Integrating Activities for Advanced Communities

D2.10 – Interactive Edition of the Science Stories Book

Project No.730938– INTERACT

H2020-INFRAIA-2016-2017/H2020-INFRAIA-2016-1

Start date of project: 2016/10/01 Duration: 48 months
Due date of deliverable: 2018/03/31 (Month 13) Actual Submission date: 2018/03/29

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Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the Consortium (including the Commission Services)	
CO	Confidential, only for members of the Consortium (including the Commission Services)	

Table of content

Publishable Executive Summary

During its first phase, INTERACT produced a highly illustrated popular science book called “Stories of Arctic Science “ to reflect that Indigenous Peoples of the Arctic pass knowledge from generation to generation by telling stories. The book was highly successful and was appreciated at all societal levels from school children to Royalty and top-most politicians. Consequently, two printings were made, each of 1,000 copies. As many “stories” were based on Transnational Access projects that were not complete at the time, there is a need to publish a new edition with appropriate updates. Also, the original book was the basis of a Mass On-line Outreach Course in English and Russian that has attracted over 5,000 learners and specific graphics and an animation were made for this course. This provides the opportunity for up-dating the book and converting it to an e-book with embedded links to animations, glossary terms, photo-gallery and research station descriptions on the INTERACT web site. This deliverable sets out a description of the book and the tasks that are necessary to complete it.

1. Introduction

During its first phase, INTERACT produced a highly illustrated and multidisciplinary popular science book called “Stories of Arctic Science “ to reflect that Indigenous Peoples of the Arctic pass knowledge from generation to generation by telling stories. The book was highly successful and was appreciated at all societal levels from school children to Royalty and top-most politicians. Consequently, two printings were made, each of 1,000 copies. As many “stories” were based on Transnational Access projects that were not complete at the time, there is a need to publish a new edition with appropriate updates. Also, the original book was the basis of a Mass On-line Outreach Course in English and Russian that has attracted over 5,000 learners and specific graphics and an animation were made for this course. This provides the opportunity for up-dating the book and converting it to an e-book with embedded links to animations, glossary terms, photo-gallery and research station descriptions on the INTERACT web site. The product is a joint initiative between INTERACT partners University of Sheffield, University of Oulu and Tomsk State University.

2. Technical details

The book will not be published in a hard copy although a pdf in printed format will be made available on the INTERACT web site: this will not have interactive functionalities. Interactive versions of the e-book will be produced with many functionalities in forms for iPads and desk top computers. The new edition will keep as far as possible its initial structure and original layout with INTERACT branding developed by Aarhus University. The e-book will be accessible through hard copy brochures with a phone/iPad readable bar code and through the INTERACT web site. The location of the files is currently under discussion with severable options available such as the super computer at Tomsk State University. Similarly, the physical location of animation and video files is under discussion with the supercomputer and/or INTERACT’s YouTube account as possibilities. In contrast, the photo-gallery, glossary and station descriptions will be physically located on INTERACT’s web site. The possibility of a link to the Mapillary video tour of research stations (WP3) will be explored.

The University of Sheffield and University of Oulu will provide the up-dated textual content via the 152 contributors and will liaise with Tomsk State University to develop explanatory animations, video clips and graphics that will also be available in stand-alone format for educational purposes. Tomsk State University will provide the technical expertise for producing the graphics and the interactive format of the book. We will also seek advice from Polar Educators International for various possibilities for technical format and to ensure lack of duplication of embedded components.

3. The process so far

The book consists of short overview chapters for 7 disciplines, each produced by experts. These topics are listed in Table 1. Each of these overviews is followed by a series of two-page stories of

Transnational Access projects. For each overview and science story, the following has been checked by the editors:

1) What textual content needs to be changed, for example new findings/understanding and new publications based on the TA projects, particularly in the sections "What did we find?" and "Why are the results important?".
2) What animations/video clips/graphics should be added/developed.
3) What additional links should be embedded throughout the book e.g. glossary terms, photo-gallery, research station description and possibly Mapillary 3D video tours of the stations.

In addition, we will solicit requests for the development of new graphics and we will explore the possibility of linking to video clips/footage/blogs from the field work. The suggestions so far are documented in Table 1.

Table 1. Suggested up-dates and graphics developments for the next "e" edition of the INTERACT "Stories of Arctic Science" book. Page numbers refer to the original book available in pdf format from the INTERACT web site.

Chapter	**Component**	**Suggested edits**
Preface	Text by HRH Princess Victoria of Sweden	Seek video message
Introduction	Northern light photo pages 10-11	Link to video clip showing movement and ensure description exist in the Glossary
	Figure 1 of seasons, page 12	Seek existing animation or develop new one
	Figure 8, global temperature change, page 15	Seek existing animation (NASA/NSIDC?)
	Figure 14, Trans national access, pages 20 and 21	Up-date
Section 1 Overview Landscapes and landforms	Figure 1.1, Holocene sea level change, page 24	Seek existing animation (International Sea Level Institute, R. Corell)
	Figures 1.3 and 1.4, glacial scenery, page 26	Develop animation about glacial effects on landscape and particularly hanging valleys (specifically requested by Schools)
	Figure 1.5, slope processes, page 27	Link to videos and/or photos of a) slush avalanches, b) mud flows and c) snow avalanches

Story 1.1	Radar scan, page 35	Is a 3D view available?
Story 1.2	No specific requests	Link to a blog?
Story 1.3	Core photo, page 35	Link to core animation developed for page 130
Story 1.4	Drone inset, page 41	Link to video clip of drone flying and/or 3D view from drone
Story 1.5	Glacial outburst sequence, pages 42 and 43	Link to video if available
Section 2, Overview, Permafrost	New content:	-Permafrost limit moving northwards (new text or photo) -Exploding pingos (new text or photo) -Animation 1. Permafrost layer animation -Animation 2. Polygon formation and degradation -Nadja Matveyeva's new photo of rapid polygonization
Story 2.1	No specific requests	Link to a blog?
Story 2.2	Link to text on roots	Develop graphic as magnifying glass on the permafrost animation showing root dynamics
Story 2.3	Pages 58 and 59	Link to later animation in Section 4 about trace gas emissions and albedo
Story 2.4	Pages 60 and 61	-Use a "magnifying glass" for stable isotopes based on Animation 1 of permafrost -Add a graphic on palsa formation (old drawing of Martti Seppälä)
Story 2.5	Pages 2.5 and 2.6	Explore if there is any video clip etc
Section 3, Overview, Snow and Ice	Page 67 Greenland Ice Sheet Figures	Link to existing animation (NSIDC)
	Page 68, Figure 3.4	Insert winter seasons' snow cover into existing animation and make a link to this
		Contribution to sea level rise (new content graphic/text)
		A new graphic: what can you find in a snow pack?
		Text and graphic about ice cores and what they show
Story 3.1		No special suggestions from Terry and Hannele
Story 3.2		Link to the new snow pack graphic
Story 3.3		Link to the new snow pack graphic
Story 3.4		Check if there are any interviews or video clips by Sebastian
Story 3.5	Figure top page 81	clarify the figure about projected changes (to make it more understandable)
Story 3.6		No requests from the editors
Story 3.7		Develop an animation how the radar works (technical point of view)

Section 4, Overview, Land-atmosphere linkages	Figure 4.2, page 88	Develop and link to an animation of the trace gases and albedo
	Figure 4.1 page 88 and 4.4 page 89	Authors to give easer explanations of the figures
Story 4.1	Figure top left page 93	Link the albedo figure to the animation in Section 4 overview.
Story 4.2		No suggestions from the editors
Story 4.3	Page 97, top right	Provide a simple information box on DNA and DNA fingerprinting
Story 4.4	Page 99, graph	Link to the trace gas animation from the overview
Story 4.5		-Link to the trace gas animation -Explore if there is any video footage on the plastic hexagons (warm plots)?
Section 5, Life on Arctic Lands, Overview		-Add new content on extreme events, e.g. invasive species and diseases, extreme weather and fire. Seek photos or video from Yamal mass reindeer death and range shift of scavenging birds (e.g. from A. Sokolov)
		-Add new content on food webs of smaller animals (e.g. spiders and small invertebrates). Include a mention of the molecular methods used and link to Story 5.6 material.
		-Include new data on browning and greening of vegetation. Link to the illustration in the Introduction by Xu et al. (Figure 9, Page 16).
		-Seek existing, or develop a new graphic about shrub rings and what they tell us about past climatic changes. Contact the authors of relevant 2-page stories to ask if they already have any relevant material.
Story 5.1	Page 113	-Link the two bottom figures to the shrub ring graphic proposed for the overview -Link the article to an existing blog
Story 5.2		No editorial requests
Story 5.3	Page 117, top right	-Request the author to simplify the graphic
Story 5.4		-Explore if a video clip is available about the field work
Story 5.5		-Cross-refer to the graphic including lemming cycles in the overview (Figure 5.9, Page 109) -Explore the availability of video clips on lemmings
Story 5.6		-Explore if author can identify existing animation/video clip explaining how DNA can be used to identify food webs
Story 5.7		-Explore the existence of relevant video clips from the field - Explore the existence of video clips/photos of experimental nests from work by Gauthier of Canada

Section 6: Life in Cold Waters, Overview	Figure 6.4, Page 129.	-Link to the ice core animation/graphic development suggested for Figure 3.4, Page 68
	Figure 6.5, Page 130	-Develop an animation/graphic of the sediment core analysis and interpretation. Include link to Story 1.3 -
	Figure 6.7, Page 131	-More information is needed on the balance between wetting and drying of tundra, perhaps by developing a graphic/ animation. This could also be related to Figure 1.10, Page 31
		- Insert new content on flow of materials/energy along major rivers
Story 6.1		-Refer to the sediment core graphic to be developed for Figure 6.5, Page 130
Story 6.2		-Refer to the sediment core graphic to be developed for Figure 6.5, Page 130
Story 6.3		-No specific requests from the Editors
Story 6.4		-No specific requests from the Editors
Story 6.5		-Consult with the authors of this and Story 6.6 about constructing an information graphic about the importance of microbes in the Arctic. Possibly refer to the Arctic Biodiversity Assessment
Story 6.6		-Consult with the authors of this and Story 6.5 above about constructing an information graphic about the importance of microbes in the Arctic. Possibly refer to the Arctic Biodiversity Assessment -The update is particularly important
Section 7: People in the North, Overview	Figure 7.1	- add video clips of communities and interviews with indigenous peoples -Links from Fig 7.1. to the interviews (click “Murmansk” for example)
		-Eploitation (mineral, oil, tourism, shipping etc.) is missing and should be added to the text
Story 7.1		-Refer to new graphics/content on slope processes suggested for Section 1
Story 7.2		-No special requests from the Editors
Story 7.3		-No special requests from the Editors except perhaps linking to an existing blog
Story 7.4		-No special requests from the Editors
Story 7.5		-No special requests from the Editors
Story 7.6	Page 166, lower Figure	-Explore with the authors if there is a video clip from the consultation or follow-up activities

New end section (1 page)		-How do we know climate change is man-made? -What can we do to prevent or reduce impacts or o adapt?? -Develop animation of man-made climate change

4. Next Steps

The next step is to advise authors of our requests and to invite them to suggest their own suggestions for up-dates and graphic development. They might also wish to provide links to video sequences of field work and study sites. The immediate term activities required are:

- Contacting the co-authors to suggest modifications listed in Table 1 and to solicit new graphics and requests for specific graphic development additional to those suggested by the editors. (University of Oulu)
- Developing animations and specific graphics. (University of Sheffield (concepts) and Tomsk State University (technical production)).
- Selecting the interactive book format (University of Sheffield and Tomsk State University)
- Contacting the University of Aarhus to discuss copyright issues and availability of electronic material (University of Oulu)
- Searching the internet for examples of existing relevant resources (University of Oulu)

5. Required graphics, form, status and action required

The process of developing graphics has started. These will be both accessed as links through the book and as stand-alone educational resources in a database. Some of the graphics are simple schematics whereas others are complex animations. The list will develop as we more clearly identify feasible activities and have feedback from authors and graphic artists/IT experts.

*Table 2. Details of required graphics plus priority rankings (*** = highest priority, ** = high priority, * = medium priority – all others are low priority). Priority rankings refer to importance and accessibility/feasibility*

Graphic	Form	Status	Action point
Northern lights, pages 10 and 11 *	video	exists	Contact Yulia Zaika
Seasons and solar cycle page 12 *	animation	unknown	Search internet
Global warming trend page 15 ***	animation	exists	Search NASA and NDIDC
Sea level change page 24 **	animation	unknown	Contact David Vaughan and Robert Corell

Periglacial scenery page 26 **	animation	Being developed	Continue development with consultation with C. Jonasson
Slope processes and extreme events page 27 ***	video	exists	Contact C. Jonasson
3D image page 35 *	Static graphic	unknown	Contact authors
Use of drones page 41 ***	video	Exists within INTERACT	Modify
Glacial outburst page 42 ***	video	unknown	Contact author
General permafrost animation, e.g. page 48 ***	animation	almost complete	Finish, make voice-over and check
Polygon formation and degradation e.g. page 48 ***	animation	almost complete	Finish, make voice-over and check
Add magnifying glass for roots and enzymes to the general permafrost animation developed for page 48 and link to on page 57***	animation	Addition to existing animation required	Develop concept
Graphic on palsa formation for page 60 *	Static graphic	Exists but needs to be re-drawn	Locate drawing from Seppela paper
Greenland Ice Sheet Cores with labels on what can be found in a snow pack added on them for page 65 *	Photos with labels	Exist but graphic needs to be designed and labels added	Locate photos from M. Johansson and/or D. Dahl Jensen
Changes of the Greenland Ice Sheet for page 67 **	Animation	exists	Locate e.g. NASA, NSDIC, Dahl Jensen
Glacial retreat for page 68 ***	Animation	Exists but modify to add snow in winter	Under development
Contributions to sea level change page for page 70? **	Table and/or static graphic/photo	Exists	Locate e.g. AMAP, IPCC
How ground penetrating radar works for page 85	Video about how to use it in the field	Probably exists	Locate e.g. by contacting the authors
Trace gases and albedo page 88 ***	Animation	Graphic exists	Convert to animation
Use of DNA in identifying food webs for page 97 **	Static graphic	Unknown	Contact author, T. Roslin
Extreme events such as anthrax outbreaks, and	Photos, newspaper clips, video	Unknown	Locate e.g/ A. Sokalov

death of reindeer for Section 5 overview *			
Explanation of shrub rings and climate for page 109 *	Video, static graphic, or animation?	Unknown	Locate e.g. A. Buras
Arctic bees for page 115	Video from the field	Unknown	Locate by asking the authors
Lemmings for page 121 *	Video	Unknown	Locate
Predator-prey interactions for page 125 *	Video from the field and photo of artificial experimental nest	unknown	Locate e.g. from Gauthier
Story 6.5 page 144 *	Information box on importance of arctic microbes	unknown	Develop with various authors and refer to Arctic Biodiversity Assessment
Local people and places, Page 150, figure 7.1 *	Video interviews and photos	Unknown	Locate and develop
Coal burning for new chapter **	Animation	exists	Locate from IASC meeting in Prague
Pathways of radiation through space for new chapter **	Graphic or animation	Graphic exists	Develop into animation

6. Example animations

Some animations are almost complete or are at an advanced stage. Examples are included below (Figure 1-3).

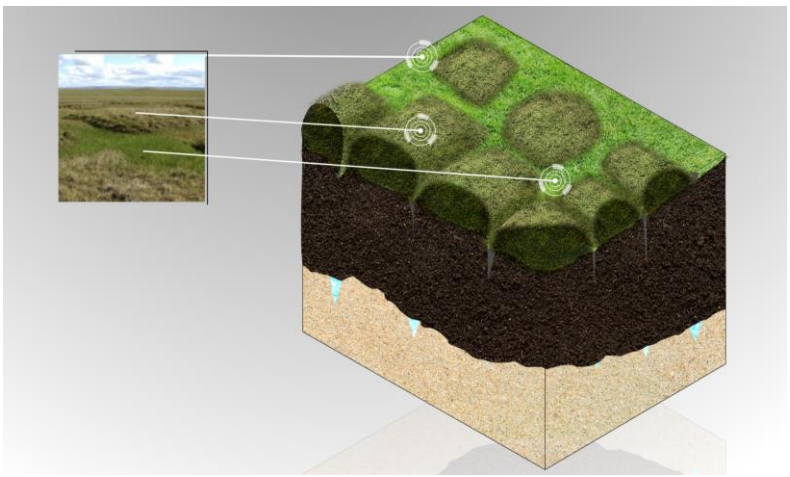

Figure 1. Frame from an animation of polygonal tundra formation and degradation. The animation phase is related to a real example in the photo to the left.

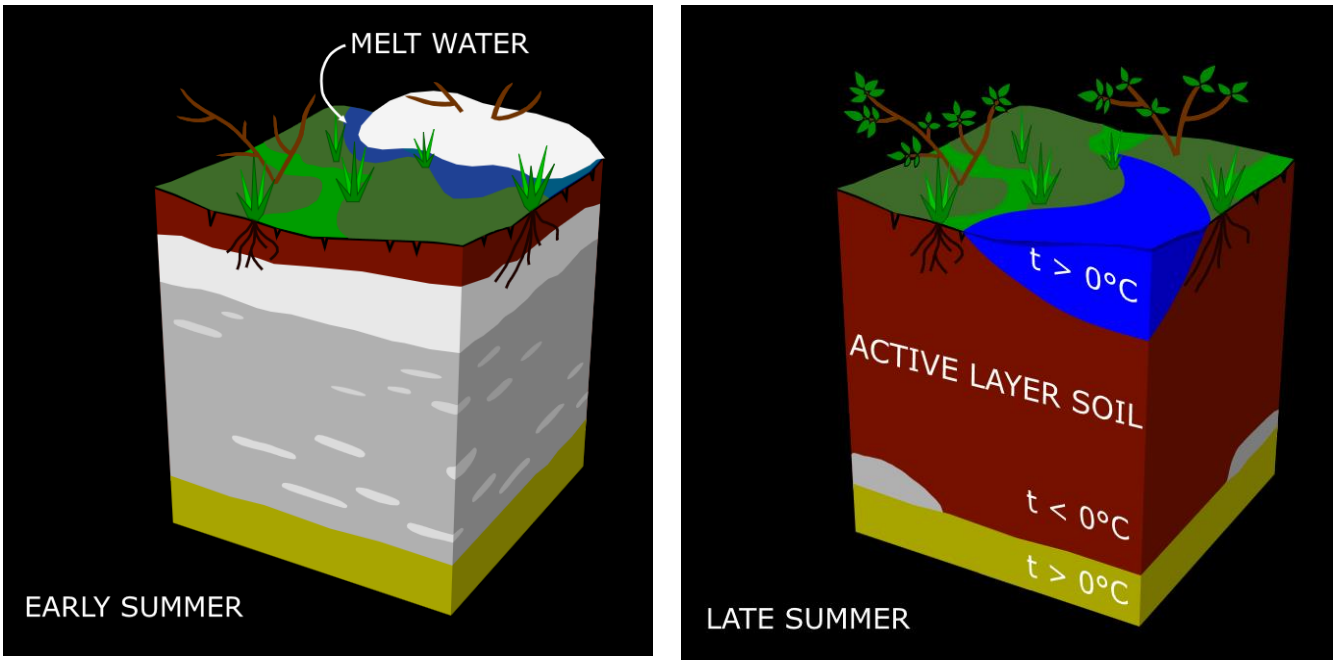

Figure 2. Two frames from an animation on general permafrost dynamics showing left, part of a natural seasonal process and on the right, changes during climate warming.

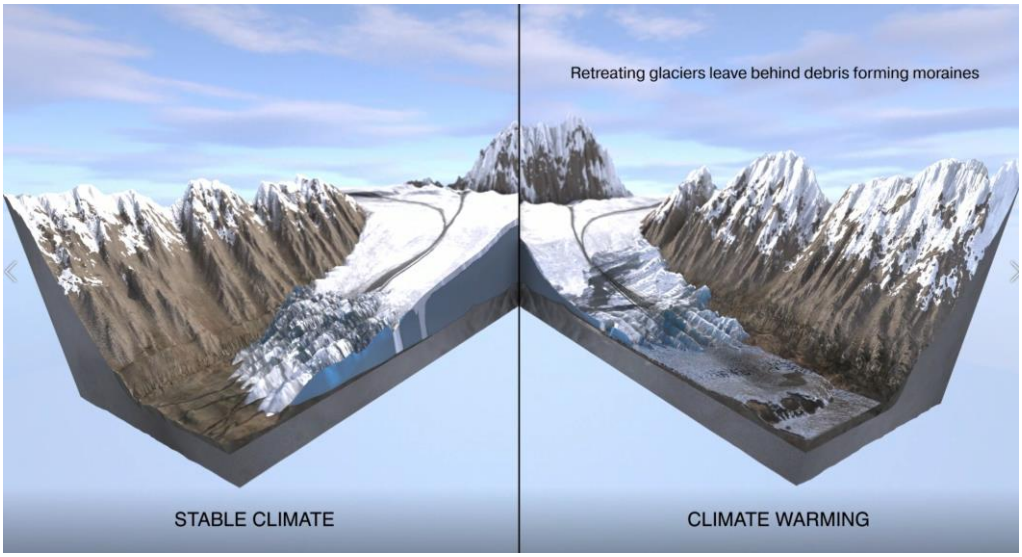

Figure 3. Part of a complex animation showing glacier dynamics (left) and a retreating glacier (right) during climate warming.