



INTERNATIONAL ORIENTEERING FEDERATION

IOF Climate Transition Action Plan to Net Zero

**The road towards zero net emissions by 2040
(and reducing the 2019 “baseline” emissions by 50 percent by 2030)**

The International Orienteering Federation

The International Orienteering Federation (IOF) is the international governing body for orienteering sports. The IOF governs four orienteering disciplines: foot orienteering, mountain bike orienteering, ski orienteering, and trail (precision) orienteering. The IOF was founded in 1961 and was recognised by the International Olympic Committee (IOC) in 1977. The current number of countries that are Members of the IOF is 78¹.

Orienteering has a special relationship with the natural environment that is embedded in its Vision, Mission and Goal.

Vision - Orienteering is the most attractive adventure-based sport for all ages.

Mission - We promote the global growth of orienteering and develop competitive and recreational orienteering.

Main Goal - Our main goal is to become a global and sustainable sport.

The very first of the IOF's core values is, indeed, **"Sustainable"**: *Orienteering provides mental and physical challenge, builds life-skills and self-confidence and promotes a healthy lifestyle. We are respectful of the natural environment and promote environmental good practice. Orienteering events require limited infrastructure and a low threshold for participation. We are progressive in our response to changes in society.*

Unique features of Orienteering

- Orienteering does not require any permanent infrastructure apart from what is provided by the environment, either natural (forests) or anthropic (cities).
- Materials used at orienteering events (for both organisers and participants) are extremely limited in quantity, always removed at the end of the events and reused over and over again (controls, start/finish, electronic equipment, compass).
- Although no prescriptive regulations have been issued regarding the preservation of the environment (in general, mainly guidelines and recommendations), the standards adopted are very high. The awareness of participants is generally good to excellent, probably stimulated by the continuous exposure to nature and its value.
- The great majority of people that attend orienteering events do participate in the event as athletes. The proportion of mere spectators apart from non-competing family members is negligible, with the exception of major competitions, such as

¹ As of 28 November 2024.

World Championships. Consequently, the benefits of active participation in sport are widespread.

- Orienteering is one of the most age-inclusive sports, with classes starting with children (non-competitive for the youngest), up to the elderly: the World Masters Orienteering Championships typically include age classes until over 95 years; adjustments in physical requirements and the mental stimulus inherent in the required navigation skills help to conserve a healthy life.

The IOF's commitment to Sustainability is made explicit in its "Sustainability Policy" and in its "Sustainable Sourcing Policy"².

IOF Commitments on Climate and the Environment

The urgency of a global effort to mitigate climate change is well expressed in the IPCC AR6 Synthesis Report 2023³: *"Human activities, principally through emissions of greenhouse gases, have unequivocally caused global warming, with global surface temperature reaching 1.1 °C above 1850-1900 in 2011-2020⁴. Global greenhouse gas emissions have continued to increase, with unequal historical and ongoing contributions arising from unsustainable energy use, land use and land-use change, lifestyles and patterns of consumption and production across regions, between and within countries, and among individuals"*.

The IOF takes this challenge very seriously and is determined to make its contribution to the mitigation of climate change in its own operations and in inspiring climate and environment-conscious behaviours, recognising the role-model that athletes represent for the younger generations and the public at large.

IOF, signatory of the S4CA framework

17 August 2019 the IOF confirmed its support to the vision outlined in the **Sports for Climate Action** Declaration, following a decision of the IOF Council of 12 April 2019, and committed itself to the implementation of the principles enshrined in the Sports for Climate Action Framework, working with peers and relevant stakeholders of the sports world.

21 January 2021, the IOF signed the Commitment to the **"Race-to-Zero"** global campaign rallying non-state actors to take immediate actions "to halve global emissions by 2030 and deliver a healthier, fairer, net zero world:

² <https://orienteering.sport/iof/governance-and-organisation/statutes-codes-and-policies/>

³ https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf

⁴ Most recent figure: 1,19 °C above 1850-1900 in 2014-2023.

- Measure emissions associated with its operations as an Organisation (all scopes).
- Reduce GHG emissions by 4.5% year on year / 45% by 2030 (all scopes included) against its 2019 baseline.
- After reduction, offset as much as possible any remaining emissions, using UN-backed credits.
- Report publicly on progress towards its climate goals.”

On 2 November 2021, in line with the S4CA initiative, the IOF adopted an **even more ambitious target** by setting the **deadline of 2030** for a **50% emissions reduction** (with respect to the baseline year 2019) and **net-zero** emissions target by **2040**.

The IOF also committed to consistently measuring and disclosing its annual climate footprint and emissions reductions progress, and to produce a Climate Transition Action Plan specifying how it intends to reach interim targets.

Communication, education, awareness raising, and advocacy are further commitments adopted by the IOF.

Emission Reduction Strategy

A carbon budget since 2019

The IOF has produced an annual carbon budget starting from 2019, taken as the base-line year.

As a reasonable starting point, the boundary was set around the organisation as such, comprising the activities that fall under its direct control and responsibility. These include the activities of President, Council, CEO, Secretary General, Office and Commissions; all together, around 120 persons, the vast majority distributed in many countries around the world.

We adopted the general principles that are common to financial accounting:

Relevance – our accounting represents to the best of our abilities, all the sources of GHG that represent the activity of the IOF and are the most useful references for an improvement pathway.

Completeness – all available data have been included and, for the few cases where reliable data were not available, best estimates and appropriate explanation thereof was given.

Consistency – The IOF Carbon budget for the year 2023 was the fifth produced by the IOF; in order to better appreciate changes across time, the same reference data bases were used. Most emission factors are derived from the “UK Government GHG Conversion Factors for Company Reporting” (DEFRA 2019, 2020, 2021, 2022, 2023). The reason for the choice were:

- the degree of detail available, covering most of the emission sources;
- the appropriateness for the European region, where the majority of IOF operations take place;
- the availability of updates on a yearly basis.

We shall refer to it as the “**DEFRA database**”, as it was initially developed by the Department for Environment, Food & Rural Affairs.

Choice of emission factors

Transparency – Raw and summary data provided by the Office are based on actual reports, invoices, travel documents etc. Where a best estimate was necessary, the criteria were made explicit.

Accuracy – Every reasonable effort was done to obtain data at the most granular level; all classes of emissions were increased by 10%, in order to remain on the safe side and avoid the risk of under-representation of emissions.

Process description

We followed the stepwise approach suggested by the Greenhouse Gas Protocol (WRI and WBCSD, 2004; p. 45) excluding the fifth step (Roll-up Data to Corporate Level) as non-applicable to the IOF.

Identification of sources: direct and indirect emissions

Scope 1 – As of 1 January 2023, the IOF closed its office in Karlstad, Sweden, whose emissions had been reported until 2022. Staff members work from home and meet occasionally. Such trips, in order to keep a similar structure as in previous years, was reported as “staff commuting”. The IOF does not own a car fleet. Therefore “Scope 1” emissions are nil.

Scope 2 – For the same reasons, no energy or heat are bought by the IOF, which brings also “Scope 2” emissions to zero.

Scope 3 – All emissions, therefore, are classified as “Scope 3”. The lion’s share is represented by business travels of Office staff, the President, CEO and Secretary General and members of the IOF Council and Commissions. Staff commuting, as mentioned before, is included here.

Calculation approach and data collection

Reporting is based on the most reliable data available.

Travel reporting is based on a detailed record keeping of individual business travels (km, means of transportation), generally, but not always, including car type and fuel type. Where detailed data were not available prudential estimates were adopted. The most detailed emission factor compatible with the level of information available was used.

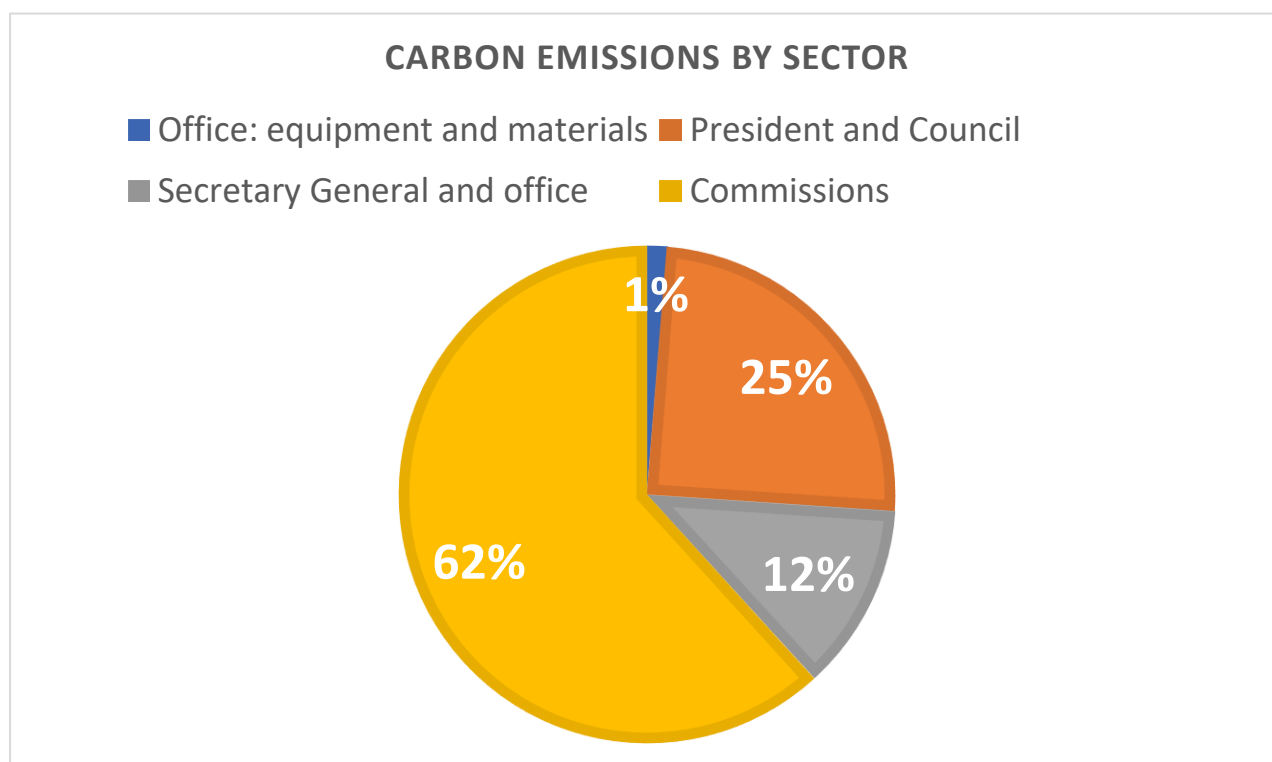
As for commuters’ travels (people working for the IOF Office), distances were calculated for each employee (home-office, return) who produced details on car type and fuel or type of public transportation: emission factors per km were therefore calculated with the highest possible detail.

- Business trips of President, Council members, CEO, Secretary General, Office staff and Commission members could reach the detail of transportation means (airplane, train, coach, ferry, car) and the number of km per means and trip. Travel which combined IOF business and other activities was assessed on a pro-rata basis according to the estimated proportion of the trip devoted to IOF business.
- Flights: European flights, all in Economy class, were calculated as "short haul"; outside Europe "long haul".
- Train: National or International rail emission factors were used according to the trip concerned.
- Coach: Local bus or Coach emission factors were used according to the trip concerned.
- Ferry: Average passenger emission factor.

- Car: Emission factors used depended on the degree of detail of information available. E.g. in case of staff commuting, where fuel type and car type segment were known, specific fuel/segment emission data were used. In contrast, in case of Council or Commission members' trips, average car emissions were used, as distance but not car type had been recorded.
- Hotel nights: most destinations were concentrated in Europe; therefore, an average emission factor for European destinations was calculated; the DEFRA database misses a significant number of European destinations which did not allow the adoption of a case by case (country-specific) emission factor. In a couple of cases (China and USA) country-specific emission factors were available and therefore employed in calculations.

The baseline: 2019

The total emissions calculated for the year 2019 amounted to **313 metric tons of CO₂e**, with fractions attributed to the activities of the four main components of the Organisations as follows:



... with mobility-related emissions exceeding 98% of the total.

Emission reduction actions

The 2019 carbon budget showed that more than 98% of all emissions were attributed to business travels. The 2020 COVID pandemics imposed a drastic reduction on in-person meetings and international orienteering events, and this was reflected by the drop of the IOF emissions to **38.3 metric tons CO₂e for the year 2020 and 27 for the year 2021**. The pandemic also influenced the 2022 carbon budget as there was no in-person joint Council-Commissions meeting.

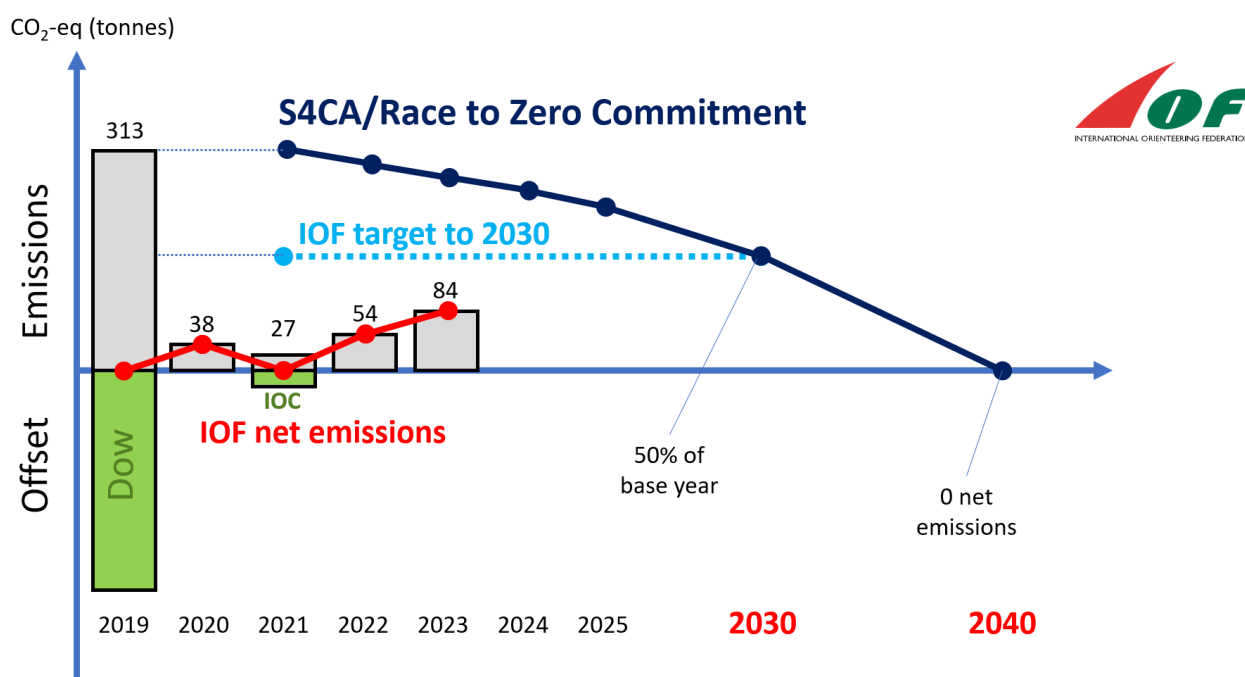
However, as most meetings had to be moved to a virtual setting, the potential of teleconferencing as a standard meeting mode proved to be effective also from an operative point of view, allowing for more frequent (albeit shorter), and sometimes more efficient, meetings.

The Council therefore decided to reduce the number of in presence meetings, to be replaced, at least in part, by teleconferences also after the end of the critical COVID period. The Office, Council members and Commission Chairs received a full Office 365 licence including the teleconferencing platform MS Teams and shared storage space One Drive. This decision proved extremely successful not only in the reduction of mobility CO₂ emissions, but also in allowing uninterrupted communications within and between the different groups.

Indeed, teleconferencing allowed for more frequent meetings, often managed in a more orderly way, and certainly more convenient for participants and cheaper for the IOF and Member Federations. Drawbacks exist but of a lesser importance: the need to accommodate for different time zones, shorter meetings and, in some cases, less effective one-to-one interaction.

A minor (in absolute terms) but significant contribution came also from the decision to close the physical office in Karlstad (SWE) and turning all its activities in a virtual setting. This was apparent from the carbon budget for the year 2023: the emissions dropped from 2.5 to 1.0 tons CO₂e.

The year 2023 was the first in which the IOF activities returned to normal “pre-COVID” levels and this fact explains the slight increase of emissions with respect to 2022, however well below the IOF target towards the year 2030.



IOF Commitment exceeds S4CA recommendations

The IOF therefore, decided to exceed the 2021 commitment of a 50% reduction of emissions with respect to the base year (2019) by 2030 by **remaining under the 50% level throughout the whole period until 2030, instead of gradual approach.**

Compensation of unavoided emission

As far as compensation for emissions is concerned, no concrete decision has been made so far.

The emissions of 2019 were offset by Dow (<https://corporate.dow.com/en-us/>) as the IOF carbon budget for 2019 had been selected for the IOC and Dow "Carbon Initiative Award".

The non-avoided GHG emissions 2021 have been fully offset by the IOC through a portfolio of ICROA-compliant GHG projects as the IOF carbon budget for 2021 had been selected for the IOC "Carbon Action Award".

The emissions of 2022 and 2023 were not offset by the purchase of carbon credits due to the ongoing debate over the reliability of many compensation projects, as was evident in COP 28, Dubai⁵. A discussion is open within the IOF, **to find suitable third-party certified programmes or alternative initiatives**, most likely in the areas of afforestation or reforestation, in line with its strong relationships with forests for the very performance of the sport of orienteering.

⁵ <https://www.unsdsn.org/news/what-happened-to-global-carbon-markets-at-cop28/>

Scenario Analysis

The carbon emissions of the IOF are directly proportional to its activities. After the Covid-19 outbreak, that provoked a severe limitation to international travels and, therefore, to international orienteering events, there was a gradual return to normal in 2022 and 2023 and this caused an increase of carbon emissions vs the absolute low of 2021.

Another aspect to be considered is that some contingency factors are likely to be reflected in the emissions. When IOF events take place outside Europe (e.g. Orienteering races in the World Games in China in 2025), the preparation requires more long-distance air travel. The composition of the Council is another variable, with the number of non-European members inevitably reflected in air-travel emissions.

The IOF has at present a centre of gravity in Europe, where the sports originated many decades ago, but **the ambition of the Federation is to make Orienteering a global sport** and many efforts are dedicated (with an ad hoc “Global Development Commission”) to supporting the spread and the growth of the sport in other continents.

The main attention of the IOF, therefore, rather than on the absolute amount of emissions, will be focused on maintaining, and possibly **decreasing, the “carbon intensity” of its activities**. For example, as the IOF Joint Meeting is by far the single event during a year with the greatest impact (traveling), when assessing potential destinations and concrete proposals going forward, we can also take more into consideration the potential for traveling by train to the destination and not only the economic part for IOF and participants/member federations, as was the case so far.

We acknowledge that the responsibility of a Governing Body goes beyond the limited boundaries of “household management”, however effective it may be.

The IOF has a responsibility to affect how the sport is managed in events that fall under a shared responsibility with local organising committees. World Championships, Regional Championships, Youth, Junior and Masters Championships in the four disciplines: Foot Orienteering, Mountain Bike Orienteering, Ski Orienteering and Trail Orienteering are appointed by the IOF to National Federations or other consortia based on criteria that include environment-related objectives.

On a third “layer”, national orienteering events, the IOF has neither direct control nor responsibility. Its role, in this case, is that of inspiration and support.

Risk and opportunities

The **major challenge** on the way towards a further “environment and climate friendly” development of the sport is **transport**. Apart from “sprint” competitions that are usually performed in urban areas, most of the competitions take place in forests, with limited, if any, possibility to be reached by public transport. Improvements may be possible (e.g. by the use of shuttles, car-pooling, etc.) but a carbon-free solution is hardly achievable. Compensation of emissions might be the only solution in the near future.

Besides the environment, the two other “pillars” of sustainability should deserve proper attention: social and economic.

- A) The benefits of a healthy lifestyle, such as stimulated by active orienteering, decrease the burden to public and private health systems due to non-communicable diseases that are steadily increasing in the world.
- B) Most of orienteering events bring participants in rural/forest areas where they contribute to local economies; in particular for accommodation and food.

Improvements are certainly possible in the **relationships with external suppliers** (mainly catering services at events), sponsors (although much more limited than for other sports), Environmental consciousness among orienteers is generally good, but experience shows that even for concerned people there is ample room for improvement. Good communication with the public and stakeholders on environment and climate issues will also improve the image of orienteering.

Initiatives

Sustainable sourcing implementation plan – Following the adoption of the Sustainable Sourcing Policy by the IOF Council in 2023, that makes explicit reference to climate as a pillar of sustainability, an implementation plan, setting out the process components and responsibilities will be developed by the end of 2024, early 2025. Fundamental is a reduction in the use of natural resources through the adoption of the principles of a circular economy: Reduce-Reuse-Refurbish-Repair-Recycle.

Guidelines and checklists for sustainable events – G&C are being developed by the IOF for National Federations, Clubs and Athletes with recommendations for the organisation of sustainable orienteering events, including:

- Emissions reduction by prioritising public transport and carpooling.
- Minimisation of single-use materials, with particular emphasis on plastics.
- Circular approach to the use of materials and equipment.
- Land Management Partnerships.
- Local and sustainably sourced catering.
- Respecting sensitive areas in course setting.
- Responsible waste disposal.

A downloadable PDF version will be available by the end of 2024 and an application for tablet/smartphone in 2025.

Education – The IOF aims at raising the awareness of practitioners (organisers, athletes and leisure orienteers) on climate change and its impact on ecosystems. A series of talks (Powerpoint presentation with voice) is being prepared. The target is to have the first three episodes (Introduction, Carbon sources, Carbon sinks) available through the IOF website by the end of 2025, Three more (Circular economy, Other challenges, Orienteering) in 2026 and at least a final one (Communication) in 2027.

Educational sessions on climate change mitigation and environmental protection have been included in the IF “**Young Leaders Academy**”, an event targeted at young orienteers from around the world organised in conjunction with a 5-Days orienteering event in Italy in 2024.

The IOF also holds annual seminars for the development of organising skills for high level orienteering events where the sustainable event planning and best practice in minimizing environmental impact will be permanently included:

- High-Level Event Seminar for future high-level event organisers
- IOF Senior Event Adviser (SEA) seminar
- Event Adviser Clinics

Research – A prize for the best scientific paper on sustainability of orienteering was launched by the IOF in 2024. Climate will be one of the subjects foreseen, alongside other environment-related topics (vegetation, wildlife, pollution, etc.) and the other two pillars of sustainable development: social and economic (<https://orienteering.sport/iof/environment-and-sustainability/iof-prize-for-the-best-scientific-publication-sustainability-and-orienteering/>).

Communication - The IOF website includes a section on “Environment and Sustainability” (<https://orienteering.sport/iof/environment-and-sustainability/>) where the annual carbon budgets and a huge number of technical documents and tools are published.

These include a “Carbon Footprint Calculator” for car trips (<https://orienteering.sport/iof/environment-and-sustainability/>) and a list of initiatives that athletes and leisure practitioners of orienteering may adopt in their daily lives to reduce their carbon footprint (<https://orienteering.sport/iof/environment-and-sustainability/how-to-reduce-your-carbon-footprint/>).

Advocacy

The IOF is an active member of the **Sports for Climate Action** and participates in its activities to raise the awareness of the athletes and of club leaders and event organisers on the need to reduce the carbon emissions.

The IOF is also a member of the **Sports for Nature** initiative that has analogous objectives, albeit with a focus on the preservation of biodiversity and the natural environment.

The IOF also supports, in collaboration with Member Federations (in liaison with environmental groups, land management authorities, and other outdoor sports organizations) the engagement in public events to promote Orienteering as an environmentally conscious sport and the benefits of nature conservation.

Orienteering events and climate adaptation

Introduction

The cancellation (and subsequent rescheduling) of the JWOC⁶ 2022 forest events highlighted the risk that climate extremes pose to the international orienteering program. Many national federations have also reported that they have had to cancel events because of extreme weather (most often extreme heat and/or wildfire risk, but on occasions also heavy rain or storm damage). While extreme weather is always a risk which needs to be considered in the staging of events, some types of extremes are becoming more frequent, more severe and extending over a longer season with climate change, and these trends are likely to continue into the future. It is therefore prudent for IOF to assess the risks posed and what options there are for addressing them.

Of extremes that impact orienteering, the clearest trends towards more adverse conditions are:

- **Extreme heat:** higher absolute temperatures, more prolonged heatwaves, and a longer season when extreme heat is possible. (It is interesting to note in this context that the 1991 JWOC relay in Berlin was run on what was then Berlin's hottest day on record, 35.7 °C; this temperature has been exceeded at least once in about half of the summers in the last 20 years, and was exceeded in all three summer months in 2022).
- **More dangerous fire weather days:** depending on the location, this can also involve the fire season becoming longer and extending into times of year which were previously low-risk, as well as significant fire risk moving into regions which have historically been considered low-risk (such as many parts of northern and central Europe).

Extreme rainfall is also expected to increase in many parts of the world, but the signal is less clear-cut than for extreme heat or fire weather. There is little evidence of a climate change signal in other severe weather elements such as high winds or severe local storms (large hail, tornadoes etc.).

This section focuses on extreme heat and fire weather as two hazards which are clearly influenced by climate change, and which are clearly concentrated in the summer in many parts of the world. Other extremes can influence events; two notable examples were the abandonment of a World Cup competition in France because of high winds, and a flash flood at a World Cup competition in Switzerland in 1996 which prevented the later competitors from reaching the finish.

⁶ Junior World Orienteering Championships

In most climates, extreme heatwaves can be forecast with a reasonable degree of skill at least 7 days in advance, although at that time range the exact location, timing and intensity of the most extreme heat may be uncertain. Extreme fire weather has a lower level of predictability as it is strongly influenced by wind speed, which can vary on relatively small spatial scales.

The text in this section is currently written from a perspective focused on IOF High Level Events in foot orienteering. Many of the issues will be relevant to lower-level IOF events (e.g. Regional Championships, WREs), national events, and to mountain bike and trail orienteering. Ski orienteering is considered in a later section.

The existing high-level events landscape

The table below summarises existing high-level events in foot orienteering, with some background notes on particular aspects of the event.

Event	Usual timing	Notes
WOC ⁷	Late June-August	Competitions are often held in the afternoon (partly for broadcast reasons)
World Cup	Normally 3 rounds (Apr/May, mid-year, Sep/Oct)	Competitions are often held in the afternoon (partly for broadcast reasons)
JWOC	July	Timeslot is school/university holidays in most countries (in both Northern and Southern Hemisphere). Large fields with a 5-6 hour start window in the long distance.
WMOC ⁸	July-August (unless outside Europe)	Not specifically tied to a particular time of year but no recent (post-2005) WMOC in Europe has been held outside July and August

⁷ World Orienteering Championships: held annually, alternating a forest editions and a “sprint” edition in an urban setting.

⁸ World Masters Orienteering Championships: open championships for athletes over 35 years of age.

What are the issues that climate extremes pose?

Issues that climate extremes pose fall into two broad categories:

- Those which limit access to the terrain – for example, authorities may withdraw approval for the use of a forest if fire danger is high.
- Those which pose a risk to the safety of the competitors.

The latter risk will vary according to the competitors. Competing in a temperature of 35 °C may be manageable for a fit elite competitor who has trained specifically for those conditions but may be dangerous for a less fit competitor or one who has not trained specifically (something which would apply to many WMOC participants). Acclimatisation is also a factor; for example, many events in Asia are held in hot and humid conditions, but as most local participants live in those conditions for significant parts of the year, they are more acclimatised to those conditions than someone from a cooler climate would be. Heat stress is also primarily an issue in longer races.

Thermal comfort combines both heat and humidity: 30 °C with high humidity is likely to be more challenging than 35 °C with low humidity. A number of indices are used which combine temperature and humidity, one being the Wet Bulb Globe Temperature (WGBT) (further information is available at http://www.bom.gov.au/info/thermal_stress/).

The exact risk that climate extremes pose will vary considerably by region. In particular, dangerous fire weather is short-lived in some regions and long-lived in others – for example, in Tasmania (Australia) fire weather can be very dangerous but such conditions rarely last for more than 1-2 days at a time, whereas in other regions, such as parts of the Mediterranean and the interior west of North America, once dangerous fire weather is established it can last for several weeks (unless it rains).

These issues mostly apply to forest events. Sprint events are normally held in urban areas which have limited exposure to wildfire and are short enough to limit the worst impacts of heat.

What potential strategies exist for addressing these issues?

Some potential strategies which exist for addressing these issues include:

- Scheduling events for a time of year less likely to be affected by extreme weather. This is most likely to be an option for WMOC – while European organisers currently prefer a July/August timeslot (possibly because they perceive it as being likely to maximise attendance, although that has not been tested in recent times), the event could be held in spring or autumn, especially if it is in southern Europe. JWOC is a much more difficult event to move because of the strong advantages of the July timeslot for its competitor base. A survey of national federations in early 2023 found strong support for the option of using a different timeslot for WMOC, and somewhat less strong support for WOC and JWOC (for WOC, 15 federations supported the option, 4 opposed and 4 neither supported nor opposed).

- If extreme heat is likely, scheduling events to take place as early in the day as possible. This is most practical for events where the start window is relatively short (it would, for example, be of only limited value for a JWOC long distance). It may be difficult for events which are being broadcast (although in some circumstances it may be easier to get broadcast timeslots in the afternoon or evening). Some sports have addressed extreme heat issues by staging summer competitions at night but that is not an option for our traditional formats.
- Allowing sufficient flexibility in schedules for events to be rescheduled if necessary – for example, to allow a short postponement, or exchanging forest and urban competitions. This is most practical in circumstances where extreme conditions are expected to be short-lived (it would not, for example, have helped at JWOC 2022). It may also be an option to bring forward start times, although this would be difficult at an event which is being broadcast. One example was that at the 2023 Australian Long-Distance Championships, it was decided a few days before the event to bring all start times forward by 1 hour following a forecast for the day of 35 °C (a record high for that location at that time of year). The 2023 survey of national federations found majority support for the option of extending event windows where required to provide additional flexibility, although some federations were strongly opposed.
- Ensuring that suitable shade is available in pre-start and (where applicable) quarantine areas, and in other areas where competitors may be waiting for significant periods.

In the most extreme cases, an option is to set limits beyond which a competition cannot proceed (e.g. exceeding a set temperature threshold, such as 40 °C). Such limits would potentially vary from region to region. The discipline Commissions should consider whether such limits are appropriate for events under their jurisdiction. (The rules for Ski Orienteering already contain temperature limits for extreme cold).

Climate is currently part of FOC's (IOF-Foot-O Commission) criteria for assessing event bids, although it has a relatively low weighting. We would, however, need to be careful from an equity perspective of not adopting criteria which are exclusionary (for example, adopting a set of criteria which had the effect of preventing major events from being hosted in tropical countries).

While heat impacts riders less than runners, MTBO athletes often compete in temperatures above 30°C with a need for adequate water stations along the course. The need for hydration, especially during long distances, is significant, and it can be challenging for athletes to carry sufficient water.

In TrailO, where participation of athletes with disabilities is very significant it must be considered that some of them (in particular those with spinal issues) are less able to moderate their body temperatures than able-bodied and that many will also take medication that may vary in speed of absorption or effectiveness when body temperature or hydration levels are abnormal.

Specific issues for ski orienteering

Climate change poses a particular risk to ski orienteering. With warming temperatures, snow seasons are becoming shorter and snow cover within the season is more unreliable. The impact is most substantial in more marginal snow climates at lower latitudes and lower elevations. Many cross-country ski centres are at relatively low elevations compared with downhill ski resorts, particularly in central Europe, making them especially susceptible to reductions in snow cover.

Of the 11 national federations surveyed which reported that they organize ski orienteering events, all 11 reported that they had had to cancel or reschedule competitions in the recent past because of poor snow conditions.

A shorter snow season means that the available competition window is shorter, especially as other snow sport competitions are often competing for the same few timeslots at the same venue. It may be difficult in the longer term to sustain the current number of IOF high level events (which are in any case sometimes having difficulty finding organizers). This problem becomes more acute if the (already small) number of countries willing to apply for IOF high level events decreases further because of unreliable snow in some potential host countries.

National federations reported considerable flexibility in their own programs. In addition to postponing events where necessary, an option which has been used in some countries is to bring events forward if early-season conditions are good (to mitigate the risk that they may deteriorate later in the season). This flexibility is perhaps the best available option for national-level events but may be more challenging for IOF major events. Backup venues (perhaps even in another country) may be an option but this comes at a substantial financial and organizational cost.

Risks for the organisers

The growing number of extreme weather events makes it necessary for the organisers of big events to address risk factors adequately, in order to avoid or reduce personal and financial liabilities.

There is a need to anticipate, with a detailed risk management plan:

- The measures to adopt in case of forecasted or actually occurring severe meteorological event (or fire), be it the cancellation or postponement of competitions.
- The initiatives to minimise negative consequences to people and infrastructure.
- A protection (with appropriate contractual clauses or insurance) from the economic risks caused by the cancellation or postponement of an event.



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