Metadata template for Learning Resources (V1.0)

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Revision Date: 16.12.2024

Version: v1.0

Title

Introduction to Remote Sensing and Hands-on Disaster Management Applications

Author/s

Authors of the EO College's Online Massive Open Online Course (MOOC) "Land in Focus - Basics of Remote Sensing"

Authors of the live virtual session: Martyna A. Stelmaszczuk-Górska, Carsten Pathe, Nesrin Salepci, Robert Eckardt

Subject

Earth Observation (EO), Remote Sensing, Flood Mapping, Synthetic Aperture Radar (SAR), Disaster Management, EO Data Processing, Natural Hazard Risk Assessment

Description

This blended learning course provides participants with foundational knowledge and practical skills in Earth Observation (EO) and remote sensing, focusing on flood mapping using Synthetic Aperture Radar (SAR) data. It combines self-paced online learning and live online sessions, offering a mix of theoretical understanding and hands-on experience in disaster management.

Part I: Self-Paced Online Learning

Participants begin with the EO College's Massive Online Open Course "Land in Focus - Basics of Remote Sensing" course, which covers the fundamentals of remote sensing, including electromagnetic

waves, imaging techniques (active and passive), and data acquisition methods. It includes 6 lessons, 23 topics, and 14 quizzes to reinforce understanding.

Part II: Live Online Training (27 November, 15:00 CET, 2-hour session)

The live session focuses on the practical application of flood mapping using SAR data. The session combines presentations, videos, and hands-on exercises using Sentinel-1 data from the Valencia Region flooding event at the end of October 2024.

Abstract

This training action offers a blended learning experience combining self-paced online modules and a live session focused on remote sensing and flood mapping using SAR data. Participants begin by learning the fundamentals of remote sensing through the EO College's "Land in Focus - Basics of Remote Sensing" course, followed by hands-on experience using Sentinel-1 SAR data in SNAP software. The live session includes presentations, videos, and practical exercises based on Sentinel-1 data from the October 2024 Valencia flood event. The course equips participants with the skills to analyze flood events and integrate EO data into disaster management.

Learning Outcomes

By the end of the course, participants should be able to:

1. Understand remote sensing fundamentals and imaging techniques.
2. Perform flood mapping using radar data.
3. Integrate EO data into natural hazard risk models for disaster management.

Target audience

This course is aimed at professionals in natural hazard risk assessment and disaster management, such as data analysts and geospatial experts, looking to expand their EO expertise.

Date created

EO College MOOC Updated: 25 October 2024

Presentation for Live Session: 27 October 2024

Type

Massive Online Open Course (MOOC): Self-paced learning materials including video lectures, readings, quizzes, and hands-on exercises.

Live Session: Interactive webinar featuring presentations, videos, and practical, hands-on experience using real-world Sentinel-1 SAR data.

Format

Massive Online Open Course (MOOC): HTML-based platform with video lectures, PDF reading materials, quizzes, and interactive exercises.

Live Session: PDF, including MP4 videos (for presentations and instructional content), with hands-on experience using SNAP software for SAR data analysis.

Publisher

Friedrich Schiller University Jena

Contributor/s

EO College's Online Massive Open Online Course (MOOC) "Land in Focus - Basics of Remote Sensing": Instructors from Land in Focus Course (https://eo-college.org/courses/landinfocus/).

Live Session: Martyna A. Stelmaszczuk-Górska, Carsten Pathe, Nesrin Salepci, Robert Eckardt

Location (URL)

The resources will be available on the SpaceSUITE website.

Language

English

Source/s

https://eo-college.org/courses/landinfocus/ and new resources

License

CC-BY-SA; SNAP is Open Source but has its own licensing mechanism: https://step.esa.int/main/download/snap-download/

Duration

14 hours

EQF level

EQF 6-8

Table Of Contents

1. Introduction to Remote Sensing
   - Overview of Earth Observation
   - Electromagnetic Waves and Their Spectrum
   - Atmospheric Interactions
2. Fundamentals of Remote Sensing
   - Active and Passive Imaging Techniques
   - Radar Principles and SAR Technology
3. Data Acquisition and Resolutions
   - Spatial, Spectral, Temporal, and Radiometric Resolutions
   - Data Sources and Platforms for Remote Sensing
4. SAR Data Processing (Hands-On)
   - Introduction to SNAP Software
   - Importing and Preprocessing Sentinel-1 SAR Data
   - Calibration, Speckle Filtering, and Subsetting
5. Image Analysis and Interpretation
   - Preprocessing Optical and Radar Data
   - Classification and Time-Series Analysis
6. Live Session (Webinar)
   - Recap of Core Concepts from the Self-Paced Course
   - Basics of the Flood Mapping Using SAR
   - Hands-On Experience with Sentinel-1 SAR Data from Valencia Flood
7. Conclusion and Future Learning Opportunities
   - Key Takeaways
   - Suggested Further Training, including Training on Drought and Fire Monitoring Techniques

Workload

Minimum 14 hours

Training Program

EO College's Online Massive Open Online Course (MOOC) "Land in Focus - Basics of Remote Sensing": **https://eo-college.org/courses/landinfocus/**

Prerequisites

No pre-requisites

Type of assessment

The type of assessment used in this training action includes quizzes to evaluate participants' understanding of the theoretical concepts and hands-on exercises to verify their ability to apply remote sensing techniques, particularly in SAR data processing and flood mapping.

Certification

Certification of Participation by EO College and SpaceSUITE

Title of the micro-credential

N/A for the time being.

Microcredential awarding body

N/A for the time being.

Relation/s (BoK)

[PP1] Basics of Optical Remote Sensing

[PP2] Basics of Microwave Remote Sensing

[IP] Image processing and analysis

[PS1] Types of remote sensing sensors

[TA13-3] Assess disasters & geohazards

[TA13-3-1] Map and assess flooding

BoK Links

https://bok.eo4geo.eu/PP1

https://bok.eo4geo.eu/PP2

https://bok.eo4geo.eu/IP

https://bok.eo4geo.eu/PS1

https://bok.eo4geo.eu/TA13-3

https://bok.eo4geo.eu/TA13-3-1