In this study, we attempt to apply InSAR analysis with JAXA's airborne SAR data (sensor name: Pi-SAR-L2). SAR data used in this study were observed on 13 Sep. 2013 and 7 Aug. 2014 from three flight paths. In the simulation of topographic fringes, we used digital terrain model which was generated by SBAS analysis with RADARSAT-2 acquired after the last eruption. Large non-deformation component remained in differential SAR interferogram. Then we confined analysis area to 1km x 1km around the crater and removed its component so that phase difference outside of the crater became negligible, assuming its component to be a plane. Obtained results show slant-range shortening in the crater, and its area is almost the same with results from spaceborne InSAR. Since slant-range changes from three flight paths were obtained, we estimated three-dimensional displacement map from them. Uplift exceeding 20cm was found. On the other hand, horizontal displacement with radial direction was found surrounding uplift area, but its amount was less than 3cm in most area. It suggests that viscosity of extruded lava is high and that fluidity to horizontal direction was low.

The lava extrusion volume during 13 Sep. 2013 and 7 Aug. 2014 was estimated to 10044m^3 from obtained uplift map. On the other hand, spaceborne SAR images up to 14 Apr. 2014 were available, and the lava extrusion volume during 13 Sep. 2013 and 16 Apr. 2014 was estimated to 7507-7704 m^3 from InSAR analysis using them. Then the lava extrusion volume during 16 Apr. 2014 and 13 Sep. 2013 was estimated to 2340-2537 m^3. Huppert and Woods (2002) indicated the model for temporal change of lava extrusion in the case that shallow magma chamber with overpressure exists. We fitted extrusion rates from spaceborne InSAR analysis to the model in the case that magma is injected to shallow magma chamber from deep source, and the lava extrusion volume of 2339 m^3 during 16 Apr. 2014 and 13 Sep. 2013 was estimated, corresponding to that from observed one. Miyagi et al. (2014) suggested continuous magma supply to shallow magma chamber from spaceborne InSAR analysis by May 2013, and result in this study suggests that such magma supply decreased.

Acknowledgements. Pi-SAR-L2 data was provided based on cooperative research with JAXA. TerraSAR-X and/or TanDEM-X data were provided on the cooperative activities between German Aerospace Center (DLR) and JAXA in the field of Satellite Disaster Monitoring.

Keywords: airborne SAR, InSAR, Shinmoe-dake, crater, lava, deformation

STT54-06 Room:201A Time:May 24 17:30-17:45

Evaluation of noise equivalent sigma_0 for Pi-SAR-L2 and PALSAR-2.

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The noise equivalent sigma_0 (NESZ) were evaluated to the data simultaneously observed with Pi-SAR-L2 and PALSAR-2 by full polarimetry mode. The observation were done on Sept. 11, 2014 over Sendai airport. Fast Fourier transforms (FFTs) was applied to the data, and 10, 20, 30, 40, 50 dB random noise were added in the frequency domain. Inverse FFTs was applied to obtain the time domain data. The change of sigma_0 for the runway in the Sendai airport was examined, and the NESZ for Pi-SAR-L2 and PALSAR-2 were evaluated from the data. Estimated NESZ were -46.2, -60.5, -61.0, -55.0 dB for sigma_0 HH, HV, VH, VV of Pi-SAR-L2 data, and -40.3, -50.0, -51.3, -43.0 dB of PALSAR-2 data. The NESZ for the Pi-SAR-L2 was 6 to 12 dB better than those for the PALSAR-2.

The Pi-SAR-L2 sigma_0 profile for the area, where the incident angle is same, were compared with the PALSAR-2 sigma_0 for each polarization. The area, where sigma_0 is more than -20 dB shows almost same profile, and shows same sigma_0. On the other hand, the area, where sigma_0 is less than -20 dB shows the difference. The difference was not explained by the NESZ estimated above. One of the possible causes for the higher NESZ may be higher azimuth ambiguity for the PALSAR-2 data.

Keywords: Full polarimetry,, SAR

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STT54-07 Room:201A Time:May 24 17:45-18:00

Detection of meso- and submeso-scale ocean fronts using Synthetic Aperture Radar (SAR) and Optical data

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Synthetic aperture radar (SAR) can image ocean surface roughness with high spatial resolution (~10m) and operationally detect information on wind speed and wave, which are related to ocean surface roughness. One of main factors by which surface roughness is modulated is convergence and divergence of surface currents and it has been reported that a large current shear is imaged as line-shaped high NRCS on a SAR image. With a combination of c-band SAR and optical images, a study on upper ocean dynamics has been reported. In the present study, information of ocean fronts with meso- and submeso-scales are detected using L-band SAR (PALSAR-2) and MODIS SST/Chl-a images. The MODIS data we used, which are processed and provided in near-real-time by JAXA/EORC, are observed in the Northwestern Pacific at October 25, 2014 01:11(UT), while PALSAR-2 data that are provided by JAXA within the framework of the 4th ALOS Research Announcement are acquired at October 25, 2014 14:17(UT), about 13 hours time gap for the MODIS acquisition.

In order to make fine structure visible, an about 20-km high-pass filtering is applied for the PALSAR-2 NRCS image after eliminating incidence angle-dependent average signals. This PALSAR-2 contrast image is then compared with the MODIS SST and Chl-a images. The comparison shows that the positions of line-shaped bright and dark patterns in the contrast images correspond with large SST gradients, i.e., SST fronts. This feature is consistent with a general theory that divergence and convergence areas induced by large current shear are imaged dark and bright, respectively, through the modulation of ocean surface roughness. Moreover, the comparison with the Chl-a image represents some local Chl-a maximum along the line-shaped patterns in the PALSAR-2 contrast image. It is suggested that the local increase of Chl-a is induced by upwelling caused by submeso-scale front phenomena. The PALSAR-2 contrast image is thus expected to give useful information on the upper ocean dynamics. In addition to that, since the detected line-shaped patterns might represent "Shiome" and are related to Chl-a concentration, it is interesting to investigate their relationship with fishing grounds.

Keywords: PALSAR-2, ocean front, submesoscale

STT54-08 Room:201A Time:May 25 09:00-09:15

ALOS-2 / PALSAR-2 ScanSAR-ScanSAR interferometry observation for Philippine Mayon Volcano analysis

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On September 14 - 18, 2014, Mayon Volcano recorded some activities including lava flows. Before and the after those activities, Advanced Land Observation Satellite-2 (ALOS-2) observed the volcano on September 4 (Scene ID: ALOS2015233350-140904) and October 16 (Scene ID: ALOS2021443350-141016). ALOS-2 carries the state-of-the-art L-band Synthetic Aperture Radar (SAR), the Phased Array type L-band Synthetic Aperture Radar-2 (PALSAR-2) [1]. It has 3m spatial resolution with 50km swath in ultra-fine mode. However, in those observations, 100m x 100m resolution with 350km swath ScanSAR mode was scheduled. No better resolution image was taken during the activities by ALOS-2.

In this paper, we tried interferometric SAR (InSAR) analysis for Mayon volcano with those pair of two ScanSAR images. There are two requirements for the ScanSAR ? ScanSAR interferometry. One is the time synchronization between two observation and the other is the accurate co-registration. PALSAR-2 is designed to have 90% or more burst synchronization. However, as PALSAR-2 was under calibration those days, some pairs have less synchronization ratio. Fortunately, the pair we used marked approximately 53.6% of burst synchronization which is enough high for the interferometry. For the co-registration, in this paper, we applied a local co-registration method using phase gradient estimation from amplitude information proposed in [2], in addition to the popular cross-correlation and geometrical co-registration.

We found some low coherency parts at the summit and the southwest skirt of the mountain. Those low coherency areas represent the surface change caused by the lava or rock fall. On the other hand, no significant deformation was found in the interferogram. These results indicates that this activity was not large enough to make a detectable deformation for 100m resolution SAR interferometry.

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Keywords: ALOS-2, PALSAR-2, ScanSAR-ScanSAR interferometry, Interferometric Synthetic Aperture Radar

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STT54-09 Room:201A Time:May 25 09:15-09:30

On the phase linking of distributed scatterers - improvement of measurement density in non-urban areas-

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Preface: Persistent scatterer interferometry (PSI) makes use of points with temporally coherent phase to achieve high accuracy measurements. However, in non-urban environments, the PS density is generally very low and distributed scatterers (DS) are dominant. Thus, it is difficult to monitor crustal deformation in a mountainous area where many active faults/volcanoes are located. To improve the spatial density of the measurement points, the use of DS, in which the phase quality should be comparable to PS, is indispensable.

Phase Linking: The small baselines subsets (SBAS) approach has been developed to extract high-quality phase information from DS. The SBAS, however, requires reliable phase unwrapping of each single interferogram. On the other hand, different approaches have been recently proposed (e.g., Monti-Guarnieri et al, 2008), in which the retrieval of phase time series is done ”before” unwrapping. In this method, the single-master phase time series is optimized on the basis of coherence information using all the multilooked ”wrapped” interferograms. The optimal phases are obtained as the maximum likelihood estimate of a complex circular Gaussian distribution for multilooked (statistically homogeneous) pixels. This approach is called phase linking as the phases stem from the results of linking all the interferogram phases.

Feasibility test by simulated data: To confirm the effectiveness and to test how well our algorithm works, we first applied it to simulated data. We generated a data set of 24 SLC images with 50 by 50 pixels, in which deformation with a constant speed is included and two kinds of (temporally-decreasing and seasonally changing) coherence matrices were used to simulate the decorrelation noise. A small fringe pattern can be recognized from standard master-slave interferograms with multilooking of 5 by 5, while the estimates by the phase linking could reproduce the true deformation for all interferograms. The standard deviation of the residual from the true phases is close to the theoretical lower limit, namely, Cramér-Rao bound, with a difference of about 0.1-0.2 rad at maximum for all interferometric pairs. On the other hand, there are large differences of about 1.5 rad at maximum for simple multilooked interferograms.

Application to actual data: We applied the method to ALOS/PALSAR data observing Japanese mountainous area, in and around Midagahara volcano where grass/trees cover the land. Only 12 SAR images are available due to the long-term snow-covered-land. We compared the results of a standard PSI analysis. In PSI analysis, the amplitude dispersion method to pick up PS candidates does not have a good performance for small data set, thus we used also the signal-to?clutter ratio method. For DS analysis, we first picked up statistically homogeneous pixels for multilooking by applying the 2-sample KS-test (Ferretti et al., 2011), and then conducted the phase linking. To get the same quality points for both analyses, we used the spatio-temporal consistency as a quality indicator (Hanssen et al., 2008) to select final measurement points. Resultantly, the PSs of 7094 pixels were obtained in full pixel size of 720000, while we could get the optimized DSs of 82138, leading that the observation density significantly improves. In this analysis, we found locally-distributed inflational ground deformation in the geothermal area. The increase of measurement point density contributes to grasp the spatial extent of inflational ground deformation. We can identify that the phase linking of DSs effectively works well for crustal deformation observation in mountainous area.

Acknowledgment: The SAR data obtained using the ALOS/PALSAR were provided by the Japan Aerospace Exploration Agency (JAXA). The ownership of PALSAR data belongs to METI (Ministry of Economy, Trade and Industry) and JAXA.

Keywords: Phase linking, Distributed scatterers, InSAR time series analysis, Persistent scatterer interferometry (PSI)

STT54-10 Room:201A Time:May 25 09:30-09:45

Condition for water infiltration in snowy highland marshes based on ALOS/PALSAR data analysis

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We have been studying how to monitor the hydrological environment of snowy highland marshes by using remote sensing. The data from L-band radar PALSAR (The Phased Array type L-band Synthetic Aperture Radar) onboard ALOS (Advanced Land Observing Satellite "DAICHI"), a Japanese satellite, has potentials to observe the marshes under the snow layer. The microwave radar measures the back- scattered signals and works in all weathers. The microwave generally reaches the subsurface layer, so the returned signal includes information about soil moisture as well as surface roughness. We analyze the data from PALSAR and try to retrieve the hydrological information in highland marshes through the year.

Based on our analysis of PALSAR/ALOS data, we lastly reported that the Oze highland marsh, extending across the 4 prefectures (Fukushima, Gumma, Niigata and Tochigi), keeps a largest amount of liquid water body in midwinter, however, no such case seems to happen in Kiritappu and Sarobetsu marshes both locating at Hokkaido. All 3 marshes are covered with snow layer in winter. The peak of water content in Oze is observed in midwinter and not in early spring. We concluded that the observed water body in Oze marsh is not meltwater but would be the liquid water squeezed out from the peat bed by the load of heavy snow. In the other 2 marshes of Kiritappu and Sarobets, the thickness of the snow layer and/or peat layer (which is a reservoir of water) seems not enough.

In this presentation, we show our new analysis about Tashiroyama, Uryunuma and Midagahara marshes, locating at Fukuushima, Hokkaido and Toyama prefectures, respectively. All 3 marshes are highland marshes where it snows in every winter. We examined whether the water infiltration out of the peat layer could be observed in these highland marshes based on the PALSAR/ALOS data. In both Tashiroyama marsh and Uryunuma marsh, water infiltration was observed during midwinter. In Midagahara marsh, on the other hand, no infiltration of water was observed. We discuss the condition for water infiltration in its correlation with peat depth and snow depth. We propose that water infiltration in highland marshes is caused when the following two conditions are met: 1) layer >2m for the thickness of peat bed and 2) snow cover >2-3m.

Keywords: PALSAR, hydrology, remote sensing, highland marsh, snow, peat bed

STT54-11 Room:201A Time:May 25 09:45-10:00

An application of ALOS-2 data for study of glacial region

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ALOS-2/ PALSAR-2 successfully launched on 24, May, 2014 and it has been collecting the data all over the world properly.The major difference between ALOS and ALOS-2 are improvement of spatial resolution, short revisit cycle, keeping short baseline and improvement of observation opportunity by left-right looking. Among them, the important improvement are short base line and short revisit cycle because it is expected to provide the high coherency between observations. It is able to observe in 14 days difference in the best case, it is almost 3 times shorter temporal difference than ALOS data.

Based on these difference, we choose two area for the comparison between ALOS-2 and ALOS data. One is Mt. El Salto, Andes region. This area has many rock glaciers and we successfully detected the movement of them. Here we would like to check whether ALOS-2 can detect these Phenomenon as ALOS data. The other target area is East Antarctic marginal zone between ice sheet and ice shelf. We already confirmed that the possibility of the extraction of grounding line by PALSAR data and how it improve using ALOS-2 data to take into the effect of short revisit cycle and short baseline. We plan to report how ALOS-2 data be useful for cryospheric study based on these two case studies.

ALOS-2/PALSAR-2 and ALOS/PALSAR data were provided by Research Announcement by JAXA PI project (PI No. P1418002)

Keywords: ALOS-2, SAR, InSAR, grounding line, glacier

STT54-12 Room:201A Time:May 25 10:00-10:15

An approach to improve the accuracy of ice flow rate measurement of Antarctic ice sheet using DInSAR method

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Differential Interferometric Synthetic Aperture Radar (DInSAR) is an effective tool to measure the flow rate of slow flowing ice streams on Antarctic ice sheet with high resolution. Since few studies had been made on accuracy estimate of the ice flow measurement using DInSAR method, it is an important subject to discuss the displacements and their changes.

We use Digital Elevation Model (DEM) at two times in the estimating ice flow rate by DInSAR. At first, we use it to remove topographic fringes from InSAR images. And then, it is used to project obtained displacements along Line-Of-Sight (LOS) direction to the actual flow direction. ASTER-GDEM widely-used for InSAR processing of the data of polar region has a lot of errors especially in the inland ice sheet area. Thus the errors yield irregular flow rates and directions. Therefore, quality of DEM has a substantial influence on the ice flow rate measurement.

In this study, we tried to improve estimate accuracy of ice flow rate estimated by DInSAR method by applying a newly created DEM (hereinafter referred to as PRISM-DEM), and compared PRISM-DEM and ASTER-GDEM. Since it is not likely that crustal displacement occurs on outcrops in Antarctica during the recurrence period (in the case of ALOS: 46days), the observed displacements on outcrops are considered to be caused by errors contained in DInSAR images. Therefore, we used the displacements on outcrops as an indicator of error evaluation.

The study area is around Skallen, 90km south from Syowa Station, in the southern part of Soya Coast, East Antarctica. For making DInSAR images, we used ALOS/PALSAR data of 13 pairs (Path633, Row 5710-5720), observed 2007/11/23-2011/1/16. PRISM-DEM covering PALSAR area was created from stereo disparity of nadir and backward images of ALOS/PRISM (Observation date: 2009/1/18, Path187, Row (nadir)5020-5030, (backward)5075-5085).

The number of irregular values of actual ice flow rate was reduced by applying PRISM-DEM compared with that by applying ASTER-GDEM. Additionally, an averaged displacement of approximately 0.74cm was obtained by applying PRISM-DEM over outcrop area, while an averaged displacement of approximately 1.65 cm was observed by applying ASTER-GDEM.

It is concluded that the accuracy of the ice flow rate measurement and errors contained in DInSAR images can be improved by using PRISM-DEM. In this presentation, we will show the results of the estimated flow rate of ice streams, and discuss the accuracy validation of PRISM-DEM.

Keywords: DInSAR, Antarctic Ice Sheet, ice flow rate, DEM

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STT54-13 Room:201A Time:May 25 10:15-10:30

Advanced Land Observing Satellite-2: Mission Status and Forest Observation

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Advanced Land Observation Satellite-2 (ALOS-2) was launched on May 24, 2014, carrying the L-band Synthetic Aperture Radar (PALSAR-2) to the low polar orbit of 628km-height with 14-day revisit time. To the four mission objectives, i.e., 1) disaster mitigation, 2) environmental monitoring represented by the forest monitoring and cryospheric monitoring, 3) land monitoring, and 4) technology development, PALSAR-2 and ALOS-2 provide the 1~3m high resolution Spotlight and Strip with multi polarization with an imaging swath of 50~70km, ScanSAR imaging with 350~490km swath with dual polarizations, shorter temporal baseline of 14 days and spatial baseline of within 500m of radius, shorter time delay of less than 72 hours (74 hours in worst case) for emergency observation request to the disaster area, and almost all of global beam synchronization for ScanSAR Interferometry. ALOS-2 science program initiates the JAXA's Calibration, Validation, Application researches of the PALSAR-2/ALOS-2 and Pi-SAR-L2. As the application research, the disaster mitigation and the urban area monitoring using the high-resolution data should contribute significantly to the human society since the disasters occur frequently and globally. High resolution and multi polarimetric SAR with the shorter revisit time reserves the quicker detection of the land changes. In this presentation, we will summarize the contents of the ALOS-2 science program, its expected outcomes, and comparative study results with PALSAR.

Keywords: L-band SAR, Forest Observation, Calibration and validation, SAR interferometry