

IMAGE QUALITY EVALUATION ON ALOS/PRISM AND AVNIR-2 - LATEST EVALUATION RESULTS-

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1. INTRODUCTION

Advanced Land Observing Satellite (ALOS, named “Daichi” in Japanese) was launched on January 24, 2006 and it continuously operating well. Initial calibration has been carried out on its initial calibration phase during Oct. 23, 2006. To keep accuracy of the instruments, JAXA/EORC keep the activity for calibration and validation.

This is a report on result of evaluation for image quality in terms of MTF (Modulation Transfer Function) and SNR (Signal to Noise Ratio) for both PRISM and AVNIR-2. SNR of PRISM image has been increased following the up dating of radiometric correction and implementation of JPEG noise reduction filter. The result was in range of specification for both sensors.

2. IMAGE QUALITY EVALUATION ON PRISM

The PRISM consists of three panchromatic radiometers, which are forward, nadir and backward looking. Stripe like noise, which is caused by pixel-to-pixel radiometric correction, has been up dated. Also brightness gap between each CCD has been corrected. These up dated corrections are applied independently for each scene.

The PRISM image is compressed into JPEG format because of reducing the data transmission rate. A major drawback of JPEG compressing is that the compressed image exhibits visually annoying blocking and mosquito noise, especially at high compression ratio. Especially for this block noise artifact, JPEG noise reduction filter has been applied. Signal to Noise Ratio (SNR) evaluation was carried out for the each image those were corrected for up dated radiometric correction and JPEG filters. The results of SNR are increasing, as each correction has been up dated. The latest results shows more than 100 which is higher than the specification of 70.

Modulation Transfer Function (MTF) has been calculated for PRISM images. Profiles used to calculate MTF have been extracted from edge shape textures in PRISM images. Profiles are carefully chosen from both along track and cross track directions. The results from PRISM 3 radiometers are varied low in 0.14 and high in more than 0.3 when the specification is more than 0.2.

3. IMAGE QUALITY EVALUATION ON AVNIR-2

The AVNIR-2 has four radiometric bands from blue in visible to near infrared and +/- 44.0 deg. of pointing angle to maximize the opportunity of re-visiting. So MTF, nadir and 41.5 deg. pointing images are evaluated in both along track and cross track directions. As same as PRISM, profiles are carefully chosen from both along track and cross track directions. The results from PRISM 3 radiometers are varied low in 0.21 and high in more than 0.3 when the specification is more than 0.25 for band 1-3 and more than 0.2 for band4. In case of the large pointing angle, MTF in along track is degraded.

SNR on AVNIR-2 image is about 250 – 270, which is higher than the specification, which are over 200 at the radiance in specification of the each band.