RINGO | Readiness of ICOS

Readiness of ICOS for Necessities of integrated Global Observations

D2.3

D2.3 Initial joint training (including gender issues related training) for research infrastructure managers (PIs) and other relevant stakeholders of the ICOS candidate countries (M18) and tailor-made trainings for the ICOS candidate countries throughout the project

RINGO (GA no 730944)

Public Document/define level

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730944

Deliverable: D2.3 Initial joint training (including gender issues related training) for research infrastructure managers (PIs) and other relevant stakeholders of the ICOS candidate countries (M18) and tailor-made trainings for the ICOS candidate countries throughout the project

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Date: 13 July 2020

Activity: WP2, Task 2.3

Lead Partner: UVGZ

Document Issue:

Dissemination Level: Public

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From	Jiří Kolman	UVGZ	Oct 12th 2020
Reviewed by	Janne-Markus Rintala & Evi-Carita Riikonen	ICOS ERIC	Oct 26th 2020
Approved by	Janne-Markus Rintala	ICOS ERIC	Dec 18th 2020

Version	Date	Comments/Changes	Author/Partner
1.0			
2.0	Nov 30	Jiří Kolman	UVGZ
3.0	Dec. 8	Jiří Kolman	UVGZ

Deliverable Review Checklist

A list of checkpoints has been created to be ticked off by the Task Leader before finalizing the deliverable. These checkpoints are incorporated into the deliverable template where the Task Leader must tick off the list.

- Appearance is generally appealing and according to the RINGO template. Cover page has been updated according to the Deliverable details. ☐
- The executive summary is provided giving a short and to the point description of the deliverable. ☐
- All abbreviations are explained in a separate list ☐
- All references are listed in a concise list. ☐
- The deliverable clearly identifies all contributions from partners and justifies the resources used
- A full spell check has been executed and is completed. ☐

DISCLAIMER

This document has been produced in the context of the *project* Readiness of ICOS for Necessities of integrated Global Observations (RINGO). The Research leading to these results has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730944.

EXECUTIVE SUMMARY

The main aim of the RINGO Work Package 2 is to support ICOS ERIC candidate and partner countries with their membership (administrative, managerial support) and their research infrastructure readiness (research infrastructure construction, operation, technical aspects).

The ICOS ERIC candidate and partner countries participating in RINGO project are from nine countries: INOE for Romania, OMSZ for Hungary, ULPGC for Spain, NOA for Greece, NUID UCD for Ireland, EULS for Estonia, ISA for Portugal, WITS for South Africa, PULS for Poland.

The deliverable D.2.3 approach was, compared with the D.2.5 *(Organisation of at least three training workshops and summer schools for the ICOS candidate representatives and other participants oriented on the scientific content related to the ICOS research infrastructure establishment and operation)* focused on knowledge transfer to broader groups then one individual country, to provide tailor-made individual approach by the ICOS community – especially by UVGZ as RINGO WP2 leader hand in hand with ICOS HO and ICOS thematic centres (ecosystem, atmospheric and ocean) represented in WP2 by UiB (mainly for ocean ICOS agenda), UNITUS (mainly for ecosystem part), UVSQ (covering mainly atmospheric ICOS domain).

This individual approach was based on careful mapping of the RINGO WP2 participants´ needs (it was done similarly for group/general needs within D.2.5, see more info in this case in the D.2.5 deliverable report).

The main D.2.3 deliverable activity was a two-day initial training for managers and other relevant stakeholders of these countries; it was organised by UVGZ in the Czech Republic in UVGZ headquarters and UVGZ research infrastructure on 13–14 September 2017. The training covered the main important contractual, managerial and funding issues connected with the ICOS research infrastructure establishment and membership. An extra part of the initial training focused on gender balance in research teams and capacity-building, considering the special needs of early career development.

During the course of the project, mainly UVGZ, ICOS Head Office and ICOS central facilities and thematic centres ensured continuous provision of tailor-made consultations to the candidate countries addressing “hot issues” (e.g. preparation of the national research infrastructure consortium agreement, ICOS atmospheric tower construction related to the national ICOS) Research Infrastructure establishment in these countries and their ICOS ERIC membership. In total, more than thirty such consultations have been provided (more than three per candidate/partner country on average).

Provided information and training materials from the D.2.3. activities have been uploaded since 2017 using the EMDESK platform for sharing with.

D.2.3 was delivered as planned in the DoW. The planned activities have been carried out. The main RINGO outcome reached hand in hand with D2.5 activities is the fact that Spain, Poland and Estonia have announced their intention to join ICOS ERIC in 2020.

In this report, the D.2.3 activities are summarized describing the whole consortium general activities and then individually from each candidate/partner country perspective.

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1. Introduction and background

To provide effective geographical coverage of ICOS RI it is necessary to ensure the building of a national network in ICOS candidate countries with possible extension of ICOS RI community by fulfilling ICOS RI tasks defined in the ICOS ERIC Statutes.

Before the RINGO project preparation (before the year 2016), with all beneficiaries of the WP2, there have been previous long-term collaboration and contacts with ICOS community. All partners from nine countries (Greece, Romania, Hungary, Poland, Estonia, Spain, Portugal, Ireland and South Africa) had showcased strong interest, will and determination to achieve ICOS RI membership; in case of South African partners, it was to increase the collaboration and partnership with ICOS RI.

The outcomes of this preparatory mapping were transformed into the main RINGO goals meeting also goals of ICOS community, as follows:

- *To support the countries to become ICOS members and enhance ICOS membership and research infrastructure sustainability by supporting countries interested to build a national consortium (geographical readiness).*

  Not only provide more general information during the joint trainings organised for several countries (see more in D.2.5 report) but also provide individual support such as specific consultations asked for by the beneficiaries.

- *To help with promoting of ICOS (ICOS provided research services) towards the national stakeholders and potential ICOS research infrastructure users.*

  This was covered by WP2 mainly within this deliverable D.2:3. The issue was also especially addressed by the RINGO project deliverables D.2.1 *(Report on enhancing membership strategy for ICOS ERIC including the online Handbook for Stakeholders)* and D.2.2. *(Concept document on collaboration with countries and stations outside European Union).*

- *To receive consultancy, e.g. on possibilities to use EU structural fund to build the infrastructure for ICOS observations.*

  This was mainly covered both by D.2:3. (individual consultancy provision) and D.2.5. (group/general such as trainings and summer schools) deliverables.

- *To receive training to improve the readiness of the scientists to work inside ICOS including joint research projects with ICOS community using ICOS research infrastructure and vice versa to promote already existing research outcomes of the ICOS candidate and partner countries.*

  Within the D.2.3 mainly organising the individual (bilateral) activities either hosted by ICOS community members (e.g. by UVGZ hosting the guests/trainees from the RINGO participating country) or organising the national RI consortium events within the ICOS candidate and partner countries.

2. Deliverable aims

To reach the main RINGO W2 goals described above following activities have been planned for the D.2.3.

In order to ensure building of national network in ICOS candidate countries, two-day initial training for managers and other relevant stakeholders of these countries were provided. The training covered the main important contractual, managerial and funding issues connected with the ICOS research infrastructure establishment and membership.

The scope of the initial training focused e.g. on financial, administrative and management tools and resources such as EU structural funding and potential solutions with the European Investment Bank (EIB), complementary Horizon 2020 and other programming (e.g. Joint programming, ERA-NETs, EEA). The training was organised by the WP leader UVGZ in cooperation with the ICOS bodies (mainly ICOS Head Office). During the further course of the

project, continuous training provided tailor-made consultations and lessons for the candidate countries addressing "hot issues" related to the national ICOS Research Infrastructure establishment in these countries and ICOS ERIC membership of candidate countries.

Particular needs related to the diverse maturity of the ICOS candidate countries was considered and the most appropriate information for research infrastructure development was provided. The first training was organized in the Czech Republic on 13-14 September 2017, where the example of the UVGZ experience with European Structural Funds and the national ICOS establishment was directly showcased to ICOS candidate countries representatives. Due to different phases in national infrastructure roadmap development, national funding procedures or EU structural funding it was necessary to prepare tailor-made strategies during this initial training.

As a European research infrastructure ICOS is committed to further develop its gender balance and the involvement of early career scientists. To support this development, an extra part of the training focused on gender balance in research teams and capacity building, considering the special needs of early career development was provided during the first initial training in the Czech Republic. Here, also, the structural funds may be used in capacity building, also among the current ICOS member countries.

3. Used methods

For fulfilment of the D.2.3. deliverable it was necessary to do mapping of the beneficiaries (ICOS RI candidate and partner countries) needs and continuous update throughout the implementation of the project. The approach for such identification of these needs was common for the whole RINGO WP2 activities and it is in detail described in the RINGO Deliverable D.2.5 report.

Based on the continuous mapping, the expressed needs were tackled in the RINGO trainings (summer schools, training workshops, see more in D.2.5 report). Apart that RINGO team (UVGZ, ICOS HO, UNITUS, UVSQ, UiB and whole ICOS community) has provided individual beneficiaries consultations (e.g. specific expertise provision, research infrastructure technical description, legal documents) and supporting activities (e.g. specific trainings, organisation of the national RI events). Together with the group activity explicitly originally planned and centrally organised for the ICOS candidate countries from the outset in the form of Initial joint training described below, there were RINGO activities that are listed also below in the individual ICOS candidate and partner countries´ overview.

The RINGO initial joint training for research infrastructure managers (PIs) and other relevant stakeholders of the ICOS candidate countries had a two-tiered approach: the first was to provide participants with a good theoretical basis from which to approach the issues; the second was to allow participants to see it in practice via field visit and RI excursion and hands on training. Background information and presentations to explained topic resources to assist those interested in acquiring further information on the subject, was provided. The contextualization method (especially information on current ICOS RI development and background of the trained participants reflecting their RI countries current status – specific context) and participatory approach (provision of the examples by participants, sharing their experience, discussion and consultation of the specific issues, open debate and feedback during the training) were used.

Concerning the gender training part of the initial training, the experience from the EU FP7 project EGERA (Effective Gender Equality in Research and the Academia, 2014-2017, UVGZ was a project consortium member) was used. UVGZ in collaboration with the National Contact Centre - Gender & Science, Institute of Sociology of the Czech Academy of Sciences provided the training based on EGERA and European Institute for Gender Equality (EIGE) recommendations and sources (especially EIGE on-line GEAR tool).

Apart above-mentioned approaches, self-reflection method was practised in training sessions in order to encourage participants to identify their sightlessness, prejudices and biases in relation to gender issues, and make them visible and open to reflexion. Trainers openly discussed also their own biases and positionalities favouring this process to reduce oppositional and judgmental attitudes.

The main topics addressed in the gender training (in the context of the Horizon 2020 EU policy and RI management) were as follows:

- *Fostering gender balance in research teams/scientific careers*

  This covered e.g. gender HR statistics, gender equality supporting measures, work life balance issues, HR Award, The Human resources strategy for researchers (HRS4R), European Charter for Researchers and Code of Conduct for the Recruitment of Researchers working conditions, career development, transparent recruitment processes based on merit.

- *Ensuring gender balance in decision-making (H2020 – advisory boards, evaluation panels, expert groups)*

  Explaning, e.g. the supporting measures related with gender culture of the institution (RI host), unconscious bias, resistances towards adopted supporting measures related to these sensitive issues, role models, awareness raising, women encouragement.

- *Integrating gender/sex analysis in research and innovation content*

  This part addressed mainly e.g. EU Horizon 2020 policy towards gender dimension integration in the research and Horizon 2020 projects, example of the gender dimension in research, relevant aspects of gender dimension in RI management (e.g. RI operation, methodology, impacts).

4. Implementation and outcomes

4.1. RINGO initial training

RINGO initial training for managers and other relevant stakeholders from ICOS candidate institutions was organised in Brno in UVGZ (CzechGlobe) headquarters on 13 September 2017. The second day, on 14 September was organised in UVGZ research site Křešín u Pacova, which is a part of the National atmospheric observatory Košetice (situated in the middle way between Brno and Prague). The filed visit was focused on construction and operation of the UVGZ atmospheric and ecosystem crop field eddy site, which is a part of ESFRIs ICOS and ACTRIS.

There was also an excursion to UVGZ laboratories located in Brno.

The training schedule included several time slots for interactive discussion of the audience with mixed experience (researchers, technicians, managers). The training was organised also as a joint discussion how to help each other with development research infrastructure to be ready for ICOS ERIC membership or partnership. Apart colleagues from UVGZ and ICOS HO trainees from Ireland, Poland, Greece and Vietnam attended the training.

Apart from these formal parts of the training, there was also time for informal consultations and discussions for the trainees to make contact with each other and with the CzechGlobe scientific community, which will help in the future collaboration.

One part of the training included also:

- Issue of gender balance in research teams and capacity-building, considering the special needs of early career development
- Gender dimension in Horizon 2020 and EU research policy including current state and trends
- HR development: How to support it from EU funding.
- HR Award agenda and trends in EU research policy towards development of research teams
- Open Access agenda to Research Infrastructures

The lecturers and trainers at the summer school were:

- Eija Juurola, Head of Operations Unit ICOS ERIC Head Office

- Jiří Kolman (ICOS Focal Point for Czech Republic, UVGZ)
- Marian Pavelka (ICOS national CZ contact point for ICOS ecosystem stations operated in the Czech Republic, UVGZ)
- Ivan Holoubek ICOS Atmospheric station operated in the Czech Republic, UVGZ)
- Gabriela Vítková (ICOS national CZ contact point for ICOS Atmospheric station operated in the Czech Republic, UVGZ)
- Vlastimil Hanuš (technician responsible for construction and operation of the ICOS UVGZ Atmospheric Station Křešín u Pacova, UVGZ)
- Hana Víznerová (National Contact Centre - Gender & Science, Institute of Sociology of the Czech Academy of Sciences)

The final RINGO initial joint training program is attached below in the D.2.3 report Appendix no. 3.

4.2. **Training materials and dissemination**

The content of the initial joint training was during the preparation consulted with colleagues from ICOS ecosystem and atmospheric thematic centres and ICOS HO. In collaboration with Carbon Portal partners the training materials were published by UVGZ on EMDESK and on ICOS websites respectively.

The information about the training workshop and the outcomes (e.g. training materials, lessons learned) were discussed in the RINGO General Assembly in Antwerp in 2018.

The training experience was presented by UVGZ in following international events, where the national RI governmental and ESFRI representatives were present; in case of Brussels event, there were also present European Commission representatives responsible for research infrastructure agenda and support:

- International conference: Day of National Research Infrastructures 2018 (Session IV: Assessment of Research Infrastructures) in Ostrava, CZ, on 6.11.2018;
- International workshop: Improving European Charter of Access to Research Infrastructures from the perspective of responsible research and innovation approach Workshop in Brussels, BE, on 25.9.2019
- International conference: 10th Danube Academies Conference in Prague, CZ, on 31.10.2019.

4.3. **Evaluation feedback and lessons learned**

The training participants provided to the organiser positive evaluation and they also appreciated gained skills.

Based on that positive feedback the host team decided to prepare and organise in September 2019 RINGO Summer School (see more information in D.2.5 report) and organise it more technically oriented (i.e. on ICOS infrastructure construction, operation and ICOS stations labelling process).

4.4. The D.2.3 overview of the ICOS candidate and partner countries participating in RINGO WP2

Below are described countries´ activities related with deliverable D.2.3.

4.4.1. Romania

Romania is represented in RINGO by National Institute of Research and Development for Optoelectronics (INOE)

Current situation in the country – state of the development of ICOS as a national research infrastructure

- In 2017, the national consortium (4 research institutions and 2 universities) was established in Romania; it is lead by INOE, with the purpose to support each other and to establish a way of communication with authorities.
- With the support of Romanian national consortia and RINGO partners, INOE prepared the documentation to include ICOS infrastructure on the national roadmap.
- In 2018 Romanian national roadmap was approved, ICOS being one of the research infrastructure included on this list.
- At a national level, there were available funds especially for research infrastructures included on the national roadmap. Two research infrastructures (the University of Bucharest and National Institute for Research and Development in Forestry), parts of ICOS-RO national consortium, submitted proposals. The proposal submitted by the University of Bucharest was successful being now in the contracting phase. The project duration is 36 months, starting in September 2020. During the project implementation, four ecosystem stations will be built.
- Also, according to DANUBIUS-ICOS agreement, another two ecosystem stations will be set-up in a wetland area of the Danube Delta starting with 2021.

Activities towards ICOS ERIC membership and national RI development during RINGO project implementation

- In the last years 2017-2020, INOE as a partner of RINGO project participated in each project annual meeting and presented the status of Romanian consortium. In the framework of RINGO project, INOE received the ICOS handbooks, characteristic for each station's type as well the support for new projects submitted by Romanians institutions.
- In spring 2018, INOE bilateral consultation started with UVGZ being focused on the issues related to the establishment of a wetland ecosystem monitoring site to be ready to be constructed according to the ICOS technical and scientific standards with EU structural funding for Romania.
- With Romanian partners, there were also consulted research infrastructures on collocation issues (in case of Romania RI ICOS, RI DANUBIUS, RI ACTRIS) during the course of the project and also during the RI DANUBIUS meetings.
- During 2019, INOE consulted with UVGZ technical issues related with the construction of the atmospheric tower station in Romania. The construction description was translated into English and shared with others on EMDESK on-line platform.
- INOE with UVGZ organised national research infrastructure consortium meeting in Bucharest on 7 May 2019 where there were discussed mainly administrative issues related with ICOS ERIC accession; UVGZ shared also its experience with EU structural funding dedicated to the research infrastructure development.
- Romanian partners participated as a consortium member in the project application preparation coordinated by UVGZ for EU Marie Skłodowska-Curie Actions Innovation Training Network programme during 2018 and 2019. The submitted project application called IMPACTER - Climate change, GHG observation and socioeconomic impacts on various terrestrial ecosystems of Europe was not successful for funding.

4.4.2. **Hungary**

is represented in RINGO by Orszagos Meteorologiai Szolgalat (OMSZ)

Current situation in the country – state of the development of ICOS as a national research infrastructure

- The potential Hungarian ICOS atmospheric and ecosystem stations are operational but they need to be upgraded to fulfil the ICOS requirements and protocols. In case of Hegyhatsal (HUN) atmospheric station there are currently (summer 2020) operated by OMSZ to close it due to lack of national funding. Currently, negotiations are running among national stakeholders, with support of World Meteorological Organisation

(WMO) and US National Oceanic and Atmospheric Administration (NOAA), to revise plans and keep the station in operation.

- Development is not possible without high-level governmental decision on joining ICOS. The Hungarian ESFRI roadmap is currently under preparation.

Activities towards ICOS ERIC membership and national RI development during RINGO project implementation

- OMSZ consulted with UVGZ the preparation of a national research infrastructure consortium agreement.
- OMSZ consulted with ICOS on atmospheric research infrastructure issues at the ICOS Atmospheric Monitoring Station Assemblies in 2017 (Lund, Sweden, 14–16 March, 2017; Groningen, the Netherlands, 21–23 November, 2017).
- Hungarian partners (represented in RINGO by OMSZ) consulted with UVGZ the project on GHGs measurements by using soil chamber techniques according to the ICOS standards.
- OMSZ also consulted preparation of a national research infrastructure consortium for Hungarian roadmap application (UVGZ also communicated the agenda with the National RDI Office responsible for ESFRI Ms. Gyorgyi Juhasz in Brussels, 27.11.2019).
- Hungarian partners participated as a consortium member in the project application (project IMPACTER, see more above) preparation coordinated by UVGZ.

4.4.3. **Spain**

is represented in RINGO by Universidad de Las Palmas de Gran Canaria (ULPGC)

Current situation in the country – state of the development of ICOS as a national research infrastructure

- Spanish government announced at UN Climate Change Conference 2019 (COP25) its intention to join ICOS ERIC in 2020.
- The main goal of ICOS Spain is to expand considerably the geographical coverage of the ICOS RI observations in all three observation domains. The ICOS Spain station network covers south-western Europe, extending the ICOS observations to the subtropical North Atlantic on the Canary Islands.
- The Spanish infrastructure will also provide GHG observations in the Mediterranean basin and in the North Atlantic. This includes the Strait of Gibraltar where the connection of the two seas leads to a significant exchange of air and water masses.
- The Spanish Atmosphere stations contribute to unique background measurements of GHGs. These stations include, for instance, the historical Izaña Atmosphere station, located in Tenerife, the Canary Islands, and the combined Atmosphere-Ecosystem station of Majadas de Tiéta located on the Iberian Peninsula.
- The Ecosystem stations provide otherwise scarce data on extremely dry natural and agricultural ecosystems in Europe, where productivity and sustainability are challenged by the climate change.

Activities towards ICOS ERIC membership and national RI development during RINGO project implementation

- Spain in collaboration with ICOS HO and ICOS thematic centres representatives has been preparing all necessary preparations for Spanish ICOS ERIC membership.
- The agreement between the State Meteorological Agency (AEMET) and the Ministry of Science and Innovation of Spain has been signed and published (https://www.boe.es/diario_boe/txt.php?id=BOE-A-2020-7106) on 22 June 2020, for the participation of Spain in ICOS ERIC.
- ULPGC representatives and stations PIs regularly participated in ICOS Monitoring Stations Assemblies (MSA) of all three ICOS thematic domains during the RINGO project preparing for Spanish membership in ICOS ERIC.
- The Spanish stations to become a part of ICOS are well established with scientific and technical well formed on the type of sensors and equipment assumed by ICOS. Therefore, most of the activities related with

participation in training workshops and consultations for ICOS-RI has been done bilaterally PI-PI and technician-technician relations among ICOS community institutions with partners from Spain.

- Spanish partners participated as a consortium member in the project application (project IMPACTER, see more above) preparation coordinated by UVGZ.
- Spanish partners actively contributed (especially Majadas station outputs) to the ICOS initiative forming a drought task force to address the 2018 extreme drought event in Europe. This task force was rapidly compiling and analysing relevant datasets. These analyses were discussed openly among the wider scientific community at a special session, 'The 2018 European Drought', which ICOS organised at the European Geosciences Union General Assembly in April 2019 and published 17 study results. The 17 study results published in a special issue of Philosophical Transactions B in 7 September 2020 show how vegetation in Europe responds to drought, i.e. how the exchange of carbon between the vegetation and atmosphere is affected. The studies cover areas from Spain to Sweden and Finland, and from the Czech Republic through Germany, France and Belgium to the Netherlands and the UK. The drought studies provide crucial knowledge when trying to minimise the negative effects of the climate change.
- UVGZ coordinated joint drought study in collaboration with Spanish ICOS partners that was published in 2019: Acosta, M., Dušek, J., Chamizo, S., Serrano-Ortiz, P., Pavelka, M. Autumnal fluxes of CH4 and CO2 from Mediterranean reed wetland based on eddy covariance and chamber methods. Catena. 2019, DEC 2019(183), 104191. ISSN 0341-8162. doi: 10.1016/j.catena.2019.104191.

4.4.4. Greece

is represented in RINGO by National Observatory of Athens (NOA)

Current situation in the country – state of the development of ICOS as a national research infrastructure

- At present there are three ICOS type atmospheric stations located at Finokalia environmental station of the UOC, Helmos Hellenic Atmospheric Aerosol and Climate Change station of NCSR Demokritos and Thissio station of NOA (since the beginning of 2019) located in the centre of the city of Athens.
- At the National Roadmap for RI published in 2014 and updated in 2017, the PANACEA (PANhellenic infrastructure for Atmospheric Composition and climatE change) RI has included a direct link to ICOS and ACTRIS RI's.
- PANACEA has officially been launched and within its frame, all the aforementioned stations are included whilst more stations are yet planned to be included. Currently, the University of Crete and Prof. Mihalopoulos Nikolaos are the official host institute of the PANACEA RI and co-ordinator respectively.

Activities towards ICOS ERIC membership and national RI development during RINGO project implementation

- PANACEA representatives and stations PIs regularly participated in ICOS Monitoring Stations Assemblies (MSA) of relevant ICOS thematic domains (ecosystem, atmospheric) and ICOS Science conferences during the RINGO project.
- NOA visited UVGZ on 14 December 2018 and consulted ICOS atmospheric station labelling process and related technical issues.
- NOA representative, who participated in the RINGO initial joint training in the Czech Republic in 2017, consulted with UVGZ administrative and technical issues and experience related with ICOS – ESFRI ACTRIS collocation stations.

4.4.5. **Ireland**

is represented in RINGO by University College Dublin, National University of Ireland (NUID UCD)

Current situation in the country – state of the development of ICOS as a national research infrastructure

- Irish ICOS type ecosystem stations consist of four ecosystem sites operated by University College Dublin, Trinity College Dublin, Teagasc, Johnstown Castle.
- ICOS type atmospheric sites (one atmospheric tall tower and three atmospheric ground sites) are operated by National University of Ireland Galway.
- The list of potential sites is still provisional and yet to be confirmed and agreed by the government. Ocean site is planned to be negotiated with the government as well.

Activities towards ICOS ERIC membership and national RI development during RINGO project implementation

- Two meetings were organized in the Royal Irish Academy in Feb. 27th 2018 and July 22nd 2020 dealing with Irish Participation into the ICOS RI.
- Cross-domain ICOS-Ireland document was collated and submitted to the Irish Environmental Protection Agency (EPA). The EPA has the primary responsibility for engaging with ICOS on behalf of Ireland. This has been revised slightly by the EPA. Further related modifications have been currently discussed, especially ICOS engagement with key stakeholders (state agencies/departments) and then with third level institutes.
- NUID UCD representative, who participated in the RINGO initial joint training in the Czech Republic in 2017, consulted with UVGZ administrative and technical issues and experience related with ICOS atmospheric and ecosystem stations collocation.

4.4.6. **Estonia**

is represented in RINGO by Eesti Maaulikool (EULS)

Current situation in the country – state of the development of ICOS as a national research infrastructure

- Estonian government announced its intention to join the ICOS ERIC research infrastructure consortium in 2020/2021.
- Estonian ICOS type ecosystem stations consist of three ecosystem sites operated by University of Tartu and Estonian University of Life Sciences.
- One ICOS type atmospheric (atmospheric measurement mast) site is operated by Estonian University of Life Sciences.
- Ocean ICOS thematic observations, operated by Tallinn Technical University, are Voluntary ship platform (VSP) of one existing on Tallinn-Stockholm line and one new planned on Tallinn-Helsinki line.

Activities towards ICOS ERIC membership and national RI development during RINGO project implementation

- EULS in collaboration with ICOS HO and ICOS thematic centres representatives has been preparing all necessary preparations for Estonian ICOS ERIC membership.
- Estonian representatives and stations PIs regularly participated in ICOS Monitoring Stations Assemblies (MSA) of all three ICOS thematic domains during the RINGO project preparing for Estonian membership in ICOS ERIC.
- RINGO partners from Estonia discussed various technical, managerial and administrative issues with ICOS experts and representatives including UVGZ at the 6th ICOS General Assembly meeting, (29–31.5.2018, Bergen).
- EULS representative, who participated in the RINGO Brno Summer school 2019 hosted by UVGZ, consulted with UVGZ technical issues and experience related with ICOS ecosystem stations operation and ICOS station labelling process.

4.4.7. **Portugal**

Portugal is represented in RINGO by Instituto Superior de Agronomia (ISA)

Current situation in the country – state of the development of ICOS as a national research infrastructure

- Three ESFRI infrastructures (LifeWatch, eLTER and ICOS) are actually integrated in only one national infrastructure named PORBIOTA (Portuguese E-infrastructure for information and Research on Biodiversity). Different research areas (corresponding to different ESFRI) have an independent scientific coordination.
- PORBIOTA is partially funded from the national budget and partially by EU structural funds.
- Portuguese ICOS type ecosystem stations consist of two ecosystem sites operated by the Forests Research Centre of the School of Agriculture, University of Lisbon (CEF/ISA/ULisboa), three sites from the University of Aveiro (urban, suburban and one forest site and one from the University of Èvora (inland water).

Activities towards ICOS ERIC membership and national RI development during RINGO project implementation

- ISA participated in the 5th ICOS ERIC General Assembly (17.11.2017, Brussels, Belgium) and thanks to WP2 activities ISA acknowledges RINGO project for contribution to enlarge and fortify the national ICOS network in Portugal, including a new research area (flux measurements in inland water bodies).
- RINGO partners from Portugal discussed various technical, managerial and administrative issues with ICOS experts and representatives including UVGZ at the 6th ICOS General Assembly meeting, (29–31.5.2018, Bergen).
- Ringo contributed to the scientific training of national scientists involved in the establishment of ICOS infrastructure in Portugal, through the participation of graduated students to the first RINGO summer school in Finland (2017) and ICOS Science Conferences.
- Ringo also provided training for research infrastructure managers (PIs), specifically through the funding of scientific and management meetings of Portuguese researchers from different universities actually running eddy covariance measurements. RINGO supported two workshops of eddy covariance users in Portugal organized in collaboration with the Forest Research Center of the School of Agriculture, which joined researchers from the Universities of Aveiro, Èvora and Lisbon (IST and ISA).

4.4.8. **South Africa**

South Africa is represented in RINGO by University of the Witwatersrand Johannesburg (WITS)

Current situation in the country – state of the development of ICOS as a national research infrastructure

- South African ICOS type ecosystem stations are hosted by several entities. Primarily by the Enhanced Freshwater and Terrestrial Ecological Observation Network (EFTEON), which is managed and hosted by the South African Environmental Observation Network (SAEON), which is a national facility of the National Research Foundation, an agency of the Department of Science and Technology of the South African government.
- SAEON also hosts another similar research infrastructure, the Shallow Marine and Costal Research Infrastructure, and it is likely to host a third, relating to Southern Ocean and Polar research, in future. All have ICOS-related elements.
- The existing set of sites in South Africa are operated, with varying degrees of capacity, by several other institutions: the Council for Scientific and Industrial Research (CSIR) operated three; University of the Northwest operates one; a German SPACES project operates three in collaboration with the Middelburg Agricultural Research Station and the University of Venda; SAEON Fynbos node operates one; Rhodes University/Agricultural Research Council operate two.

Activities towards ICOS ERIC membership and national RI development during RINGO project implementation

- During the RINGO kick-off meeting in Heidelberg, WITS representative consulted specific issues related of ICOS ERIC partnership and membership respectively in case of non-EU countries. Another issue was the articulated need of especially technical trainings dealing with stations operations and including data handling.
- South African representative Wim Hugo consulted ICOS ecosystem research infrastructure sites operation and related data management during his visit in UVGZ on 24.9.2019.
- WITS RINGO team closely participated in organisation of the EC Flux winter school in conjunction with SPACES program held in June 2019 a total of 20 Students participated from a range of countries including South Africa, Botswana, Angola and Zambia. Next winter school was meant to be held in June 2020 but obviously has been put on hold, hopefully until Q1 of 2021 as a result of COVID-19.

4.4.9. **Poland**

Poland is represented in RINGO by Uniwersytet Przyrodniczy w Poznaniu (PULS)

Current situation in the country – state of the development of ICOS as a national research infrastructure

- Polish PULS representative Janusz Olejnik announced in RINGO GA in Poznan that Polish government announced its intention to join the ICOS RI research infrastructure consortium in 2020/2021.
- ICOS Poland is hosted by a single institution, the Institute of Environment Protection (IOŚ) in Warsaw, and operated by IOŚ together with five other scientific institutions and universities: the Institute of Agrophysics (IA PAN) and the Institute of Oceanology (IO PAN) of the Polish Academy of Science, the Poznan University of Life Sciences (PULS), the University of Lodz (UOL) and the University of Science and Technology (AGH).
- ICOS Poland will consist of eight stations, of which five are already operating (built during the CarboEurope/NitroEurope projects) and three stations will be built in the near future. These comprise four ecosystem, three atmosphere and one ocean station (the Pomerania ship at the Baltic Sea). The ecosystem stations are located in different ecosystems, which partly represent the mosaic land-use structure in Poland: forest, agriculture and wetland.
- The urban station is situated in Lodz, the third largest city of Poland. The triangular placement of the atmosphere stations covers a significant part of the Polish territory: two of the atmosphere stations are located on the east side of Poland along the borders with Belarus and Ukraine, and the third atmosphere station is in the middle west of Poland.

Activities towards ICOS ERIC membership and national RI development during RINGO project implementation

- Poland in collaboration with ICOS HO and ICOS thematic centres representatives has been preparing all necessary preparations for Polish ICOS ERIC membership.
- PULS representatives and stations PIs regularly participated in ICOS Monitoring Stations Assemblies (MSA) during the RINGO project preparing for Polish membership in ICOS ERIC.
- PULS representative visited UVGZ and consulted ICOS ecosystem stations labelling process with UVGZ on 19.7.2018.
- Polish partners participated as a consortium member in the project application (project IMPACTER, see more above) preparation coordinated by UVGZ.
- PULS actively collaborated with ICOS partners in publication of ICOS ecosystem protocols published in International Agrophysics in December 2018.
- PULS hosted the RINGO General Assembly with RINGO Executive Board and ICOS Research Infrastructure Committee in Poznan in 2020 where PULS presented latest development of Polish accession to ICOS RI and consulted with ICOS community next steps.

5. Conclusion

The main aim of the RINGO Work Package 2 D.2.3 is to support ICOS candidate and partner countries with their membership (administrative, managerial support) and their research infrastructure readiness (research infrastructure construction, operation, technical aspects) is a long-term activity that should be kept and continue in the future.

Even though there might not be “umbrella” supporting project such is RINGO in near future, thanks to these RINGO activities, there has been established a basis for future actions and potential project with above mentioned ICOS RI candidate and partner countries; and, definitely, this basis is suitable and open for such activities with other non-RINGO partners as well.

An unintended effect of the D.2.3 appeared during its implementation. The shared experience and information with non-ICOS countries has been also interesting for current ICOS RI members (best practices sharing) and it has been also used as information material for colleagues who are new in ICOS community.

List of appendixes

Appendix 1: List of abbreviations

- **AEMET** - State Meteorological Agency
- **AGH** - University of Science and Technology
- **CEF/ISA/ULisboa** - Forests Research Centre of the School of Agriculture, University of Lisbon
- **CSIR** - Council for Scientific and Industrial Research
- **DoW** - Description of Work
- **EFTEON** - Enhanced Freshwater and Terrestrial Ecological Observation Network
- **EGERA** - Effective Gender Equality in Research and the Academia
- **EIB** - European Investment Bank
- **ERA-NET** - European Research Area Network
- **EEA** - The European Economic Area
- **EPA** - Irish Environmental Protection Agency
- **ESFRI** - European Strategy Forum on Research Infrastructures
- **ESFRI ACTRIS** - Aerosols, Clouds and Trace Gases
- **ESFRI AnaEE** - Analysis and Experimentation on Ecosystems
- **ESFRI DANUBIUS-RI** - International Centre for Advanced Studies on River-Sea Systems
- **ESFRI eLTER RI** - Integrated European Long-Term Ecosystem, Critical Zone & Socio-Ecological Research Infrastructure
- **ESFRI LifeWatch** - The e-Science and Technology European Infrastructure for Biodiversity and Ecosystem Research
- **EULS** - Estonian University of Life Sciences
- **GA** - General Assembly
- **GHG** - Greenhouse gas
- **HRS4R** - Human resources strategy for researchers
- **IA PAN** - Institute of Agrophysics of the Polish Academy of Science
- **ICOS** - Integrated Carbon Observation System
- **ICOS ERIC** - ICOS European Research Infrastructure Consortium
- **ICOS HO** - ICOS Head Office
- **INOE** - Romanian National Institute of Research and Development for Optoelectronics
- **IO PAN** - Institute of Oceanology of the Polish Academy of Science
- **IOŚ** - Institute of Environment Protection
- **ISA** - Institute of Agronomy, University of Lisbon
- **MSA** - ICOS Monitoring Stations Assemblies
- **NCSR Demokritos** - The National Centre of Scientific Research “Demokritos”
- **NOA** - National Observatory of Athens
- **NOAA** - US National Oceanic and Atmospheric Administration
- **NUID UCD** - University College Dublin, National University of Ireland
- **OMSZ** - Hungarian Meteorological Service
- **PANACEA** - PANhellenic infrastructure for Atmospheric Composition and climatE change
- **PORBIOTA** - Portuguese E-infrastructure for information and Research on Biodiversity
- **PULS** - University of Life Sciences in Poznań
- **RI** – Research Infrastructure
- **SAEON** - South African Environmental Observation Network
- **TWC** - The World Café
- **UiB** - University of Bergen
- **ULPGC** - University of Las Palmas de Gran Canaria

- **UNITUS** - Tuscia University
- **UOC** - University of Crete
- **UOL** - University of Lodz
- **UVGZ** - Global Change Research Institute CAS (Ústav výzkumu globální změny AV ČR, v. v. i.)
- **UVSQ** - University of Versailles Saint-Quentin-en-Yvelines
- **VSP** - Voluntary ship platform
- **WITS** - University of the Witwatersrand Johannesburg
- **WMO** - World Meteorological Organisation

Appendix 2: References

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EIGE Gender Equality in Academia and Research - GEAR tool. http://eige.europa.eu/gender-mainstreaming/toolkits/gear

EURAXESS The Human resources strategy for researchers https://euraxess.ec.europa.eu/jobs/hrs4r

Special issue of Philosophical Transactions B: https://royalsocietypublishing.org/toc/rstb/375/1810 The agreement between the State Meteorological Agency (AEMET) and the Ministry of Science and Innovation of Spain (https://www.boe.es/diario_boe/txt.php?id=BOE-A-2020-7106)

Appendix 3: Agenda of the RINGO initial joint training

(including gender issues related training) for research infrastructure managers (PIs) and other relevant stakeholders of the ICOS candidate countries

RINGO INITIAL TRAINING

SEPTEMBER 13th & 14th, 2017

RINGO initial training for managers and other relevant stakeholders from ICOS candidate institutions (as planned in WP2 Task 2.2 of the RINGO project), organised in Brno in CzechGlobe headquarters (Brno, Bělidla 4a, 603 00) on Wed. 13 September. The second day Thu. 14. September will be organized in CzechGlobe research site Křešín u Pacova, which is a part of the National atmospheric observatory Košetice (situated cca in the middle way between Brno and Prague). Visit will be focused on the CzechGlobe atmospheric and ecosystem crop field eddy site, which is a part of ESFRIs ICOS and ACTRIS.

Below time slots include the time for interactive discussion, the audience will be with mixed experience. The event rather consider as a joint discussion how to help each other with development research infrastructure to be ready for ICOS ERIC membership or partnership.

Wednesday 13 September

(Brno, CzechGlobe headquarters, Street Bělidla 4a, ground floor big meeting room)

9:00 – 10:00 - Introductory word of CzechGlobe director prof. Michal V. Marek (he is also Czech delegate to ESFRI) and Jiří Kolman

- *ESFRI participation of CzechGlobe in ESFRI research infrastructure, sharing the experience with the development of CzechGlobe to be ready for ICOS ERIC membership from managerial perspective (finances, management, sustainability of the operation of the infrastructure, upgrade and outlook for the future)*

10:00 – 10:15 - coffee break

10:15 – 11:45 - Eija Juurola, Head of Operations Unit ICOS ERIC Head Office

- *What is ICOS (history of the development of ICOS, outlook, and plans for the future)? Why ICOS? What are the benefits to be a member of ESFRI ICOS ERIC, what to say to national government to get on board?*
- *What are the necessary steps to become ICOS ERIC member?*
- *What are the main challenges to be tackled by candidate countries and for the ICOS ERIC members as well?*

- *ICOS stations labelling process (from ICOS perspective)*

11:45 – 12:15 - Jiří Kolman, CzechGlobe and WP2 RINGO leader

- *Summary of the RINGO WP2 questionnaire, what can RINGO and ICOS do for you - discussion about the expectations of the candidate countries representatives about RINGO project.*

12:15 – 13:15 - Lunch break in CzechGlobe premises

13:15 – 14:15 - Marian Pavelka (CzechGlobe) and Bogdan Chojnicki (PULS - Poznan Univeristy of Life Sciences), Poland

- *CzechGlobe experience with development of ICOS Czech Rep. ecosystem research infrastructure and experience with ICOS ERIC CzechGlobe membership (i.e. ICOS labelling process)*
- *Experience from Poland: Past, presence and future of ICOS PL*

14:15 – 15:15 - prof. Ivan Holoubek and Gabriela Vítková

- *CzechGlobe experience with development of ICOS Czech Rep. atmospheric research infrastructure and experience with ICOS ERIC CzechGlobe membership (i.e. ICOS labelling process)*

15:15 – 15:30 - Coffee break

15:30 – 17:30 - Hana Víznerová (Institute of Sociology of the Czech Academy of Sciences) and Jiří Kolman

- *Gender dimension in Horizon 2020 and EU research policy, current state and trends, HR development: How to support it from EU funding, HR logo agenda and trends in EU research policy towards development of research teams; Open Access to Research Infrastructures*

Thursday 14 September

(National atmospheric observatory Košetice/Křešín - atmospheric station and ecosystem crop field eddy site)

07:30 – 10:00 -	**Departure at 7:30 at CzechGlobe headquarters at Brno, Street Bělidla 4a.** Transport by cars to National atmospheric observatory Košetice/Křešín
10:00 – 11:00 -	Introductory word of Jaroslava Svobodová (Czech Hydrometeorological Institute - that is also national ACTRIS node) and prof. Ivan Holoubek: *National atmospheric observatory - synergies of research institutes benefits and challenges*
11:00 – 11:30 -	Vlastimil Hanuš (CzechGlobe technician): *Technical aspects of construction and maintenance of the atmospheric tower*
11:30 – 12:30 -	Marian Pavelka: *Technical aspects of construction and maintenance of the eddy crop field eddy site*
12:30 – 13:30 -	Lunch break on site
13:30 – 15:00 -	*Excursion of the site* (research infrastructure being part of ICOS, ACTRIS and other research programmes: Atmospheric tower, crop field eddy site, Czech Hydrometeorological station) guided by Gabriela Vítková, Vlastimil Hanuš, Marian Pavelka, Jan Čech, Jaroslava Svobodová a Jaroslav Pekárek
15:00 – 17:00 -	Transport to Brno or to Prague airport (for participants who had registered)