

Ionospheric disturbances observed by the PALSAR onboard ALOS satellite

Masanobu Shimada¹, Yasushi Muraki², and Yuichi Otsuka³

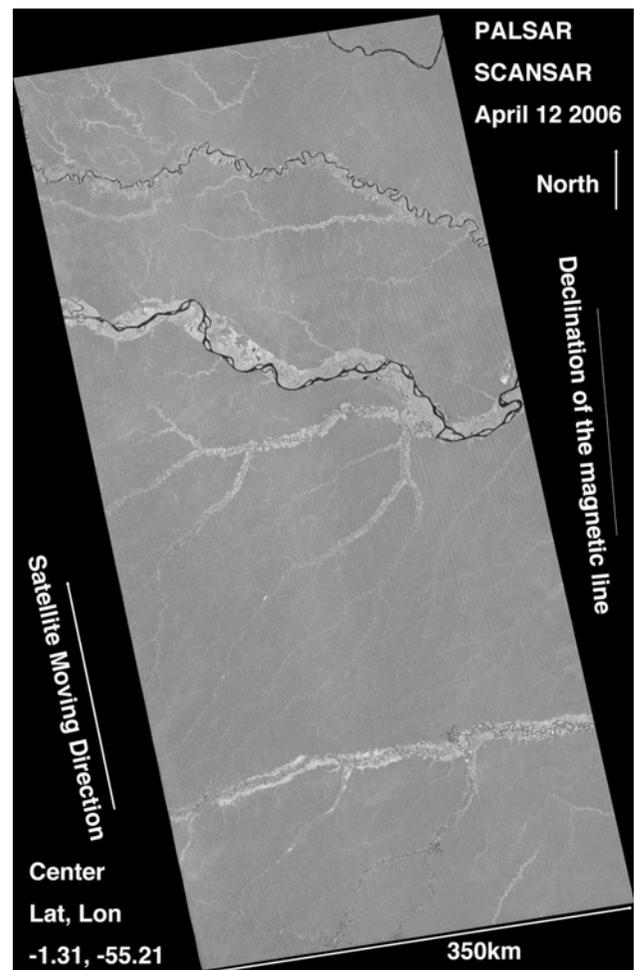
1 Earth Observation Research Center, Japan Aerospace Exploration Agency, Sengen 2-1-1, Tsukuba, Ibaraki, 305-8505, Japan

2 Department of Physics, Konan University, Kobe, 658-0073, Japan

3 Solar-Terrestrial Environment Laboratory, Nagoya University, Toyokawa, 442-8507, Japan

INTRODUCTION

We discovered anomalous stripes over the large area of Amazon when the region was scanned by the radar (PALSAR) onboard ALOS satellite. The stripes appeared on the local midnight along the geomagnetic field line with a typical characteristic width of 600m. The radar has sensitivity not only on the scattering characteristics of the ground surface but also on the irregularity of the ionosphere between the ground and the satellite. The phenomenon was investigated by two different kinds of data taken by the SAR interferometry and the polarization measurement. Both measurements gave the same profiles of the space irregularity. Furthermore when the ALOS PALSAR observed the stripes, the GPS receivers located at the same area observed the scintillation. Therefore, it would be natural to set a hypothesis that the stripes are induced by the irregularity of the ionosphere. This report has been made being based on the data set obtained in the observation days between April 2006 and January 2007. During that time the satellite scanned the Earth surface almost twice and collected 9132 data sets. Within 9132 data sets, in the 54 images the stripes were seen. The stripes were observed not only over Amazon but also over West Africa, South-East Asia, east New Guinea and Hawaii in their local night. We estimated the difference of the brightness of the stripes by the TEC unit and it turns out as about 3 TECU. Taking account of these facts, we may conclude that the stripes are induced by the Rayleigh-Taylor instability enforced by the planetary wave rising from the lower altitude passing through the mesosphere.



REFERENCES