

L-BAND RFI GLOBAL DISTRIBUTION MEASURED BY ALOS/PALSAR

M. Shimada ¹⁾, D. Sango ²⁾, P. Rosen ³⁾

1 Earth Observation Research Center, Japan Aerospace Exploration Agency, Sengen 2-1-1,
Tsukuba, Ibaraki, 305-8505, Japan

2 Remote Sensing Technology Center of Japan, Sengen 2-1-1, Tsukuba, Ibaraki, 305-8505, Japan

3 Jet Propulsion Laboratory

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Abstract

L-band SAR plays very important roll for monitoring the earth environment change at the cryosphere, biosphere, and solid earth sciences. However, the recent increase of the RFI at the L-band, on the other hand, suppresses the sensitivity of the L-band SAR images. Degree of the interference ranges from a spike noise like signal of a very narrow bandwidth, the wide bandwidth of 2~3 MHz, and the quite high intensity with large bandwidth covering the full spectrum of the SAR signal. Although the first two interferences can be suppressed by applying the notch filtering techniques, which replace the contaminated frequency bin by zero, the third one degrades the image quality seriously regardless of the correction or non-correction (See Fig. 1). In comparison to the JERS-1 SAR images, intensity, bandwidth, and the frequency of the FRI appearance are increased so much.

Since the L-band frequency plays very important role for monitoring the earth from the space, knowledge of the current global contamination is very important for setting up the observation strategy using the L-band sensors (i.e., ALOS-2, Aquarius, MOMS). After the launch of the ALOS, JAXA has acquired more than 400TB of the PALSAR images which correspond to 2.1 million PLASRA images globally and which corresponds to 25 times of the global land coverage's. At the PALSAR imagining, we always measured the signal contamination rate and levels at every 0.1 second interval. By analyzing the contamination rate with regard to the location, we can know the global contamination rate and its distribution.

We will introduce the distribution of the RFI appearance in terms of the intensity, histogram, distribution in this presentation. The method used in this is the segmented

frequency analysis of the PASAR raw data and the JERS-1 SAR raw data.

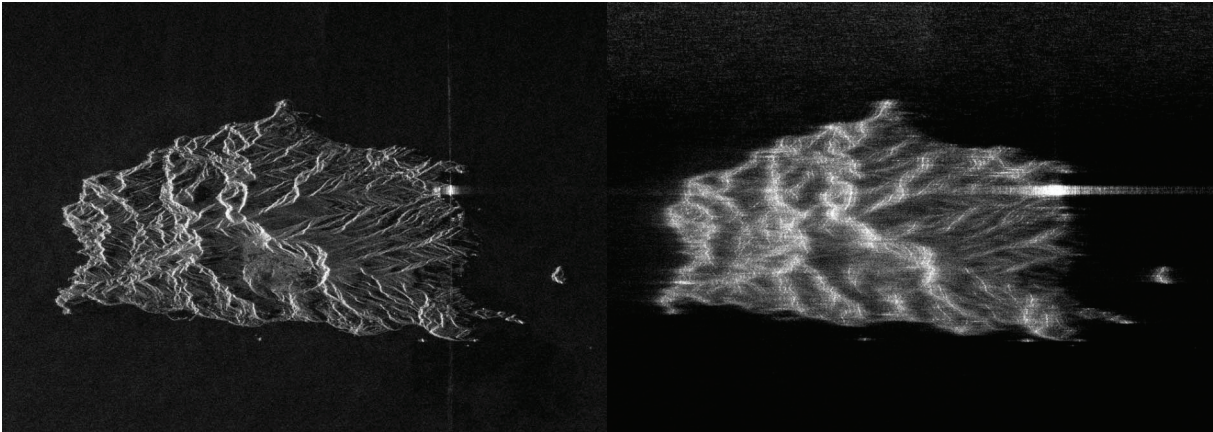


Fig. 1. Unsuccessful attempt to eliminate a seriously interfering signal. Left: Image obtained without notch filter. Right: Image obtained with notch filter. Application of the notch filter deforms the image.

Conclusions

L-band SAR is very important for the global monitoring. Frequency analysis and the measurement of the number of the occurrence that the notch filtering was used give the distribution of the signal contamination globally.

References

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