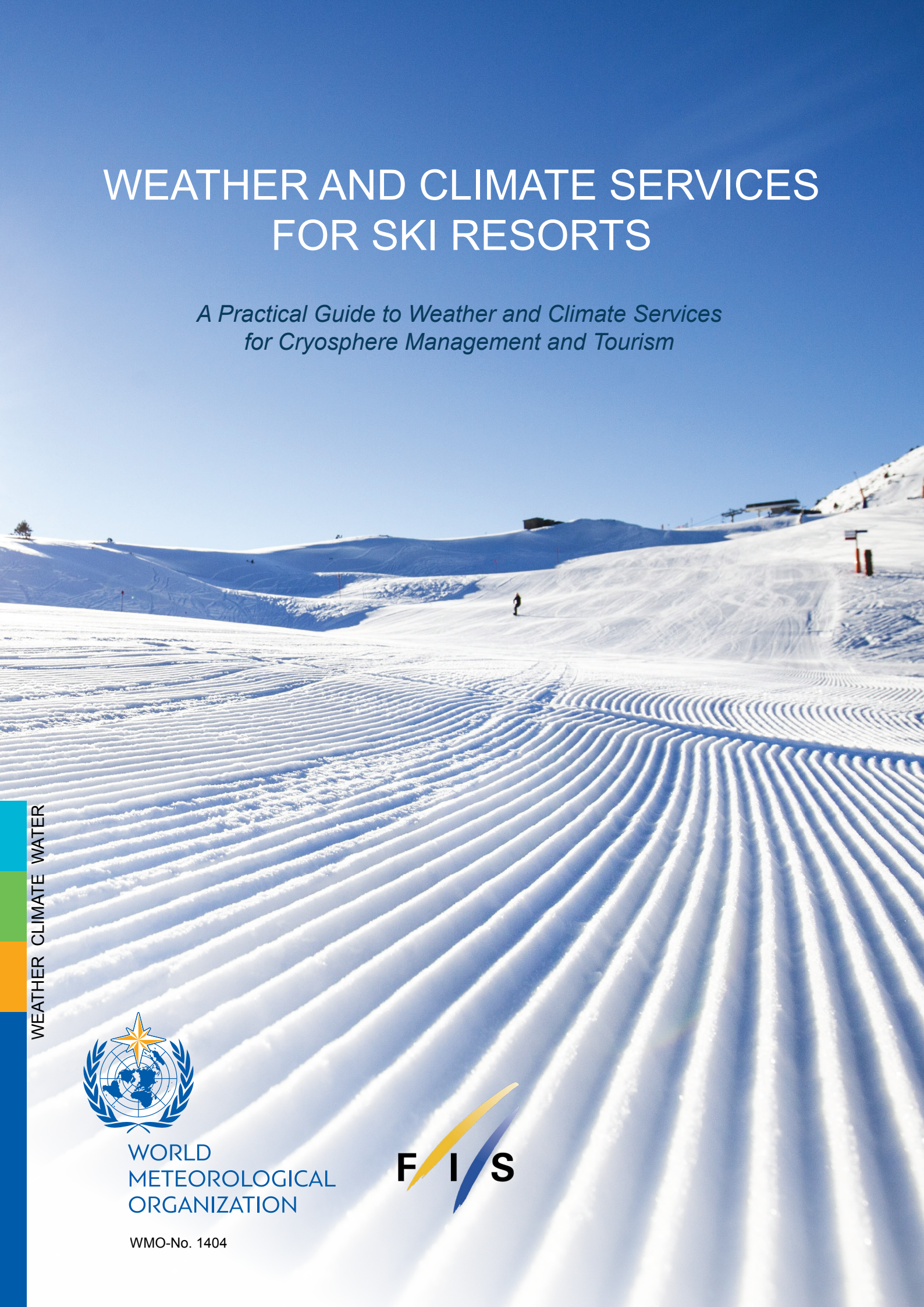
WEATHER AND CLIMATE SERVICES FOR SKI RESORTS

A Practical Guide to Weather and Climate Services for Cryosphere Management and Tourism



WEATHER CLIMATE WATER

WORLD METEOROLOGICAL ORGANIZATION

FIS

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Foreword

In 2024, the World Meteorological Organization (WMO) and the International Ski and Snowboard Federation (FIS) established a partnership to raise awareness of the effects of climate change on snow and ice and the resulting impacts on ecosystems, communities and outdoor activities.

Jointly developed by WMO and FIS, this practical guide draws on the latest observations, projections and research. It is intended to help ski-area operators, destination managers and winter sports organizations make effective use of weather and climate information in operational, seasonal and long-term planning.



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1. Introduction

Weather, snow and climate conditions influence decisions across ski facility operations, from day-to-day management to long-term investment. This guide is designed to help you use weather and climate information – whether you are deciding to open the lifts tomorrow morning, planning next season's budget, or deciding whether to invest in a new snowmaking system.

Rather than explaining meteorology in detail, the guide focuses on three practical questions:

- What information do I need? ***A forecast, a seasonal outlook or historical data?***
- When is it useful? ***Today, this season or for a 20-year investment?***
- Where do I get it? ***Which service, provider or data source?***

WHY IS THIS GUIDE IMPORTANT?

Recent observations and scientific studies illustrate the changing conditions affecting ski facilities:

- The year 2024 was the warmest year on record, with global temperatures reaching 1.55°C above pre-industrial levels (*State of the Global Climate 2024* (WMO-No. 1368); *State of the Global Climate 2025* (WMO-No. 1391)).
- The hydrological years 2021/2022 to 2023/2024 constituted the most negative three-year glacier mass-balance period on record (*State of the Global Climate 2025* (WMO-No. 1391)).
- In the European Alps, winters warmed by 0.3 °C–0.4 °C per decade between 1968 and 2017, while snow-cover duration decreased by 5–7 days per decade, with the strongest declines at low and intermediate elevations (Monteiro and Morin, 2023).
- A Europe-wide study of 2 234 ski resorts found that, without snowmaking, 53% face a very high snow-supply risk at 2 °C of global warming, rising to 98% at 4 °C (François et al., 2023).
- In the 2025/2026 season alone, weather conditions forced the cancellation of 25 Ski World Cup races.[1]

These trends show that climate-related risks are already shaping day-to-day operations, financial decisions and long-term planning for winter tourism. Reliable weather, climate and cryosphere[2] information can help to support these decisions.

1 Internal calculation by the International Ski and Snowboard Federation (FIS), 2026.

2 The cryosphere includes the components of the Earth System at and below the land and ocean surface that are frozen, including snow cover, glaciers, ice sheets, ice shelves, icebergs, sea ice, lake ice, river ice, permafrost, and seasonally frozen ground and solid precipitation. Source: WMO, https://wmo.int/themes/cryosphere.

Who this guide is for

This guide is written primarily for ski facility operators, mountain destination managers and organizers of ski events and winter festivals. It is equally useful for National Meteorological and Hydrological Services (NMHSs) and other public authorities responsible for developing, tailoring and delivering weather and climate services relevant to winter tourism. Insurers, sports federations and other organizations supporting the winter tourism sector may also find it useful.

How to use this guide

The guide is organized around three types of decisions: day-to-day operations, seasonal planning, and long-term planning and adaptation. Each section identifies the types of weather, climate and cryosphere information that can support these decisions and provides links to relevant services and resources.

2. Decision-making across timescales

Ski facilities make decisions across a range of time horizons, from immediate operational decisions to seasonal planning and long-term investment (Figure 1). As shown in Table 1, different types of weather, climate and cryosphere information can support decisions at each of these horizons.



Figure 1. Weather and climate information supports ski facility decisions across different timescales

Table 1. Weather, climate and cryosphere information for ski facility decision-making

Timescale	Typical decisions	Weather and climate information
Day-to-day (hours–10 days)	Lift safety, closures, grooming, snowmaking windows, avalanche risk, event-day calls	Real-time observations, nowcasting, short-range forecasts, hazard warnings, avalanche bulletins
Seasonal (weeks–months)	Opening/closing dates, staffing, snowmaking strategy, water and energy planning, marketing	Extended-range, sub-seasonal and seasonal outlooks, snow monitoring and forecasts
Long-term (years–decades)	Infrastructure investment, snowmaking capacity, diversification, insurance, adaptation	Climate monitoring, historical trends and climate projections

3. Supporting day-to-day operations

Short-range forecasts, real-time observations, nowcasting, weather warnings and avalanche information can support operational decision-making from hours to several days ahead. This section highlights the weather and cryosphere information most relevant to ski facility operations and where it can be accessed.

Safety and lift operations

Short-range forecasts and real-time observations of wind, visibility, precipitation, temperature and thunderstorms can support decisions on lift operations and activities in exposed areas. In mountain environments, conditions can vary substantially with elevation and exposure, making locally relevant forecasts and observations particularly valuable. Short-range forecasts provide managers with lead time to plan staffing, warn visitors and schedule work safely. Key weather parameters for operational decision-making include:

- **Wind:** Wind speed, gusts and direction can vary substantially with elevation and exposure. Forecasts for ridges, peaks and other exposed locations support decisions on lift operations and other activities.
- **Temperature:** Forecast temperatures at different elevations and the height of the freezing level[3] provide important information for snowmaking, snow stability assessments and visitor comfort.

3 The freezing level is the altitude at which the air temperature is 0 °C. Source: American Meteorological Society, Glossary of Meteorology, https://glossary.ametsoc.org/wiki/freezing-level. It provides a useful indication of where precipitation is more likely to fall as rain or snow.



Figure 2. Snowmaking can help maintain ski facility operations when natural snow is limited but depends on suitable temperature and humidity conditions.
Credit: violetta, Pixabay (https://pixabay.com/photos/snow-cannon-snow-making-system-253404/)

- **Precipitation:** The timing, amount and type of precipitation, and particularly whether it falls as rain or snow, inform snow grooming, avalanche risk and water planning for snowmaking.
- **Cloud cover and visibility:** Cloud cover and visibility affect skiing conditions, glacier sightseeing and aerial operations.
- **Nowcasting:** Very short-range forecasts, typically covering the next few hours, provide updated information on rapidly developing or changing weather conditions. Nowcasting products can include precipitation forecasts, cloud information, lightning detection and severe weather warnings.

Snowmaking

Snowmaking conditions depend on both temperature and humidity, commonly expressed as wet-bulb temperature[4] (Figure 2). As winters warm, windows of opportunity with suitable conditions for snowmaking are becoming shorter and less frequent, especially at lower elevations. Short-range forecasts can help to:

4 The wet-bulb temperature is the temperature a parcel of air would have if it were cooled to saturation (100 per cent relative humidity) by the evaporation of water into it, with the latent heat supplied by the parcel. Source: WMO Codes Registry, https://codes.wmo.int/wmdr/ObservingMethodAtmosphere/340. A wet-bulb temperature of around −2.5 °C is commonly used as a practical threshold for snowmaking, although this varies with equipment and local conditions. Source: TechnoAlpin, https://www.technoalpin.com/en/wet-bulb-calculator

- Identify brief periods of suitable snowmaking conditions;
- Identify how snowmaking conditions are expected to vary across elevations and locations;
- Track water availability, including snowmelt, streamflow and reservoir levels, to support water planning for snowmaking;
- Support energy planning, including consideration of electricity prices alongside forecast snowmaking conditions.

Grooming

Grooming conditions depend on snow depth, density, recent temperature swings (freeze–thaw cycles), wind and expected skier traffic. Short-range forecasts and observations of these conditions can support grooming schedules and adjustments following snowfall, wind or rain events.

Nowcasting can provide updated information as conditions change. Snowfall and accumulation forecasts, including information on snow type and expected variations across elevations and terrain, can support slope preparation and access management. Fresh-snowfall information may also be useful for visitor communications and marketing.

Avalanche safety

Avalanche forecasts combine snowpack data, current weather and terrain characteristics and typically communicate avalanche danger using a five-level scale, from low to very high, together with information on avalanche problems such as wind slab or wet snow. Because they draw on snowfall, wind and temperature forecasts as well as real-time snow and weather observations, they require specialists who understand snow science and local conditions. Avalanche forecasts should always be treated as expert guidance, not just another data feed.

Event days

Ski races, festivals, glacier excursions and helicopter tours use short-range forecasts to support go/no-go decisions and contingency planning. Reliable forecasts and observations of wind, precipitation, visibility and other relevant conditions can support event planning and decisions as conditions change.

Tools for day-to-day decisions

A range of national, regional and specialist services provide weather, avalanche and snow information to support day-to-day ski facility operations. Selected resources are listed below in Table 2, Table 3 and Table 4.

Table 2. Weather forecasts and observations

Service	What it provides	Web address
Bureau of Meteorology (BOM) (Australia)	Alpine region forecasts and warnings: temperature, precipitation, wind, snow	www.bom.gov.au/weather-and-climate/specialised-forecasts-and-observations/alpine-regions
Japan Meteorological Agency (JMA)	Detailed forecasts, snowfall/temperature monitoring, hazard warnings	www.jma.go.jp/bosai/map.html
Météo France	Elevation-specific mountain bulletins and avalanche weather information	meteofrance.com/meteo-montagne
Meteomont Italy	Combined weather and snow monitoring for the Italian Alps and Apennines, including avalanche risk	meteomont.carabinieri.it
MeteoSwiss	Location-specific weather forecasts for Swiss mountain areas; select the relevant resort or nearby location	www.meteoschweiz.admin.ch
MetService New Zealand	Mountain and alpine forecasts, snow and severe weather warnings	www.metservice.com/mountains-and-parks/ski-fields
Mountain Forecast	Searchable forecasts for mountain summits at multiple elevations	mountain-forecast.com
United States National Weather Service	Point forecasts and winter alerts available; avalanche danger forecasts usually at regional avalanche centres	weather.gov
Windy	Free animated maps of wind, precipitation and other conditions – very intuitive, no training needed	windy.com

Table 3. Avalanche information

Service	What it provides	Web address
European Avalanche Warning Services (EAWS)	An association/standards site with member links; current local bulletin is at the national or regional service	avalanches.org
Avalanche Canada	Avalanche forecasts across Canadian mountain regions	avalanche.ca
Varsom (Norway)	Avalanche forecasts for Norway	varsom.no
American Avalanche Association / Avalanche.org (United States of America)	US regional avalanche forecasts, danger ratings, avalanche problems and safety guidance	Avalanche.org

Table 4. Snow and snowmaking information

Service	What it provides	Web address
Alpine3D (Switzerland)	Spatial modelling of mountain snow cover, including snowpack evolution, wind-driven snow redistribution and runoff. Requires specialist implementation.	www.slf.ch/en/services-and-products/alpine-3d
WSL Institute for Snow and Avalanche Research SLF (Switzerland)	Maps of new snow, snow depth and snow depth relative to the long-term average, based on measurements and modelling	www.slf.ch/en/services-and-products/snow-maps
Snow Data Assimilation System (SNODAS)	Snow depth, water content and snowmelt rates (US-focused, technical documentation via National Snow and Ice Data Center)	www.nohrsc.noaa.gov/nsa

4. Supporting seasonal planning

Once a decision needs to be made weeks or months ahead, a different type of information becomes useful: extended-range, sub-seasonal and seasonal forecasts. These do not predict individual snowfalls; instead, they tell you whether the coming weeks or months are likely to be warmer, colder, wetter or drier than usual.

> **GOOD TO KNOW**
> Seasonal forecasts are expressed in probabilities, not certainties. For example, “65% chance of a milder-than-average January” rather than an exact temperature. Forecast skill varies by location, season and lead time, so the probability and confidence associated with the forecast are important when interpreting the information.

Opening and closing dates

Extended-range outlooks (roughly 10–30 days ahead) and sub-seasonal to seasonal (S2S) forecasts (2 weeks to 2 months ahead) can provide an indication of expected conditions in the lead-up to the season, supporting decisions around opening and closing dates.

Staffing, budgets and contracts

Information on how conditions may develop over the season can support hiring plans, contract lengths and budget allocation well before the snow actually falls.

Snowmaking strategy

Seasonal outlooks can provide an indication of how temperature and precipitation conditions may develop over the coming weeks and months, providing context for snowmaking planning. Extended-range and sub-seasonal forecasts can provide more information as the relevant period approaches.

Water and energy management

Snow water equivalent (how much water is stored in the snowpack) and seasonal outlooks can inform water-resource planning for snowmaking and help anticipate energy needs.

Marketing and event scheduling

Information on expected conditions and the possibility of snow-poor periods can inform marketing campaigns and event calendars, including contingency planning, where appropriate.

Tools for seasonal planning

Selected national and international services providing extended-range, sub-seasonal and seasonal forecast information are listed below in Table 5.

Table 5. Selected tools for seasonal planning

Service	What it provides	Web address
Copernicus Climate Change Service (C3S) User and Learning Guides	Free training on accessing, interpreting and using C3S climate data	climate.copernicus.eu/user-learning-services
C3S Seasonal Forecasts	Monthly updated, multi-model seasonal outlooks for temperature and precipitation, shown as probabilities for one- and three-month periods	climate.copernicus.eu/charts/packages/c3s_seasonal
European Centre for Medium-Range Weather Forecasts (ECMWF)	Europe's leading centre: Extended-range outlooks to 46 days, plus SEAS5 seasonal forecasts up to 13 months ahead (temperature, precipitation, snow variables), updated monthly	ecmwf.int Charts: charts.ecmwf.int
Met Office (United Kingdom of Great Britain and Northern Ireland)	Seasonal outlooks for temperature and precipitation	www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks
NOAA Climate Prediction Center (CPC)	US extended (6–14 day) and seasonal outlook maps for temperature and precipitation	cpc.ncep.noaa.gov
National Oceanic and Atmospheric Administration (NOAA) Climate Forecast System Version 2 (CFSv2)	Global seasonal forecasts up to 9 months ahead, particularly useful for North America	www.cpc.ncep.noaa.gov/products/CFSv2/CFSv2seasonal.shtml
S2S Prediction Project database	Sub-seasonal forecast data from multiple centres for specialist analysis; requires selecting, downloading and interpreting datasets	ecds.ecmwf.int/data-sets/s2s-forecasts

5. Supporting long-term planning and adaptation

Decisions with a long lifetime, such as a new lift, snowmaking infrastructure or a multi-year insurance contract, require a different kind of evidence: not a forecast, but a clear picture of how conditions have already changed, and how they are likely to change further. Climate monitoring and projections provide this evidence base.

Understanding how conditions have already changed

Climate monitoring services track temperature, snow, ice and glaciers over years and decades, combining satellite images, ground measurements and models. These records provide the historical context for understanding current conditions and longer-term changes.

- **Snow cover and depth:** Satellite and ground-based observations can show how snow cover, depth and duration have changed over time, including differences by elevation.
- **Glaciers:** Long-term ground and satellite observations document changes in glacier mass and extent, providing information relevant to glacier tourism and water resources.
- **Historical climate records (reanalyses):** Reanalyses combine observations with weather models to produce consistent, long-term datasets, including for locations where observations are sparse. They can provide historical information on temperature, precipitation, wind and snow conditions.

Looking ahead: Climate projections

Climate projections are not forecasts; they don't predict a specific winter, but describe a range of possible future climate conditions decades from now, depending on future greenhouse gas emissions. They can inform infrastructure and investment decisions with long lifetimes.

> **IN PLAIN TERMS**
> Across almost all ski regions, projections agree on the same broad pattern of rising temperatures and declining natural snow cover, with the largest effects generally occurring at lower elevations and in milder climates. Higher and colder locations are also affected as warming increases. Snowmaking can reduce snow-supply risk, but suitable snowmaking conditions also decrease with warming.

Snow reliability and investment decisions

Snow reliability indicators combine climate and snow information to assess how frequently a location is likely to have sufficient snow for skiing. A commonly used benchmark is the "100-day rule": snow depth of at least 30 cm for 100 days in seven out of ten winters. Such indicators can provide one source of information for assessing longer-term snow conditions and investment decisions.

Managing financial risk: Insurance and derivatives

Two financial tools can help ski facilities manage weather and climate risk without having to prove damages case by case:

- **Weather derivatives**: Pay out automatically when agreed weather thresholds are crossed (for example, not enough snowfall or too warm for snowmaking);
- **Parametric insurance:** Works similarly, with payouts triggered by measurable conditions such as low snow depth or rain instead of snow during key periods.

Both depend on reliable weather and climate data to define and verify the agreed thresholds. Historical records can also help assess the frequency and likelihood of the conditions being covered. NMHSs and other providers can be important sources of these data.

Assessing climate risk formally

Because lifts, lodges and access roads often last for decades, climate risk can be considered in long-term investment, financing and insurance decisions. Structured climate risk assessments may include:

- **Scenario analysis:** How operations and investments perform under different warming levels (for example, 1.5 °C, 2 °C, 3 °C), accounting for physical and transition risks;
- **Stress testing:** Resilience to extreme events;
- **Transition risk assessment:** Financial impact of regulatory, market and societal shifts (for example, energy restrictions, carbon pricing, changing consumer preferences).

Emerging and evolving tools and technology

New technologies are expanding the ways weather, climate and snow information can be observed, forecast and used in ski facility operations. Examples include:

- **Artificial intelligence and machine learning:** These tools are increasingly used in weather forecasting and to analyze snow cover from satellite and other imagery. They can also support applications such as snowmaking planning. For safety-critical decisions, these tools should be used alongside appropriate expertise and established operational procedures;
- **High-resolution and slope-level models:** These tools can provide increasingly detailed information on local conditions, including variations in snow and wind across complex mountain terrain. This can be useful for infrastructure design;
- **Connected sensors (Internet of Things):** Networks of sensors can provide real-time information on local weather and snow conditions and can be integrated with automated snowmaking and grooming systems. These can be powerful but are also reliant on stable power and connectivity.

Tools for long-term planning

Selected services and tools for monitoring past change, exploring future climate conditions and supporting climate risk assessment are listed below in Table 6, Table 7 and Table 8.

Table 6. Selected tools for monitoring snow, glaciers and historical climate conditions

Service	What it provides	Web address
Copernicus Land Monitoring Service	Daily satellite snow cover maps and snow water equivalent estimates	land.copernicus.eu/en/products/snow
National Snow and Ice Data Center (NSIDC)/ Moderate Resolution Imaging Spectroradiometer (MODIS) (USA)	Global satellite snow data, useful for multi-decade trend analysis	nsidc.org/data/mod10a1/versions/61
National Aeronautics and Space Administration (NASA) Earthdata (USA)	Global satellite data on snow cover, glacier extent, temperature and precipitation	earthdata.nasa.gov
NOAA/U.S. National Ice Center Interactive Multisensor Snow and Ice Mapping System (IMS) (USA)	Daily northern hemisphere snow cover maps	usicecenter.gov/Products/ImsHome
Snow Telemetry (SNOTEL) Network (USA)	800+ ground stations across the western US measuring snow depth and water content in detail	www.nrcs.usda.gov/resources/data-and-reports/snow-and-water-interactive-map
World Glacier Monitoring Service (WGMS)	The world's most complete database of glacier mass and length changes	wgms.ch
Global Land Ice Measurements from Space (GLIMS)	Satellite-based glacier monitoring for remote regions	glims.org
ECMWF ERA5	Global hourly historical climate dataset – over 100 variables, for many decades	cds.climate.copernicus.eu/datasets/reanalysis-era5-single-levels

Service	What it provides	Web address
Climate Reanalyzer	Free, no-code tool to compare current conditions against historical averages	climatereanalyzer.org
NOAA National Centers for Environmental Information (NCEI) – Climate Data Online	Global historical weather and climate observations, including snowfall and snow-depth data	www.ncei.noaa.gov/cdo-web

Table 7. Selected tools for climate projections and impact assessment

Service	What it provides	Web address
Coupled Model Intercomparison Project Phase 6 (CMIP6)	The global climate model ensemble underpinning Intergovernmental Panel on Climate Change (IPCC) assessments	wcrp-cmip.org/cmip-data-access
EURO-CORDEX	Regional projections of temperature and precipitation across Europe	euro-cordex.net Data: cds.climate.copernicus.eu/datasets/projections-cordex-domains-single-levels
Climate Impact Lab	Accessible visualizations of climate impacts by sector and region (not ski-specific, but easy to use)	impactlab.org
Climate Engine	No-code app and documentation. Requires account and dataset/area setup. Future-projection availability depends on app/product	climateengine.org
WSL Institute for Snow and Avalanche Research SLF (Switzerland)	Research/explanations with Swiss snow-day index by altitude	slf.ch/en/snow/snow-and-climate-change



Figure 3. Spring snow cover across the European Alps, observed by NASA's Terra satellite in March 2016

Credit: NASA/Jeff Schmaltz, Land, Atmosphere Near real-time Capability for Earth observation (LANCE)/ Earth Observing System Data and Information System (EOSDIS)

Table 8. Selected resources for managing financial climate risk

Service	What it provides	Web address
Weather Risk Management Association	Information and resources on weather risk and weather derivatives	wrma.org
UK Financial Conduct Authority (FCA) Climate Financial Risk Forum	Practical guidance on scenario analysis, stress testing and transition risk assessment	www.fca.org.uk/cfrf

6. Further information and resources

This section brings together the main data portals, analysis tools and training resources used throughout the guide, together with additional useful resources. Some resources are repeated from earlier sections to provide a single reference point.

Major data portals

Major weather, climate and Earth observation data portals are listed below in Table 9. Satellite observations, such as the example shown in Figure 3, provide information on snow cover and other conditions across mountain regions.

Table 9. Major weather, climate and Earth observation data portals

Service	What it provides	Web address
Copernicus Climate Data Store	Europe's main climate data hub: observations, satellite data, reanalyses, seasonal forecasts and projections	cds.climate.copernicus.eu
NASA Earthdata	Global satellite and Earth observation data	earthdata.nasa.gov
NASA Worldview	Interactive visualization of near-real-time satellite observations for monitoring snow cover and storms	worldview.earthdata.nasa.gov
National Meteorological Services	Official national weather, climate and hydrological information and services	Various web addresses
NOAA NCEI – Climate Data Online	Historical weather and climate observations, including snowfall and snow depth	www.ncei.noaa.gov/cdo-web
World Meteorological Organization (WMO)	Information on WMO and its Members' weather, climate and hydrological services	wmo.int

Analysis tools: From no-code to advanced

Many of the resources in this guide can be used without programming skills. The tools in Table 10 range from simple, browser-based applications to more advanced options for customized analysis.

Table 10. Selected climate data analysis and visualization tools

Service	What it provides	Web address
Climate Reanalyzer	Interactive maps and charts for exploring current and historical climate conditions. No programming needed; browser-based	climatereanalyzer.org

Service	What it provides	Web address
Copernicus Interactive Climate Atlas	Interactive maps and time series of past climate and future projections, including temperature, precipitation and snowfall indicators. Select a region, season, dataset and scenario in the browser.	atlas.climate.copernicus.eu/atlas
Google Earth Engine	Cloud-based tools for analyzing satellite and geospatial data	earthengine.google.com
Copernicus Data Space Ecosystem	Cloud-based access and analysis tools for Copernicus Earth observation data, including Sentinel satellite data	browser.dataspace.copernicus.eu
Python and R	Programming languages widely used for customized climate data analysis	python.org www.r-project.org

Training and guidance

Selected training and guidance resources are provided in Table 11 below.

Table 11. Selected training and guidance resources

Service	What it provides	Web address
WMO Training Resources	Searchable collection of WMO and partner learning resources	etrp.wmo.int/course/view.php?id=346
Copernicus C3S Training	Webinars and tutorials on accessing, interpreting and using Copernicus climate data	climate.copernicus.eu/user-learning-services
WCRP Academy	Training and learning resources from the World Climate Research Programme (WCRP) and partner organizations, including a catalogue of training opportunities	wcrp-academy.org
Coursera, edX, FutureLearn	Online courses on climate science, meteorology, data analysis and related topics	coursera.org edx.org futurelearn.com

Quick access: Four useful starting points

For quick access to weather and climate information, these four resources provide useful starting points for day-to-day, seasonal and long-term planning, together with access to national meteorological services worldwide.

Day-to-day weather: Mountain Forecast
www.mountain-forecast.com

Seasonal outlooks: ECMWF
www.ecmwf.int/en/forecasts

Long-term climate information: Copernicus Climate Data Store
cds.climate.copernicus.eu

National weather and climate services: WMO
wmo.int

BEFORE YOU GO

Weather and climate services work best when they become part of the everyday routine, not an occasional check. Combine what these tools tell you with your team's on-the-ground knowledge and experience – each adds an important part of the picture.

WANT TO GO DEEPER?

This guide is intentionally short and non-technical. If you want to go deeper, a longer companion report covers the scientific background, additional tools and more detailed guidance for weather and climate service providers.

doi.org/10.59327/WMO/ESDP/SKI/2

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