



## Half-way assessment of project impacts

### CHARTER Milestone 11

Grant Agreement Number: 869471

Project Acronym: CHARTER

Project title: Drivers and Feedbacks of Changes in Arctic Terrestrial Biodiversity

Starting Date: 01/08/2020

Project Duration: 48 months

Project Officer: Alberto Zocchi

Project Coordinator: Bruce Forbes / LAY

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Status	
Draft	
Final	x

Type		
R	Document, report	x
DEM	Demonstrator, pilot, prototype	
DEC	Websites, patent fillings, videos, etc.	
OTHER		

Dissemination level		
PU	Public	x
CO	Confidential, only for members of the consortium (incl. the Commission services)	

### Revision history

Date(s)	Lead author(s)	Comments
5.10.2022	Coordination team	1 <sup>st</sup> draft version; presented and discussed at the General Assembly (GA)
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25.11.2022	Coordination team	3 <sup>rd</sup> draft version, Helen Honkasaari
28.11.2022	Coordination team	4 <sup>th</sup> draft version, Sirpa Rasmus and Markku Heikkilä
30.11.2022	Coordination team	Final version, submitted

# Half-way assessment of CHARTER impacts

## Background

As part of the half-way impact assessment we collected data on published scientific articles, completed dissemination activities since the beginning of the project and confirmation of participation and/or reports on other activities listed in PEDR table 5. For this report we received data from 16/21 partners. The data was sufficient to confirm initial impact results and to draw conclusions on the state of CHARTER impact. This report covers period 1.8.2020 – 30.11.2022, which is slightly longer than first 24 months of the project. We also present some future plans.

The report is structured with conclusions and analysis at the beginning followed by our metrics for impact as presented in our Plan for the Exploitation and Dissemination of Results (PEDR). PEDR can be found for example here: <https://www.charter-arctic.org/charter-deliverables/>

During months 40-48 we will evaluate the impacts of CHARTER work, especially science-policy dialogue. This half-way assessment report provides us a possibility to check where we are and what we plan to achieve during the second half of the project. This exercise also gives us possibility to evaluate if we are using suitable impact metrics and, if needed, modify these when we update the PEDR by project month 34.

## Conclusions

Looking at the timeline, results at this point in the project include activities aimed at *dissemination for awareness* and *dissemination for understanding*, which was expected. The project has raised awareness through different activities, mainly in the scientific community but also occasionally among policy-makers and the general public. The dissemination for understanding activities has mainly been undertaken among local stakeholders, such as reindeer herders and local land users. All CHARTER work contributes to either one or other of our two, wide cross-cutting themes: “Tools and data for Arctic Strategies”, and “Public dialogue on the Arctic”.

Impact metrics presented in the PEDR are generally suitable, although verifying for example the use of CHARTER results in land-use planning or development of policies and strategies is very difficult, even impossible, during the project lifetime.

## Analysis

The data gathered consisted of listing all published papers in peer-reviewed journals, listing communication and dissemination activities, and confirming participation in and/or reports on activities listed in PEDR table 5. This material was analyzed and contrasted with PEDR, meaning other metrics in PEDR were also analyzed.

### *Published papers*

Since the beginning of the project CHARTER researchers have published at least 36 papers in peer-reviewed journals. The list is not exhaustive, as feedback from some partners was lacking. Of these publications a few are in publications listed as of special interest in PEDR table 3. Table 3 acted as a preliminary planning tool to get started with publications. Many of the finished articles were determined to be better suited for other publications, which is why this list has not been strictly followed. Currently a number of manuscripts are still in preparation and some are pending review. The Russian invasion of Ukraine (24.2.22) has had some impact on publishing practices, as some journals have started rejecting papers with Russian co-authors. This has not yet adversely affected CHARTER researchers, but it is something discussed during the GA in Hamburg.

PEDR table 3. Planned publications (Name of publication, type, year)

<i>Political Geography</i> Scientific journal 2021-22	
<i>Land Degradation and Society</i> Scientific journal 2021-22	
<i>Environmental Research letters</i> Scientific journal 2021-22	✓
<i>Global Ecology and Biogeography</i> Scientific journal 2021-22	upcoming
<i>Global Change Biology</i> Scientific journal TBD	
<i>Journal of Biogeography</i> Scientific journal TBD	
<i>One Earth</i> Scientific journal TBD	upcoming
<i>Nature Sustainability</i> Scientific journal TBD	upcoming
<i>PNAS</i> Scientific journal TBD	✓
<i>Polar Research</i> Scientific journal TBD	
<i>Environmental &amp; Science Policy</i> Scientific journal TBD	
<i>Arctic Anthropology</i> Scientific journal TBD	
<i>Arctic</i> Scientific journal TBD	✓
<i>Ambio</i> Scientific journal TBD	
<i>Siberian times</i> Regional magazine TBD	
<i>High North News</i> Regional magazine TBD	
<i>Guardian</i> Global magazine TBD	
<i>Arctic portals</i> Internet platform 2021-22	
Arctic geopolitical blogs Internet platform 2021-2	

In addition to scientific publications, CHARTER has published grey literature which include reports and white papers, such the report from EU polar week 2020.

### ***Communication activities***

CHARTER has a joint Communication plan (D7.2). An update of the Communication plan is scheduled for month 34. The main public facing communication channels include the project website, Twitter, a CHARTER YouTube playlist ([https://youtube.com/playlist?list=PL6SojJRvu9GT\\_AbAQ-HQONh5Bl8W1xTtK](https://youtube.com/playlist?list=PL6SojJRvu9GT_AbAQ-HQONh5Bl8W1xTtK)), a CHARTER infographic accessible from the webpage and press releases. CHARTER website has had 15 310 individual visitors so far. We are pleased to offer project summaries in the following languages: English, Russian, Finnish, Norwegian, Swedish, North Sámi, Inari Sámi, Nenets, German, French and Bulgarian: <https://www.charter-arctic.org/suomi-sami-nordic/>. CHARTER Twitter has 329 followers; the Arctic Centre at University of Lapland Twitter account has about 9000 followers. The current upheaval around Twitter appears to be having negative effects on the usability of Twitter in academic communication. However, there is not yet any well- functioning alternative. This is problematic for the use of social media in a project such as CHARTER. A project newsletter was not listed in communication plan but a need for such became obvious and the first issue of CHARTER newsletter came out in November 2021. The newsletter is also linked to EU Polar Cluster Communication Task Group activities. CHARTER has a representative in each of the EU Polar Cluster Task Groups and has participated actively especially into the work of the Stakeholder, Education and Communication Task Groups.

The visual appearance of the project has been designed in house (logo, publication template, etc., supporting also the design of the policy briefs and posters). A digital infographic which can be also updated through the project (D7.9) has been created. It shows the main idea of the project and its expected outcomes. It also serves as an introductory presentation for the project, although we have also shared a short power point presentation to partners through Eduuni and CHARTER intranet. See the digital infographic here: <https://prezi.com/view/gqDjTrtNES3Mt4hVUyg/>

### ***Dissemination activities***

CHARTER needs to follow and report communication and dissemination activities, laid out in the Communication plan and in the PEDR. When asking partners to list completed dissemination activities we adhered to the metrics articulated in PEDR, such as type of activity, main partners, audience and geographical reach. We were interested in interpersonal communication/dissemination (workshops, presentations, etc.) as well as written (newsletters, media releases, scientific publications, etc.) and technology-based (internet, videos, etc.).

When looking at the data on completed dissemination activities we can see that the most prevalent types of activities are diverse working group meetings or meetings in professional networks. These activities were mainly aimed at the scientific community and have a global reach geographically. The scientific community is one of the stakeholders/target audiences listed in the PEDR, table 1. Another quite prevalent activity is participation in and presenting at conferences and events. The different conferences and events cover a large spectrum, ranging from the World Economic

Forum to Nordic Oikos Conference. Of the events and conferences planned in the PEDR table 4, CHARTER has attended a number so far and is planning to attend more in the future.

Attendance at several conferences such as AGU (American Geophysical Union) and ASSW (Arctic Science Summit Week) have been paused or postponed due to COVID-19 pandemic. COVID-related health worries and travel and meeting restrictions affected CHARTER work throughout most of the first 24 months. Meetings evolved into hybrid or remote meetings and many workshops and seminars were held online. This was a challenge, but on the other hand, this gave CHARTER new tools and new know-how. Dissemination activities in general have been affected by COVID and the Russian invasion of Ukraine which meant that most project fieldwork had to be relocated from Russia to Fennoscandia. In CHARTER the situation has been to secure the complex fieldwork situation first and then consider dissemination actions once contacts to relevant stakeholders are concretised.

PEDR Table 4: List of conferences/workshops which are planned to be attended by the partners for disseminating project related information

CONFERENCE/WORKSHOP/EXHIBITION Year	Completed or upheld by half-way impact assessment
United Nations Climate Change Conferences	Some partners annually
Arctic Spirit 2021 and 2023	✓ (2021)
EGU European Geosciences Union -Scientific sessions -Interdisciplinary session on communication	Some partners annually
AGU American Geophysical Union	Some partners annually
ASSW Arctic Science Summit Week	Some partners, 2023
Arctic Frontiers	2023
Nordic Society Oikos conference 2022	✓
INQUA International Union for Quaternary Research 2023	-
ICOP International Conference on Permafrost 2022	-

The interactive interface (D7.14), needs to be mentioned separately as a dissemination activity. This task is already underway, with plans in place. The interface will be integrated into exhibition stations of Arktikum Science Centre as well as distributed through different media in multiple formats. The interface will be digital so easily portable across the internet, with offline access also possible. The interface will include the information related to the CHARTER as well as its main outcomes, and will have a broad focus on the impact of “rain on snow” on plants, animals and peoples.

This work is under the responsibility of the science communicators, supported by the Arktikum exhibition team and exhibition design service providers, who will gather the information, data and results through the researchers as well by participating in the fieldwork and workshops related activities. The science communicator will script the interface content in a popularized manner.

The exhibit will feature a map-based interface with embedded audio, video and text from across the CHARTER study area. The exhibit will also feature a full featured

animation that visualizes the “rain on snow” phenomenon. The multiple interfaces will be produced by the exhibition team and the service providers and will be an interactive, immersive and aesthetic experience introducing the main idea and outcomes of the CHARTER (with a focus on specific cross cutting themes) in a pedagogical manner contributing to a broader understanding and interest of the general public in the project themes

### ***CHARTER stakeholders and co-production of knowledge***

Looking at which stakeholder groups or target audiences CHARTER has reached at this point, of the stakeholder/target audience listed in PEDR table 1 only the organizations dealing with conservancy and environmental protection have in general not been reached through CHARTER dissemination activities. Also, efforts towards the general public are still in progress. From our list of dissemination activities several interviews and public appearances are missing. Project leader Bruce Forbes has given a number of interviews to media, been invited to number of panel discussions, and participated in public discussion e.g. through an opinion piece in Helsingin Sanomat, and about “Increasing Rain in the Arctic” in Nature Communications.

Through the completed dissemination activities, CHARTER has reached both policy - makers and the scientific community and participated in public discussion at relevant fora. Policy-makers and ministries were also listed as a stakeholder/target audience in the PEDR. CHARTER impact on policy-makers stems currently mainly from researcher participation in policy related working groups, such as writing IPCC assessments.

The possibilities of CHARTER partners to “engage critically to ongoing policy debates” varies. In Nordic countries the environmental legislation and legislation guiding reindeer husbandry are under development, and commenting the policy documents and participating working groups supporting the decision making is possible.

During this half-way assessment, we asked researchers to confirm their attendance and/or report on new activities taken in the fora listed in the PEDR table 5 (scroll down). This participation accounts for *dissemination for action* activities. CHARTER has also published policy proposals / policy briefs, which are directly aimed at policy- or decision-makers, and more are planned. See CHARTER Working Papers here: <https://www.charter-arctic.org/charter-scientific-publications/>

UH as a WP6 leader and other partners coordinating the participatory work in WP6 (UmU, NINA, UHAM) have had an important role in establishing contacts to different policy actors and networks that work within EU, nation states and regional authorities. Towards the end of the project, CHARTER will evaluate the impacts of its science-policy dialogue (D7.15). For this, a Stakeholder Analysis Template needs to be designed and regularly updated by partners. This template has been prepared (D7.8) and will be used for Social Network Analysis work in 2023.

CHARTER researchers have also organized a number of workshops as part of their research, which we have chosen to count as dissemination activities. Many of the

stakeholders involved were reindeer herders, i.e. representing local communities and/or local land users. These workshops account for the *dissemination for understanding* activities. The World Reindeer Herders Association involvement has been minimal, so far. The Association has had to undergo a significant reorganization due to the Russian invasion of Ukraine and is in the process of reformulating its structure.

### ***Expertise in CHARTER and expected impact***

The expertise and expected impact of CHARTER can be seen in PEDR table 5 (scroll down). These are related to:

- Implementation of the new integrated EU policy for the Arctic
- IPCC assessments and other major regional and global initiatives
- Enhanced engagement of and interaction with local communities and indigenous societies.
- Support the EU Polar Research Cluster and EU-PolarNet
- Supporting the EC bioeconomy strategy
- Supporting the EU space policy
- Contributing to the IPBES work

CHARTER has ongoing participation in most of these activities, for example IPCC and IPBES assessment work. Because all this is work in progress, the actual impact of CHARTER work is not yet possible to analyze. There has been a concern that Arctic biodiversity might end up being again underrepresented in the next round of IPBES assessments. CHARTER researchers have been encouraged to become involved as nominated experts.

Collaborating within the EU Polar Cluster has been fruitful so far. CHARTER has participated in EU Polar Week in 2020, and produced a joint white paper with other Arctic projects. CHARTER has networked especially with other two Arctic biodiversity projects ECOTIP (marine) and FACE-IT (coastal), and two other “Nordic” projects ArcticHubs and JUSTNORTH. CHARTER has provided input to CO-CREATE through attending a PolarCluster side-meeting in June 2022 in Brussels and filling in their survey (“The mission of the CO-CREATE project is to provide the EU Commission with a short-/mid-/long-term evidence-based strategic Roadmap to achieve successful inclusion of Indigenous rightsholders and Indigenous knowledge into the EU project and funding landscape”)

In addition to EU Polar Cluster collaboration, collaboration with the NSF-funded project AROSS on the topic of rain on snow and with local communities has proven fruitful, and combining expertise and funding from CHARTER and AROSS will make the Arktikum Science Exhibition more impactful. In the Nordic countries, collaboration with several ongoing EU and national projects working on changing environment and local communities helps to find more resources for the work, organize joint workshops and other events, share data and produce joint publications. All these works towards higher impact and less research fatigue, compared to situation where all projects work independently.



### ***Working with CHARTER Expert Advisory Group***

The CHARTER Expert Advisory Group has taken the practice of meeting twice a year. It receives updates on the project activities and on general project issues, discusses with project leadership and provides questions, comments and proposals. EAG has (after cancelling the Russian membership), members who represent Finnish ministries, Swedish environmental administration and Sami communities and organizations. As such, EAG is an important outreach tool and mediator between important stakeholder groups, ranging from practitioners to policy makers. For instance, the Finnish EAG members play important and project-relevant roles in the ministries of environment and agriculture and through EAG they become directly involved with the project and its achievements. The decision to invite the chair from within the Arctic Centre helps in practical functions and also prevents the EAG from being too far removed from the project.

### ***Unplanned work related to education***

CHARTER did not plan for great impact through researcher education or producing material for basic level education. Several MSc and PhD students have been involved in CHARTER in any case, and at least 4 MSc theses and 2 PhD theses have been or are being written in connection to CHARTER. An Undergraduate level intern and one Fulbright scholar from United States have worked with the CHARTER coordination team at the University of Lapland.

In collaboration with the recently finished Nordic Centre of Excellence ReiGN project, the CHARTER coordination team organized a PhD course on participatory research in Rovaniemi in October 2021. This hybrid course had 12 students attending in-person and two on-line. CHARTER researchers have participated in snow related teaching at least at the University of Jyväskylä and the University of Lapland, and more snow related teaching is planned.

Because researchers' field work was generally cancelled in 2020-2021 due to the COVID-related travel restrictions, snow profile observations needed in WP1 had to be collected by local colleagues, reindeer herders and other collaborators in northern Fennoscandia and Yamal. For this, a simple CHARTER snow protocol was designed, and an online survey opened. Media releases were written and this ad hoc "citizen science" exercise was communicated, especially in Finland. Interestingly, this led to opening a collaboration with the LUMA Centre, which supports natural science teaching at basic education / schools in Finland, and also provides education to future teachers. A day was arranged for school kids in Rovaniemi, educational material planned, and simple snow kits were produced. Collaboration was also initiated with the Finnish Environmental Centre SYKE and the Finnish Meteorological Institute, aiming at a citizen science tool for snow observations. These collaborations will continue in the future, and in the best possible scenario, may result in a citizen science element that outlives CHARTER.

Active networking also led to unplanned collaborations with small businesses developing snow observations, and contacts from individuals working in research in Arctic North America (offering to make and share snow observations), and more or less

well-known faces working to increase awareness about climate issues (offering collaboration).

Collaborating with smaller national level research projects, CHARTER has organized three small workshops at the Lapland University for Applied Sciences and for the Sámi Educational Centre SOGSAKK in Inari, as well as providing their reindeer husbandry teachers and students material about climate change.

### ***Reach, resonance and audience size***

For this half-way impact report, we have also looked at media resonance in two specific cases. This exercise was conducted at both the University of Lapland and at the University of Zurich. At LAY we looked at how many times CHARTER related content (interviews given by CHARTER researchers) was visible in domestic news in Finland. The findings were 18 different articles in 10 different media outlets. A citizen science experiment with school children and snow pits was a regional media success.

At UZH they looked at the Meltwater report on their press release “Vegetation regulates energy exchange in the Arctic”. This particular press release had a reach of almost 70 million, covering France, Germany and the United Kingdom in Europe, the United States, India and Australia.

Rough estimates of persons reached (in the scientific community, industry, civil society, general public, policy makers, media, investors, customers...) was given in our 18-month reporting and will be given again, in our 36-month reporting. From this media resonance exercise we have to conclude that the audience size for dissemination activities is hard to determine. Most activities reached an audience counted in tens or hundreds, which is consistent with the most prevalent types of actions taken, i.e. meetings and conferences, while the press releases had a reach of millions. However, statistical reach alone is no proof about the actual number of readers.

### **Future focus**

To conclude, CHARTER has achieved many communication and dissemination aims, as well as co-production of knowledge aims. See the table below about deliverables related to maximizing our impact, below. At this half-way point, it is nevertheless clear that more - and more impactful - activities are still needed during the next 24 months.

In our 18-month review, the external reviewer pointed out that we need to “let the world know about what is going on in the project”. We should communicate more about our activities, our publications, and even about our deliverables. The reviewer also asked us to consider using our social media channels more frequently. These remarks and requests were not targeted to coordination team only – CHARTER partners are doing great work but even more dissemination and communication activities would be welcome.

The whole consortium needs to continue being active in the EU Polar Cluster and learn to know the opportunities created by the new Catalyst -platform (<https://polarcatalyst.eu/>). There will be CHARTER participation in the EU Polar Cluster networking meetings during summers, and in Policy meetings / Polar Weeks in autumns.

CHARTER will continue to collaborate especially with other two Arctic biodiversity projects ECOTIP (marine) and FACE-IT (coastal), and other two “Nordic” projects ArcticHubs and JUSTNORTH. Joint policy briefs, workshops and publications are being planned. Recently dialogue has also started with ArcticXchange (EU PolarNet2 service contract project) and Arctic Passion, on locally relevant data bases and climate services. CHARTER plans to work, as much as possible, with existing data and rather than building own data sharing platforms or databases, providing material to existing ones. Collaboration with Arctic Passion will increase the impact of both projects, as CHARTER data gets more visibility, and their “Arctic Window” gets more relevant data.

There are many upcoming dissemination activities for year 2023. CHARTER partners will be active in hosting and organizing events and symposia on Arctic biodiversity, climate and local knowledge topics, below some examples.

- ArcticHubs, CHARTER and JUSTNORTH will organize a joint workshop for collaborators and stakeholders, in connection to the Arctic Frontiers (30.1.-2.2.2023) in Tromsø, Norway.
- UEDIN will host the Arctic System Science Week (23-29.3.2023) in Edinburgh, UK, with CHARTER-relevant workshop.
- CHARTER, ECOTIP and FACE-IT will organize a joint Business Meeting at Arctic Science Summit Week (17.-24.2.2023) in Vienna, Austria and a “Mid-term Policy Event” in Brussels in mid-March 2023.
- AROSS and CHARTER will host a workshop for herders and hunters in connection to the Arctic Ungulate Conference (8-12 May 2023) in Anchorage, Alaska.
- Other events with planned CHARTER involvement include at least COP28 in the UAE, Arctic Circle meetings, EGU and AGU meetings.

Many CHARTER researchers worked in the Nordic Centre of Excellence ReiGN, during past years. ReiGN is planning for popular publications based on its results and recently published book. CHARTER coordination team will collaborate in this effort, and through this, also gain more visibility in CHARTER teams (changing operational environment of northern local livelihoods, local views on and adaptations to changes).

More workshops and townhall events are planned towards the end of the project, as joint WP6 and WP7 activity.

Updating the PEDR (planned for the month 34) as well as updating the Data management plan and the Communication plan are all needed, so that the exploitation of project results can be planned well. Data management plays a crucial role here, as CHARTER impact in sharing data and research tools is expected to be significant.

We need to collect ideas related to the exploitation of CHARTER results - further use of results, suggested further research areas, contributing to strategic initiatives, funding schemes, other application areas, collaboration with other projects, data storing and sharing etc. We also need to ensure the future use of our intangible and unplanned findings, like how to live through the 1-2 year of uncertainty and misunderstandings in a large, genuinely multidisciplinary consortium, and how to navigate through restrictions and sudden changes due to Global pandemic and war in Europe.

Deliverables related to maximizing the impact:	Completed by half way impact report
D7.8: The Stakeholder Analysis Template will be designed and used to identify the groups, their potential influence on generating impact and interest in our research.	✓
D7.9: Planning and designing an introductory poster showing through a comprehensive infographic the main idea of the project and its expected outcomes, and supporting the design of the policy briefs.	✓
D7.10: Expert Advisory Group will be established.	✓
D7.11-D7.13, D7.17: Annual reports and meetings of the Consortium, Steering Committee and the Expert Advisory Group	D7.11 and D7.12 yes, D7.13 due in 2023 and D7.17 in 2024
D6.2: Mapping of stakeholder network required for the co-design of pathway narratives by means of a social network analysis	
D6.4: Co-design of policy options to inform climate adaptation and mitigation policies and practices and enhance the viability and resilience of Arctic local livelihoods. This involves white papers about policy options for maintaining livelihoods and biodiversity.	
D6.5: Cross-cutting work to develop Arctic strategy and provide policy recommendations. This involves townhall events and world cafes for discussion and dissemination, forum piece -types of texts, and policy briefs.	
D7.15: Evaluating the impacts of CHARTER science-policy dialogue, based on qualitative interviews with policy- and decision-makers in the region investigated about their knowledge of CHARTER's research results/findings and combine this with a Social Network Analysis.	

## CHARTER metrics

The tables below originate from the CHARTER PEDR. They have been filled out so that the half-way impact assessment has been added in a column on the right in the matrix.

PEDR Table 1. CHARTER stakeholder groups

Stakeholder group	Example	Aspects of participation, co-production of knowledge and dissemination	Half-way impact assessment
Local land users in different regions	Reindeer herders in Finland; Saami reindeer herders in Norway and Sweden, reindeer herders in Yamal; companies leasing land in pasture areas for resource extraction	Previously established contact; early consultation; free, prior and informed consent; on-site observations; participatory GIS; summaries of research findings in accessible language and format	<i>Previously established contact; early consultation completed. free, prior and informed consent received; on-site observations, participatory GIS ongoing.</i>
Local communities in four countries	Core study region: northern Fennoscandia, north-west Russia	Early consultation; well-advertised stakeholder workshops; respect for local languages; sensitivity towards divergent opinions; consideration of indigenous rights and other ethical issues; transcribed minutes of stakeholder workshops; summaries of research findings in accessible language and format; narrative scenarios developed in cooperation with the community; policy recommendations built upon previous local experience; Townhall meetings	<i>Early consultation completed; well-advertised stakeholder workshops held. Summaries from workshops, in various formats and accessibility.</i>
World Reindeer Herders Association	Transnational and regional representatives	Early consultation; discussion on research design; exchange of data; inclusion of issues that deserve research from their point of view; summaries and detailed reports about research findings in (at least) English and Russian	-
Policy makers, ministries and land-use regulatory institutions	Ministry of Agriculture, Komi Republic; Reindeer Herders' Association in Finland, The Saami Reindeer Herders' Association of Norway, relevant EU institutions	Early consultation; discussion on research design; exchange of data; inclusion of issues that deserve research from their point of view; summaries and detailed reports about research findings in English and Russian	<i>EAG involvement covers part of early consultation.</i>
Organisations dealing with conservancy and environmental protection	Finnmárkkku luonddugáhttenlihttu - Norges Naturvernforbund (Friends of the Earth Norway), Management bodies of protected areas (Natura 2000 network, within EU territory)	Early consultation; inclusion of issues that deserve research from their point of view; summary reports about research findings in (at least) English and Russian	-
Arctic Council	Sustainable Development Working	Accounting for Arctic Council's goals and working groups' agendas; summaries	<i>AC activities suspended since</i>

	Group of the Arctic Council	and detailed reports about research findings in English	<i>24.2.22. Finnish CAFF presidency involvement.</i>
General public		Project website; presentations and updates in regional and transnational media; cooperation with Frozen Ground cartoon project (IASC and IPA); proactive and conscious strategy of contributing to the “Public Dialogue on the Arctic”	<i>Project website completed and in operation. Some presentations and updates in regional and transnational media.</i>
Scientific community	Colleagues, students	Data and tools developed during the project, open access scientific publications, grey literature, sharing data and results in online repositories, databanks and portals, presentations at conferences, seminars, courses for students, video clips, town hall events	<i>Open access scientific publications, grey literature presentations at conferences, seminars, video clips, courses, town hall events</i>

PEDR Table 2. CHARTER target audiences and key messages to be delivered; some examples and their relation to the sustainable development goals (SDGs) given

Target audience	Key message	Communication measures	Half-way impact assessment
Scientific community (e.g. Academic Institutions, Research Agencies / establishments)	Dissemination of scientific results and expected benefits on materials design and processing technology of the project foregrounds. Improved framing of biodiversity drivers and feedbacks in contrasting SES contexts; Better understanding of long-term (centennial) development of land-use via paleoecological data. Contribution to SDG15 (Life on Land) and SDG13 (Climate Action)	Scientific publications in open access, highly ranked journals and conference proceedings, presentations in conferences, seminars and workshops, educational material, courses for students etc. Grey literature like reports and white papers, sharing data and results in online repositories, databanks and portals, video clips, town hall events.	<i>36 Scientific publications in open access, highly ranked journals. Minimum of 10 presentations in conferences, seminars and workshops. Several video clips on website.</i>
Local Arctic communities and livelihoods	Improved preparation for and adaptation to extreme weather events (e.g. ROS) in the short term (1-10 yrs) and climate change in the longer term (decadal). Improved framing of biodiversity drivers and feedbacks in contrasting SES contexts; Better understanding of long-term (centennial) development of land-	Electronic and web-based outreach tools (project website, social media, etc.), newsletters, newspaper, radio, TV, press releases etc. Simulation and model visualizations with infographics and key data, participatory workshops with local residents, regional administrators and	<i>Electronic and web-based outreach tools established and in use (project website, social media, etc.). 3 newsletters published. 3 press releases. Participatory workshops with local residents, regional administrators and local to regional policy makers.</i>

	use via paleoecological data. Contribution to SDG15 (Life on Land) and SDG13 (Climate Action)	local to regional policy makers.	<i>1 town hall event hosted.</i>
General public	Information related to the social impact of the project such as the new ambitious environmental goals, job opportunities, etc.	Newspaper, radio, TV, press releases, electronic and webbased outreach tools (project website, social media, etc) interviews, etc.	<i>Electronic and web-based outreach tools established and in use (project website, social media, etc.). 3 newsletters published.</i>
Policy makers	Information related to the innovations. Improved local and regional land-use maps and models, local innovation and improved adaptation to extreme weather events (sub-decadal) and climate change (decadal). Contribute and advance SDG11 (Sustainable Communities) and SDG15 (Life on Land). Creating narratives and pathways based on model and observational data that can offer policy options, as well as act as a dissemination tools for the public. Drafting roadmaps that are illustrative on how to ensure both ecological and socio-cultural sustainability of livelihoods in the Arctic while maintaining biodiversity	Meetings, participation in ongoing policy processes through our Expert Advisory Group, e.g. ministerial working group “Future of reindeer husbandry in Finland”, 2020- 2021. Simulation and model visualizations with infographics and key data, participatory workshops with local residents, regional administrators and local to regional policy makers. Engage critically to ongoing policy debates. Target debates to do with livelihoods: These include for example reindeer herding (e.g. herding limits and numbers), infrastructure development (wind-power parks, train line in N Norway-Sweden /Finland, mining), and forestry debates. Leverage the consortium’s links to administrators and policy makers to maximize reach.	<i>EAG work started and in operation.</i>  <i>Participation in national working group on future of reindeer husbandry. Policy brief published.</i>  <i>Work within the EU Polar Cluster and towards the EU level policy makers in collaboration with other Polar Cluster projects.</i>

PEDR Table 5. Expected impact. Updates to table 5 have been directly included in the text.

Type of involvement	Description (as written in the PEDR, with updates for the half-way impact assessment)
Involvement in the development of national / EU Arctic policies and strategies	<p>The EU policy for the Arctic (EU's Joint Communication on An Integrated Policy for the Arctic 2016; JOIN 2016; European Political Strategy Centre 2019) and the EEA Climate Change Impacts and Vulnerability report (CCIVE 2017) together present three main policy gaps. An urgent policy gap is that our "understanding of the Arctic systems, their functions and possible responses to various drivers are still largely unknown". The data synthesis and modelling components of CHARTER are geared to address this gap. The second policy gap is "Climate mitigation and adaptation strategies". CHARTER's modelling outputs and participatory workshops will focus on rendering climate mitigation strategies, such as increasing surface albedo at regional scales, into practical actions directly involving indigenous populations and local communities. CHARTER will make strong contributions to filling third gap in "Protecting the environment" via development of clear metrics for maintaining Arctic biodiversity. CHARTER further addresses the environmental impacts of climate change, as requested by the EU. CHARTER's planned work with pastoralists is very relevant to sustainable use of rangelands, and to economic development of people living in the study regions. By advancing the understanding of how changes in winter climate interact with human land use in influencing key biodiversity elements for local residents, it will contribute to make informed decisions about conservation priorities for the future. CHARTER will contribute via participatory workshops with Arctic residents, administrators and scientists to jointly develop adaptation strategies.</p> <p>By involving a large number of international partners and emphasizing the collaboration with indigenous peoples, CHARTER will provide relevant contributions to the integrated EU Arctic policy: (1) The willingness of the EU to work together with Arctic states, their local communities and indigenous groups, as well as with relevant international fora to develop an ambitious climate adaptation agenda for the Arctic region; and (2) The continued engagement of the EU with Arctic indigenous peoples and local communities to ensure that their rights are respected and their views are reflected in the ongoing development of EU policies.</p> <p>Gabriela Schaepman-Strub (CHARTER partner, WP1 &amp; 5) serves as an EU-PolarNet 2 Policy Advisory Board Member. Experiences and scientific results gained in CHARTER are important in her role as Scientific Director of the Swiss Polar Institute.</p> <p>Markku Heikkilä (EAG chair and CHARTER management team member) coordinated and acted as one of the writers in the report commissioned by the Finnish Government on the impact of Russian aggression on international cooperation in the Arctic region and on the implementation of Finland's Arctic policy strategy.</p>



<p>IPCC assessments</p>	<p>LAY is serving as CA for IPCC-AR6's Special Report Ocean and Cryosphere (SROCC) Polar Regions chapter. Bruce Forbes was CA in 2019.</p> <p>AWI is CA to the IPCC-AR6's Regional Atlas Chapter, Polar Regions. Annette Rinke (AWI) is a contributing author to the IPCC-AR6's Regional Atlas Chapter, Polar Regions. Both Annette Rinke (AWI) and Heidrun Matthes (AWI) contributed with publications within and outside the Polar CORDEX framework to the IPCC-AR6's Regional Atlas Chapter Polar Regions.</p> <p>WSL is CA for IPCC SROCC chapter High Mountain Areas.</p> <p>UCL is CA for IPCC-AR6 chapter Polar Regions sections on Arctic sea ice and Arctic amplification. Julianne Stroeve at UCL helped write the Arctic sea ice and Arctic amplification chapters in the SROCC special report on the oceans and presented on it in Stockholm back in 2019.</p> <p>LAY (Minna Turunen) is CLA of Chapter 6 Impact analysis and consequences of change and CA for Chapter 9 Adaptation options in Adaptation Actions for a Changing Arctic (AACA): Perspectives from the Barents Area.</p> <p>CLA for Part 1 CA for Part 2 of the Red Book of Threatened Habitats in Finland 2018.</p> <p>Researcher Annett Bartsch (BGEOS, WP1) has been involved as reviewer of the recent WGI and WGII report.</p>
<p>Other major regional and global initiatives</p>	<p>LAY is CA to the NOAA's annual Arctic Report Card (Bruce Forbes), as well as numerous Arctic Council assessments, e.g. Arctic Biodiversity Assessment, Arctic Biodiversity Trends, Arctic Climate Impact Assessment, Arctic Oil &amp; Gas, Arctic Social Indicators, Snow, Water, Ice and Permafrost Assessment (SWIPA) and Arctic Resilience Report. LAY is co-lead of the UArctic Thematic Network Arctic Extractive Industries (Florian Stammer).</p> <p>As concerns the International Arctic Science Committee (IASC), UZH and WSL are the Swiss representatives in the IASC Terrestrial Working Group. Gabriela Schaepman-Strub serves as Swiss national delegate to the IASC Council. UZH is also the Co-PI of the Arctic Vegetation Archive activities of IASC.</p> <p>Gabriela Schaepman-Strub has contributed to the CAFF START report and to the BIODIVERSITY MAINSTREAMING IN ARCTIC MINING progress report of CAFF. She acts as an official Swiss observer to CAFF.</p> <p>UZH is also the PI of the Arctic Biodiversity activities of IASC. AWI is vice-chair in IASC's Atmospheric Working Group. Annette Rinke (AWI) is a member of the IASC's Atmospheric Working Group.</p> <p>UHAM and B-GEOS are respective members of IASC's Social and Human Sciences and Cryosphere Working Groups. Researcher Annett Bartsch (BGEOS, WP 1) has been IASC Cryosphere working group representative until 2022. Helena Bergstedt (BGEOS, WP1) is co-leader of the IPA action group on drained lake basins. Joachim Otto Habeck (UHAM) (WP3) was replaced by another representative in December 2021. He continues to be member of the German National Committee for SCAR/IASC.</p>

	<p>CHARTER consortium members actively contribute to the Circumpolar Biodiversity Monitoring Programme (CBMP): AU is a member of the CBMP Terrestrial Invertebrates Expert Network, and Arctic UiT is a member of the CBMP Terrestrial Mammal Expert Network and was a LA in the Arctic Biodiversity Assessment.</p> <p>UH is a member of Arctic Monitoring and Assessment Program (AMAP) and SWIPA Climate Change Assessment. It is also a member of the scientific delegation of Finland in the Arctic Ministerial Forum of the EU. UOXF is a LA on Arctic ecosystem services in The Economics of Ecosystems and Biodiversity Scoping Study for the Arctic.</p> <p>UHAM is founding member of the “Permafrost and Culture” Working Group of IPA (2014-2019).</p> <p>At FMI Anna Kontu is a member in World Meteorological Organization’s Global Cryosphere Watch.</p> <p>UiT leads, and NINA is partner on, the Climate Ecological Observatory for Arctic Tundra (COAT), a monitoring initiative for Norwegian tundra ecosystems under the effect of climate change, and the terrestrial flagship of the Fram Centre for climate and the environment in Tromsø. UiT is also a PI of an initiative parallel to COAT in West Siberia on long-term dynamics of vertebrate tundra food webs. NINA has a leading role in the The Svalbard Integrated Observation System (SIOS) and contributes to the annual Arctic Report Card.</p> <p>AWI is cluster speaker and PI of the German Transregional Collaborative Research Centre on Arctic Amplification: Climate Relevant Atmospheric and Surface Processes, and Feedback Mechanisms (AC)3, a Year of Polar Prediction YOPP endorsed project, and co-coordinator of the modelling activities for the international project MOSAiC (Multidisciplinary drifting Observatory for the Study of Arctic Climate). UCL leads a sea ice/snow remote sensing study during MOSAiC and contributed to the EU PolarNet white papers on the most pressing issues in Polar Regions. Annette Rinke (AWI) is PI of the German Transregional Collaborative Research Centre on Arctic Amplification: Climate Relevant Atmospheric and Surface Processes, and Feedback Mechanisms (AC)3 Block D on Atmospheric Circulation &amp; Transport, which is currently applying for third phase funding.</p> <p>EDU and AU, respectively, are the founders and leaders of the ShrubHub and Herbivory Networks. Isabel C Barrio (AUI) is leading the Herbivory Network. CHARTER activities are closely linked to some of the research projects coordinated through the Herbivory Network, like “Herbivores in the tundra: linking diversity and function (TUNDRAsalad)” funded by the Icelandic Research Fund (grant nr. 217754). AU leads the Network for Arthropods of the Tundra. AU leads the Network for Arthropods of the Tundra.</p>
Other Arctic projects (EU Polar Cluster or others)	<p>The CHARTER consortium is well incorporated into the EU-PolarNet. LAY has established contacts with the EU Polar Research Cluster project KEPLER to engage indigenous stakeholder communities in Finland, Sweden and Russia. LAY was a project member of Arctic Cluster project BLUE-ACTION (Ilona Mettiäinen and John More).</p>

	<p>Joachim Otto Habeck (UHAM) (WP3) is member of the Advisory Board of the EU Polar Cluster Project “ARCTIC PASSION” since 1 July 2021.</p> <p>B-GEOS is involved in two WPs of Arctic Cluster project NUNATARYUK: (1) Terrestrial Permafrost; and (2) Infrastructure. UZH supports the Arctic Cluster through research, monitoring and major infrastructure support of the Chokurdakh scientific research station in Sakha Republic, Russia, which is an INTERACT station. Annett Bartsch, b.geos (WP1) leads the ESA Polar Science Cluster action EO4PAC - Quantifying disturbance impacts on feedbacks between Arctic permafrost and global climate (July 2021- June 2023). Annett Bartsch, b.geos (WP1) is also involved in ERC Synergy project Q-Arctic (Quantifying disturbance impacts on feedbacks between Arctic permafrost and global climate; Oct. 2021-2027)</p> <p>FMI is a partner in iCUPE, INTAROS and INTERACT, with Juha Lemmetyinen.</p>
EC bioeconomy strategy	<p>CHARTER is aligned with the European Commission’s bioeconomy strategy and action plan (EC 2012, 2018) that aims to reconcile the use of renewable biological resources with biodiversity and environmental protection. Research is often disconnected from its application due to information and knowledge gaps, or institutional and conceptual barriers between researchers, producers, policy-makers and society at large. CHARTER bridges this gap and surmounts conceptual barriers by incorporating local approaches to sustainability and integrating them in management practices and policy options. CHARTER operates across EU borders, working with Russian and Chinese groups in search of global solutions to the global challenges of biodiversity loss and adaptation to climate change.</p>
EU space policy and activities	<p>B-GEOS in Vienna serves as the science lead of the European Space Agency (ESA) Climate Change Initiative Permafrost. It also functions as Permafrost community representative to the World Meteorological Organization (WMO) Polar Space Task Group, which coordinates satellite data acquisitions in the Arctic among the various global space agencies. Researcher Annett Bartsch (BGEOS, WP 1) serves as the science lead of the European Space Agency (ESA) Climate Change Initiative Permafrost. Annett Bartsch, b.geos (WP1) leads the ESA Polar Science Cluster actions EO4PAC - Quantifying disturbance impacts on feedbacks between Arctic permafrost and global climate (July 2021- June 2023) as well as AMPAC-Net – Arctic Methane and Permafrost Challenge networking action (July 2022-May 2024).</p> <p>FMI (Kari Luojus) is a member of the ESA Snow Climate Change Initiative, responsible for global/hemispheric snow-water equivalent monitoring continuing the GLOBSNOW work (including arctic and sub-arctic areas). Sodankylä and Saariselkä are FMI’s reference sites for NASA SMAP and ESA SMOS satellite missions focusing on soil moisture and soil frost monitoring applications.</p> <p>UCL is a member of the Mission Advisory Group for a newly planned ESA satellite (STEROID). The new Earth Explorer Mission HARMONY (formerly known as STEROID) has been accepted and is moving forward. Julianne Stroeve is still on the advisory committee and will be hiring a new postdoc to work on sea ice related studies.</p>

IPBES work	CHARTER's stakeholder engagement will be used to complement IPBES communications activities to raise awareness, catalyse knowledge generation, support capacity-building and inform policymaking in the public and private sectors as well as in civil society. From the perspective of wild species, IPBES considers various approaches to the enhancement of the sustainability of the use of wild species and to strengthen related practices, measures, capacities and tools for their conservation through such use, taking into account the multiple worldviews and knowledge systems that operate within different socio-ecological contexts.
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**Attachments:**

I CHARTER Papers published in peer reviewed journals 1.8.2020 – 30.11.2022

II CHARTER Dissemination activities 1.8.2020 – 30.11.2022

# I CHARTER papers published

**These scientific journals listed in the CHARTER PEDR:** Political Geography (2021-22), Land Degradation and Society (2021-22), Environmental Research letters (2021-22), Global Ecology and Biogeography (2021-22), Global Change Biology, Journal of Biogeography, One Earth, Nature Sustainability, PNAS, Polar Research, Environmental & Science Policy, Arctic Anthropology, Arctic, Ambio

No	Full reference: Authors, Year, Title, Publication, link if available
1	<p>Serreze, M.C., Gustavson, J., Barrett, A.P., Druckenmiller, M.L., Fox, S., Voveris, J., Stroeve, J., Sheffield, B., Forbes, B.C., Rasmus, S., Laptander, R., Brook, M., Brubaker, M., McCrystall, M.R., Bartsch, A. 2021.</p> <p>Arctic Rain on Snow Events: Bridging Observations to Understand Environmental and Livelihood Impacts. Environmental Research Letters. <a href="https://doi.org/10.1088/1748-9326/ac269b">https://doi.org/10.1088/1748-9326/ac269b</a></p>
2	<p>Andrew C. Martin, Jakob J. Assmann, Richard H. W. Bradshaw, Mari Kuoppamaa, Niina I Kuosmanen, Signe Normand, James D. M. Speed &amp; Marc Macias-Fauria What evidence exists for temporal variability in Arctic terrestrial and freshwater biodiversity throughout the Holocene? A systematic map protocol. Environ Evid 11, 13 (2022). <a href="https://doi.org/10.1186/s13750-022-00267-x">https://doi.org/10.1186/s13750-022-00267-x</a></p>
3	<p><b>Barrio, I.C.</b>, Barbero-Palacios, L., Kaarlejärvi, E. <i>et al.</i> What are the effects of herbivore diversity on tundra ecosystems? A systematic review protocol. <i>Environ Evid</i> 11, 1 (2022). <a href="https://doi.org/10.1186/s13750-022-00257-z">https://doi.org/10.1186/s13750-022-00257-z</a></p>

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9	Hannon, G.E., Molinari, C., Bradshaw, R.H.W. 2022. Factors influencing late-Holocene vegetation dynamics and biodiversity on Hallands Väderö, SW Sweden: A statistical evaluation. The Holocene 32, 1317-1326.

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12	Istomin, K.V. 2020. Roads versus Rivers: two systems of spatial structuring in Northern Russia and their effects on local inhabitants. <i>Sibirica: Interdisciplinary Journal of Siberian Studies</i> , 19 (2): 1-26. doi: 10.3167/sib.2020.190202
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14	Istomin, K.V., Habeck, J.O. & Laptander, R. 2022. Reindeer Herding Statistics in Russia: issues of reliability, interpretation, and political effect. <i>Pastoralism: Research, Policy and Practice</i> , 12 (1): 19. <a href="https://doi.org/10.1186/s13570-022-00233-9">https://doi.org/10.1186/s13570-022-00233-9</a>
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18	Marin, A. & M.N.Sara, 2023. Place Attachment, Sacred Geography, and Solidarity: Indigenous Conceptions of Development as Meaningful Life in Mongolia and Norway, in The Routledge Handbook of Indigenous Development Edited By Katharina Ruckstuhl, Irma A. Velásquez Nimatuj, John-Andrew McNeish, Nancy Postero.
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21	McCrystall, M.R., J. Stroeve, M. Serreze, J. Screen and B. Forbes (2021), New climate models reveal faster and larger increases in Arctic precipitation than previously projected, <i>Nat Comm.</i> , 12, 6765, <a href="https://doi.org/10.1038/s41467-021-27031-y">https://doi.org/10.1038/s41467-021-27031-y</a> .
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34	Verdonen, M., Berner, L.T., Forbes, B.C. & T. Kumpula (2020). Periglacial vegetation dynamics in Arctic Russia: decadal analysis of tundra regeneration on landslides with time series satellite imagery <i>Environmental research letters</i> <a href="https://doi.org/10.1088/1748-9326/abb500">https://doi.org/10.1088/1748-9326/abb500</a>
35	Wang, W., He, C., Moore, J., Wang, G., & Niu, G.-Y. (2022). Physics-based narrowband optical parameters for snow albedo simulation in climate models. <i>Journal of Advances in Modeling Earth Systems</i> , 14, e2020MS002431. <a href="https://doi.org/10.1029/2020MS002431">https://doi.org/10.1029/2020MS002431</a>
36	Zhang, J., Huang, X., Wang, J., Bradshaw, R.H.W., Wang, T., Xiang, L. Luo, D., Wang, Z., Chen, F. 2022. An inverse relationship between moisture and grazing intensity in an arid mountain-basin system. <i>Progress in Physical Geography</i> 46, 310-322.

## II Dissemination activities

**Dissemination and communication activities:** Organisation of a Conference, Organisation of a Workshop, Press release, Non-scientific and non-peer-reviewed publication (popularised publication), Exhibition, Flyer, Training, Social Media, Website, Communication Campaign (e.g. Radio, TV), Participation to a Conference, Participation to a Workshop, Participation to an Event other than a Conference or a Workshop, Video/Film,

**Stakeholder groups:** Scientific Community (Higher education, Research), Industry, Civil Society (World Reindeer Herders Association), General Public, Policy Makers (Arctic Council, ministries, land-use regulatory institutions and organisations dealing with conservancy and environmental protection), Media, Investors, Customers, Other. \*Local landusers can be classified as under

**These conferences/workshops are listed in the CHARTER PEDR:** UN Climate Change Conference COP, Arctic Spirit, Nordic Society Oikos conference, INQUA International Union for Quaternary Research, ICOP International Conference on Permafrost, EGU European Geosciences

No	Type of activities	Main organizer	Partners	Title of the dissemination material	Title of the dissemination activity	Place	Date	Target audience/stakeholder	Estimated size of audience	Geographic coverage
1	CESM Land Model and Biogeochemistry Working Group Annual Meeting	National Center for Atmospheric Research		Parameters matter: improving soil and air temperature representation in an Arctic RCM using improved vegetation and soil boundary parameters		National Center for Atmospheric Research, Boulder, USA (online meeting)	2.2.2022	Scientific Community	40	global
2	CLIVAR Arctic Processes in CMIP6 Bootcamp	Ruth Mottram, Danish Meteorological Institute		Arctic Terrestrial Processes		Søminestationen, Denmark	11.10.2022	PhD students, early PostDocs= Scientific Community	20	Europe
3	Conference on Sami Forest Landscapes		Tim Horstkotte, Umeå University		Sami Forest Landscapes	Arjeplog	16-17.06.2022	Reindeer herders and researchers.		
4	Conference participation	Neotoma Palaeoecology Database	University of Liverpool	A mammoth comeback? Can large herbivores dominate ecosystem functions?		Web-based	28.4.2021	Palaeoecological researchers	120	Global
5	Conference participation	Ecological Societies of America and Canada	University of Liverpool	The use of palaeoecology in restoration ecology		Montreal, Canada	17.8.2022	Ecologists	50	North America (including Canada)
6	Non-scientific and non-peer-reviewed publication	Isabel C. Barrio, Agricultural University of Iceland	Bruce C. Forbes, University of Lapland et al.	Eating Plants to Mitigate the Impacts of Climate Change on Tundra?	Shared Voices Magazine	<a href="https://old.uarctic.org/shared-voices/shared-voices-magazine-2021/eating-plants-to-mitigate-the-impacts-of-climate-change-on-tundra/">https://old.uarctic.org/shared-voices/shared-voices-magazine-2021/eating-plants-to-mitigate-the-impacts-of-climate-change-on-tundra/</a>	2021	General Public, Scientific community	2000	Circumpolar
7	Oral presentation at the BIOSCAN NOReDNA Conference	Norwegian Barcode of Life (NorBOL)	BIOSCAN Europe; NTNU	Long-term management history affects seasonal diet composition of semi-domesticated reindeer		Trondheim, Norway	09-10.11.2022	Scientific community	>100	International
8	Oral presentation at the International Conference on DNA Barcoding and Biodiversity (ICDBB)	Bulgarian Academy of Sciences		Long-term management history affects seasonal diet composition of semi-domesticated reindeer		Sofia, Bulgaria	25-27.05.2022	Scientific community	>100	International
9	Organisation of a Workshop	Laura Barbero-Palacios, Agricultural University of Iceland		Systematic review on the effects of herbivore diversity on tundra ecosystems	Nordic Oikos Conference	Aarhus, Denmark	6 June 2022	Scientific community	10	Nordic countries
10	Organisation of a Workshop	Laura Barbero-Palacios, Agricultural University of Iceland		Systematic review on the effects of herbivore diversity on the functioning of tundra ecosystems	Herbivory Network meeting	online	16 Nov 2021	Scientific community	50	Circumpolar
11	Outreach event in a school	Jakob J. Assmann, Aarhus University		Career pathways for drone pilots and technicians; Drones help ecologist to understand the impacts of climate change on the Arctic.	Istituto Tecnico Commerciale "G. P. Chironi" Nuoro, Sardinia, Italy (part of an ERASMUS plus programme)		24.09.2021	High school students= GENERAL PUBLIC	30-40	Italy
12	Outreach event in a school	Salla Eilola, UTU - Finland		Maantieliijä arktisen alueen havaittuja ympäristömuutoksia tutkimassa ("Studying perceived environmental changes in the Arctic as a geographer")		Upper secondary school of Savukoski	27.4.2022	High school students= GENERAL PUBLIC	5	Savukoski, Finland
13	Panel at the World Economic Forum	Arctic Basecamp	Prince Albert II of Monaco	The Polar Alarm Bells are Ringing. Will the World Listen?	Panel	World Economic Forum, Davos	23.5.2022	Various stakeholders	30-40 in person, 100s online	Global
14	Participation to a Conference	Laura Barbero-Palacios, Agricultural University of Iceland	BARBERO-PALACIOS, L., BARRIO, I.C., SPEED, J.D.M. et al.	Synthesizing the role of herbivore diversity on tundra ecosystems. [poster presentation]	Nordic Oikos Conference	Aarhus, Denmark	7-10 June 2022	Scientific community	300	Nordic countries
15	Polar CORDEX annual meeting	Annette Rinke, AWI, John Cassano, UoC Boulder		Providing relevant climate information to Arctic reindeer[herding communities]		Bjerkness Center, Bergen, Norway	28.9.2022	Scientific Community	15	Polar CORDEX community (Europe, US, Asia, South America)
16	PolarRes annual meeting	Priscilla Mooney, Bjerkness Center		Dedicated interaction with PolarRes partners and coordinator to promote possible synergies between PolarRes and CHARTER.		Bjerkness Center, Bergen, Norway	26.-27.9.2022	Scientific Community	10	PolarRes partners (EU)
17	presentation at conference	ESA – Living Planets Symposium	Miguel Villoslada, Sari Juutinen, Henni Yläne, Franziska Wolff, Pasi Korpelainen, Timo Kumpula	Using Unmanned Aerial Systems to unveil the impacts of woody encroachment in subarctic tundra wetlands		Bonn	25.5.2022			Germany

18	presentation at conference	ESA – Living Planets Symposium	Timo Kumpula, Helena Bergsted, Roza Laptander, Dorothee Erich, Alexander Sokolov, Natalia Sokolova, Svetlana Abdulmanova, Annett Bartsch, Pasi Korpelainen, Bruce C. Forbes.	The thaw lakes and drained thaw lakes in the Yamal peninsula 1961 – 2018, impacts on land cover change and reindeer herding		Bonn, Germany				
19	presentation at conference	Ecosystem Services Partnership – EU Conference.	Miguel Villoslada, Sari Juutinen, Henni Yläne, Franziska Wolff, Pasi Korpelainen, Timo Kumpula	Arctic shrubification: Unveiling the role of reindeer husbandry as a Nature-based solution in tundra ecosystems.		Heraklion, Greece	14.10.2022			
20	Press release	NMBU- Norway		Advancing the Adaptive Capacity of Arctic communities		<a href="https://www.nmbu.no/en/faculty/landsam/departmant/noragric/news/node/40338">https://www.nmbu.no/en/faculty/landsam/departmant/noragric/news/node/40338</a>	12.05.2020	General public/academics/students		Global
21	Press release	UTU - Finland	University of Lapland	Kyselyllä selvitetään ympäristömuutoksia ja asukkaiden tulevaisuuden toiveita Savukosken seudulla ("Survey investigates perceived environmental changes and local people's future		<a href="https://www.espressi.com/tiedotteet/tiede-ja-tutkimus/kyselylla-selvitetaan-ymparistomuutoksia-ja-asukkaiden-tulevaisuuden-toiveita-savukosken-seudulla.html">https://www.espressi.com/tiedotteet/tiede-ja-tutkimus/kyselylla-selvitetaan-ymparistomuutoksia-ja-asukkaiden-tulevaisuuden-toiveita-savukosken-seudulla.html</a>	4.2.2022	Residents and land users		Northern Finland
22	Press release	UZH	ULapland, GEUS, FMI, Batelle, University Montreal, Argonne National Lab, University of North Dakota	Vegetation regulates energy exchange in the Arctic			31 Oct 2022	public	69.5 Mio potential readers (28 articles)	global
23	Public event in a town hall	UTU - Finland	University of Lapland, Arctic Centre	Savukosken seudulla havaittuja ympäristömuutoksia ja toiveita tulevaisuudelle - CHARTER-hankkeen käynnissä oleva kysely ("Perceived environmental changes and future wishes in Savukoski region - ongoing survey of Charter project")		Town hall of Savukoski municipality	6.4.2022	Residents and land users, municipal decision-makers = CIVIL SOCIETY/POLICY MAKERS		2 Savukoski, Finland
24	Scientific seminar at the Ecology and Dynamics of Human-influenced Systems Lab, University of Amiens, France	Ronan Marrec, University of Amiens		Long-term management history affects seasonal diet composition of semi-domesticated reindeer		Amiens, France	17.06.2022	Scientific community	15	France
25	Website interview	NMBU- Norway		Hvordan kan reindrifta tilpasse seg klimaendringene? ("How can reindeer herding adapt to climate changes?")		<a href="https://www.nmbu.no/aktuelt/node/42407">https://www.nmbu.no/aktuelt/node/42407</a>	04.02.2021	General public/academics/students		Norway/Scandinavia
26	Workshop with reindeer herders		Anna Skarin, SLU, Sweden, Hans Tommervik, NINA	Impact of supplementary feeding on reindeer health and the environment		Arvidsjaur	7-9.06.2022	Reindeer herders	18	
27	conference	UNFCCC	Annett Bartsch, bgeos	Contribution to UNFCCC Panel on early warning using satellite data at Earth Day	Contribution to UNFCCC Panel on early warning at Earth Day	Sharm el Sheik, Egypt	9.11.2022	General public/academics/students	>1000	Global
28	Training	ESA	Annett Bartsch, bgeos	Lecture on community involvement in snow monitoring (material prepared by LAY)	ESA Training Course on Arctic Methane and Permafrost 2022	Andoya Space centre, Norway	22.9.2022	university students and post-docs	24	Global
29	conference	ASSW/ IASC	Annett Bartsch, bgeos	satellite based monitoring of industrial development across the Arctic	invited keynote	University Tromso	29.3.2022	Scientific Community (Higher education, Research)	>100	Global
30	Seminar series	ISSI	Annett Bartsch, bgeos	Changing northern lands	ISSI Game Changer Seminar, invited contribution	ISSI Bern -online ( <a href="https://www.issi.bern.ch/game-changers-changing-northern-lands/">https://www.issi.bern.ch/game-changers-changing-northern-lands/</a> )	13.5.2022	General public/academics/students	>100	Global
31	participation to a workshop	Doctoral Pro-gramme, Ecosystems and Environment Research Programme Helsinki Institute of Sustainability Science (HELSUS)	Jussi Eronen	Sustainable development pathways achieving Human well-being while safeguarding the climate And Planet Earth (SHAPE) Stakeholder workshop	Creative adaptation to wicked socio-environmental disruptions (WISE STN) Doctoral Programme in Geosciences, Past Present Sustainability (PAES)	Helsinki, Finland	4-8.4.22	scientific community		Finland
32	participation to a workshop	Doctoral Pro-gramme, Ecosystems and Environment Research Programme Helsinki Institute of Sustainability Science (HELSUS)	Jussi Eronen	Virtual Symposium and Round Table: The past as a lens for biodiversity conservation on a dynamically changing planet		United States	2-3.12.21	scientific community		USA

33	participation to a workshop	Doctoral Programme, Ecosystems and Environment Research Programme Helsinki Institute of Sustainability Science (HELSUS)	Jussi Eronen	Sustainable development pathways achieving Human well-being while safeguarding the climate And Planet Earth (SHAPE) Stakeholder workshop	Creative adaptation to wicked socio-environmental disruptions (WISE STN) Doctoral Programme in Geosciences, Past Present Sustainability (PAES)		6.12.2021	scientific community		global
34	TV	YLE	Jussi Eronen	YLE 5+1 sukupuuttoa (haastattelu ja juttu)		Helsinki, Finland	24.8.2022	general public		Finland
35	TV	YLE	Jussi Eronen	Tutkijoiden mukaan kuudes joukkosukupuutto etenee vauhdilla ja uhkaa koko ihmiskuntaa – Lajikatoa on kuitenkin vielä mahdollista hidastaa			24.8.2022	general public		Finland
36	Interview	Tekniikka ja Talous magazine	Jussi Eronen	Haastattelu Keikahduspeisteistä			4.9.2020	General public		Finland
37	article	Poromies	Sirpa Rasmus, Sonja Kivinen, Sarkki Simo, Jussi T. Eronen, Jouko Kumpula, Timo Kumpula, Minna Turunen et al.	Toteutuivatko 20 vuotta sitten tehdyt ennusteet?			2022			Finland
38	exhibition	Heureka	Jussi Eronen	A popular-scientific exhibition "Facing Disaster"	Consultation for the Facing Disaster exhibition, helping with the planning and scientific context for the exhibition.	Finland	Period:23 Nov 2021 → Sep 2023	general public		Finland
39	publication	<a href="https://researchportal.helsinki.fi/en/organisations/helsinki-institute-of-sustainability-science-helsus">https://researchportal.helsinki.fi/en/organisations/helsinki-institute-of-sustainability-science-helsus</a>	Reetta Toivanen, Pirjo Kristiina Virtanen, Jussi T. Eronen, et al.	Promoting comprehensive sustainability in strategy work in the Arctic			2021	scientific community		Finland
40	publication	HELSUS	Reetta Toivanen, Pirjo Kristiina Virtanen, Jussi T. Eronen, Hanna Guttorm, Inari Helle, Kaisa Korhonen-Kurki, Linda Lammensalo	Kokonaiskestävyiden edistäminen arktisen alueen strategiatyössä			11 Oct 2021	scientific community		Finland
41	publication		Jussi T. Eronen, Sirpa Rasmus, Mia Landauer, Bruce Forbes	CHARTER-hankkeen taustapaperi 1: Tietoa ja arktisia näkemyksiä ilmasto- ja ympäristölainsäädännön tueksi			30 Sep 2020	scientific community		Finland
42	publication		Jussi T. Eronen, Sirpa Rasmus, Mia Landauer, Bruce Forbes	CHARTER Working Paper 1: Knowledge and Arctic Perspectives to Support Climate and Environmental Legislation development			18 Dec 2020	scientific community		Finland
43	publication	Faculty of Biological and Environmental Sciences, University of Helsinki	Emelie Winquist	Impacts of reindeer grazing and local topography on plant and lichen communities across the reindeer fence along the Finnish-Norwegian border	master thesis	Helsinki, Finland	2021	scientific community		Finland
44	publication	Uarctic - Shared Voices Magazine	Philip Burgess et al. / LAY	CHARTER – Towards a Broader Understanding of Arctic Complexity			2021	general public		Circumpolar
45	Participation in Event	Arctic Centre, Ulapland. Arctic Cafe event	Markku Heikkilä, Bruce Forbes	Arctic Café: Maankäyttö, ilmastonmuutos, oikeudenmukaisuus – Kolme pohjoiselle tärkeää Horisontti -hanketta esittäytyy		Rovaniemi, Finland	25.11.2020	general public		Finland
46	publication	Rannís - Rannsóknamiðstöð Íslands	Egill Þór Nielsson and Þorsteinn Gunnarsson (eds.)	Mapping Arctic Research in Iceland			2020	scientific community		Iceland
47	Interview	Maaseudun Tulevaisuus - magazine	Sirpa Rasmus	Lumihiutale muuttaa muotoaan koko talven ajan		Finland				Finland
48	Participation at a conference	IASS (Institute for Advanced Sustainability Studies)	J. Otto Habeck (UHAM)	Stakeholder involvement and participatory research: how do they work in practice? Examples from the circumpolar North	Methods and Ethics in Transformative Arctic Research	ONLINE (Institute for Advanced Sustainability Studies), Potsdam, Germany	25.09.2020	Scientific community (research)	Approx. 40 scientists of different disciplines	
49	Participation at a conference	Saxon State Museum for Archaeology (SMAC)	J. Otto Habeck (UHAM)	What is it like to live with/without permafrost? Cattle, sheep, horses, reindeer and their herders in sub-polar and inner-Asian regions	ON MELTING GROUND: ARCTIC ARCHAEOLOGY (conference)	Saxon State Museum for Archaeology (SMAC), Chemnitz, Germany	21.10.2021	Scientific community (research)	Approx. 50 scientists of different disciplines	Northwest Russia (Komi), Siberia (Central Yakutia/Sakha), Mongolia (Selenge)
50	Non-peer-reviewed publication	Saxon State Museum for Archaeology (SMAC)	J. Otto Habeck (UHAM)	What is it like to live with/without permafrost? Cattle, sheep, horses, reindeer and their herders in sub-polar and inner-Asian regions	On Melting Ground: Arctic Archaeology (collected volume; ms accepted for publication)	Saxon State Museum for Archaeology (SMAC), Chemnitz, Germany	26.10.2022	Scientific community (research)	Less than 300 (no online edition – the collected volume will appear only in print)	Northwest Russia (Komi), Siberia (Central Yakutia/Sakha), Mongolia (Selenge)
51	Other (science communication and planning)	Social and Human Sciences Working Group (SHWG) of the International Arctic Science Committee (IASC)	J. Otto Habeck (UHAM) as German representative of SHWG	Update on work in CHARTER	Open session of the Social and Human Sciences Working Group (SHWG) of the International Arctic Science Committee (IASC)	ONLINE (Arctic Science Summit Week 2021), Lisbon, Portugal	20.03.2021	Scientific community (research)	Approx. 35 representatives of 21 countries (mostly IASC member states)	Fennoscandia, Northwest Russia

52	Lecture (video available)	Universität Hamburg (UHH)	J. Otto Habeck (UHAM)	Klimawandel im hohen Norden Russlands: Wie Rentierhirten die Veränderungen in der Tundra beschreiben	Ringvorlesung Osteuropastudien an der Universität Hamburg, Wintersemester 2021/22 „Zwischen Umweltzerstörung und ländlicher Idylle: Osteuropa in ökologischer Perspektive“	ONLINE (Universität Hamburg), Hamburg, Germany	12.01.2022	Scientific community (higher education)	120 students of different BA and MA programmes	Northwest Russia (Komi, Yamal, etc.)
53	Non-peer-reviewed publication (popularised publication)	Istituto Geografico Polare "Silvio Zavatti"	Kirill Istomin, J. Otto Habeck (UHAM)	"Permafrost e utilizzo autoctono del suolo negli Urali settentrionali: allevamento delle renne dei Komi e Nenets" [Permafrost and indigenous land use in the Northern Urals: Komi and Nenets reindeer herding].	Il Polo: rivista trimestrale dell'Istituto Geografico Polare "Silvio Zavatti", LXXV (2): 9-29.	Istituto Geografico Polare "Silvio Zavatti"; Fermo, Italy	01.10.2020	General public, mainly academia-related	Less than 300 (no online edition – the journal appears only in print)	Northwest Russia (Komi, Yamal, etc.)
54	Other (science-policy interface)	Arktisbüro Deutschland (Arctic Office Germany)	J. Otto Habeck (UHAM), Stephan Dudeck (IASS Potsdam)	Zur derzeitigen Situation in der sozialwissenschaftlichen Arktisforschung mit Bezug auf Russland	Arktis-Dialog Nr. 20	Deutsche Gesellschaft für Auswärtige Politik, Berlin, Germany	29.11.2022	Policy Makers (ministries)	Approx. 25 representatives of different German federal ministries and research agencies	Russia in general
55	Social Media (youtube broadcast)	Pora foundation	Kirill V. Istomin (UHAM)	Arctic Nomads, <a href="https://www.youtube.com/watch?v=JMpVSz1Fn0&amp;t=21s">https://www.youtube.com/watch?v=JMpVSz1Fn0&amp;t=21s</a>	"Arctic vibes" Video series	N/A	14.08.2021	General public	575 unique views	Russian Arctic
56	Participation at a conference	The 10th International Congress of Arctic Social Sciences (ICASS X)	Roza Laptander (UHAM)	The Nenets religious norms of hunting for sea mammals in the Baydarata Bay, Yamal Peninsula	<b>Session: Spirits of places, animals and persons: New religions for new needs</b>	ONLINE (University of Arkhangelsk), Arkhangelsk, Russia	18.07.2021	Scientific community (research)	Approx. 50 scientists of different disciplines	Western Siberia (Yamal)
57	Participation at a conference	Vienna Anthropology Days (Vanda 2020)	Roza Laptander (UHAM)	Changing Cryospheres I: Global Warming in Polar and Alpine Settings	Climate change and coping with other rapid changes in the Yamal tundra	ONLINE (University of Vienna), Vienna, Austria	30.09.2020	Scientific community (research)	Approx. 30 scientists of different disciplines	Western Siberia (Yamal)
58	Participation at a conference	CIFU XIII Vienna University, Finno-Ugrian Studies	Roza Laptander (UHAM)	Reindeer food names in Nenets language	Names of Lichen and other reindeer food in the Nenets language: how to save them in the condition of the climate change	University of Vienna, Vienna, Austria	25.08.2022	Scientific community (linguists, researchers)	40 linguists from the different fields of the Finno-Urgian and the Samoyedic languages	Western Siberia (Yamal)
59	Participation at a conference	Vienna Anthropology Days (Vanda2022)	Roza Laptander (UHAM)	Traditional and modern environmental knowledge of snow, ice and permafrost among the Yamal Nenets. <a href="https://vanda.univie.ac.at/scientific-program/">https://vanda.univie.ac.at/scientific-program/</a>	Traditional and modern environmental knowledge of snow, ice and permafrost among the Yamal Nenets. <a href="https://vanda.univie.ac.at/scientific-program/">https://vanda.univie.ac.at/scientific-program/</a>	University of Vienna, Vienna, Austria	26.09.2022	Scientific community (research)	Approx. 50 scientists of different disciplines	Western Siberia (Yamal)
60	Lecture (video available)	PhD Course: Participatory Research in a Globalizing North (University of Lapland)	Roza Laptander (UHAM)	Revisiting the relationship between researchers and people in the tundra (a talk about working with tundra people and conducting interviews with them)	PhD Course: Participatory Research in a Globalizing North	University of Lapland, Rovaniemi, Finland	12.10.2022	PhD Students community (research)	Approx. 20 people	Western Siberia (Yamal)
61	Press release (website)	Arctic Anthropology Blog	Roza Laptander (UHAM)	Mobility in the tundra: how to use the old snowmobiles in the summer. <a href="https://arcticanthropology.org/2021/09/15/mobility-in-the-tundra-how-to-use-the-old-snowmobiles-in-the-summer/">https://arcticanthropology.org/2021/09/15/mobility-in-the-tundra-how-to-use-the-old-snowmobiles-in-the-summer/</a>	Arctic Anthropology Updates and News from Northern Anthropologies of Circumpolar Regions	ONLINE (Arctic Centre), Rovaniemi, Finland	15.9.2021	General public	Unknown	Western Siberia (Yamal) Polar Ural Mountains
62	Press release (website)	Arctic Anthropology Blog	Roza Laptander (UHAM)	If Santa Claus' reindeer can fly, what about other reindeer? <a href="https://arcticanthropology.org/2022/06/20/if-santa-claus-reindeer-can-fly-what-about-other-reindeer/">https://arcticanthropology.org/2022/06/20/if-santa-claus-reindeer-can-fly-what-about-other-reindeer/</a>	Arctic Anthropology Updates and News from Northern Anthropologies of Circumpolar Regions	ONLINE (Arctic Centre), Rovaniemi, Finland	20.7.2022	General public	Unknown	Western Siberia (Yamal)
63	Video/Film making	BBC Frozen Planet II: The Nenets, BBC (film)	Roza Laptander (UHAM)	Translation work of Interviews from Nenets to English collected from the Yamal Nenets talks about climate change and global warming in the Yamal Tundra	BBC Frozen Planet II	ONLINE	2020-2022	General public	Global	Western Siberia (Yamal)
64	Video/Film making	DOMINO PRODUCTION, Belgium (film)	Roza Laptander (UHAM)	Translation work of Interviews from Nenets to English collected from the Yamal Nenets talks about climate change and global warming in the Yamal Tundra	Translation work	in work	June-August 2022	General public	Global	Western Siberia (Yamal)
65	Popularised publication	Laptander, R., Laptander, N. Salminen, T.; helda.fi (Helsinki University Digital Archive)	Roza Laptander (UHAM)	Laptander, R. 2022. Ngesiko' Laptander's Pi' sarma khnytabts.Helsinki: Helsingin yliopiston kirjasto, 2022, pp. 383-396. <a href="https://helda.helsinki.fi/bitstream/handle/10138/342438/Osa%2032%20Laptander.pdf?sequence=5">https://helda.helsinki.fi/bitstream/handle/10138/342438/Osa%2032%20Laptander.pdf?sequence=5</a>	<a href="http://www.helda.fi">www.helda.fi</a> (Helsinki University Digital Archive)	Laboravaya, Yamal-Nenets Autonomous Okrug, Russia; ONLINE (University of Helsinki), Finland	2022	General public	?	Western Siberia (Yamal) Polar Ural Mountains

66	Popularised publication	Nordicum-Mediterraneum: Icelandic E-Journal of Nordic and Mediterranean Studies	Roza Laptander (UHAM)	The Nenets' Sacred Places: The singing mountain Yangana-Pe. <a href="https://nome.unak.is/wordpress/volume-17-no-3-2022/long-abstract-editor-review/the-nenets-sacred-places-the-singing-mountain-yanganya-pe/">https://nome.unak.is/wordpress/volume-17-no-3-2022/long-abstract-editor-review/the-nenets-sacred-places-the-singing-mountain-yanganya-pe/</a>	Nordicum-Mediterraneum: Icelandic E-Journal of Nordic and Mediterranean Studies	ONLINE (University of Akureyri), Iceland	2022	General public	?	Western Siberia (Yamal) Polar Ural Mountains
67	Press release (website)	GoArctic.ru (News Portal)	Kirill Istomin, Roza, Laptander, J. Otto Habeck (all at UHAM)	Reindeer and numbers: How reindeer-herding statistics come into being and work [Олени и цифры: как создаётся и работает статистика оленеводства]. <a href="https://goarctic.ru/work/oleni-i-tsifry-kak-sozdayetsya-i-rabotaet-statistika-olenevodstva/">https://goarctic.ru/work/oleni-i-tsifry-kak-sozdayetsya-i-rabotaet-statistika-olenevodstva/</a>	Arctic Development Portal [Портал о развитии Арктики] – <a href="https://goarctic.ru">https://goarctic.ru</a>	ONLINE (GoArctic.ru), Arkhangelsk, Russia	14.06.2022	General public	Unknown	Northwest Russia (Kola, Komi, Yamal, etc.)
68	Non-Scientific and non-peer-reviewed publication (popularised publication), Website	GoArctic.ru (News Portal)	Kirill V. Istomin (UHAM)	Невидимые люди. 90 лет злочлоений воркутинских ненцев-частников. <a href="https://goarctic.ru/politics/nevidimye-lyudi-90-let-zloklyucheniyy-vorkutinskiy-nentsev-chastnikov/">https://goarctic.ru/politics/nevidimye-lyudi-90-let-zloklyucheniyy-vorkutinskiy-nentsev-chastnikov/</a>	Arctic Development Portal [Портал о развитии Арктики] – <a href="https://goarctic.ru">https://goarctic.ru</a>	Online (GoArctic.ru), Arkhangelsk, Russia	06.12.2021	General Public	Unknown	Vorkuta, Komi Republic, Russia