



GEMAS: Colours of dry and moist agricultural soil samples of Europe

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High resolution HDR colour images of all Ap samples from the GEMAS survey were acquired using a GeoTek Linescan camera. Three measurements of dry and wet samples with increasing exposure time and increasing illumination settings produced a set of colour images at $50\mu\text{m}$ resolution. Automated image processing was used to calibrate the six images per sample with respect to the synchronously measured X-Rite colorchecker chart. The calibrated images were then fit to Munsell soil colours that were measured in the same way. The results provide overview maps of dry and moist European soil colours. Because colour is closely linked to iron mineralogy, carbonate, silicate and organic carbon content the results can be correlated to magnetic, mineralogical, and geochemical properties. In combination with the full GEMAS chemical and physical measurements, this yields a valuable data set for calibration and interpretation of visible satellite colour data with respect to chemical composition and geological background, soil moisture, and soil degradation. This data set will help to develop new methods for world-wide characterization and monitoring of agricultural soils which is essential for quantifying geologic and human impact on the critical zone environment. It furthermore enables the scientific community and governmental authorities to monitor consequences of climatic change, to plan and administrate economic and ecological land use, and to use the data set for forensic applications.