**Integrating Activities for Advanced Communities**

# D2.14- Series of Infographics

Project No.730938– INTERACT

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

Start date of project: 2016/10/01 Duration: 48 months
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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) | |

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## Publishable Executive Summary

INTERACT has developed a range of info-graphics in a series of educational resources. So far, eight resources have been produced on topics of environments and environmental change in the North. The resources have ranging complexity in production from video sequences through schematic animations to sophisticated graphic computer models and realistic landscapes. The topics focus on permafrost, glaciers, the taiga and past environments. The resources have been produced with collaboration among the University of Sheffield, the Polish Academy of Sciences and Tomsk State University. Considerable added value has been achieved. Particularly, as one of the animations was a project for a master student. More animations are being developed and these are intended for inclusion in the developing INTERACT Stories of Arctic Science book and an extended Coursera/Lektorium course on the changing Arctic.

# 1. Introduction

INTERACT has proven success in reaching out to all sectors of society from school education to politicians. Part of the success is due to ease of communication in attractive and informative formats such as the science stories book. We are now building on this success to develop a series of info-graphics that are required by educators and also have been identified as important to communicate to the wider public. We have focussed on producing videos/animated stories of various Arctic environmental processes. During the first period, three of these resources were almost completed (see deliverable D2.10). In this second period, these resources have been completed and three new resources have been developed.

Rather than individual slides or graphics, the six resources offer the user the option of watching and learning about an Arctic environmental process over a period of about six minutes while enabling an educator to pause and select individual photos or graphic frames relevant to a lesson. The resources have developed in technical complexity and vary from simple graphics to sophisticated animations and increasingly embed video clips. Furthermore, one resource has been produced as added value from the master's course on science communication at Sheffield University. Thus, the info-graphics both inform the public and develop the skills of students in communicating science.

The production of the info-graphics has involved an INTERACT team. The science stories to be developed were identified by the CAWI survey (deliverable D2.2) carried out by the Polish Academy of Science and plans constructed by University of Oulu and Sheffield University to supplement the next stories of Arctic Science book. The story lines have been developed by the University of Sheffield with expert input according to the discipline covered. The videos and animations have been developed by Tomsk State University apart from the animation from one resource.

All the resources can be downloaded from the INTERACT web site: https://eu-interact.org/arctic-awareness/

# 2. Products

## *2.1. General permafrost dynamics*

This resource is a schematic animated graphic of seasonal permafrost dynamics in a tundra soil during a stable climate. The animation develops into a scenario of what happens to the soil and vegetation as permafrost starts to thaw during warming (Figure 1).

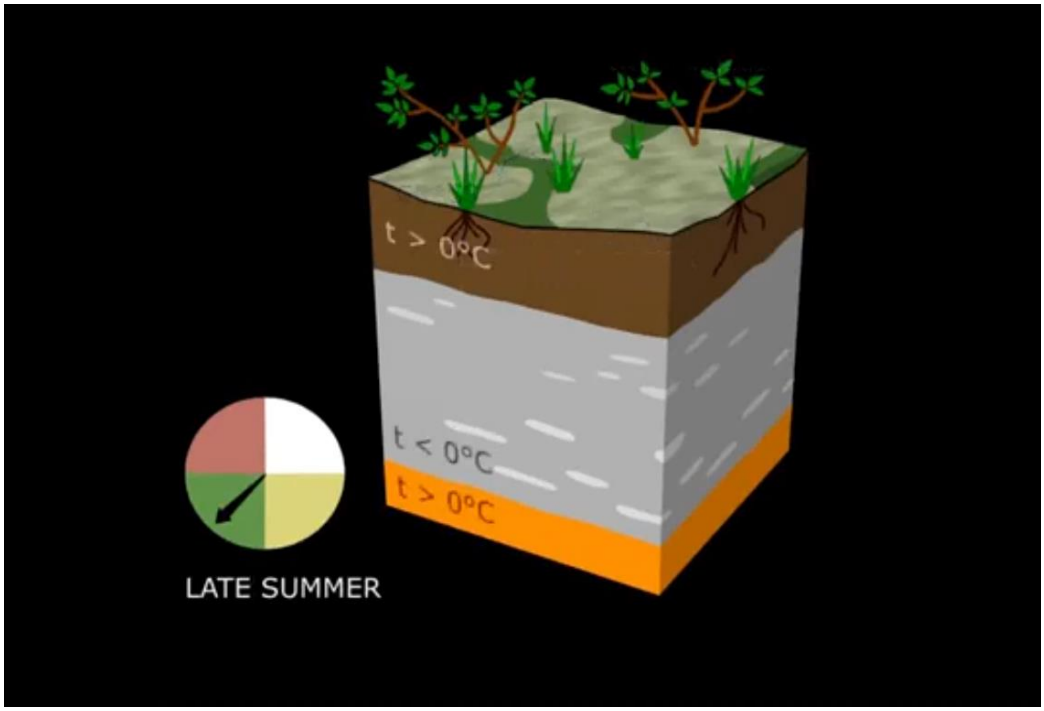


*Figure 1. Schematic of permafrost dynamics in a tundra soil during a changing climate.*

## *2.2. Permafrost and patterned ground*

Many coastal permafrost areas of the tundra are characterised by formation of patterning in the landscape. This resource shows a development of the animation into a more realistic format and includes comparisons in stages of the landscape changes depicted by the graphics with actual photographs from the field (Figure 2).

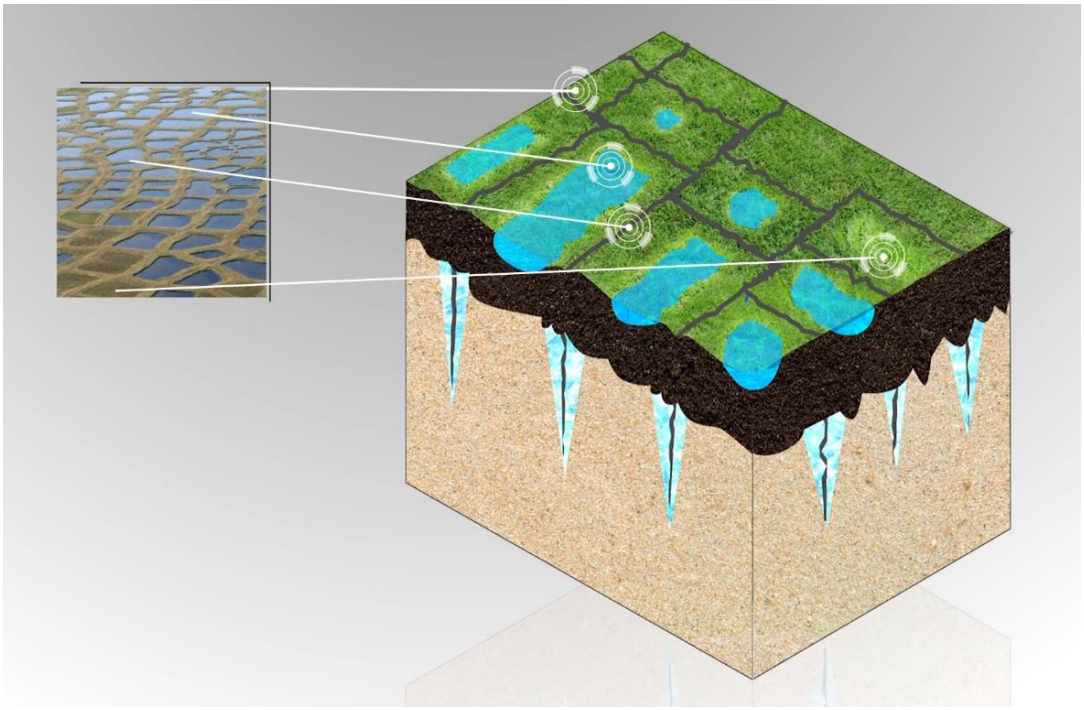

*Figure 2. Formation of patterned ground showing comparisons of stages from the animation compared with photos.*

## *2.3. Glacier dynamics in a changing climate*

This animation represents some further development of graphics in that the landscapes and glaciers depicted seek reality. The resource shows fundamental aspects of seasonal glacier dynamics during a stable climate. The animation continues to open up a glacier to compare a stable glacier with a glacier melting during a warm period (Figure 3).

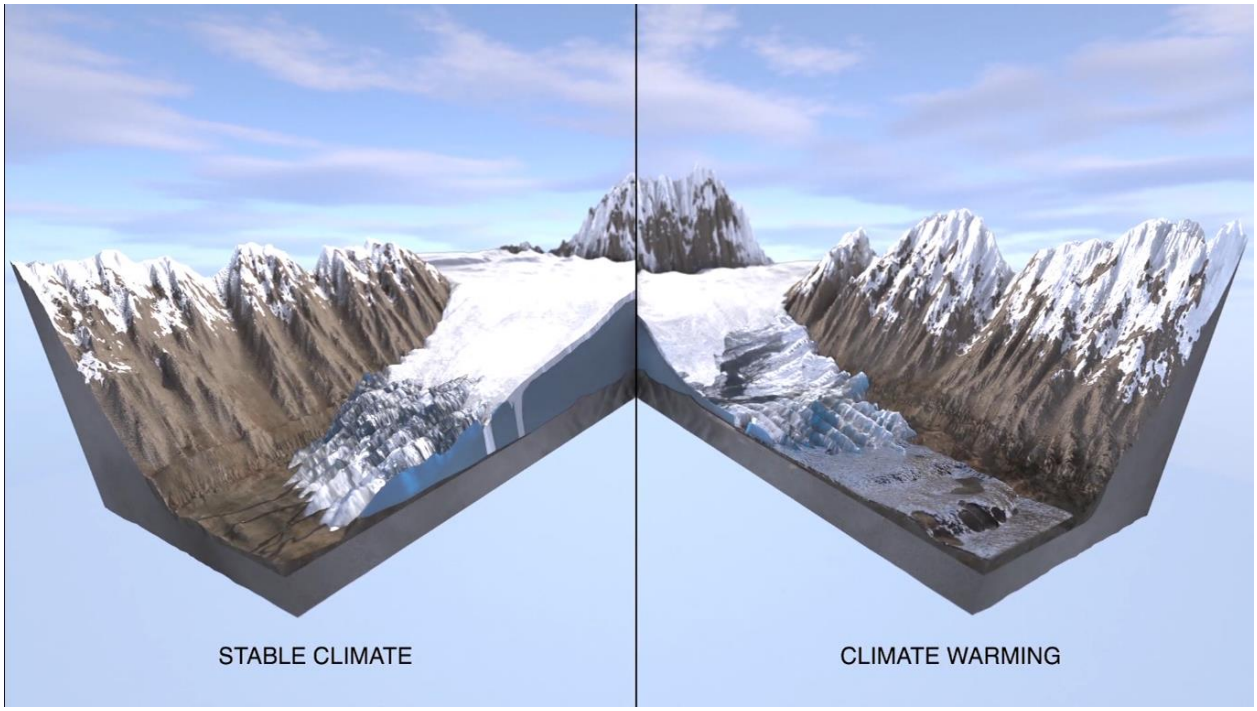


*Figure 3. A comparison between a glacier in a stable climate and one experiencing warming.*

## *2.4. Formation of hanging valleys*

This animation adds a special case to the general glacier dynamics by showing repeated advances and retreats of a glacier and then extra stages in which a hanging valley is formed and a periglacial, vegetated landscape develops. This animation, like the animation described in 2.3, uses a high degree of reality rather than a schematic approach (Figure 4).

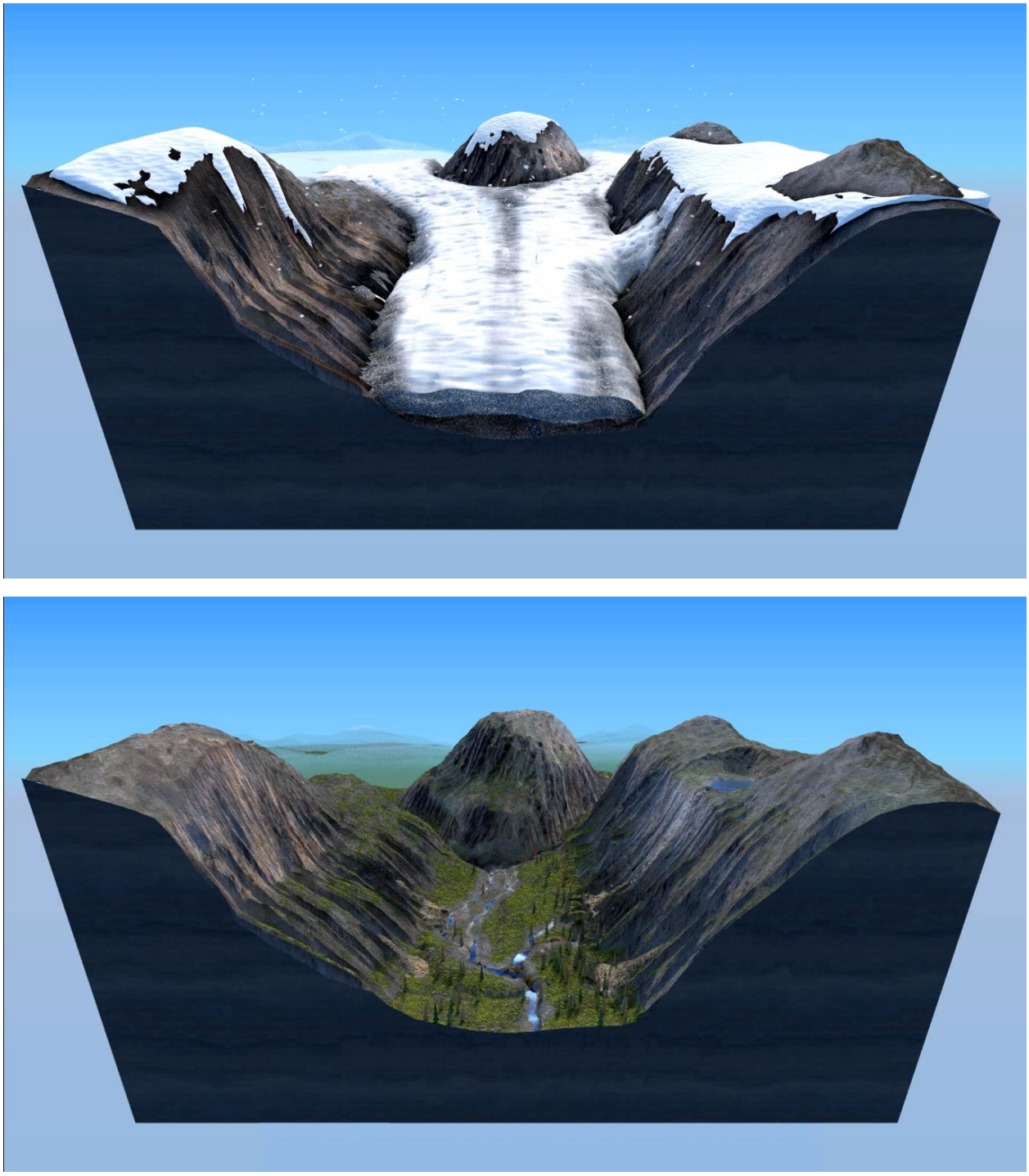

*Figure 4. Stages in the formation of a hanging valley and periglacial landscape. Top: glacier during a cold phase. Bottom: a periglacial u-shaped valley.*

## *2.5. Peatlands as records of past environments*

A series of animations in production focuses on how we can learn about past environments and past climate changes and how we can use this information to understand likely future changes.

The first resource in this series was produced as part of a master's project. It therefore presents simpler graphic animations and also deviates from former resources by embedding a video sequence of field work in Siberia. This resource also explains complex processes such as $C^{14}$ dating (Figure 5).

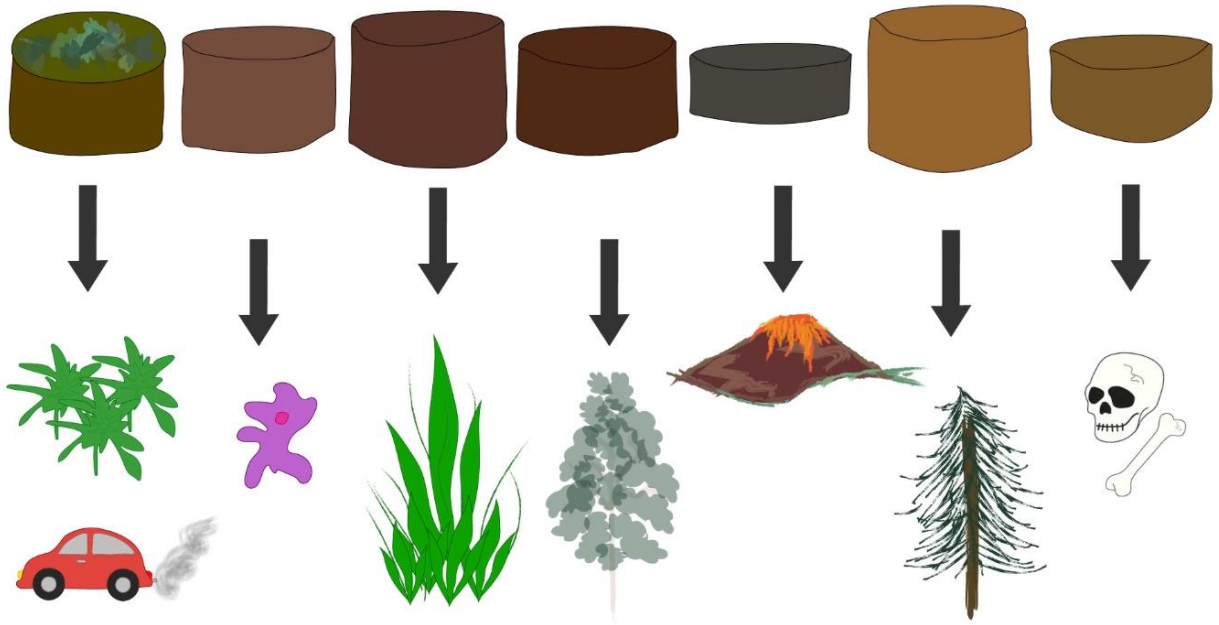

*Figure 5. A frame from the educational resource on peatlands showing how various layers in a peat core hold information on a range of past environments.*

## *2.6. Secrets of dead plants – past levels of UV-B radiation*

This animation is another contribution to the theme of how we can look at past environments to learn about the future. It is a very sophisticated product that includes a video sequence, models of an ancient plant group, reconstruction of a carboniferous period forest and graphics of back projections of ozone for the past 100 years in Greenland. It finishes with landscape videos from a drone and highlights lessons for the future (Figure 6).

*Figure 6. Computer model of a member of an ancient plant group as it releases its millions of spores. The next frames show how an individual spore from within the box (dotted line) is adapted to UV-B radiation.*

## *2.7. The Taiga – Part 1: the forest*

This educational resource was specifically requested by Wicked Weather Watch which is a UK Charity that produces educational resources for primary schools. It is purely video footage but footage made specifically in Siberia by a Siberian researcher with first-hand knowledge of her environment. Furthermore, a young school boy greets students from the taiga (Figure 7).


*Figure 7. Prof Irina Volkova from Tomsk State University demonstrating the taiga forest.*

## *2.8. The Taiga – Part 2: the rivers*

This educational material is video footage from Siberia demonstrating how the rivers are a life-line for the people who live there. The resource includes specific video footage and interviews made for the resource and archived material showing areal coverage of various river systems. In response to requests from schools, various Russian words are introduced (Figure 8).

*Figure 8. Rivers are a life-line for people living in Siberia.*

# 3. Use of the products

One of the most important aspects of the products is that the learner can experience processes that take place over hundreds to thousands of years in nature within a few minutes. Also, one of the current educational resources (the formation of hanging valleys) was a direct response to a request from a teacher's association which highlighted the modern problems of health and safety regulations that limit the ability of students to attend field courses in nature. Thus, the animations also provide a safe environment for learning. On a more positive note, those resources that includes video clips, allow students to experience parts of the world that are otherwise difficult to access.

One aspect of the animations that emerged was that the animation of patterned ground formation illustrated a process that has not been seen in its entirety. The sequence therefore is built on information from different parts of the cycle from different areas and is perhaps a contribution to a wider understanding than just education.

Some of the resources, for example those on permafrost and glaciers, have been included in "educational packages" by the Polish Academy of Sciences. So far the main users of the resources have been students (at different levels) and teachers.

# 4. Further development

In the future, it is intended to develop more educational resources, particularly those highlighted in deliverable D2.10. Many of these will be developed as added value and will be used as stand-alone but also as resources linked to the developing INTERACT book of Stories of Arctic Science. In addition, these resources will be included in a new coursera/lektorium course on the Changing Arctic.