COPERNICUS MASTER IN DIGITAL EARTH

PARIS LODRON UNIVERSITÄT SALZBURG

24S651031: Copernicus Hubs and Institutions

Excursion Report

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Introduction

As part of the Copernicus Hubs and Institutions seminar, we went on an excursion to Vienna on June 10 to visit the Earth Observation Data Centre (EODC) and the Environment Agency Austria. First, we visited the Science Center of the TU Wien, where we could see the EO Data Repository and especially the EODC Cloud and High Performance infrastructure. Together with the second visit to the Environment Agency Austria, we were able to identify important institutions in the Copernicus domain and above all their implementation in Austrian institutions.

Prior to our visit, we received valuable insights into the EU space program, which prepared us perfectly for the excursion. Martin Sudmanns explained the importance of the EODC in Vienna in connection with the huge archive of Sentinel data. In addition, Manfred Mittlböck introduced us to the importance of open data and the INSPIRE directive, with the latter playing a key role during our visit to the Environment Agency Austria.

Earth Observation Data Centre (EODC)

The Earth Observation Data Centre is a foundation that specializes in setting up IT services related to earth observation applications for scientific, public and private organizations. Its focus is on collaboration between the public and private sector and on linking science and applications.

In the context of our visit to the EODC in Vienna, we first received a presentation from Christian Briese, the Managing Director of the EODC. He introduced us to the objectives of the EODC and explained the IT infrastructure in detail. During the presentation, he also established the link between the EODC and Copernicus' operational services, for instance the Copernicus Climate Change Service (C3S) and the Global Flood Monitoring Service of the Copernicus Emergency Management Service. Special attention was paid to the High Performance Computing (HPC) Service of the EODC, which is connected to the Vienna Scientific Clusters (VSC) 4 and 5, which we were able to visit after the presentation. Through the connection to the supercomputers, the EODC can enable its users to process satellite data on a large-scale. In this context, we were also introduced to the Multi-Site Computer Austria (MUSICA), currently the most powerful high performance computer in Austria, which is distributed between Vienna, Linz and Innsbruck. Due to its powerful GPUs, it is ideally suitable for machine learning, artificial intelligence and their use in the earth observation domain.

After the presentation, we visited the Vienna Scientific Clusters 4 and 5 as well as the high performance computer MUSICA. It was very impressive to see the complexity of the infrastructure with the server racks and the corresponding compute nodes. For me it was surprising that not all supercomputing

facilities were cold inside, which I initially assumed was to prevent the high performance computer units from overheating. However, it was explained that there are different cooling techniques which are the reason for the temperature differences. For the MUSICA supercomputer in particular, it was interesting to learn about the innovative liquid cooling system in which water circulates through the racks and absorbs the heat from the processors. This hot water can then be sent outside to evaporate. In this context, we also learned that attempts are being made to recycle hot water by integrating it into the district's heating system, which would be a positive achievement for environmental sustainability.

All in all, the visit to the EODC in Vienna helped me to better understand the entire IT infrastructure that is needed to store and process satellite data. It was particularly helpful not only to hear about the high performance computers, but also to see them on site. Furthermore, I enjoyed the discussion about EODC's services in the context of sustainability, climate change and security. It was interesting to hear different perspectives among my peers on possible threats and also innovative solutions that could be more compatible with rising temperatures due to climate change, geopolitical tensions and data security risks.

Environment Agency Austria

The Environment Agency Austria, based in Vienna, is Austria's most important environmental organization. It is active in various areas such as climate and biodiversity and provides a basis for decision making at local, regional, national, European and international scale. Furthermore, it has a large network and collaborates closely with different partners such as the European Environment Agency EEA (Environment Agency Austria, 2025).

During our visit to the Environment Agency Austria in Vienna, we received a presentation by Gebhard Banko and Roland Grillmayer. They introduced us to various areas and specific projects that the Environment Agency Austria is working on and that are related to remote sensing and spatial analysis. One of the most interesting topics for me personally was the analysis of land take and soil sealing, since I worked on a similar project during my internship as part of my bachelor's degree. In particular, it was interesting to see the similarities between the approaches to identifying soil sealing in Austria and Germany, but also to gain new insights into possible progress and mitigation strategies in this context.

Furthermore, we were introduced to many ongoing projects dealing with environmental issues such as biodiversity loss and droughts. Here it was interesting to see how the Environment Agency Austria combines different data sources such as in-situ measurements, laser scanning and optical remote sensing for analysis. In the context of drought impacts on ecosystems, it was interesting to see how the host institution is developing an indicator that can be closely linked to the European Environment

Agency. Similarly, the links between the Environment Agency Austria and Copernicus were well explained. In particular, it was interesting to see how the host institution supports the Copernicus Land Monitoring service (CLMS) in different areas such as the validation of the Corine Land Cover (CLC) with the latest update in 2024.

In conclusion, the visit to the Environment Agency Austria was a valuable experience for me, especially as I can imagine working in such an institution in the future. It was interesting to see the wide range of areas in which the host institution works and to learn about future-orientated topics such as the creation of digital twins based on knowledge graphs, which I particularly enjoyed. Furthermore, the presentation gave us a good overview of how the Environment Agency Austria is networked with different national, European and international partners and institutions such as Copernicus and the European Environment Agency. Lastly, it was interesting to see how the Environment Agency Austria is working to improve the exchange of environmental data by actively participating and establishing standards such as ISO and the INSPIRE Directive.

EU Inspire & EU Copernicus Data Space Ecosystem

We were first familiarized with the EU INSPIRE Directive and the Copernicus Data Space Ecosystem (CDSE) in the seminar sessions led by Martin Sudmanns and Manfred Mittlböck. During our visit to the two host institutions in Vienna, we were then able to see practical examples of how these systems are implemented in the context of earth observation and spatial data.

In general, the Infrastructure for Spatial Information in Europe (INSPIRE) directive was established by the European Commission in 2007 to facilitate easy access to spatial data and enable interoperability. The initiative consists of rules that must be followed for specific topics such as geology, protected sites as well as land cover and land use. These rules apply to specific features such as the metadata or the network services through which the data can be found, viewed and downloaded. The aim of the directive is to better prepare, implement and monitor environmental policies. This also applies to cross-border analysis and comparisons. Furthermore, this initiative will make it possible to seamlessly combine spatial data from different sources, which is crucial in environmental analysis.

The Copernicus Data Space Ecosystem (CDSE) is a system of platforms for efficient access to earth observation data. It consists of various parts such as the Copernicus Browser, which provides access to up-to-date earth observation data archives. The aim of the CDSE is to enable free and immediate access to the data and services of the Copernicus Sentinel missions. In addition to data exploration, the CDSE also enables cloud-based processing of earth observation data. The entire system is operated by leading European cloud and earth observation service providers such as Sinergise and the German

Aerospace Center (DLR). One of the latest achievements is the migration of Copernicus Land Monitoring Service (CLMS) datasets to the CDSE, facilitating access and use of these higher level global-scale earth observation products (Copernicus Data Space Ecosystem, 2025).

Conclusion

In conclusion, the Copernicus Hubs and Institutions seminar with its seminar sessions at the university and the excursion to the Earth Observation Data Centre (EODC) and the Environment Agency Austria in Vienna helped us to gain a better understanding of the EU space program and especially its implementation in Austrian institutions. By visiting the two host institutions, we were able to understand the collaboration between the public and private sectors in the earth observation domain. Moreover, it became clear how the institutions collaborate at local, regional, European and international scale and at the same time contribute to the success of Copernicus. This seminar also contributed significantly to my understanding of the principles and the need for initiatives such as the INSPIRE Directive and the Copernicus Data Space Ecosystem. It became clear how these initiatives facilitate easier access and interoperability, thus supporting a standardized infrastructure for spatial data in Europe.

Acknowledgements & References

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Copernicus Data Space Ecosystem (2025). Retrieved June 23, 2025, from https://dataspace.copernicus.eu/

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