Regional fact sheet - Asia

Common regional changes

The observed mean surface temperature increase has clearly emerged out of the range of internal variability compared to 1850-1900. Heat extremes have increased while cold extremes have decreased, and these trends will continue over the coming decades (*high confidence*).

Marine heatwaves will continue to increase around Asia (*high confidence*).

Fire weather seasons will lengthen and intensify, particularly in North Asia regions (*medium confidence*).

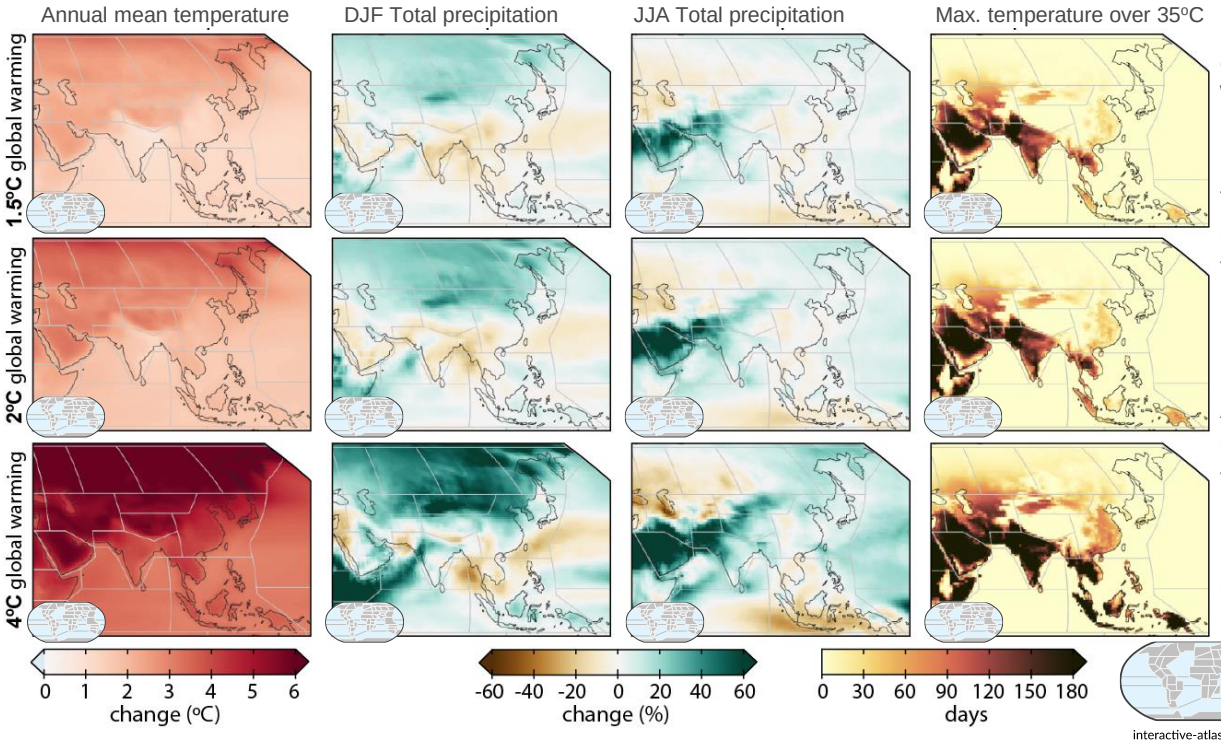
Average and heavy precipitation will increase over much of Asia (*high* to *medium confidence*).

Mean surface wind speeds have decreased in Asia (*high confidence*) and will continue to decrease in central and northern parts of Asia (*medium confidence*).

Glaciers are declining and permafrost is thawing. Seasonal snow duration, glacial mass, and permafrost area will decline further by the mid-21st century (*high confidence*).

Glacier runoff in the Asian high mountains will increase up to the mid-21st century (*medium confidence*), and subsequently runoff may decrease due to the loss of glacier storage.

Relative sea level around Asia has increased faster than global average, with coastal area loss and shoreline retreat. Regional-mean sea level will continue to rise (*high confidence*).



Projections at 1.5ºC, 2ºC, and 4ºC global warming

Changes relative to the 1850–1900 in annual mean surface temperature, total precipitation (Dec–Feb, DJF), and total precipitation (Jun–Aug, JJA). Last column shows the total number of days per year with maximum temperature exceeding 35ºC.

Results expanded in the Interactive Atlas (active links)

Asian Monsoons

- The South and Southeast Asian monsoon has weakened in the second half of the 20th century (*high confidence*). The dominant cause of the observed decrease of South and South East Asian monsoon precipitation since mid-20th century is anthropogenic aerosol forcing.
- The dry-north and wet-south pattern of East Asian summer monsoon precipitation change results from the combined effects of greenhouse gases and aerosols (*high confidence*).
- In the near-term, South and South East Asian monsoon and East Asian summer monsoon precipitation changes will be dominated by the effects of internal variability (*medium confidence*).
- In the long-term, South and South East Asian monsoon and East Asian summer monsoon precipitation will increase (*medium confidence*).

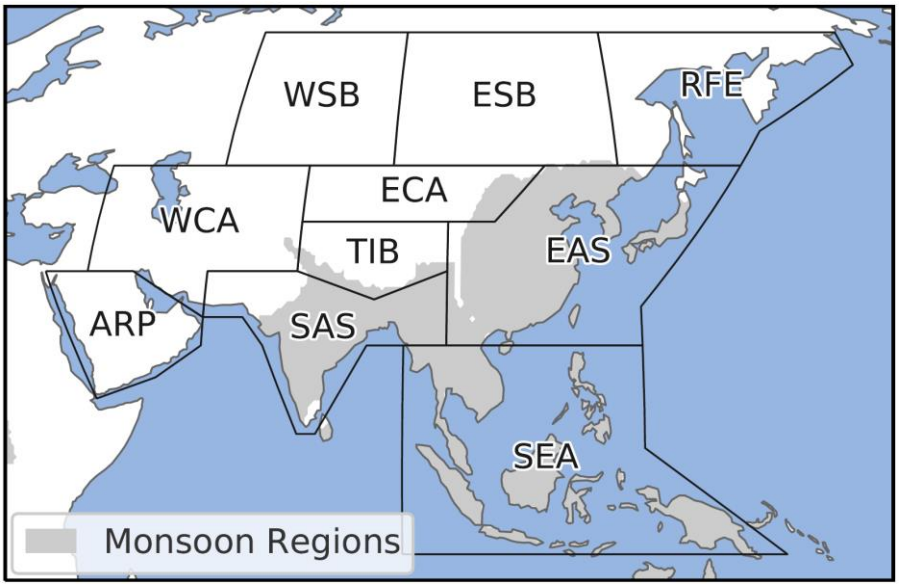
Common change: TS.4.3.1, TS.4.3.2.2, Box 9.2; 9.5; 11.5.5; 12.4.2. **Asian monsoons**: 8.3.2.4, Box 8.1, 8.4.2.4, Box TS.13. **North Asia:** 2.3.2, 8.2, 8.3, 8.4, Table 11.7, Table 11.8, Table 11.9, 12.4.2, Table 12.4, Atlas.5.2, TS.4.3.2.2, Tables TS.4 and TS.5. **East Asia**: TS4.3.2.2; 11.4; 11.7.1; Table 11.8; Table 11.9; 12.4.2; Atlas.5.1. **Tibetan Plateau**: CCB10.4, 11.4.5. **South Asia**: TS 4.3.2, 8.4.1, 11.3.2, 11.3.5, Table 11.5, 12.4.2, 12.5.2.1. Atlas 5.3.2, Atlas 5.3.5, Atlas 5.10. **South East Asia**: TS.4.3.2.2; 11.5.5; 11.7.1; 12.4.2; Atlas.5.4. **South West Asia**: 8.2, 8.3, 8.4, 9.5, Table 11.7, Table 11.8, Table 11.9, 12.4.2, Table 12.4, Atlas.5.5, TS.4.3.2.2, Table TS.4, Table TS.5

North Asia (WSB, ESB, RFE)

- Permafrost has thawed, its temperature increased, and seasonal snow duration and extent decreased while maximal snow depth has increased over the past 3 to 4 decades (*high confidence*). It is *virtually certain* that permafrost extent and volume will shrink with further global warming.
- Annual precipitation has increased since the mid-1970s (*very high confidence*), and rising heavy convective showers caused more intense floods (*medium confidence*). Projected increase in precipitation almost doubles the annual maximum river discharge, with increased flooded area in major Siberian rivers by mid-21st century (*medium confidence*).
- The number of dry days has decreased for much of the region but increased in south-western parts, where total soil moisture will decline and the fire season will lengthen (*medium confidence*).

South West Asia (WCA, ARP)

- Anthropogenic warming has amplified droughts since the 1980s (*high confidence*).
- An increase in extreme precipitation has been observed, mostly in elevated areas.
- Mountain permafrost degradation at high altitudes has increased the instability of mountain slopes in the past decade (*medium confidence*). Reduction of the annual maximum amount of snow increases with elevation in mountain areas.
- Annual precipitation totals and intensity and frequency of heavy precipitation are projected to increase with increasing warming levels. Strong spatiotemporal differences with overall decreasing precipitation are projected in summer, with the opposite tendency in winter in WCA.



Tibetan Plateau (TIB)

- Over most of the Hindu Kush Himalayan region, snow cover has reduced since the early 21st century, and glaciers have retreated and lost mass since the 1970s. The Karakoram glaciers have remained either in a balanced state or slightly gained mass. During the 21st century, snow-covered areas and snow volumes will decrease in most of the Hindu Kush Himalayan, and snowline elevations will rise and glacier volumes will decline (*high confidence*).
- A general wetting across the whole Tibetan Plateau and the Himalaya is projected, with increases in heavy precipitation in the 21st century.

South Asia (SAS)

- Heatwaves and humid heat stress will be more intense and frequent during the 21st century (*medium confidence*).
- Both annual and summer monsoon precipitation will increase during the 21st century, with enhanced interannual variability (*medium confidence*).

East Asia (EAS, ECA)

- Daily precipitation extremes have increased over parts of the region (*high confidence*). Heavy precipitation will increase in frequency and intensity (*high confidence*), leading to more frequent landslides in some mountain areas.
- Droughts have become more frequent in much of continental East Asia, while arid Eastern Central Asia has become wetter (*medium confidence*).
- The rate of intensification and number of strong tropical cyclones have increased (*medium confidence*), and tropical cyclone tracks *likely* migrated poleward.

South East Asia (SEA)

- Future warming will be slightly less than the global average (*high confidence*).
- Observed mean rainfall trends are not spatially coherent or consistent across datasets and seasons (*high confidence*). Rainfall will increase in northern parts and decrease in the Maritime Continent (*medium confidence*).
- Compound impacts of climate change, land subsidence, and local human activities will lead to higher flood levels and prolonged inundation in the Mekong Delta (*high confidence*).
- Although there has been no significant long-term trend in the overall number of tropical cyclones, fewer but more extreme tropical cyclones have affected the region.