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# Two Cyclones Occur in the Indian Ocean Region

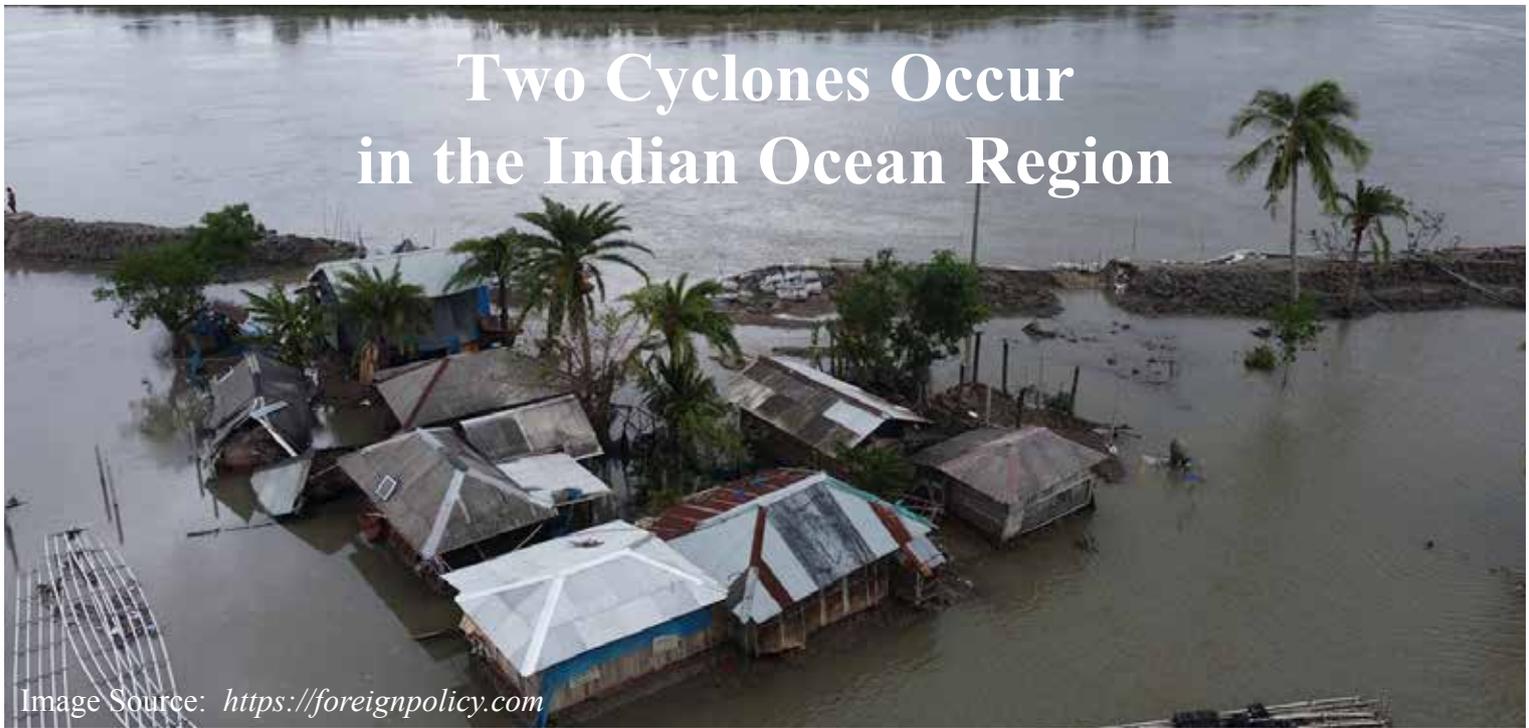
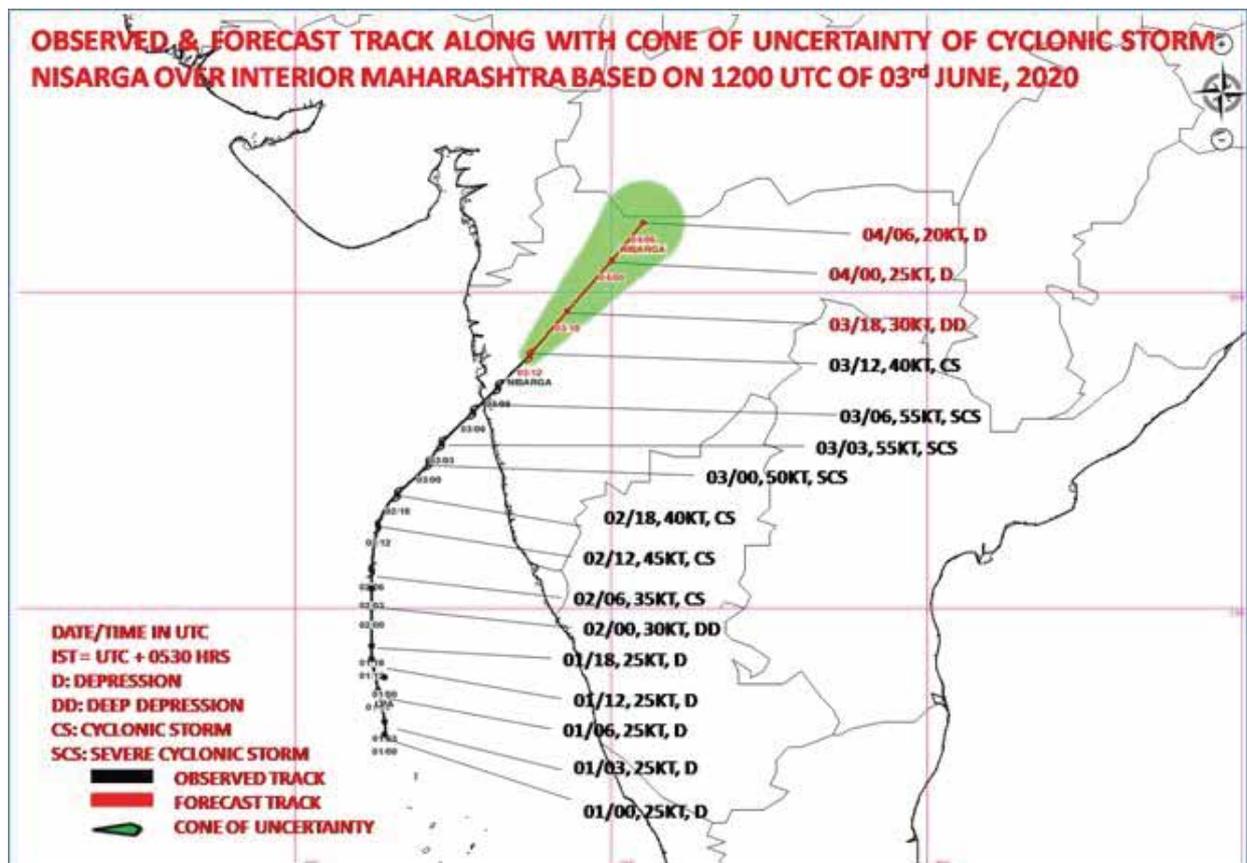


Image Source: <https://foreignpolicy.com>

Cyclone Amphan and Cyclone Nisarga occurred in the Bay of Bengal and Arabian Sea respectively within a span of a fortnight. While Amphan, made landfall on May 20, affected the Indian state of Odisha, West Bengal and Bangladesh, Nisarga, made landfall on June 3 in district Raigad in Maharashtra, south of Mumbai.

Initial estimates suggest that Cyclone Amphan caused damage worth US\$ 13 Billion in India and US\$ 130 Million in Bangladesh. The insurance companies in both countries were settling claims despite COVID 19 situation. According to initial estimates, insured losses were around US\$ 47 Million in India.

Cyclone Nisarga severely damaged horticulture and floriculture crops in Pune, Ratnagiri, Sindhudurg, and Raigad districts of Maharashtra.



Tracks of Cyclone Nisarga

## Higher Sea Surface Temperature (SST)

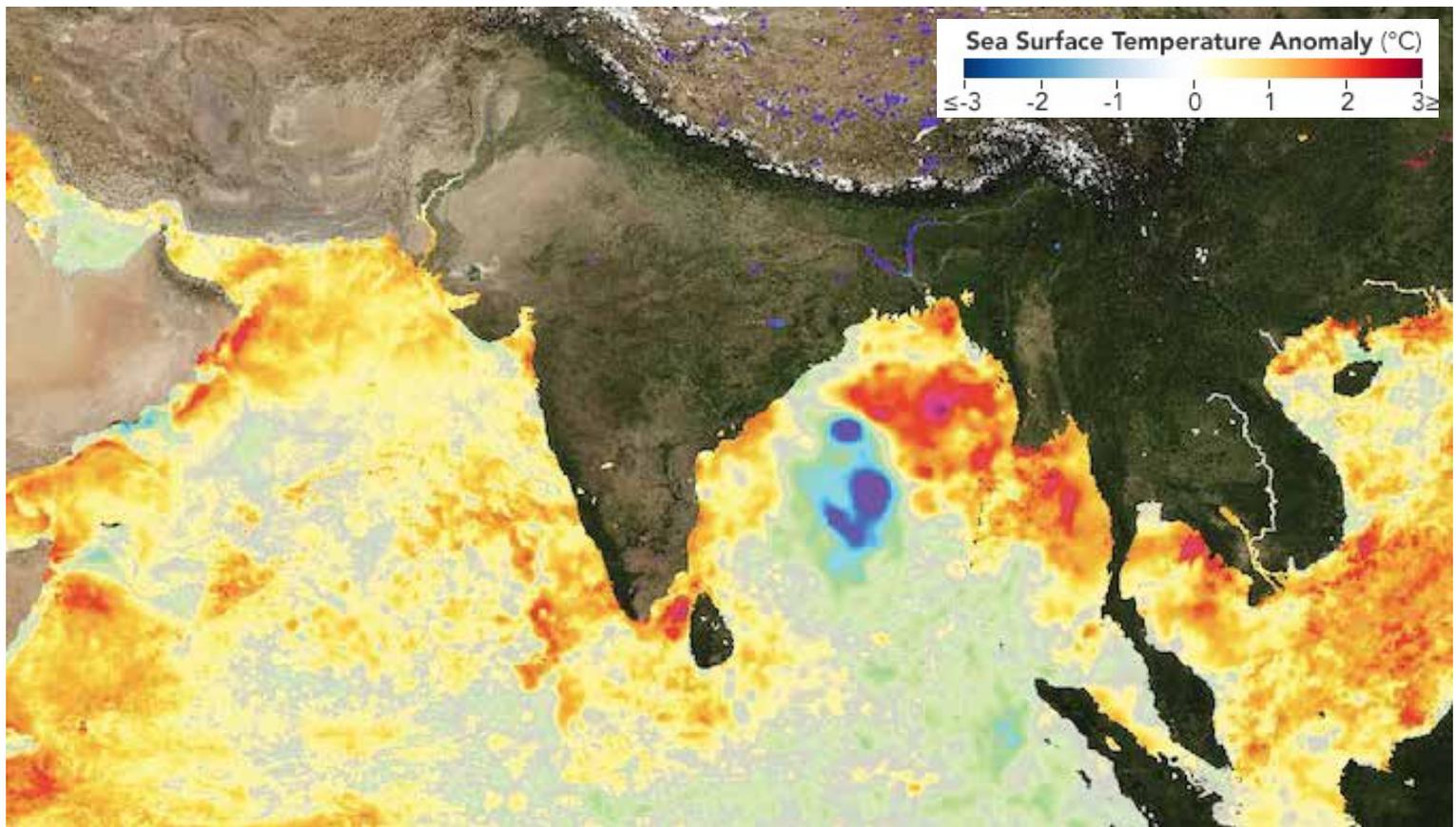
Scientists believe that occurrence of 2 cyclones indicates not only above normal sea surface temperatures in the Indian Ocean, but also the trend of increased cyclonic activity in the pre-monsoon period.

The Bay of Bengal and the Arabian Sea have both been witnessing “above normal” cyclogenesis in the last two years, boosted by "abnormally warm ocean temperatures".

While an increase has been noticed in post-monsoon tropical cyclones in the Arabian Sea, the trend is moving towards pre-monsoon. For example, in 2015, two cyclones Chapala and Megh occurred back-to-back albeit post monsoon. Likewise, in 2019, Super Cyclone Kyarr and Maha occurred in quick succession; again, post-monsoon.

IPCC reports have warned of increase in Arabian Sea cyclones during the pre- and post-monsoon seasons as a response to the rapid ocean warming trends.

In the case of Amphan as well as Nisarga, abnormally warm ocean temperatures were seen. These higher temperatures are conducive to such rapid intensification of cyclones in the North Indian Ocean.



A satellite image showing temperature anomalies in north Indian Ocean on May 19, a day before Cyclone Amphan made landfall in eastern India. There was a variation of more than 2C on May 19 in the Bay of Bengal. | Source: *PODAAC/NASA*

While temperatures in Bay of Bengal were between 30-33°C prior to Amphan, SST over Arabian Sea were recorded 30-32°C prior to Nisarga. Researchers have observed that in recent years, cyclones are forming quite quickly: Amphan intensified from a category-one to a category-five cyclone within 18 hours.

In mid-May, the IMD apparently did not expect a cyclone formation in the Arabian Sea. Even on May 28, it talked about a depression forming in the Arabian Sea that would advance monsoon but talk of cyclone was still not there.

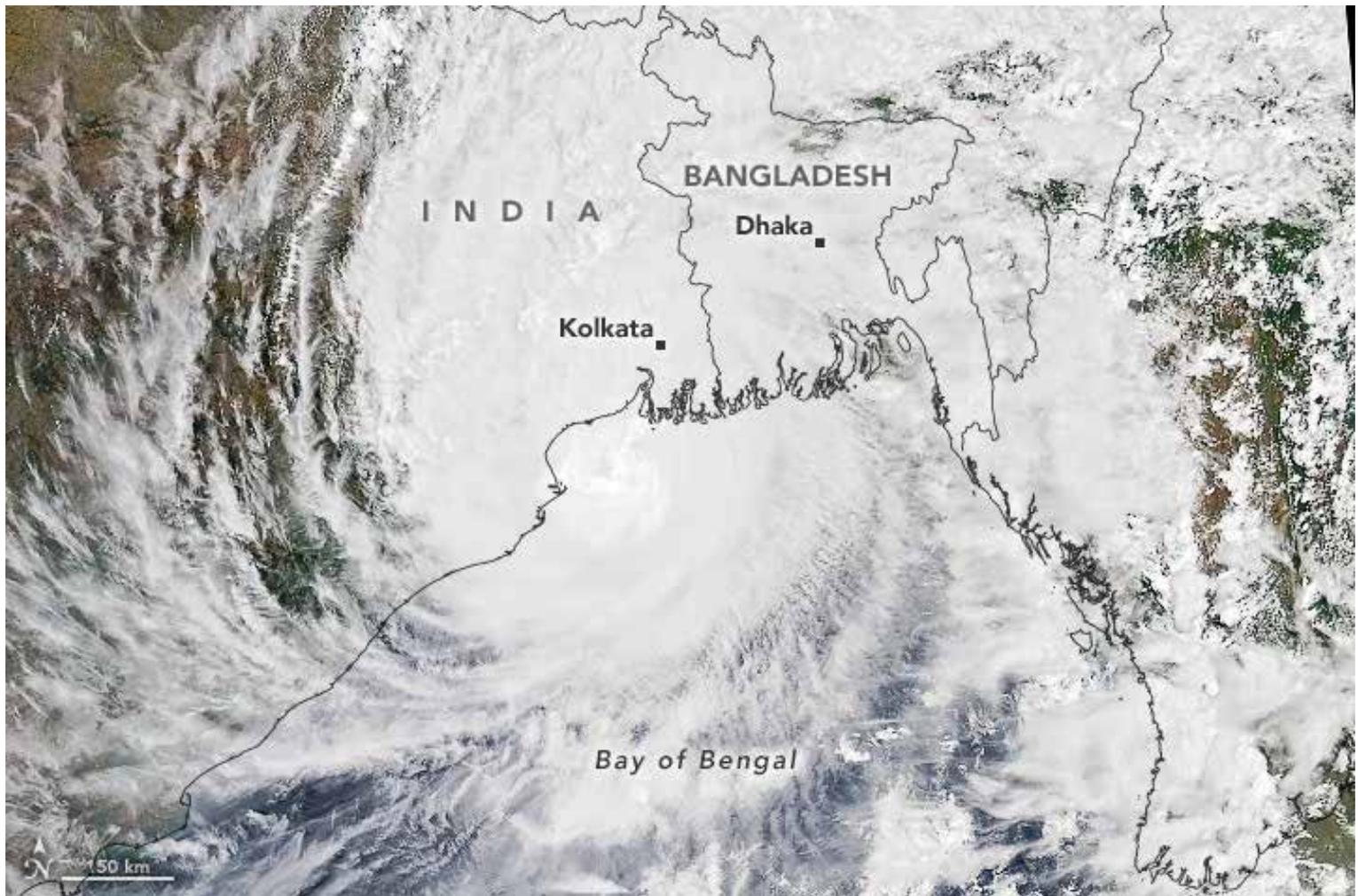
This could indicate a surprise element in the behaviour of the Arabian Sea, which has long been known for being pacific.

## Role of Climate Change

Experts say climate change is increasing damage caused by cyclones like Nisarga and Amphan in several ways. Higher SST make cyclones more powerful and increase rainfall during the storm. They increase sea levels, thus increasing the distance inland storm surges reach.

Between 1891-2018, the Indian Meteorological Department (IMD) recorded 126 cyclones in the Arabian Sea compared to 520 in the Bay of Bengal. However, climatologists now suggest that the Arabian Sea is emerging as the new cradle of cyclones. Atmospheric scientist Hiroyuki Murakami conducted a study of the cyclones originating in the Arabian Sea and concluded that majority (64 %) of cyclonic storms in the region is due to climate change.

Climate change amplifies the cyclonic storms that typically form in the northern Indian Ocean. Increasing sea surface temperatures can make cyclones more powerful. Warmer oceans mean there is higher rainfall during storms. Rising sea levels due to global warming make for higher storm surges\*, which reach larger inland areas.



Cyclone Amphan| Acquired at 1 p.m. India Standard Time (07:30 Universal Time) on May 20  
Source: NASA

## Impact

The North Indian Ocean accounts for only about 7% of the total number of tropical cyclones that occur globally. However, more than 80% of the global fatalities occur in this region, particularly around the Bay of Bengal.

Due to technological improvements and better co-ordination among countries and various agencies, loss of lives has been drastically reduced compared to the previous events. However, with increase in urbanization and commercial activities, more exposure is at risk than before.

In densely populated coastal cities, events generated due to higher temperature could put millions at risk. With destruction of mangroves that act as buffer and unplanned growth, the risk as well as financial and insured losses would increase. Governments in developing countries with low insurance penetration would need to deploy resources in disaster management that could be utilized in various development activities.

*\* Storm surge is the abnormal rise in seawater level during a storm, measured as the height of the water above the normal predicted astronomical tide. The surge is caused primarily by a storm's winds pushing water onshore. The amplitude of the storm surge at any given location depends on the orientation of the coastline with the storm track; the intensity, size, and speed of the storm; and the local bathymetry; in other words, the depths and shapes of underwater terrain.*

Source: IITM, IMD, NASA, NOAA, India Today, Hindustan Times

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