Irlbach 2021 - An Agricultural Flight Campaign to prepare for Spaceborne Spectroscopy using the AVIRIS_NG Instrument.

(https://doi.org/10.5880/enmap.2022.001)

Hank, Tobias[1], Berger, Katja[2], Wocher, Matthias[3]

1. *Ludwig-Maximilians Universität München, München, Germany*
2. *Mantle Labs, Vienna, Austria and University of Valencia, Valencia, Spain*
3. *Ludwig-Maximilians Universität München, München, Germany*

1. Licence

2. Citation

When using the data please cite:

Hank, T.; Berger, K.; Wocher, M. (2022): Irlbach 2021 - An Agricultural Flight Campaign to prepare for Spaceborne Spectroscopy using the AVIRIS_NG Instrument. GFZ Data Services, https://doi.org/10.5880/enmap.2022.001

Online video tutorials:

To be added

3. Data Description

The airborne hyperspectral image was acquired by the AVIRIS-Next Generation (AVIRIS-NG) instrument during the AVIRIS-NG Europe 2021 HyperSense campaign that has been conducted as a joint effort of ESA, NASA/JPL and the University of Zurich. Acquired was an agricultural area near Irlbach, Germany on May 30th, 2021. The data was pre-processed (radiometrically, geometrically and atmospherically corrected) to contain 419 bands in the 402 - 2495 nm spectral range.

In situ data was acquired on the same day for the variables Leaf Area Index (LAI), Leaf Chlorophyll content, crop height and phenology.

An overview of metadata acquisition and processing can be found in the HYPERedu YouTube videos on ground reference data acquisition in the field and ground reference data acquisition in the lab. More details on LAI and chlorophyll acquisition can be found in the field data guides assembled by the authors of this dataset via enmap.org

The dataset is made publically available as part of “hands-on” tutorials within the massive open online course (MOOC) "Beyond the Visible - Introduction to Imaging Spectroscopy for Agricultural Applications", available from December 2022.

4. File description

The data is provided in form of a zipped file containing five subfolders: 01_Airborne_Data, 02_Training_Database_Example, 03_Trained_ANN_Model_Example, 04_ANN_Retrieval_Examples, 05_InSitu_Validation_Data.

The folder 01_Airborne_Data contains the AVIRIS-NG image of the Irlbach area acquired on May 30th 2021 in BSQ format with header (hdr) file. Additional information on coordinate system and acquisition parameters are available from an xml file.

The folder 02_Training_Database_Example contains a lookup table (lut) and accompanying files that were generated using the EnMAP-Box Agricultural Apps (https://enmap-box-lmu-vegetation-apps.readthedocs.io/en/latest/) as part of the online courses hands-on excercises.

The folder 03_Trained_ANN_Model_Example contains nine files that are all associated with an artificial neural network (ANN) model configured in the EnMAP-Box Agricultural Apps and trained on the lookup table from folder 02.

04_ANN_Retrieval_Examples contains another image in BSQ format accompanied by a header (hdr) and XML file. This image has only for bands that correspond to the values of Leaf Area Index (LAI), Leaf Chlorophyll content, crop height and phenology as modelled with the ANN in the exercise.

Finally, folder 05 contains a shape file with the in situ data that was acquired on the same day as the image in folder 01 (30. May 2021) for the variables Leaf Area Index (LAI), Leaf Chlorophyll content, crop height and phenology. In the course exercise it is used for comparison with the model results in folder 04.

Related work:

Danner, M., Locherer, M., Hank, T., & Richter, K. (2015). Measuring Leaf Area Index (LAI) with the LI-Cor LAI 2200C or LAI-2200 (+2200Clear Kit) – theory, measurement, problems, interpretation. EnMAP Flight Campaigns Technical Report; https://doi.org/10.2312/ENMAP.2015.009

Süß, A., Danner, M., Obster, C., Locherer, M., Hank, T., Richter, K., & EnMAP Consortium. (2015). Measuring Leaf Chlorophyll Content with the Konica Minolta SPAD-502Plus. EnMAP Field Guides Technical Report; https://doi.org/10.2312/ENMAP.2015.010

Wocher, Matthias; Berger, Katja; Verrelst, Jochem; Hank, Tobias (2022): Retrieval of carbon content and biomass from hyperspectral imagery over cultivated areas. ISPRS Journal of Photogrammetry and Remote Sensing. 10.1016/j.isprsjprs.2022.09.003

Link to the online course “Beyond the Visible – Imaging Spectroscopy for Agricultural Applications (online course at eo college)”: https://eo-college.org/courses/beyond-the-visible-imaging-spectroscopy-for-agricultural-applications/ (last access 6 December 2022).