

# SnowApp climate service for winter tourism

**Blue-Action: Arctic Impact on Weather and Climate project (EU Horizon2020)**

ACAF Arctic Climate Adaptation  
Webinar with the USA on 16.6.2021

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Proper winter conditions are the key to commercial success  
for nature-based winter tourism





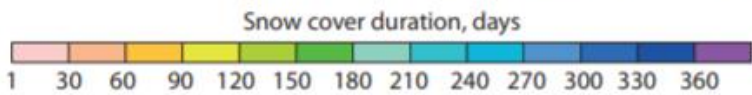
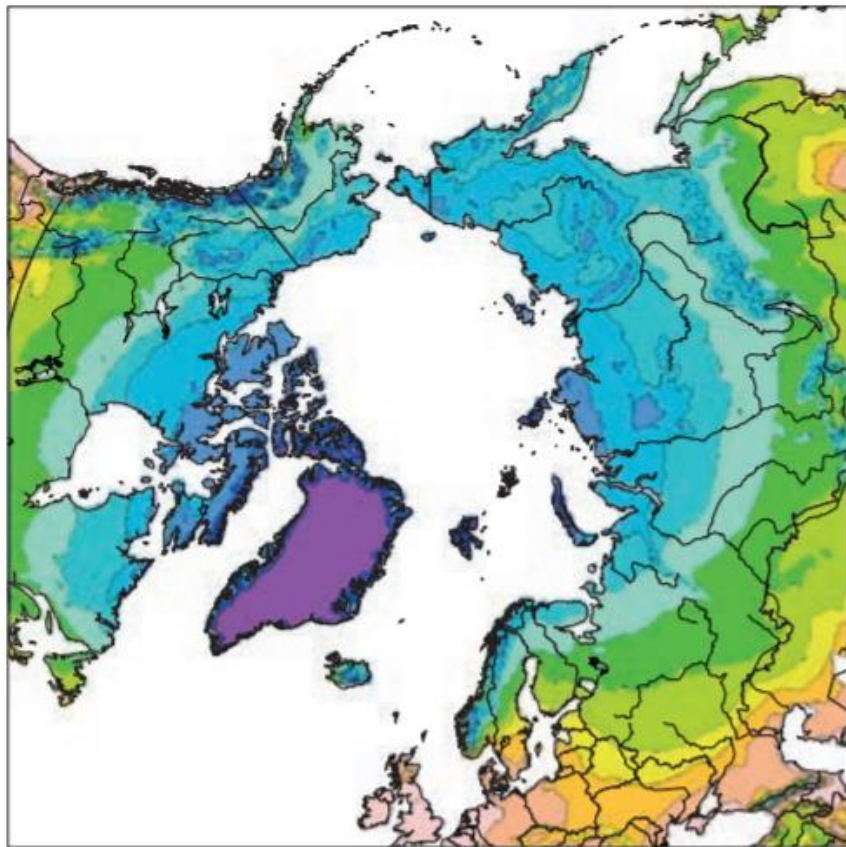


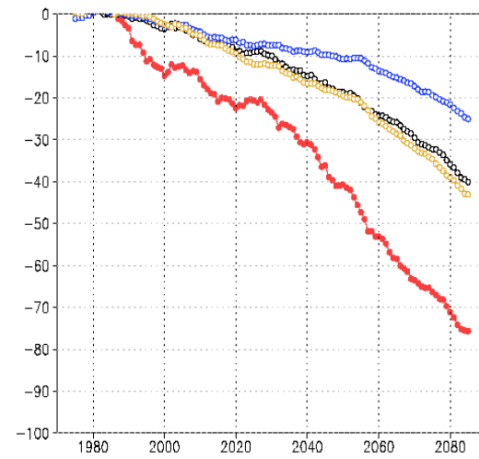
Figure 3.1 Mean annual snow cover duration over Arctic land areas from the NOAA IMS-24 daily snow cover analysis for the snow seasons 1998/99 to 2013/14.

### Snow in Northern Finland now

- 180-210 snow cover days / year
- Snow depth 65-100 cm

(SWIPA 2017)

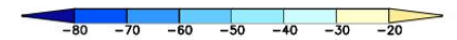
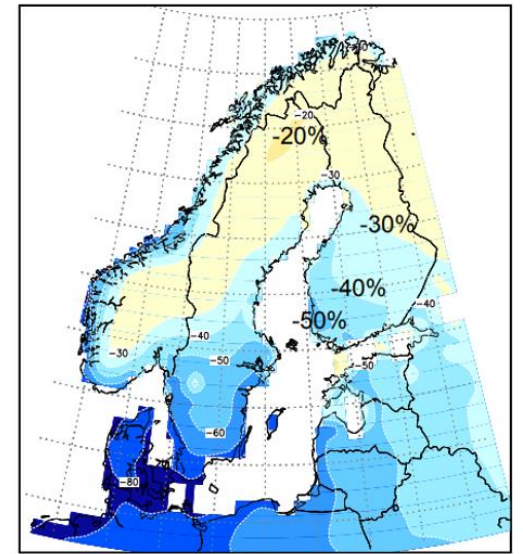
### The decrease of snow cover days (%) in Northern Finland (appr. 67°N), A2 scenario



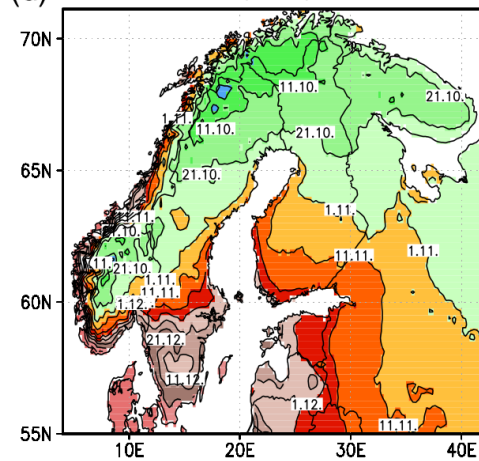
- Red: October
- Black: December
- Blue: February
- Yellow: April

Decrease in snow cover days (%)  
1961-1990 →  
2071-2100,  
according to A2  
scenario  
(FMI 2010)

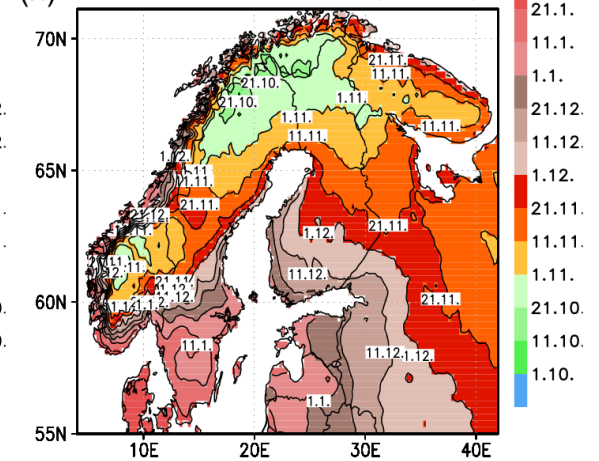
(FMI 2010)



(d) Winter onset (10°C) 1971–2000



(h) Winter onset 2040–2069 (RCP4.5)



(Ruosteenoja et al. 2020, Luomaranta 2020)

**Downhill skiing as the “canary in the coalmine”**

**Snowmaking and snow storage are increasingly used as adaptive strategies in ski resorts for improving snow security**

**Uncertainty on snow and snowmaking conditions beyond 3-4 days’ weather forecast**



# Climate services

The European Commission's Roadmap to Climate Services 2015:

*“[T]he transformation of **climate-related data** — together with **other relevant information** — into **customised products** such as projections, forecasts, information, trends, economic analysis, assessments (including technology assessment), counselling on best practices, development and evaluation of solutions and any other service in relation to climate that **may be of use for the society at large**. As such, these services include data, information and knowledge that **support adaptation, mitigation and disaster risk management (DRM)**.” (EC 2015)*

WMO 2013:

*“A climate service is a **decision aide** derived from climate information that **assists individuals and organizations in society to make improved ex-ante decision-making**. A climate service requires appropriate and iterative engagement to produce a timely advisory that end-users can comprehend and which can aid their decision-making and enable early action and preparedness. Climate services need to be provided to users in a seamless manner and, most of all, need to **respond to user requirements**.” (<https://public.wmo.int/en/bulletin/what-do-we-mean-climate-services>)*

- In short: **the provision of relevant climate related information in a way that is user-friendly and meaningful for the end-user and assists its decision-making**

# Climate service for winter tourism industry

- Co-designed by the multidisciplinary and multiprofessional team consisting of Arctic Centre (University of Lapland) and Rukakeskus Ltd. experts in 2017-2020
- **Goal: seasonal forecast on snowmaking conditions for ski resorts in Northern Finland, with replicability elsewhere**
- Iterative co-design process, where end-user involvement was key principle



BLUE ACTION 



ARCTIC CENTRE  
University of Lapland



Deutscher Wetterdienst  
Wetter und Klima aus einer Hand



DMI  
Vejr, klima og hav

SAMS  
Research Services Ltd



# SnowApp climate service for winter tourism centres



- **4-week reliable forecast on snowmaking conditions**
- **A decision-support tool for ski resort management**
- **Particularly suitable for forecasting periods of critical or too warm conditions, like in the early season 2018**
- **With optimization based on better foresight on snowmaking conditions, emissions and costs can be reduced, and additional income can be gained**
- **Designed by Ruka Ski Resort and Arctic Centre, University of Lapland in 2017-2020**
- **Applicable in other ski resorts too**







# The SnowApp


sn❄wApp


**Date range:**  
 to

**Language:**

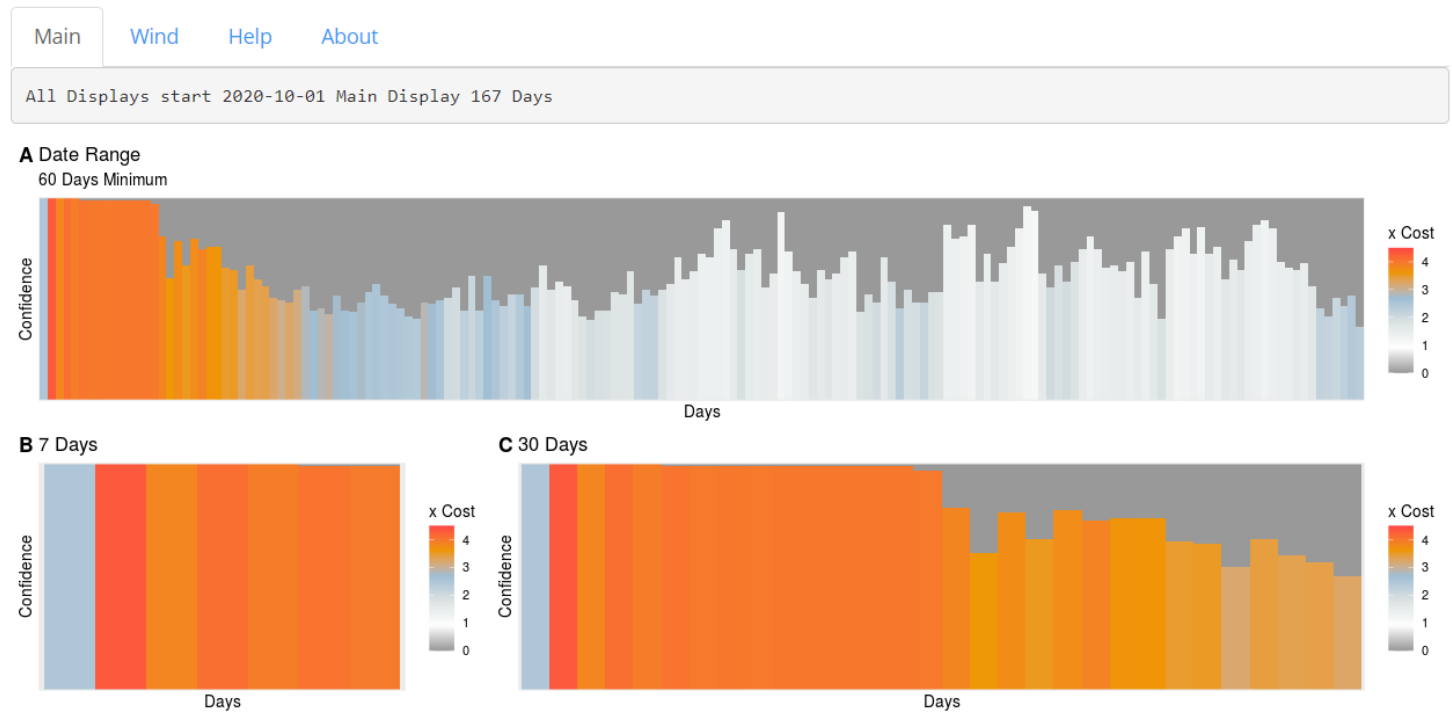
**Key to conditions:**

-  Good
-  Borderline
-  Poor
-  Impossible

  
 European Union, Horizon 2020, Grant: 727852



Version 3.018






# sn❄️wApp

Date range:


to

« November 2020 »

Su	Mo	Tu	We	Th	Fr	Sa
25	26	27	28	29	30	31
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5

**BLUE ACTION** 

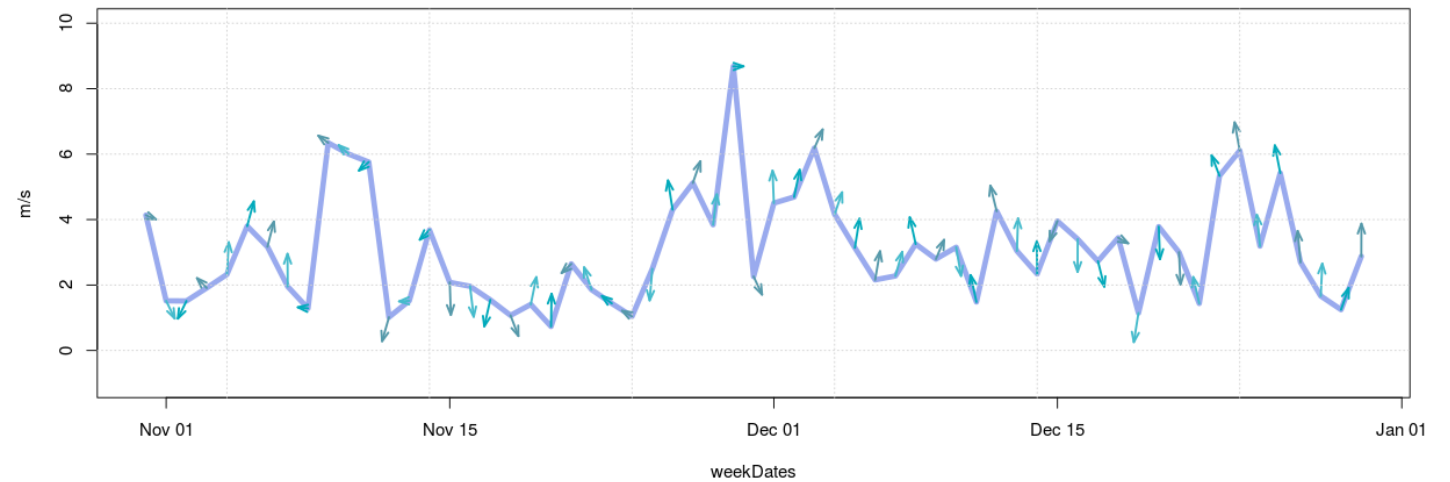
European Union, Horizon 2020, Grant: 727852



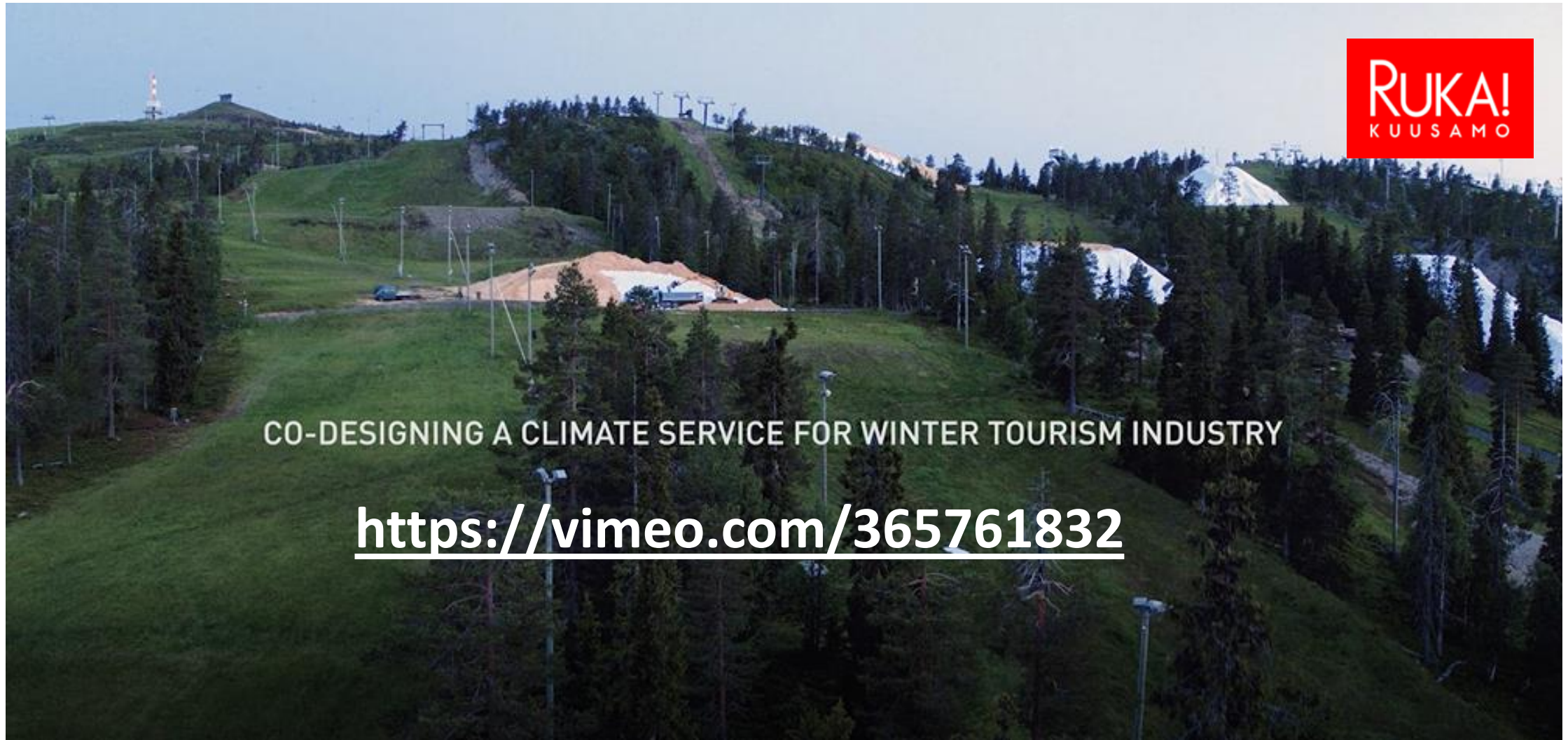
Version 3.018

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All Displays start 2020-11-01 Wind display 60 Days



Video on our SnowApp climate service and the case study (2019)



CO-DESIGNING A CLIMATE SERVICE FOR WINTER TOURISM INDUSTRY

<https://vimeo.com/365761832>



# Thank you for your attention!

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