Geophysical Research Abstracts
Vol. 21, EGU2019-9179, 2019
EGU General Assembly 2019
© Author(s) 2019. CC Attribution 4.0 license.

Derivation of satellite-supported near-surface soil parameters for arable and vine-growing areas (BopaBW)

Sabine Chabrillat (1), Frank Waldmann (2), Michaela Frei (3), Elke Fries (3), and Simon Schmidt (3)

(1) German Research Centre for Geosciences (GFZ) Helmholtz Center Potsdam, Section 1.4: Remote Sensing, Potsdam, Germany (chabri@gfz-potsdam.de), (2) Regierungspräsidium Freiburg – Dept. 9, State Authority for Geology, Mineral Resources and Mining (LGRB), Freiburg i. Br., Germany, (3) Federal Institute for Geosciences and Natural Resources (BGR), Hannover, Germany

The Department 93 of the State Authority for Geology, Raw Materials and Mining (LGRB) Baden-Württemberg has the task of carrying out the systematic soil survey in Baden-Württemberg, Germany's third-largest state in southwest Germany. The results are used, for example, in the implementation of soil protection concerns in planning (regional planning, urban land-use planning and large-scale projects such as long-distance traffic routes and power lines), in water management (water framework regulations, discharge modelling), in agriculture (cross-compliance erosion, disadvantaged areas) and in nature conservation (biotope network). In current work processes, the information source satellite-based earth observation has only been used sporadically. Nowadays free high quality multispectral imagery is available from space such as from the twin Sentinel-2 (S2) sensors providing wide coverage, minimum five-day global revisit-time at 10 to 20 m spatial scale, and improved spectral characteristics than previous multispectral satellites. The capabilities of the S2 sensors for soil assessment (soil organic carbon, soil texture) were recently demonstrated in local areas using ground databases for calibration (Gholizadeh et al., Castaldi et al., 2018).

In this study, we evaluate the potential of satellite data of the Copernicus Mission for the assessment of area-wide, high-resolution, near-surface soil parameters (e.g. organic carbon content, clay content, soil moisture, stone content, soil roughness) for the Baden-Württemberg region in southeastern Germany. In particular, this work is based on the collaborative project BopaBW supported by the Copernicus-Services program in Germany and lead by the LGRB, Freiburg. BopaBW aims at the development of a data processing concept for the derivation of additional soil information for soil maps from Copernicus satellite imagery. The aim is to elaborate the relationships of near-surface soil parameter and their spectral characteristics by fusing the multispectral S2 data with analyzed soil samples of arable and vine-growing areas in Baden-Wuerttemberg and hyperspectral field and laboratory spectrometer measurements. For calibration and validation, extensive ground truth data from soil surveys including chemical and physical soil properties and hyperspectral field measurements are available.

One of the most important cornerstones in the use of Copernicus earth observation data is the operational and long-term availability of physically homogeneous, high-quality data. The requirements on the products for the integration into the official LGRB tasks have to be defined with regard to temporal and spatial availability, quality standards as well as processing levels for the creation of the data processing concept. The technical implementation of the overall concept is carried out during the project in an iterative process.