

# UPSC Prelims 2019

# THE HINDU

# SEPTEMBER

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**Microtubes create space for neurons to grow**

Tiny, thin microtubes could provide a scaffold for neuron cultures to grow so that researchers can study neural networks, their growth and repair.

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Silicon, which is one of the most common elements in Earth's crust, is also sprinkled abundantly throughout interstellar space.

# Role of El Nino in heat build-up in Indian Ocean

K.S. RAJGOPAL

The Indian Ocean has been warming at a rate faster than thought before (1.2° C during the past century). It is also the largest consistent contributor to the global ocean warming trends.

Recent studies show that a warm Indian Ocean can in turn modulate the Pacific conditions including the El Nino events. So basically, such large warming over the Indian Ocean has implications on the global climate.

The western Indian Ocean, traditionally thought to have cooler sea surface temperatures (SSTs) than the central and eastern Indian Ocean, is surprisingly showing an even stronger summer warming trend over the whole of the 20th century than the central

The warming is significantly so large that it may alter the monsoon circulation, monsoon rainfall, marine food webs and fisheries (western Indian Ocean is one of the most productive means of global climate including the El Nino).

A recent study published in the *Journal of Climate* focused on the causes for this warming and found that it was mainly due to El Nino events, which are getting stronger in the recent decades, possibly due to a changing climate.

These El Nino events weaken the summer westerly (blowing from west to east) winds over the Indian Ocean. Winds have the effect of cooling the sea surface. Strong winds cause evaporation and loss of latent heat from the ocean leading to cooling.



**THE DEVELOPMENT:** The frequency and magnitude of El Ninos have increased in the recent decades.

— PHOTO: B. JOTHI RAMALINGAM

ened the opposite happens — the ocean warms.

The study found that the ocean atmospheric phenomenon — the El Nino, and its influence on the Walker Circulation were responsible for periodic weakening of mon-

normally high summer sea surface temperatures in the western Indian Ocean.

Walker Circulation represents the zonal (east-west) circulation over the tropics. In the Pacific, the trade winds blow from east to west.

...the west and high pressure over the east, which drives these winds. This is linked to the warm waters over the west Pacific and cool waters over the east Pacific.

During summer, the Pacific cell is linked to the monsoon westerlies in the Indian Ocean. During an El Nino, the wind direction reverses and the whole circulatory system shifts eastward leaving only weak surface westerlies in the western Indian Ocean.

This results in ocean warming in the Western Indian Ocean.

“The frequency and magnitude of El Ninos have also increased in the recent decades, possibly due to global warming. This means a piling up of heat on the Indian Ocean,” notes Dr. Roxy Mathew Koll in an email. Dr. Koll, from the Indian Institute of Tropical

first author of the paper.

Unlike the Pacific or the Atlantic Oceans, the Indian Ocean is land-locked on the north. This means that the ocean circulation which carries the tropical heat towards the poles is restricted in the Indian Ocean, withholding the piled up heat.

When queried how Indian Ocean warming affects the El Nino, Dr. Koll noted: “Earlier studies have shown that enhanced tropical Indian Ocean warming in recent decades favours stronger trade winds in the western Pacific via the Walker circulation and hence is likely to suppress the El Nino events.”



Officer Rishi  
remarks  
go viral



A "people's movement"  
is necessary for Ganga  
Act, says Uma Bharti  
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Russia bombs  
Syrian militants  
from Iran base  
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WADA challenges  
clean chit given to  
Narsingh Yadav  
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# THE HINDU ANALYSIS



**UNREST CONTINUES:** Villagers raise slogans during the funeral march of four civilians killed in Budgam on Tuesday. — PHOTO: ISSAR SHAM

## 5 protesters killed CRPF fired

Curfew restrictions on, ... suspended

PURIZADA ANIRUDH

**SRINAGAR:** The volatile situation in the Kashmir Valley took a turn for the worse on

Political parties, meanwhile, claimed they were losing space because of Chief Minister Mehbooba Mufti and the Centre's failure to com-

## India likely to skip SAARC meeting

SPECIAL CORRESPONDENT  
NEW DELHI: Union Finance Minister Arun Jaitley is most likely to skip the SAARC Finance Ministers' conference in Islamabad on August 26 as one of his counterparts is also not likely to attend owing to domestic pre-occupations. According to official sources, a senior Finance Ministry official is likely to represent the country instead. Mr. Jaitley is expected to send a formal note to Prime Minister Narendra Modi and External Affairs Minister Sushma Swaraj in regard. The decision on who should be asked to represent at the SAARC Finance Ministers' meet in Islamabad next month will be taken in consultation with the Prime Minister's Office and the Ministry of External Affairs. The meeting doesn't warrant the presence of In-

Indian High Commission sources in Islamabad said they have not received any communication from the government about who will attend the conference.

The SAARC Finance Ministers' conference is the next big item on the regional group's agenda following the ministers' meeting in Islamabad this month.

- IMPOVERISHED BALUCHISTAN BLEEDS
- ANSWERING PAKISTAN PROVOCATIONS | EDITORIAL

## AMU slams U-turn on minority status

## 'Action against Amnesty or if sedition charge is proved



**TOUGH STAND:** Manohar Parrikar speaking at a meeting during the Tiranga Yatra at Rewari, Haryana, on Tuesday.

## Pakistan is the same as hell, says Parrikar

SPECIAL CORRESPONDENT  
NEW DELHI: A day after Prime Minister Narendra Modi announced Balochistan in his Independence Day address, the Union Minister for External Affairs Manohar Parrikar took a tough stand on Pakistan, saying it was "hell."

On Monday, the major infiltration by Pakistan into the LoC in Uri sector of Jammu and Kashmir killed five terrorists. (With inputs from ...)

**WARNS PAKISTAN 'FITTING REPLY'**

