INGV ANNALS OF GEOPHYSICS

Wavelength influence in sub-pixel temperature retrieval using the dual-band technique

V. Lombardo, L. Merucci, M. F. Buongiorno

Abstract

The thermal model proposed by Crisp and Baloga (1990) for active lava flows considers thermal flux as a function of the fractional area of two thermally distinct radiant surfaces. In this model, the larger surface area corresponds to the cooler crust of the flow and the other, much smaller to fractures in the crust. These cracks temperature is much higher than the crust one and approaches the temperature of the molten or plastic interior flow.
The dual-band method needs two distinct SWIR (short wave infrared) bands to formulate a two equations system from the simultaneous solution of the Planck equation in each band. The system solutions consist in the crust temperature and the fractional area of the hot component. The dual band technique originally builds on data acquired by sensors (such as Landsat TM) with two SWIR bands only. The use of hyperspectral imaging spectrometers allows us to test the dual-band technique using different wavelengths in the SWIR range of the spectrum.
DAIS 7915 is equipped with 40 bands into the range 1.54-2.49 nm which represent potential input in dual band calculation. This study aims to compare results derived by inserting assorted couples of wavelengths into the equation system. The analysis of these data provides useful information on dual-band technique accuracy.

Keywords

remote sensing;volcanoes;dual-band;DAIS sensor;hyperspectral analysis

Full Text:

PDF

References

DOI: https://doi.org/10.4401/ag-3173

Published by INGV, Istituto Nazionale di Geofisica e Vulcanologia - **ISSN:** 2037-416X

Sezione CNT, Roma, Italia

L. Merucci
Istituto Nazionale di Geofisica e Vulcanologia, Sezione CNT, Roma, Italia

M. F. Buongiorno
Istituto Nazionale di Geofisica e Vulcanologia, Sezione CNT, Roma, Italia

KEYWORDS

Central Italy Earthquake GPS Historical seismology Ionosphere Irpinia earthquake Italy Mt. Etna Seismic hazard Seismic hazard assessment Seismology UN/IDNDR earthquake earthquakes historical earthquakes ionosphere magnetic anomalies paleoseismology seismic hazard seismicity seismology