

## Integrating Remote Sensing in International Development Work (EO4IntDev)

This training addresses beginners and is dedicated to the basics, analysis, quality assessment, and visualization of satellite remote sensing data using QGIS and Google Earth Engine. Monitoring and Evaluation (M&E) in the sense of derivation, analysis, and interpretation of time series are part of this training. The nexus of climate change - adaptation to climate change - land cover and land use - will be addressed in targeted examples and taken up in an exchange with the participants and the GeoSens team.

The training "Integrating Remote Sensing in International Development Work" (EO4IntDev) provides an overview of the potential of remote sensing with a focus on the analysis of satellite-based remote sensing data (such as Landsat, Sentinel, MODIS) and their applications, considering the basics, possibilities, and limitations in relation to the cooperation in international development projects such as those of GIZ.

During a total of five days, practical hands-on exercises for the implementation of a workbench (e.g., download of data, pre-processing, derivation of indicators and phenological indices, analysis, and interpretation) using open-source geospatial analysis tools such as Quantum GIS (QGIS, <https://www.qgis.org/en/site/>) and Google Earth Engine (<https://earthengine.google.com/>) will be provided along with theoretical knowledge.

Experiences from international projects in implementing remote sensing activities in project planning and international collaboration take a major role in this training. Lessons learned from the application of remote sensing data and methodologies in diverse projects will be presented and discussed in exchange with the participants.

The training EO4IntDev will be held by the GeoSens team, a non-profit training initiative run by a collective of researchers and experts from the Department of Remote Sensing at the Julius Maximilians University of Würzburg (Germany) and the German Remote Sensing Data Center at the German Aerospace Center (DLR). The EO4IntDev training takes place as a GeoSens Summer School and addresses interested persons with previous knowledge in spatial data (e.g., vector and raster data) who have ideally already worked with geographic information systems (GIS).

The training will take place in presence, hosted by the Department of Remote Sensing in Würzburg. Depending on the covid 19 pandemic situation and regulations, we would, if necessary, substitute the possibility of online training. In this case, the training will be provided online via the platforms MS Teams/Zoom. In case the training is held online, the GeoSens team seeks to provide the opportunity to meet virtually in smaller groups (breakout rooms) to ensure more detailed discussions and exchanges.

The participants of the five-day training will obtain a hard copy of the workbook for the GeoSens EO4IntDev training containing theoretical and practical (e.g., coding) information, and links to open-access data, and data portals. Furthermore, participants will receive a hardcopy of the book "An Introduction to Spatial Data Analysis: Remote Sensing and GIS with Open Source Software" by M. Wegmann, J. Schwalb-Willmann, and S. Dech (2020) introducing into spatial data analysis using QGIS and 'R Project for Statistical Computing' for gaining further hands-on for processing and analyzing spatial data, and their visualization.

<b>Name of the training</b>	Integrating Remote Sensing in International Development Work (EO4IntDev)
<b>Type</b>	Theory and practice
<b>Goal</b>	Enhancing the understanding of how remote sensing can support international development work and cooperation by gathering an overview of the potentials of satellite-based remote sensing data and their applications, considering basics, possibilities, and limitations in relation to the cooperation in international development projects such as those of GIZ.

<b>Precondition</b>	Persons already working or interested in working in international development work and cooperation with previous knowledge in spatial data (e.g., vector and raster data) and, in the best case, experience in working with geographic information systems (GIS). The GeoSens team encourages the participants to bring their own data, meaning that; If the participant has spatial data and a specific use case from a project that could be assessed further, we will be available to assist during the training.
<b>Duration</b>	Five (5) days in an entire week with sessions in the morning and afternoon (a total of 5 hours and 45 minutes per day)
<b>Adds-on</b>	Training material (i.e., workbook and note pad, installation guides for QGIS and Google Earth Engine, a hardcopy of “An Introduction to Spatial Data Analysis: Remote Sensing and GIS with Open Source Software” by M. Wegmann et al. (2020), access to the Q&A Forum hosted by the Department of Remote Sensing in Würzburg, exchange with participants and trainers in an international group, certificate of participation after completion of the training
<b>Trainers</b>	GeoSens team, a group of researchers and experts from the Department of Remote Sensing (University of Würzburg) and the German Aerospace Center (DLR), and guest lecturers on an invitation
<b>Fee</b>	<b>979.00 Euros</b> An invoice will be sent via email attachment. Costs for travel and accommodation are not included and must be financed by the participants themselves. <b>The GeoSens team collects an additional lump sum of 20.00 Euros per day for catering during the training.</b>
<b>Training language</b>	English (presentations and material) We are currently working on a Spanish EO4IntDev training.
<b>Next training dates</b>	19 <sup>th</sup> to 23 <sup>rd</sup> of September 2022
<b>Training capacity</b>	15 to 25 participants
<b>Registering</b>	Registration via the GeoSens website ( <a href="http://geosens.org">http://geosens.org</a> ) or directly via e-mail to <a href="mailto:eo4intdev@uni-wuerzburg.de">eo4intdev@uni-wuerzburg.de</a> , and through the announcement by the Network Remote Sensing and Geoinformation of the GIZ. The registration for the training is binding after confirmation of the registration by the GeoSens team. The GeoSens team reserves the right to cancel the training if the minimum number of participants is not reached.

## Online GeoSens Winter School 2022

Earth Observation for International Development (EO4IntDev) 04<sup>th</sup> to 08<sup>th</sup> April 2022

**Timetable & schedule**

Time (C.E.T.)	Monday 04	Tuesday 05	Wednesday 06	Thursday 07	Friday 08
9 – 10:30 a.m. (90 min)	<b>Opening &amp; introduction to the GeoSens Winter School 2022</b> with short introduction round by participants	<b>Data access &amp; integration II:</b> Information products with theory and hands-on exercise	<b>Methods and analysis in EO and remote sensing</b> with theory and Google Earth Engine	<b>Q &amp; A and start of practical unit:</b> application of learned methods and own data for own project of interest	<b>Continuation Practical unit:</b> application of learned methods and own data for own project of interest
10:30 – 10:45 a.m.	Short break				10:00 – 11:15 a.m. <b>EO applications in projects</b> (Guest lecture by PD Dr. Hannes Taubenböck, Head of Team “City & Society”, EOC/DFD at DLR): <i>The mega-trend of urbanization - Dimensions and forms based on earth observation and auxiliary data</i>
10:45 a.m. – 12:15 p.m. (90 min)	<b>Introduction to Earth Observation (EO) &amp; remote sensing</b>	<b>Continuation Data access &amp; integration II:</b> Information products with theory and hands-on exercise	<b>Methods and analysis in EO and remote sensing</b> with theory and Google Earth Engine	<b>Continuation Q &amp; A and start of practical unit:</b> application of learned methods and own data for own project of interest	
12:15 – 02 p.m.	Lunch break				
02 – 03:30 p.m. (90 min)	<b>Data access &amp; integration I:</b> Raw Data with theory and hands-on exercise using QGIS	<b>Hands-on exercises:</b> Selection of data, software and processing platform with case study	<b>EO applications in projects</b> (Guest lecture by PD Dr. Tobias Ullmann, Physical Geography, University of Würzburg): <i>Mapping and monitoring small-scale mining activities in Ghana using Sentinel-1 SAR time series AND Assessing Spatiotemporal Variations of Landsat Land Surface Temperature and Multispectral Indices in the Arctic Mackenzie Delta Region between 1985 and 2018</i>	<b>Continuation Practical unit:</b> application of learned methods and own data for own project of interest	<b>Discussion &amp; summary GeoSens Winter School Picture with all participants</b>
03:30 – 03:45 p.m.	Short break				
03:45 – 05:00 p.m. (75 min)	<b>Continuation Data access &amp; integration I:</b> Raw Data with theory and hands-on exercise using QGIS	<b>Continuation Hands-on exercises:</b> Selection of data, software and processing platform with case study	<b>EO applications in projects</b> (Dr. Doris Klein, EOC/DFD at DLR): <i>Overview from existing projects and discussion</i>	<b>Continuation Practical unit:</b> application of learned methods and own data for own project of interest	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p style="text-align: center; margin: 0;">Access the Q &amp; A Forum for further questions</p> </div>

Example of a GeoSens EO4IntDev training program.