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PRISMA hyperspectral satellite mission: first data on snow in the Alps

Biagio Di Mauro¹, Roberto Garzonio¹, Gabriele Bramati¹, Sergio Cogliati¹, Edoardo Cremonese², Tommaso Julitta³, Cinzia Panigada¹, Micol Rossini¹, and Roberto Colombo¹

¹University of Milano Bicocca, Department of Earth and Environmental Sciences, Milan, Italy (biagio.dimauro@unimib.it)

²Environmental Protection Agency of Aosta Valley, Aosta, Italy

³JB Hyperspectral Devices, Dusseldorf, Germany

On the 22nd of March 2019, PRISMA (PRecursores IperSpettrale della Missione Applicativa) mission has been launched by the Italian Space Agency (ASI). Since then, the spacecraft has been collecting on demand hyperspectral data of the Earth surface. The imaging spectrometer features 239 bands covering the visible, near infrared and shortwave infrared wavelengths (400-2500 nm) with a spectral resolution <12nm. PRISMA acquires hyperspectral images with a spatial resolution of 30m and a swath of 30 km.

The satellite mission is still in the initial commissioning phase. During this period, the acquisition of field spectroscopy data contemporary to satellite observation is fundamental. With the aim of calibrating and validating PRISMA observations on snow fields, we organized field campaigns at a high altitude (2160 m) experimental site (Torgnon, Aosta Valley) in the European Alps. During these campaigns, we measured spectral reflectance of snow with a Spectral Evolution spectrometer (350-2500 nm), snow grain size, and snow density. Among different instruments operating at the site (e.g. net radiometer, webcam, sensors for snow depth, snow water equivalent, snow surface temperature etc.), we recently installed an unattended spectrometer acquiring continuous measurements of snow reflectance. This instrument covers part of the visible and near infrared spectral range (400-900 nm) and it was used to analyze the daily evolution of snow reflectance during the snow season.

In this contribution, we present a preliminary comparison between field and satellite hyperspectral reflectance data of snow. This comparison is fundamental for the future development of algorithms for the estimation of snow physical variables (snow grain size, snow albedo, and concentration of impurities) from satellite hyperspectral data.