EduServ 25th Distance e-Learning Courses
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EuroSDR
European Spatial Data Research

Maynooth University
National University of Ireland Maynooth

Working with VGI data:
A practical and contemporary introduction

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Pre-course seminar: March 1, 2027 (TU Delft)

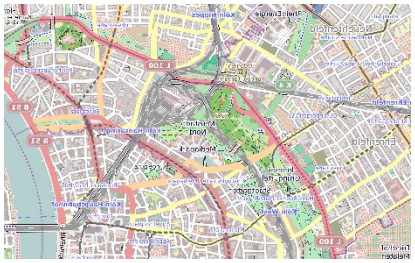
Target audience: Staff of national mapping agencies and private companies, researchers, academics, students, members of citizen communities involved in geospatial data collection.

Prerequisites: Basic practical GIS knowledge will be useful for participants, but no Python knowledge is required, as interactive Jupyter Notebooks will be provided to participants for the exercises and practical parts of the course. Access to a desktop GIS tool such as QGIS or ArcGIS would be useful but not required.

Course objectives: This course provides a practical and contemporary introduction to Volunteered Geographic Information (VGI), exploring both its theoretical foundations and its growing importance in the geospatial landscape of 2027 and beyond. Delivered fully online over two weeks, the course combines lectures, discussion, and hands-on exercises to help participants understand what VGI is, why it matters, and how it complements traditional and official geographic data sources. Participants will examine the evolution of VGI research, the role of citizen-generated geographic information in modern mapping and environmental monitoring, and the reasons why organisations such as EuroSDR have a strong interest in understanding and leveraging these data sources.

Topics tackled: A central focus of the course is **developing practical skills for discovering, accessing, analysing, and visualising VGI datasets using open-source tools and platforms.** Through a series of guided exercises in *Google Colab* and *Python*, participants will work with widely used geospatial libraries such as *GeoPandas* and modern visualisation tools to investigate real-world datasets. *OpenStreetMap*

serves as the primary case study, allowing participants to explore data structures, tagging practices, feature representation, and mapping quality. The course then broadens to include other prominent VGI initiatives, including biodiversity observations from *iNaturalist* and environmental monitoring data from *SafeCast,* demonstrating the diversity of volunteer-generated datasets and the challenges associated with their interpretation and use.



Building on these foundations, **participants will learn how to compare VGI with authoritative geographic datasets** from national mapping agencies and other official sources. Through a range of practical exercises, the participants will assess similarities and differences between volunteered and authoritative data, explore measures of completeness and quality, and examine real-world examples of data integration and import processes.

The course concludes with a **forward-looking discussion on the future of VGI in an era increasingly influenced by artificial intelligence,** considering topics such as the use of VGI for AI training, the impact of AI on volunteer participation, and emerging opportunities and challenges for citizen-generated geographic information. By the end of the course, participants will have a strong understanding of contemporary VGI and the practical skills needed to work confidently with volunteer-generated geospatial data in research, government, and industry settings.

The course is structured into four modules, spread over two weeks.

- **Module 1: Introduction to VGI – What does VGI mean in 2027/2028**
  In this module, we will explore several aspects of VGI. What is VGI, and what is special about it? Why are EuroSDR interested in VGI? What is the current state of the art in academic research in VGI. What role can VGI play in 2027? What approaches are used to work with VGI data?

- **Module 2: Working with OpenStreetMap data, the key source of VGI**
  In this module, participants will begin working with OpenStreetMap (OSM) data – the key source of VGI. This will involve downloading OSM data, visualisation of the data, and understanding the tagging structure of OSM. We will work on examples considering different geographic features, highlighting the nature of OSM data. Participants will work with *Jupyter* notebooks with *Python* code, which will facilitate a low-barrier introduction to working with OSM programmatically. This module will allow participants to continue working with OSM but also consider other sources of VGI, including *iNaturalist* and *SafeCast.* The module will consider how representative sources of VGI are of geographic space and how these data can potentially be used to supplement official sources of data. The module also considers some aspects of data quality for VGI. Comparisons will be made with some official sources of geographic data.

- **Module 3: Working with VGI and Authoritative data**
  Participants will continue working with Jupyter notebooks for this module. This module will consider approaches to combining, integrating, and contrasting official sources of geographic data with VGI data sources such as OSM. Using the tools introduced in Module 2, participants will undertake some basic data quality and comparison assessments. The module will also consider where various sources have been imported into OSM and the impact of these large bulk imports.

- **Module 4: The future outlook for VGI in an AI world**
  The final module will open a conversation about VGI's future outlook in an AI-driven or AI-dominated world. We will discuss how VGI is being used in model training for AI and the problems this can create. We will discuss how AI can have an adverse effect on the recruitment and retention of volunteers for VGI. The module closes with some research-driven speculation on the future for VGI.

Assessment: *After each module, participants will complete a quiz and exercise on Moodle to demonstrate understanding of the concepts and ideas outlined in that Module. For the practical modules, participants will be provided with a Python Notebook and asked to make some changes and adaptations to the code provided to complete some exercises around data analysis, data quality exploration, and so on. Participants will submit their completed code and visualisations for assessment via Moodle.*