Climate information relevant for Tourism

CLIMATIC IMPACT-DRIVERS (CIDs) AFFECTING THE SECTOR

A climatic impact-driver (CID) is a physical climate condition that has the potential to affect society or ecosystems. CIDs capture important characteristics of both common and extreme weather and climate events, as well as the average climate. Here we focus on selected CIDs, identified of greatest relevance for risk assessment in the tourism sector. Some CIDs describe extreme weather and climate events that may trigger natural disasters, such as storms, heatwaves, floods, droughts, and wildfires, which cause direct damage and lasting impacts. Other CIDs describe gradual climate changes like changes in mean temperature and precipitation, sea level rise, and snow cover decline. {FAQ 12.1; Table 12.2}

Impacts and adaptation *options for tourism are assessed in the WGII Assessment Report.*
Mitigation aspects *are assessed in the WGIII Assessment Report.*

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HEAT AND COLD

- On regional-to-continental scales, trends of increased frequency of hot extremes and decrease of cold extremes are generally consistent with the global trends in mean temperature (*high confidence*). {TS4.3.1}
- The frequency and intensity of hot extremes will continue to increase and those of cold extremes will continue to decrease, at both global and continental scales and in nearly all inhabited regions with increasing global warming levels. {ES11}

WET AND DRY

- Precipitation will *very likely* increase over high latitudes and the tropical oceans and *likely* increase in large parts of the monsoon region, but *likely* decrease over large parts of the subtropics in response to greenhouse gas-induced warming. {ES4}
- General drying is expected over the subtropical regions, particularly over the Mediterranean, southern Africa and parts of Australia, South America, and south-west North America, as well as over the subtropical Atlantic and parts of the subtropical Indian and Pacific Oceans. {FAQ 4.3}
- Extreme precipitation and pluvial flooding will increase in many regions (*high confidence*). {ES12}

SNOW AND ICE

- Decreases in snow and ice and increases in pluvial and river flooding (*high confidence*) will pose challenges for tourism in North America, Arctic regions, Andes regions, Europe, Siberia, Central, South and East Asia, Southern Australia and New Zealand. {12.5.1; TS4.3.2}
- It is *virtually certain* that snow cover will experience a decline over most land regions during the 21st century, in terms of water equivalent, extent and annual duration. Nevertheless, it is *very likely* that some high-latitude regions will experience an increase in winter snow. {TS4.3.1}

COASTAL AND OCEANIC

- The slow response of sea level to greenhouse gas emissions leads to long-term committed sea level rise, associated with ongoing ocean heat uptake and the slow adjustment of the ice sheets, that will continue over the centuries and millennia following cessation of emissions (*high confidence;* cf. timing of global sea level rise milestones in Fig. 2 of the Fact Sheet on Marine Ecosystems, Fisheries and Aquaculture). {Box TS.4}
- With the exception of a few regions with substantial land uplift, relative sea level rise is *very likely* to *virtually certain* (depending on the region) to continue during the 21st century, contributing to increased coastal flooding in low-lying areas (*high confidence*) and coastal erosion along most sandy coasts (*high confidence*) over the 21st century. {TS4.3.1}

- Marine heatwaves (i.e., extreme events of high sea temperature that can lead to severe and persistent impacts on marine ecosystems, e.g., coral reefs, cf. Fact Sheet on Marine Ecosystems, Fisheries and Aquaculture) will *very likely* increase in frequency, duration, spatial extent and intensity under future global warming in the 21st century, but will not be globally uniform. The largest increases in frequency are projected to occur in the western tropical Pacific and the Arctic Ocean (*medium confidence*). Moderate increases are projected for mid-latitudes, and only small increases are projected for the Southern Ocean (*medium confidence*). {Box 9.2; 12.3.6.2}
- Trends towards increasing wave heights during the satellite era (last 60 years; relevant for maritime tourism, surfing, and coastal regions) have been reported, although most pronounced in the Southern Ocean. Several technical issues limit confidence in reported trends (*medium confidence*). There is *medium confidence* in projections of changes in mean wave climate and *low confidence* in the projected changes in extreme wave conditions due to *limited evidence*. {9.6.4}

CONCURRENT CHANGES IN CIDs

- Every region of the world will experience concurrent changes in multiple CIDs by mid-century (*high confidence*). Even for the current climate, climate change-induced shifts in CID distributions and event probabilities, some of which have occurred over recent decades, are relevant for risk assessments of ecosystem-based tourism. {TS4.3.1}
- The frequency of extreme temperature and precipitation events in the current climate will change with warming, with warm extremes becoming more frequent (*virtually certain*), cold extremes less frequent (*extremely likely*), and precipitation extremes more frequent in most locations (*very likely*). {TS2.1}
- The combination of extreme sea level, increased by both sea level rise and storm surge, and extreme rainfall/riverflow events may increase the frequency/severity of coastal flooding (*high confidence*). {12.4.5.6}
- Small Islands and similar coastlines are particularly vulnerable to sea level rise and concurrent/compound events, whose probability has *likely* increased in the past due to human-induced climate change and will *likely* continue to increase with further global warming. {11.8; Table 10.SM.9; Cross-Chapter Box Atlas.2}
- Tropical cyclone (TC) peak wind speeds and the proportion of Category 4–5 TCs will *very likely* increase globally with warming. It is *likely* that the frequency of Category 4–5 TCs will increase in limited regions over the western North Pacific. It is *very likely* that average TC rain-rates will increase with warming, and *likely* that the peak rain-rates will increase in some regions. It is *likely* that the average location where TCs reach their peak wind-intensity will migrate poleward in the western North Pacific Ocean, and that the global frequency of TCs over all categories will decrease or remain unchanged. {11.7.1.5}

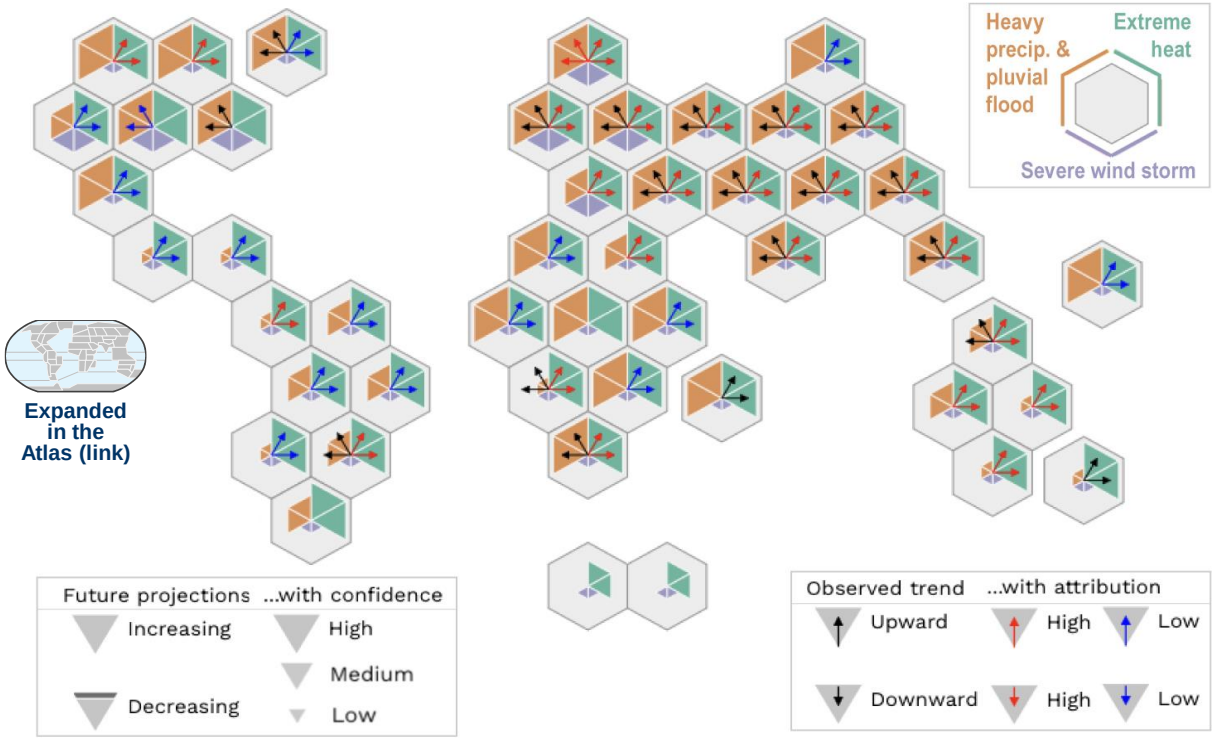

Figure 1: concurrent changes in climatic impact-drivers (CIDs) grouped into features of extreme heat, heavy precipitation and pluvial flood, and severe wind storm {Interactive Atlas}