



## **Estimating the Plant Area Index and Phytomass of Mountain Grasslands from Multispectral Reflectance**

**S. Pilloni** (1), M. Heintl (1), A. Hammerle (1), D. Gianelle (2), L. Vescovo (2), U. Tappeiner (1), G. Wohlfahrt (1)

(1) Universität Innsbruck, Institut für Ökologie, Austria, (2) Centro di Ecologia Alpina, Italia

The plant area index and above-ground phytomass are crucial input parameters for models which simulate the mass and energy exchange between ecosystems and the atmosphere. Aim of the present study was to estimate the plant area index and above-ground phytomass of mountain grasslands from multi-spectral measurements of radiation reflected from their plant canopies. Multi-spectral (400-1100 nm) reflectance measurements were made in 2006 with a portable spectroradiometer at four grassland sites in Tyrol/Austria, from which various reflectance indices were calculated. The plant area index and phytomass were measured concurrently with reflectance, using optical methods and destructive harvesting, respectively. The investigated grasslands were mown 2-3 time per year, resulting in a very dynamic canopy development, the plant area index reaching values of up to  $7 \text{ m}^2 \text{ m}^{-2}$  and phytomass up to  $700 \text{ g m}^{-2}$ . For the plant area index, all of the calculated reflectance indices (SR, NDVI, EVI, PRI) saturated at values of around  $2\text{-}3 \text{ m}^2 \text{ m}^{-2}$ , preventing higher plant area indices to be estimated with confidence. In contrast, most of the investigated reflectance indices were linearly related to phytomass. These linear relationships, however, usually possessed little predictive power. Ground-based NDVI values compared poorly with the MODIS satellite-derived NDVI (250 m resolution), which is thought to result from interference of non-grassland ecosystems surrounding the study sites.