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Deliverable D4.1 “National hubs”

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Executive Summary

Deliverable D4.1 “National hubs available” is the first deliverable of task T4.1, “Development of national CLIMADEMY hubs”. There are four national hubs, one in each partner country: Finnish Hub, UH; German Hub, UBREMEN; Greek Hub, UOC and Italian Hub, UNIBO and FG. All four national hubs are available, their operation has been launched with national operations on site, introduced internationally to CLIMADEMY pilot teachers in an online workshop and they are also open for international operation. Information on the CLIMADEMY progress and announcements is available on its web site <https://climademy.eu>. At the CLIMADEMY web site there is link to the CLIMADEMY central platform the CLAUDI auditorium (also accessible directly through <https://claudi.chemistry.uoc.gr>), where the areas of the National Hubs can be accessed.

German HUB:

<https://claudi.chemistry.uoc.gr/course/index.php?categoryid=4>

Finnish Hub:

<https://claudi.chemistry.uoc.gr/course/index.php?categoryid=7>

Italian Hub:

<https://claudi.chemistry.uoc.gr/course/index.php?categoryid=5>

Greek Hub:

<https://claudi.chemistry.uoc.gr/course/index.php?categoryid=2>

Auditorium (material and courses in English)

<https://claudi.chemistry.uoc.gr/course/index.php?categoryid=93>

Climate Auditorium (forum and meetings area)

<https://claudi.chemistry.uoc.gr/course/index.php?categoryid=6>

Abbreviations and acronyms

Abbreviation / Acronym	Description
WP	Work Package

Partner short name used in this document	Full Partner Name
EA	Ellinogermaniki Agogi Scholi Panagea Savva A
FG	Fondazione Golinelli
RDPSEC	Regional Directorate of Primary and Secondary Education of Crete
UBREMEN	University of Bremen
UH	Helsingin Yliopisto (University of Helsinki)
UNIBO	University of Bologna
UOC	University of Crete

1 Introduction

Deliverable D4.1 “National hubs available” is the first deliverable of task T4.1, “Development of national CLIMADEMY hubs”. The deliverable initiates the establishment of the task that aims to design and realize national CLIMADEMY Teachers’ Academy hubs in the four partners’ countries (UH, UOC, BEN and COO). As stated in the application these hubs will provide hands-on and out-of-school training by both physical and virtual access. National hubs will be focused on partners’ expertise and will adapt international knowledge to national particularities. National hubs do active national networking and will operate in two languages: English and the local language. These hubs will be the contact point for every teacher interested in teaching climate change in the classroom.

Two of them, in Finland and Greece, are developed around the atmospheric monitoring stations of Hyytiälä and Finokalia, respectively, where the atmospheric changes (physics and chemistry) leading to climate change are monitored. In Germany and Italy, hubs are established in Bremen by UBREMEN, where satellite data are acquired and analyzed, and in Bologna (by UNIBO and FG), where special attention is given to environmental education focusing on climate change. The hubs are able to host trainees and organize training sessions at their premises.

At least one person from each beneficiary in charge of the national hubs will be internally trained to the entire available educational material and will be dedicated to support all of the hub’s training activities. The hubs will offer both virtual training through their link to CLIMADEMY’s central platform (CLAUDI, Task 4.2) and hands-on, out-of-school training at the stations of the University premises. Hands-on exercises will include acquiring atmospheric composition and essential climate variables from observations and numerical models, data visualization and data analysis by statistical tools. Open data from the European Union’s and European Space Agency’s (ESA) Earth Observation Programme, the European Centre for Medium-Range Weather Forecasts (ECMWF), the US National Aeronautics and Space Administration (NASA), the US NOAA (National Oceanic and Atmospheric Administration), ICOS, ACTRIS, World Meteorological Organisation/Global Atmospheric Watch (WMO/GAW) and the European database EBAS will be used for training exercises together with data from the stations. At the Italian hub, the trainees will be trained on novel education and training tools based on digital applications and focusing on how to incorporate environmental education and climate change in the most recent IT tools available. The main goal will be to exploit novel e-education methods and concepts, ICT based services and tools for data analysis.

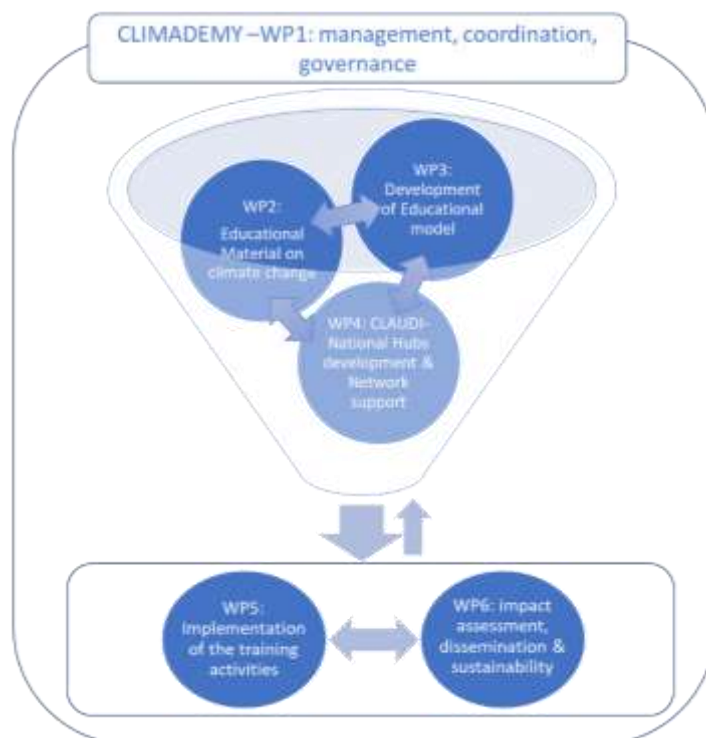
2 Project Description

This deliverable reports work done within WP2 of the CLIMADEMY project.

The Climademy project is divided into 6 work packages, listed below.

- WP1: Project management, coordination and governance
- WP2: Educational materials on climate change
- WP3: Development of educational model for teacher training
- WP4: Establishment of a common virtual Climate Auditorium (CLAUDI) and National Hubs
- WP5: Implementation of the Training Activities
- WP6: Impact assessment, dissemination and sustainability

In WP1 the project coordination and management bodies will be established, in order to ensure the general project coordination and monitoring of progress. In WP2 educational material will be collected and further developed to understand the main drivers of climate change. WP3 will focus on the development of an educational model suitable for teacher training. WP4 is concerned with the establishment of the four national hubs and the development of the virtual Climate Auditorium (CLAUDI) platform. The aim of WP5 is to organize the large-scale implementation of the Training Activities leading to an enhanced notion on Climate Change Education of participating teachers and eventually to their professional development. Finally, WP6 is concerned with the dissemination and sustainability of the project deliverables.



3 Deliverable description

All four national hubs are available. Their operation has been launched with national operation (see below for details) and they are also open for international operation. The hubs were introduced in the CLIMADEMY in International Workshop for CLIMADEMY Community held for all pilot teachers on Tuesday 9th May 2023.

Finnish Hub, UH

The hub is located in Hyytiälä forest field station is available for national and international visits

- The CLIMADEMY activities are described at the Hyytiälä field stations webpage <https://www.helsinki.fi/fi/tutkimusasemat/hyytialan-metsaasema/tiedekasvatus/climademy-opettajakoulutus>, where also teachers can sign up for a newsletter on the activities.
- The Finnish pilot teachers and their schools are listed in table 1. The Finnish pilot teachers have been met three times online. The first introductory meeting was on 31.1.2023, followed by meetings on 8.3.2023 and 4.5.2023. During these meetings, materials for the CLAUDI online platform and the competence framework have been discussed and shared.
- National visit to Hyytiälä:
 - o 40 teachers have been introduced to the Hyytiälä Hub and its activities with their groups and students. Visits to Hyytiälä have included guided tours of the climate research station SMEAR II (Station for Measuring Ecosystem-Atmosphere Relations), various workshops on tree carbon sequestration, lectures by scientists on climate change and their research and independent exploration of Hyytiälä's research through an 18-panel science trail.
- Climademy and Finland Hub was present at Educa Fair 27.-28.1.2023, an event for teachers in Finland with more than 15 000 visitors.
- A newsletter for Finnish teachers participating in the network, sent on 15.12.2022 and 24.4.2023. A total of 30 teachers have subscribed to the newsletter.
-

Finnish Hub on the project platform:

<https://claudi.chemistry.uoc.gr/course/index.php?categoryid=7>

For personal data protection policy, the list of 6 teachers and 4 schools engaged with the development of the content of the Finland – Hub is available upon request from the project coordination team (info@climademy.eu)



Figure 1: School visitors are introduced to the research measurements of the SMEAR II station located in Hyttiäälä, the Finnish Hub of the CLIMADEMY.

Greek Hub, UOC

The Greek Hub of the Climademy network is hosted at the Center for Research, Innovation and Dissemination on climate change and air pollution of the UOC that combines the Finokalia atmospheric research station, and the near-by old primary school at the village of Nofalias. The building has been equipped and organized so that educational activities can take place and groups up to 30 people can be hosted. The school is located at a distance of 10 minutes drive away from Finokalia research station and 45 minutes from the Department of Chemistry, University of Crete in Heraklion. It is therefore easily accessible from both locations.



Figure 2: The Greek Hub of the CLIMADEMY is established at the old primary school of the Nofalias village and the near-by Finokalia atmospheric research station. Here, the Climademy partners visit the Hub during the kick-off meeting on 16/09/22.

To utilize the long-term observations that provide scientific evidence for the connections between the anthropogenic effect on atmospheric composition and the resulting changes in the planet's climate, personnel from UOC and RDPSEC worked together on the available data from the Finokalia station that could be used for training activities. Data series from long-term monitoring of atmospheric composition at Finokalia regarding CO₂, CH₄, ozone as well as physical properties of atmospheric aerosols were evaluated and were complemented by other available datasets (ICOS, ACTRIS, NASA) for comparison and evaluation.

Webpage of the Finokalia station: <https://finokalia.chemistry.uoc.gr>

The first teachers to be involved in the development of the Greek Hub were indicated and drafted from RDPSEC from schools on Crete. The first meeting with the co-designers teachers of the Greek Hub took place during an online meeting that was held on 24/10/22. The names and schools of the first five teachers are available from the project coordination team upon request (info@climademy.eu). There were two more online meetings that took place in 2022, during which, Climademy project was described and the aims and methods were presented. As a next step, an in person meeting was arranged on 05/03/23, when the available data from the Finokalia station were presented to the teachers, the transformation of these data to educational material was discussed and the possible ways to exploit these data for climate change education were explored.

Furthermore, for the development of the Hub, the five selected teachers were invited to join the training activities that took place at the Greek Hub. During these activities, 41 teachers around Crete participated in a seminar about climate change and for the first time the Greek Hub at Finokalia/Nofalia was actually utilized for educational activities. The teachers involved at the CLIMADEMY project were also invited to visit the Greek Hub with their classes. Their visits were completed on 04/05/2023, so that the five co-designer teachers had the chance to participate in educational activities and visit the atmospheric research station at Finokalia. These activities were also extremely useful for the personnel of UOC and RDPSEC as they had the chance to utilize the informal education setting of the Greek Hub for climate change education for the first time.

Additionally, in order to support virtual training activities at the Greek Hub, educational material has been added at the dedicated area of CLAUDI platform for the Greek Hub.

Greek Hub on the projects platform:

<https://claudi.chemistry.uoc.gr/course/index.php?categoryid=2>

Overall, the Greek Hub is now well established and both the personnel of the Climademy partners that will be involved in the training activities and the five co-designer teachers are familiar with the site, the available materials and the needs for new material to be developed.

For personal data protection policy, the list of 5 teachers and 5 schools engaged with the development of the content of the Greek – Hub is available upon request from the project coordination team (info@climademy.eu)



Figure 3: First meeting of teachers training activities at the Greek Hub hosted at Nofalia village next to the Finokalia atmospheric research station held on 21-22/01/23. A) Giannis Metaxas demonstrating heat capacity experiment, B) Nikos Kalivitis and teachers from Crete working on IR radiation absorption by CO₂, C) Maria Kanakidou presenting GHG data from the Finokalia station D) Eirini Dermitzaki demonstrating water acidification experiments.

German Hub, UBREMEN

Information on the 1st meeting of the German-Hub with teachers: The first meeting of the “German – Hub” and local teachers took place on the 16th of December 2022 at the University of Bremen premises. During the first meeting, five teachers (see Figure 4) met with the project coordinator and the local PIs and project members. Overall, seven (7) local schools with eleven (11) teachers (list available at Management office info@climademy.eu) are actively engaged in the training processes linked to the German Hub development.

After an introduction of the attendees, the PI of the German-Hub, gave an introductory talk on the goal of the project, the UB expertise and the development of hubs, and the benefits of the collaboration. The participants were enthusiastic about the prospect of having access to climate change educational material and state-of-the-art satellite and modeling data. It was concluded that the development of the hub's content would be done following a dynamic approach, where both researchers and teachers would discuss the information to be included regarding the drivers and impacts of climate change. All participants exchanged emails for post-meeting discussions and follow-up of the process.



Figure 4: Some of the participants at the 1st meeting of Bremen teachers and the CLIMADEMY consortium at the premises of the University of Bremen.

German HUB on the project's platform:

<https://claudi.chemistry.uoc.gr/course/index.php?categoryid=4>

Italian Hub, UNIBO and FG

The Italian Hub in presence activities are located in Opificio Golinelli, the headquarters of Fondazione Golinelli, with laboratories and facilities dedicated to STEAM approach of teaching and learning, that hosts over 18,000 teachers and students a year.

The Italian pilot teachers and their schools are listed in Table 4. The Italian pilot teacher and some of their colleagues (12 people in total from 5 schools) have been two times online and two times physically. They were co-designing and discussing workshops on best practices, teaching approaches, ideas and values for teaching climate change at a local and national level. During them teachers worked together with 6 researchers and PhDs of UNIBO and 3 experts and educators of FG.

The first introductory online meeting, held on 01.12.2022 and attended by 12 teachers and school managers focused on presenting the project aim and starting sharing ideas and opportunities for school partners and Italian teachers ([one of the output](#)). The second online meeting, held on 17.02.2023 and attended by 10 teachers, aimed to share and discuss the pedagogical model, the European mobility opportunities and pointed out some designing principles for teachers training for the local hub. The third meeting was with physical presence (on 4.03.2023, attended by 10 teachers). It has been a peer training workshop during which some good practices were shared and discussed in order to point out approaches, values, areas of interest for content development, also some materials were collected for the future upload on CLAUDI platform (some [output](#)). The last peer to peer in presence training workshop was held on 08.05.2023 and attended by 6 teachers with the aim to further work on the development of the pedagogical model and on the implementation plan.

During these meeting the italian hub priorities were defined and outlined:

combining the consolidation of basic scientific skills (on drivers, impacts and mitigation measures), with an active, constructivist and steam pedagogical approach mainly working on

- future literacy

- uncertainty and complexity
- data literacy
- storytelling
- civic education and active citizenship (agency)

CLIMADEMY and the purpose of the Italian Hub were formally presented on 11.10.2022 by FG during a national event organized in Bologna with the Italian Ministry of Education ([Culture of innovation at school](#)). The event was addressed to teachers and school managers and was attended by 198 visitors.

Landing pages of the project and Italian hub have been created on the [FG website](#) and [UNIBO website](#). Updated [news](#) on the Italian hub development, including the Italian session of CLAUDI and the public announcement for the enrollment of more co-designer teachers. The call has also been disseminated through some of the Italian organizations interested in supporting the national implementation plan of training activities.

The list of 7 teachers from 5 schools engaged with the development of the content of the Italian– Hub is available at the Management Office (info@climademy.eu)



Figure 5: 4THst meeting in Opificio Golinelli of Italian co- designer teachers, Unibo and FG researchers and trainers.

Italian Hub on the project's platform:

<https://claudi.chemistry.uoc.gr/course/index.php?categoryid=5>

Conclusions

The four national hubs have been established, advertised and visited by the first visits of Teachers. CLIMADEMY project and its aims and implementation strategy have been presented during these visits. The first pilot teachers have discussed on strategy to follow to define their needs and co-design material within CLIMADEMY. The hubs were introduced in the CLIMADEMY in International Workshop for CLIMADEMY Community held for all pilot teachers on Tuesday 9 May 2023.