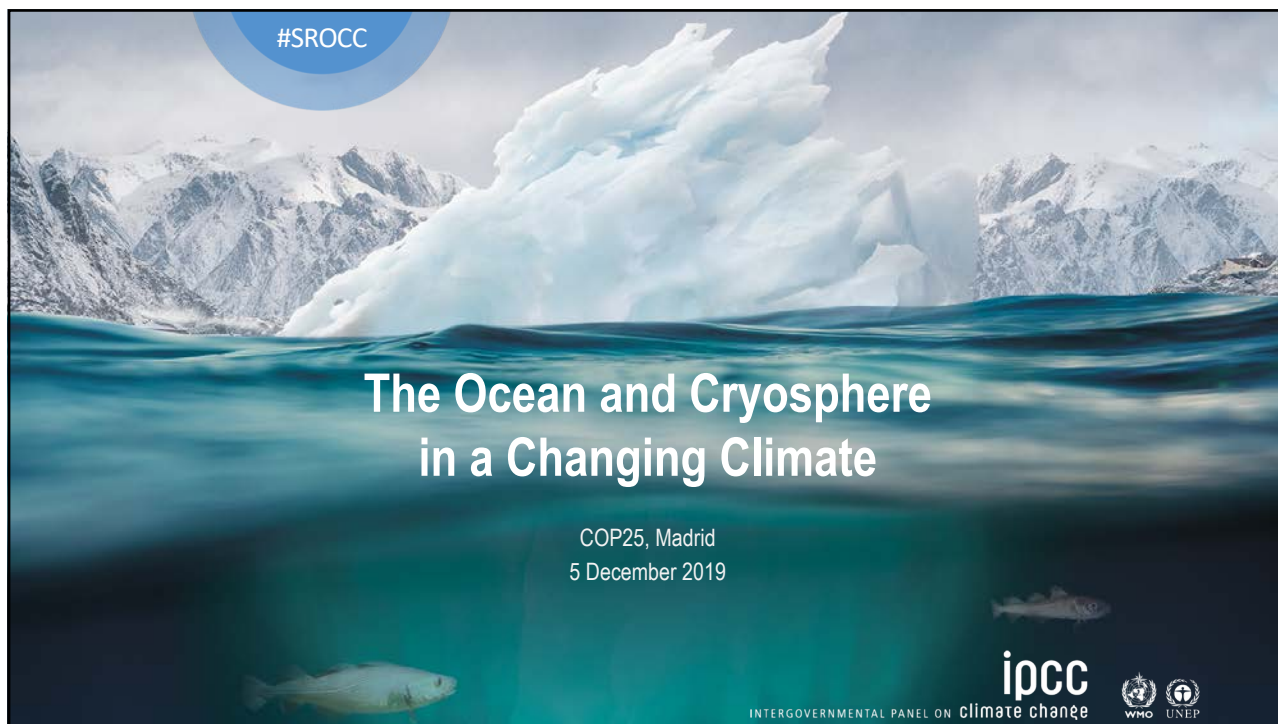


SBSTA-IPCC special event: Unpacking the new scientific knowledge and key findings in the Special Report on the Ocean and Cryosphere in a Changing Climate





Observed changes in the mountain cryosphere

- **Mass change of glaciers in all mountain regions is -123 ± 24 Gt /yr in 2006–2015**
- In nearly all high mountain areas, **the depth, extent and duration of snow cover have declined** over recent decades, particularly at lower elevation
- **Permafrost temperatures**, averaged across polar and high mountain regions, **have increased** to record high levels from 1980s to present



Observed regional hazards in the high mountain

Attributed to Cryosphere Change		Himalaya, Tibetan Plateau and other High Mountain Asia ²	Low Latitudes ³	Southern Andes	New Zealand	Western Canada and USA	European Alps and Pyrenees	Caucasus	Scandinavia ⁴
Physical changes	Water availability	●●●	●●●	●●		●●●	●●●	●	●●
	Flood	●				●	●	●	
	Landslide	●			●	●	●●●		●
	Avalanche	●					●●●	●	
	Ground subsidence								

Physical changes
 increase
 decrease
 increase and decrease

Attribution confidence
 high
 medium
 low
 no assessment

- Glacier, snow and permafrost decline has **altered the frequency, magnitude and location** of most **related natural hazards** such as landslides, avalanches, flooding, ground subsidence and wildfires



Observed impacts on ecosystems and human systems in the high mountain regions

Attributed to Cryosphere Change		Himalaya, Tibetan Plateau and other High Mountain Asia ²	Low Latitudes ³	Southern Andes	New Zealand	Western Canada and USA	European Alps and Pyrenees	Caucasus	Scandinavia ⁴
Ecosystems	Tundra	●●●	●			●●	●●		●●
	Forest	●●				●●			
	Lakes/ponds								
	Rivers/streams		●	●	●	●●	●●●		
Human systems and ecosystem services	Tourism	●●	●		●	●●	●●●	●	●
	Agriculture	●●	●	●					●
	Infrastructure	●●●					●●●		
	Migration ⁶	●							
	Cultural services	●●	●●				●●●		●

Systems
 positive
 negative
 positive and negative

Attribution confidence
 high
 medium
 low
 no assessment

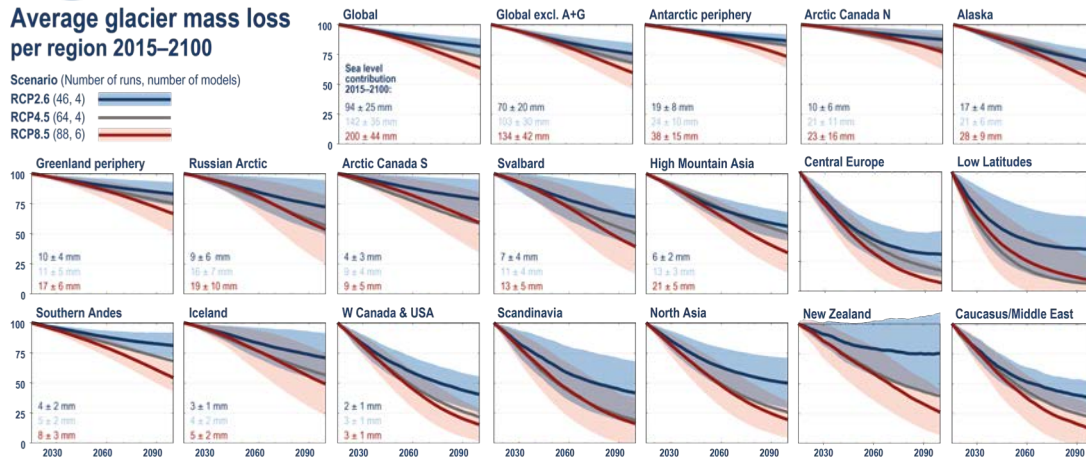
- Lower-elevation **vegetation and wildlife have changed** abundance, extended upslope and established in **new areas**
- Changes in cryosphere also **alters the land and freshwater habitats** of mountain vegetation and wildlife
- Changes have contributed to declines Tourism in many regions and in agricultural yields including the Hindu Kush Himalaya and the tropical Andes



Future: glaciers, snow cover and permafrost are projected to continue decline in most regions

Average glacier mass loss per region 2015–2100

Scenario (Number of runs, number of models)
 RCP2.6 (46, 4)
 RCP4.5 (64, 4)
 RCP8.5 (88, 6)



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Glaciers, snow cover and permafrost are projected to continue decline in most regions

- Projected **decreases in low elevation winter snow depth**, compared to 1986–2005, are likely 10–40% by 2031–2050 (all RCPs), and 50–90% for RCP8.5 by 2081–2100
- **Widespread permafrost thaw** is projected for this century and beyond. By 2100, projected near-surface permafrost area shows a **decrease of 24 ± 16% for RCP2.6 and 69 ± 20% for RCP8.5**

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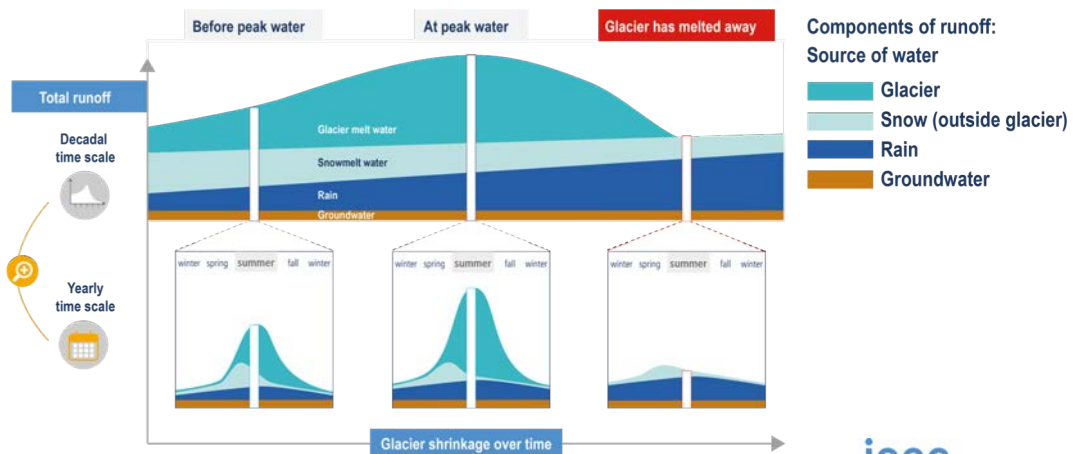


Hazards are projected to occur in new locations and different seasons

- In many high mountain areas, **glacier retreat and permafrost thaw** are projected to further **decrease the stability of slopes**, and **the number and area of glacier lakes will continue to increase**
- **Floods** due to glacier lake outburst or rain-on-snow, landslides and snow avalanches, are projected to occur also **in new locations or different seasons**



In all emissions scenarios, average annual and summer runoff from glaciers are projected to peak at or before the end of the 21st century then decline





Projected risks for high mountain ecosystems

- Future cryosphere changes will continue to alter terrestrial and freshwater ecosystems with **major shifts in species distributions resulting in changes in ecosystem structure and functioning, and eventual loss of globally unique biodiversity.**
- Warm-adapted plant and animal species migrate upslope. **Cold- and snow-adapted species decrease and risk eventual extinction**, especially without conservation.
- Permafrost thaw and decrease in snow will **affect mountain hydrology and wildfire**, with impacts on vegetation and wildlife



Projected risks for people

- **Hazards for people**, through landslides, snow avalanches or floods **will increase**
- The retreat of the cryosphere will continue to **adversely affect recreational activities, tourism and cultural assets**
- **Disaster risks** to human settlements and livelihood options are expected to **increase**
- **Changing water availability and water quality** affects households, agriculture, energy systems, and people both **in the region and beyond**

Limiting global warming helps people to adjust to changes.

Significant risk reduction and adaptation strategies help avoid increased impacts.

Integrated water management and transboundary cooperation provide opportunities to reduce the impacts.

**Our ocean and cryosphere –
They sustain us.
They are under pressure.
Their changes affect all our lives.**

The time for action is now.

More Information:

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