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Experimental and methodological development for the determination of soil properties in land degradation studies using imaging spectroscopy

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The overall goal of this study is to develop remote sensing desertification indicators for drylands, in particular using the capabilities of imaging spectroscopy to derive soil and vegetation specific properties linked to the land degradation status. The presented work is incorporated in the integrated EU project DeSurvey (A Surveillance System for Assessing and Monitoring of Desertification) that started in March 2005. The presentation will focus on a first analysis about the accuracy of soil iron prediction from hyperspectral data and the influence of variable natural environments.

Airborne hyperspectral HyMap data of the Natural Park Cabo de Gata-Nijar in south-eastern Spain are used to develop a preliminary procedure that allows the determination of the soil iron content. Laboratory soil analysis and corresponding image spectra of the analyzed soil samples are input data for a correlation analysis that is based on the visible and near-infrared absorption of iron. The technique and the resulting map on soil iron content of the test site are presented.

In general, the determination of soil properties like soil iron from remote sensing data is strongly affected by various environmental factors such as variation in vegetation cover and status. We therefore developed laboratory experiments to study the spectral variability of vegetation under dry stress conditions and the effect of different underlying soils. Different types of plants are grown on diverse soils that are naturally enriched in sand, silt, clay and iron content. The accelerating water stress induced by a strong light source and the plants decay is continuously spectrally measured in the laboratory. In a similar experiment, a small bamboo bush withered over a period of several weeks through ceased watering. Again, the spectral reflectance was continu-

ously measured documenting the process. We will present the changes observed in the spectral reflectance linked with variable plant status, plant cover and different soil types.