



Snowmaking as an adaptation strategy in ski resorts

Avoiding maladaptation by a climate service



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Downhill skiing as a “canary in the coalmine”

- Winter tourism industry strongly dependent on climatic conditions for economically successful operation
 - Downhill skiing as an indicator of the impacts of climate change
 - Fewer snow-cover days and delay of winter in Northern Finland in the future
- Snowmaking and snow storage are increasingly important for ensuring early beginning of the skiing season



The first day of downhill skiing in Ruka in the season 2017-2018 was 6 October (Photo credits: Rukakeskus LTD)



Downhill skiing in Ruka in February 2018 (photo: Ilona Mettiäinen, Arctic Centre)

Snowmaking as an adaptation strategy

- Snow-making and storing of snow are common adaptation strategies in skiing centers
 - Important for snow security; used for ensuring early season start
- Snowmaking important expenditure
- Adaptive strategies can be reactive or proactive, and contribute to climate change mitigation (adaptation) or be maladaptive
- Snowmaking potentially maladaptive like airconditioning? Economically devastating due to the increasing costs? (NB! Ruka uses only renewable energy)

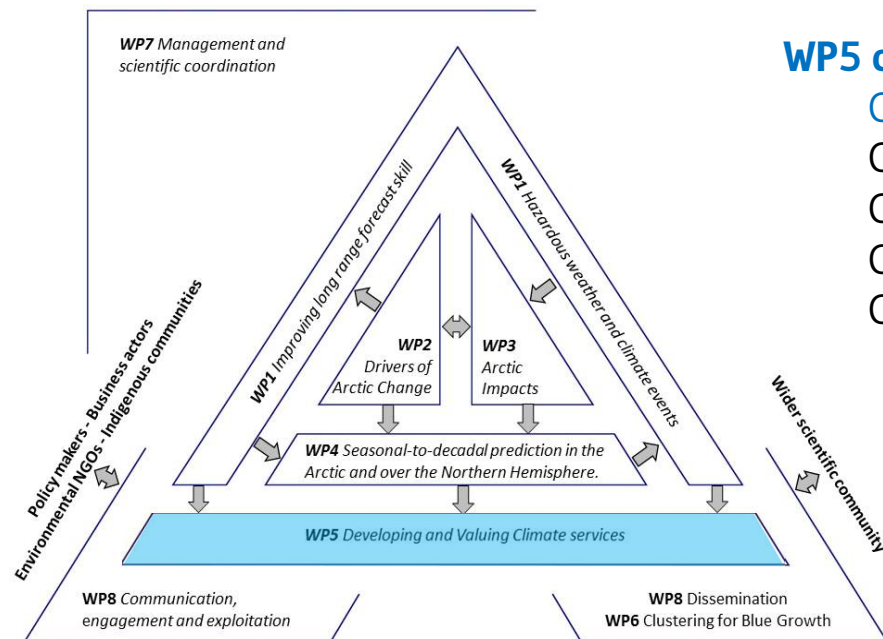
Climate services

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)

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

Five case studies on climate services in the Blue-Action project (EU Horizon2020)



WP5 case studies co-design climate services for different fields:

CS1 Winter tourism centers in Northern Finland

CS2 Temperature-related human mortality in European regions

CS3 Extreme weather risks to maritime activities

CS4 Climate services for marine fisheries

CS5 Yamal 2040: Scenarios for the Russian Arctic

More information: www.blue-action.eu

Case study 1 on winter tourism in Northern Finland



- Information on future climate and specific local weather conditions is fundamental for preparing and adapting to future change (including delayed arrival of winter) in the long-term business planning
- Co-designing a climate service for the end-user RUKA first, then to be replicated to winter tourism business more widely

RUKA skiing center as the end-user and business partner in the case study



RUKA skiing center in Northern Finland



- Awarded Finland's Best Ski Resort in the World Ski Awards 2014
- Market leader in ski resort industry - nearly 20% share of ski pass sales, turnover of approx. EUR 26 million annually, 380,000 visitors and employs about 170 people
- 34 slopes, 21 ski lifts and chairlifts, lift capacity of 25,400 skiers per hour
- Summit height = 492 m, longest slope = 1300 m
- 200 ski days per year
- Forerunner in environmental programs:
 - Green energy (hydropower and biomass)
 - Carbon neutral
- Strategy to be the most snow-secure resort in Europe



Developing our climate service for Ruka

- Aim to reduce uncertainty on weather and climate, for allowing informed decisions and foresight for seasonal, operational decisions, and decisions with decadal time span like investment plans
- Right now: to reduce the uncertainty related to snow-making, in terms of the way in which decisions on snow-making and the opening of the skiing season are made



Photos: 1.-3. Teemu Heljo and Jani Kärppä, Rukakeskus Ltd., 4. Ilona Mettiäinen, Arctic Centre

Benefits for winter tourism business and the environment (1)

- Snowmaking as an important adaptation strategy in winter tourism centres
- Better information on seasonal scale
 - Reducing snowmaking costs and environmental impacts etc.
- Informed decisions on investments in the longer run
 - Including alternative activities

Benefits for winter tourism business and the environment (2)

- Maximizing energy-efficiency in snow-making
 - Optimal wet-bulb temperature for snowmaking will be less frequent in the future + natural snowfall delayed
 - Difference of snowmaking costs in good/bad conditions is 30 X
- Adaptation or maladaptation?
 - Our climate service may help to reduce the costs of snowmaking
 - Our climate service may help to avoid the increase of environmental impacts from snowmaking and hence to avoid snowmaking from being, in fact, maladaptation (like e.g. air conditioning)
- Adaptation + mitigation = adaptigation

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