



Comparison of in-situ measurements and satellite-derived surface emissivity over Italian volcanic areas

Malvina Silvestri, Massimo Musacchio, Diego Cammarano, Maria Fabrizia Buongiorno, Stefania Amici, and Alessandro Piscini

Istituto Nazionale di Geofisica e Vulcanologia, CNT, rome, Italy (malvina.silvestri@ingv.it)

In this work we compare ground measurements of emissivity collected during dedicated fields campaign on Mt. Etna and Solfatara of Pozzuoli volcanoes and acquired by means of Micro-FTIR (Fourier Thermal Infrared spectrometer) instrument with the emissivity obtained by using single ASTER data (Advanced Spaceborne Thermal Emission and Reflection Radiometer, ASTER 05) and the ASTER emissivity map extract from ASTER Global Emissivity Database (GED), released by LP DAAC on April 2, 2014. The database was developed by the National Aeronautics and Space Administration's (NASA) Jet Propulsion Laboratory (JPL), California Institute of Technology. The database includes land surface emissivity derived from ASTER data acquired over the contiguous United States, Africa, Arabian Peninsula, Australia, Europe, and China.

Through this analysis we want to investigate the differences existing between the ASTER-GED dataset (average from 2000 to 2008 season independent) and fall in-situ emissivity measurement. Moreover the role of different spatial resolution characterizing ASTER and MODIS, 90m and 1km respectively, by comparing them with in situ measurements, is analyzed. Possible differences can be due also to the different algorithms used for the emissivity estimation, Temperature and Emissivity Separation algorithm for ASTER TIR band (Gillespie et al, 1998) and the classification-based emissivity method (Snyder and al, 1998) for MODIS. Finally land surface temperature products generated using ASTER-GED and ASTER 05 emissivity are also analyzed.

Gillespie, A. R., Matsunaga, T., Rokugawa, S., & Hook, S. J. (1998). Temperature and emissivity separation from Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) images. *IEEE Transactions on Geoscience and Remote Sensing*, 36, 1113-1125.

Snyder, W.C., Wan, Z., Zhang, Y., & Feng, Y.-Z. (1998). Classification-based emissivity for land surface temperature measurement from space. *International Journal of Remote Sensing*, 19, 2753-2574.