

# HYPERedu – EnMAP education initiative

## Online-Schulungsprogramm für hyperspektrale Fernerkundung

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EnMAP Team und Kooperationspartner



German  
Space Agency  
at DLR



UNIVERSITÄT GREIFSWALD  
Wissen lockt. Seit 1456



UNIVERSITÄT  
TRIER



FRIEDRICH-SCHILLER-  
UNIVERSITÄT  
JENA



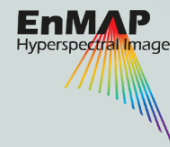
INRAE



University of  
Zurich <sup>UZH</sup>



EnMAP  
education  
initiative



Supported by:



on the basis of a decision  
by the German Bundestag

# HYPERedu auf einen Blick

## Basics

Principles of Imaging Spectroscopy



Preprocessing



Sensor Technology and Data Acquisition



Sensor Simulation



## Methods

Dimensionality Reduction



Hyperspectral Processing Techniques



Retrieval of Vegetation Traits



## Software and Data

EnMAP-Box



EnMAP Portal



PRISMA Portal



## Applications

Agricultural Systems



Soil Mapping



Terrestrial Ecosystems

Forest Ecosystems



Geological and Mineral Mapping



Snow and Ice Mapping

Inland and Coastal Waters



Quantifying Carbon Cycling

Natural and Anthropogenic Hazards

Urban Environments



Atmospheric Composition

More to come ...



Slide collection



Hands-on tutorial



YouTube Video Screencast



Massive Open Online Course (MOOC)

Zielgruppe  
Studierende  
und Fachleute  
in Forschung,  
Wirtschaft und  
Behörden

Vorkenntnisse  
Basiswissen  
optische  
Fernerkundung

Lizenz  
CC BY 4.0

Sprache  
Englisch

Plattform  
EO-College

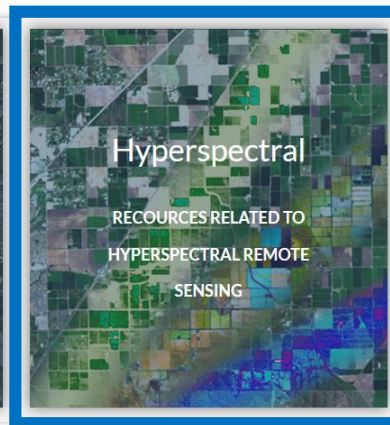
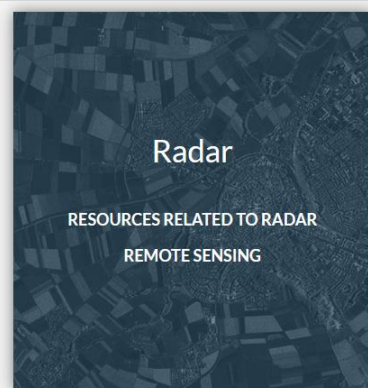
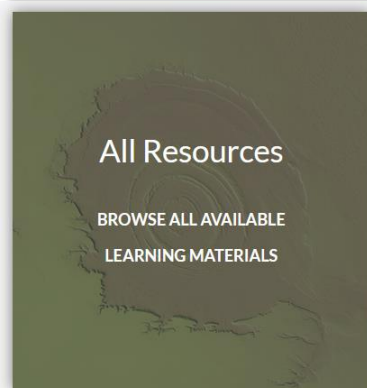


FRIEDRICH-SCHILLER-  
UNIVERSITÄT  
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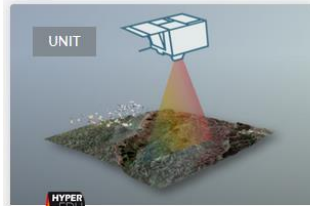


- ❖ Schulungsplattform für Erdbeobachtung mit verschiedenen Beitragenden, Themen und Zielgruppen
- ❖ Open education Lehrmaterialien und Kurse, Austausch und Informations-Hub

*Robert Eckardt*



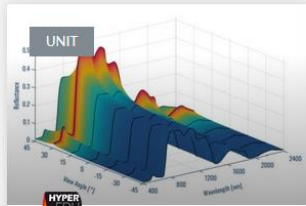
# Schulungsmaterial Hyperspektrale Fernerkundung



UNIT

Sensor simulation

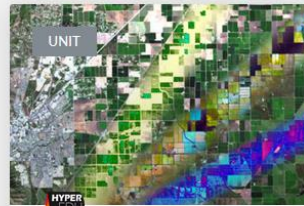
HYPERedu • January 15, 2021



UNIT

Imaging spectroscopy of forest ecosystems

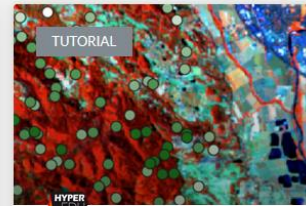
HYPERedu • November 26, 2020



UNIT

Retrieval approaches of vegetation traits from imaging spectroscopy data

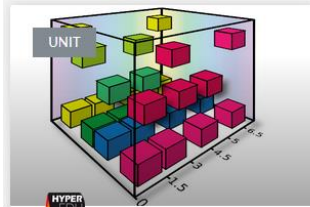
HYPERedu • October 7, 2020



TUTORIAL

Regression-based mapping of forest aboveground biomass

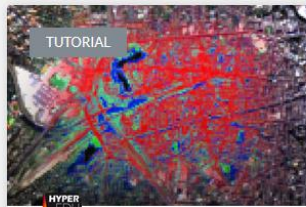
HYPERedu • September 3, 2020



UNIT

Dimensionality reduction of imaging spectroscopy data

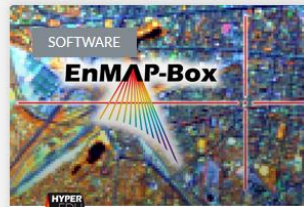
HYPERedu • April 26, 2020



TUTORIAL

Regression-based unmixing of urban land cover

HYPERedu • March 30, 2020

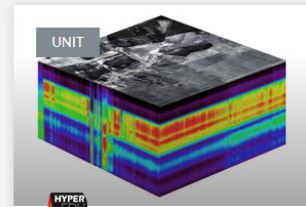


SOFTWARE

**EnMAP-Box**

EnMAP-Box

HYPERedu • September 23, 2019



UNIT

Principles of imaging spectroscopy

HYPERedu • September 23, 2019

Hyperspectral resources on EO-College



<https://eo-college.org/resource-spectrum/hyperspectral/>

# Basis-MOOC Hyperspektrale Fernerkundung (2021)

Welcome

Pre-Assessment

## Principles of Imaging Spectroscopy

- Imaging spectroscopy and electromagnetic radiation
- Interaction with atmosphere and targets
- Spectral reflectance of surface materials

L1

## Principles of Sensor Technology & Data Acquisition Techniques

- The four resolutions
- Imaging spectroradiometers
- Data acquisition: spaceborne, airborne and ground-based (field & lab)
- Data products

L2

## Hands-On-Training

- From research question to final product
- Data sources: spaceborne, airborne, spectral libraries
- Data preprocessing
- Methods and software
- EnMAP-Box introduction

L3

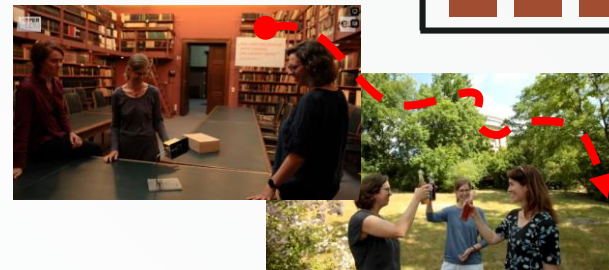
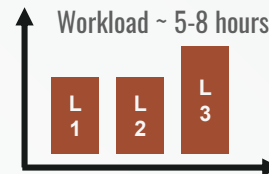
Final exam, user survey and goodbye

## Learning elements

- 🔍 Quizzes
- 🖱️ Interactive graphics
- 🎥 Videos
- 📄 Texts
- 📅 Hands on exercises
- 💬 Discussion forum

## Documents

- 📄 Offline document
- 📄 Diploma supplement
- 📄 Certificate
- 📄 Data set

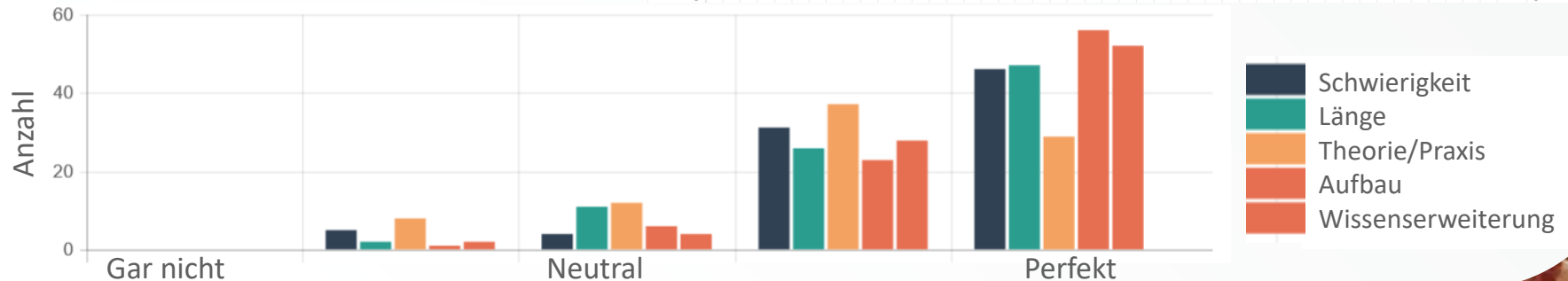
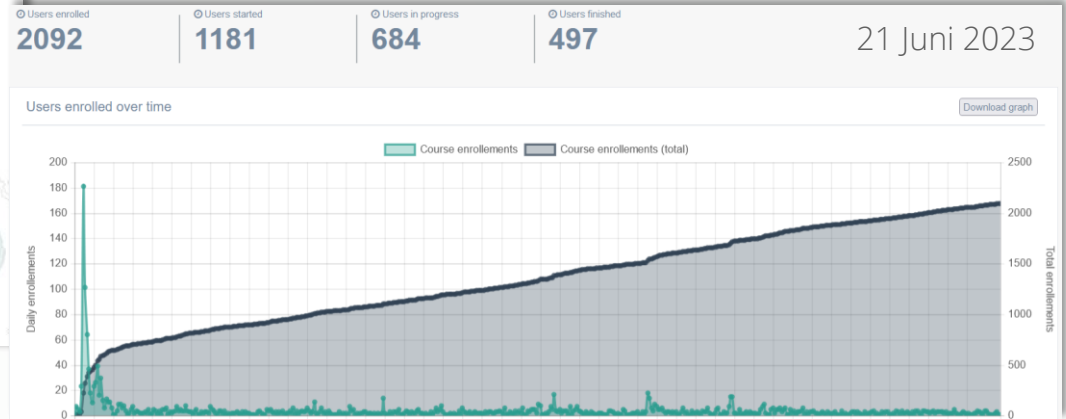
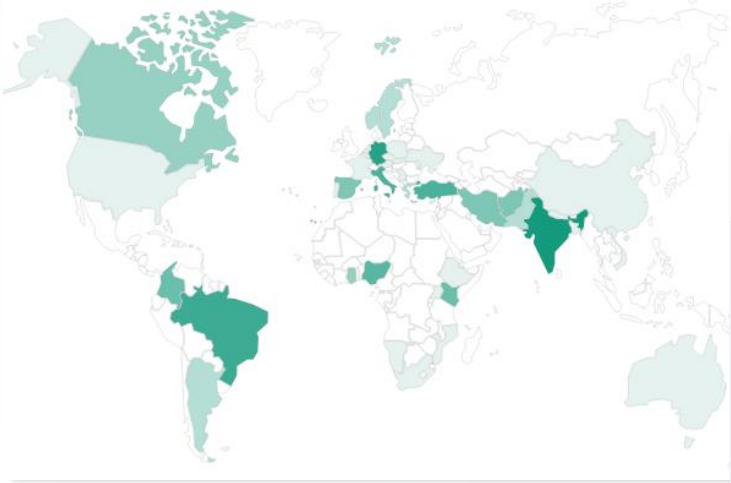


# Basis-MOOC Hyperspektrale Fernerkundung (2021)



# Basis-MOOC: Teilnehmende und Feedback

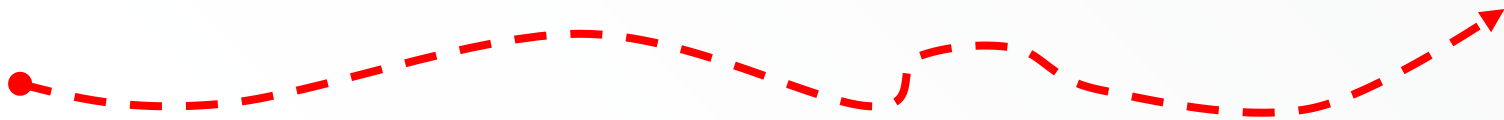
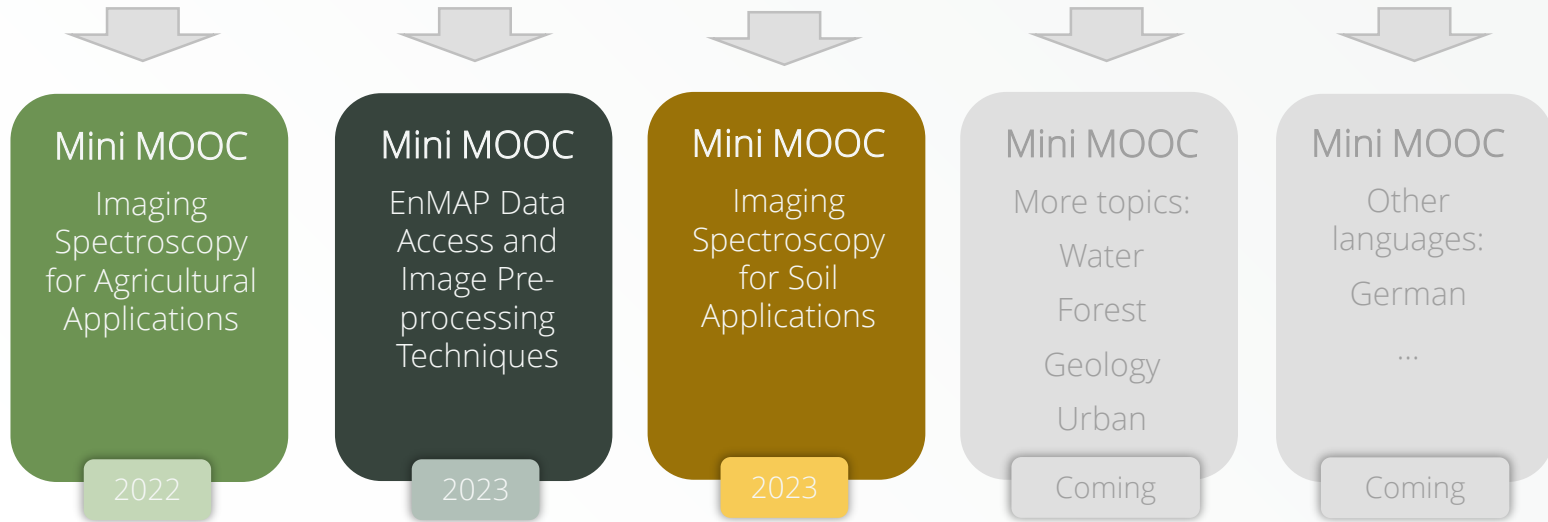
❖ > 2000 Anmeldungen und 500 Abschlüsse seit Nov 2021



# Hyperspectrale MOOC Familie

## Basic MOOC Introduction to Hyperspectral Remote Sensing

2021





# Mini-MOOC 'Data access and preprocessing' (coming soon)

Discussion Forum

Welcome *EnMAP mission organization*

Pre-Assessment

### Hyperspectral Image Preprocessing over LAND

- General introduction (preprocessing steps)
- EnMAP product levels (repetition preprocessing steps)
- Assessment of data quality

L1

### EnMAP Data Access

- Registration to portal
- Data from archive
- New acquisitions

*Screencasts*

L2

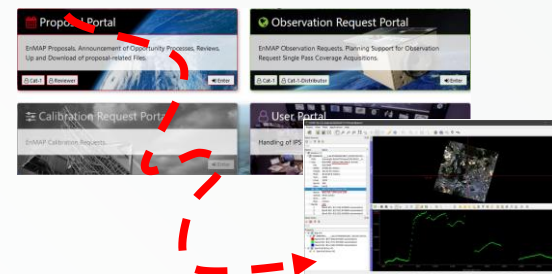
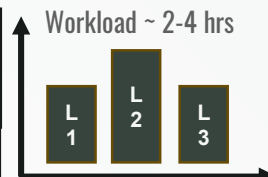
### Hands-On-Training

- EnMAP-Box introduction
- Hands-on exercise based on EnPT
- Discussion of accuracy and limitations

*Screencasts*

L3

Final exam, user survey and goodbye



## Learning elements

- ? Quizzes
- 🖱️ Interactive graphics
- 🎥 Videos
- 📄 Texts
- 📅 Hands on exercises
- 💬 Discussion forum

## Documents

- 📄 Offline document
- 📄 Diploma supplement
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- 📄 Data set

# Video Screencasts zum EnMAP Data Access Portal



[Home](#) [Data & Access](#) [Mission](#) [Science & Applications](#) [Tools](#) [Events & Education](#)

[Data Access Portal](#)

## Data & Access

### SCREENCASTS

[How to register and assign to user roles](#)

[How to submit a data proposal](#)

[How to plan and request future observations](#)

[How to search and download data from the archive](#)

### RELATED DOCUMENTS

[Portal User Manual](#)

[Level 1B, Level 1C, Level 2A](#)

The Data Access Portal [in general](#) include two major entry points: the EnMAP Instrument Planning Portal and the EOWEB® GeoPortal.

On the EnMAP Instrument Planning Portal users can register, submit proposals, and plan and request future orders. The EOWEB® GeoPortal contains the full EnMAP Data archive. Users can access EnMAP data using two different options:

- Users can request acquisitions through the EnMAP Instrument Planning Portal. The portal includes the Proposal Portal for proposal submission by all scientific users responding to an Announcement of Opportunity (AO) and the Observation Request Portal providing planning support of observation requests and submission of future orders.
- Users can search and order data in different processing levels from the German Satellite Data Archive (D-SDA) through the EOWEB® GeoPortal.

More information on using the EnMAP Data Access Portal is available in the user manual and in short video

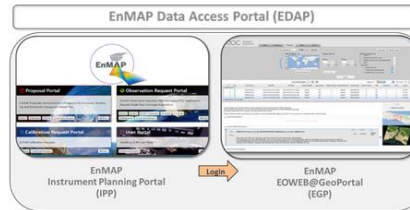
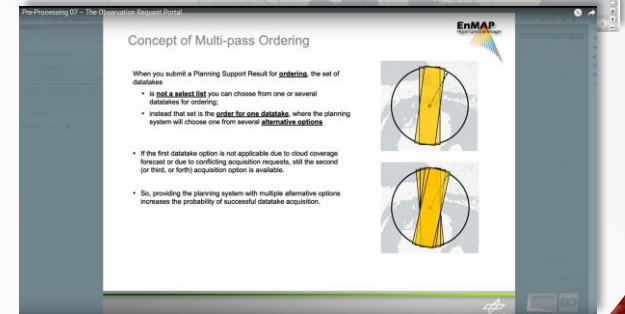
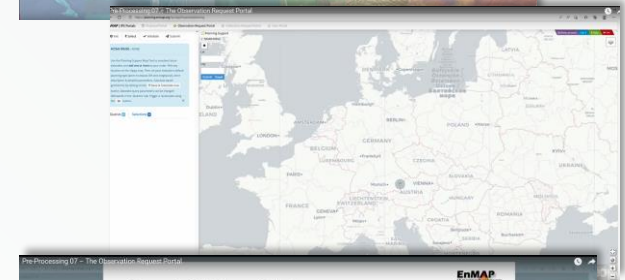
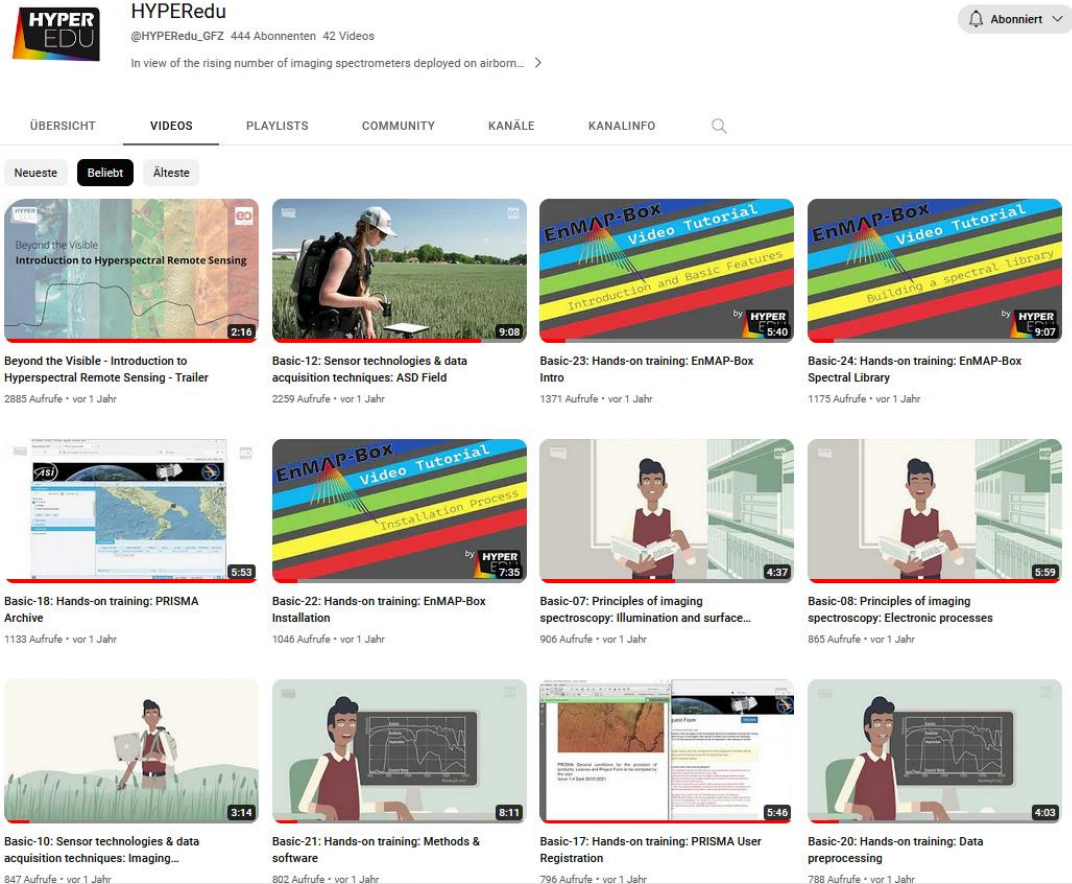


Image: The EnMAP Data Access Portal



# HYPERedu YouTube channel



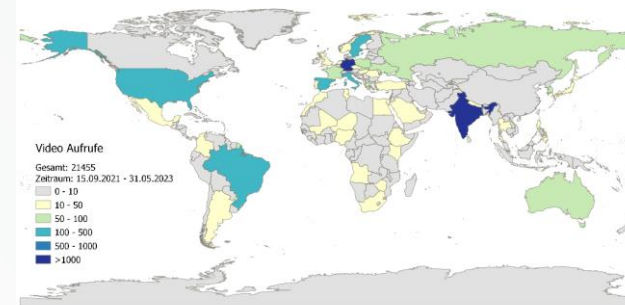
**HYPERedu**  
@HYPERedu\_GFZ 444 Abonnenten 42 Videos  
In view of the rising number of imaging spectrometers deployed on airborn... >

ÜBERSICHT **VIDEOS** PLAYLISTS COMMUNITY KANÄLE KANALINFO

Neueste **Beliebt** Älteste

- Beyond the Visible - Introduction to Hyperspectral Remote Sensing - Trailer**  
2:16  
2885 Aufrufe • vor 1 Jahr
- Basic-12: Sensor technologies & data acquisition techniques: ASD Field**  
9:08  
2259 Aufrufe • vor 1 Jahr
- Basic-23: Hands-on training: EnMAP-Box Intro**  
5:40  
1371 Aufrufe • vor 1 Jahr
- Basic-24: Hands-on training: EnMAP-Box Spectral Library**  
9:07  
1175 Aufrufe • vor 1 Jahr
- Basic-18: Hands-on training: PRISMA Archive**  
5:53  
1133 Aufrufe • vor 1 Jahr
- Basic-22: Hands-on training: EnMAP-Box Installation**  
7:35  
1046 Aufrufe • vor 1 Jahr
- Basic-07: Principles of imaging spectroscopy: Illumination and surface...**  
4:37  
906 Aufrufe • vor 1 Jahr
- Basic-08: Principles of imaging spectroscopy: Electronic processes**  
5:59  
865 Aufrufe • vor 1 Jahr
- Basic-10: Sensor technologies & data acquisition techniques: Imaging...**  
3:14  
847 Aufrufe • vor 1 Jahr
- Basic-21: Hands-on training: Methods & software**  
8:11  
802 Aufrufe • vor 1 Jahr
- Basic-17: Hands-on training: PRISMA User Registration**  
5:46  
796 Aufrufe • vor 1 Jahr
- Basic-20: Hands-on training: Data preprocessing**  
4:03  
788 Aufrufe • vor 1 Jahr

## Anzahl der Video-Aufrufe pro Land (YouTube)



21 June 2023

HYPERedu on  
YouTube



[https://www.youtube.com/  
@HYPERedu\\_GFZ](https://www.youtube.com/@HYPERedu_GFZ)

# Information und Interaktion

- ❖ Nutzen von HYPERedu Materialien (in Lehre, Schulungen, Selbststudium....)
- ❖ Mitwirken in der Erstellung von Lehrmaterialien und Kursen
- ❖ Bewerben von HYPERedu in Netzwerken
- ❖ Feedback geben
- ❖ Poster besuchen

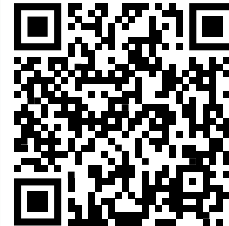
## Kontakt

hyperedu@eo-college.org

No. 28



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Basis-MOOC  
Beyond the Visible



HYPERedu  
YouTube Channel

