

2018

IASBABA



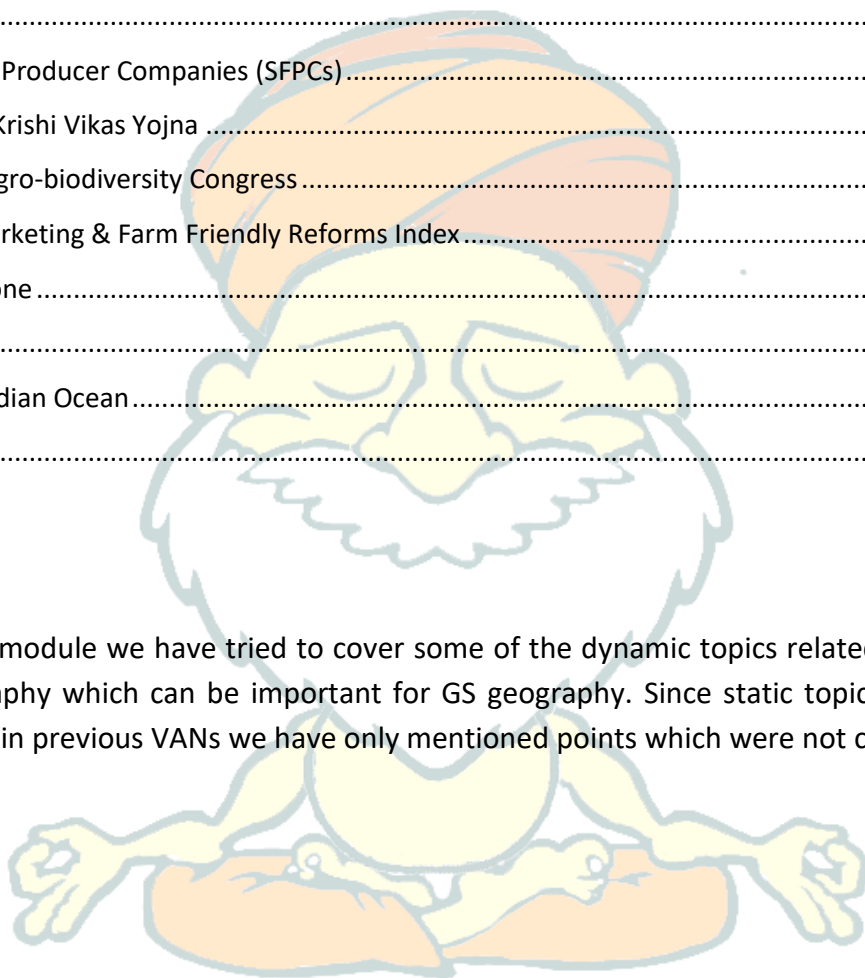
[GEOGRAPHY- IN NEWS]

Integrated Learning Programme 2018 is a step towards 'Enabling a person located at the most remote destination a chance at cracking AIR 1 in UPSC/IAS'

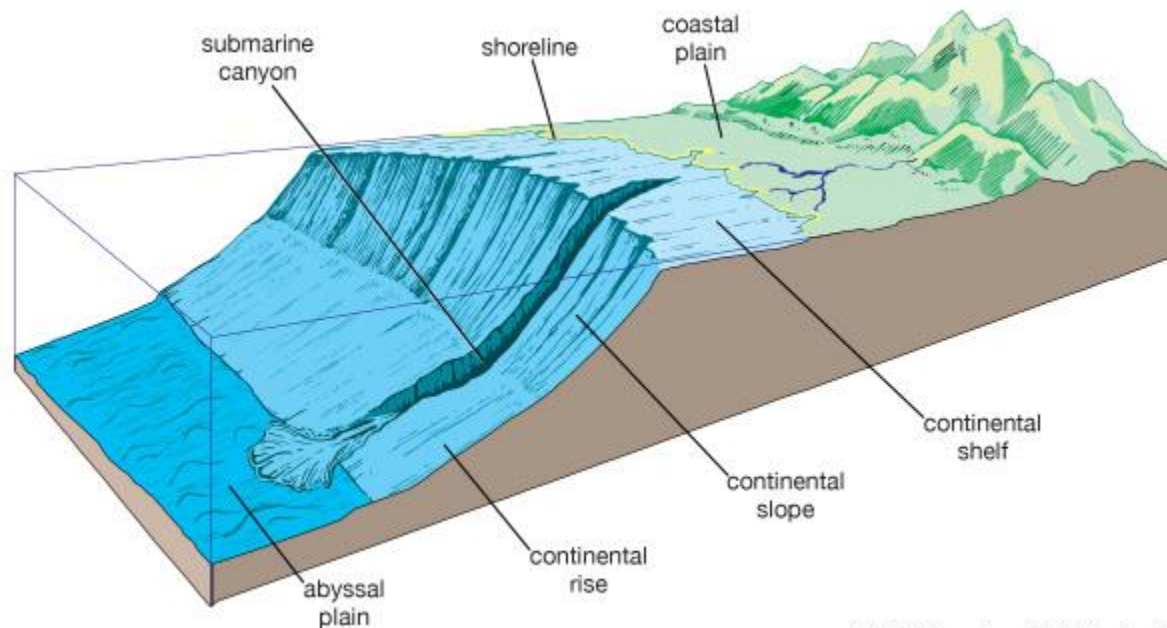
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NOTE: In this module we have tried to cover some of the dynamic topics related to World and Indian Geography which can be important for GS geography. Since static topics have already been covered in previous VANS we have only mentioned points which were not covered before.



Submarine Canyons



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Definition -

Submarine canyon, any of a class of narrow steep-sided valleys that cut into continental slopes and continental rises of the oceans. Submarine canyons originate either within continental slopes or on a continental shelf. They are rare on continental margins that have extremely steep continental slopes or escarpments. Submarine canyons are so called because they resemble canyons made by rivers on land.

Difference between Submarine canyon and continental Canyon:

The characteristics of the submarine variety and those of the nearby land canyons are quite distinct:

The submarine canyons, for example, tend to have steeper side slopes, much higher gradients, and considerably narrower floors.

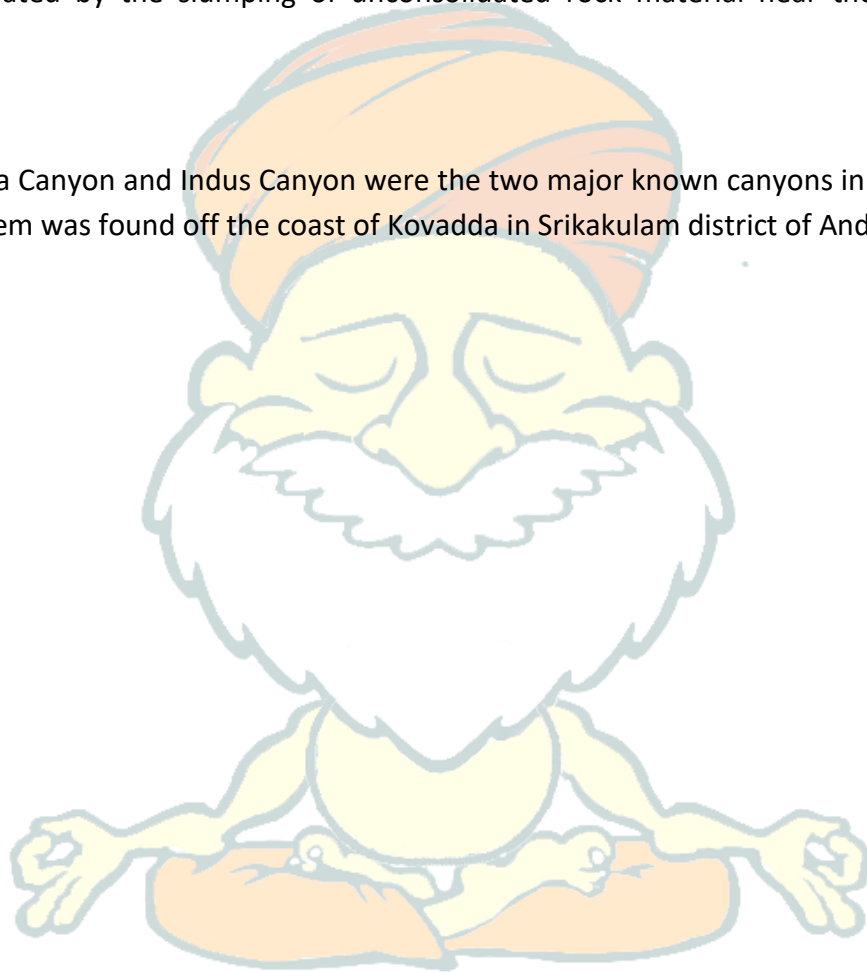
Moreover, the drainage pattern of submarine canyons differs from that of their terrestrial counterparts. The submarine canyons have a substantial number of tributaries at their heads but generally do not have as many tributaries in their lower courses as do the land canyons. Even so, many submarine canyons end in a series of distributary channels through the continental rise, and these channels often emerge in the deep sea on abyssal plains that are found adjacent to the continents, especially in the Atlantic basin.

Origin:

For years the origin of submarine canyons has been the subject of much debate among investigators. Various ideas have been proposed, but prevailing theory favours sub-aerial erosion as the starting point for a good number of undersea canyons. Such erosion is thought to have begun with the lowering of sea level during the glaciations of the Pleistocene Epoch (about 2,600,000 to 11,700 years ago). It is perceived, however, that sub - aerial erosion alone could scarcely have excavated deep canyons that extend down to the seafloor. Evidence seems to suggest that the principal agents responsible for the formation of submarine canyons are marine processes, most notably the erosion and transportation of sediments by turbidity currents activated by the slumping of unconsolidated rock material near the heads of the canyons.

Why in News:

Till now Ganga Canyon and Indus Canyon were the two major known canyons in India. Recently a canyon system was found off the coast of Kovadda in Srikakulam district of Andhra Pradesh.



Drip Irrigation



Drip irrigation is sometimes called trickle irrigation and involves dripping water onto the soil at very low rates (2-20 litres/hour) from a system of small diameter plastic pipes fitted with outlets called **emitters** or drippers. Water is applied close to plants so that only part of the soil in which the roots grow is wetted (Figure 60), unlike surface and sprinkler irrigation, which involves wetting the whole soil profile. With drip irrigation water, applications are more frequent (usually every 1-3 days) than with other methods and this provides a very favourable high moisture level in the soil in which plants can flourish.

Suitable crops

Drip irrigation is most suitable for row crops (vegetables, soft fruit), tree and vine crops where one or more emitters can be provided for each plant. Generally only high value crops are considered because of the high capital costs of installing a drip system.

Suitable soils

Drip irrigation is suitable for most soils. On clay soils water must be applied slowly to avoid surface water ponding and runoff. On sandy soils higher emitter discharge rates will be needed to ensure adequate lateral wetting of the soil.

Suitable irrigation water

One of the main problems with drip irrigation is blockage of the emitters. All emitters have very small waterways ranging from 0.2-2.0 mm in diameter and these can become blocked if the water is not clean. Thus it is essential for irrigation water to be free of sediments. If this is not so then filtration of the irrigation water will be needed.

Blockage may also occur if the water contains algae, fertilizer deposits and dissolved chemicals which precipitate such as calcium and iron. Filtration may remove some of the materials but the problem may be complex to solve and requires an experienced engineer or consultation with the equipment dealer.

Drip irrigation is particularly suitable for water of poor quality (saline water). Dripping water to individual plants also means that the method can be very efficient in water use. For this reason it is most suitable when water is scarce.

Benefits of Drip Irrigation:

- Water use efficiency. Less water is wasted in runoff or seepage.
- Because of Reduced leaching and runoff, nutrients are not lost.
- Recycled non potable water can be used.
- Field capacity moisture can be maintained at the root zone.
- Soil erosion is minimized.
- Labour cost is less than as compared to other methods.
- Foliage remains dry reducing risk of diseases.
- Salinity due to over irrigation can be minimized.

In the news:

The Department of Horticulture has proposed to bring 140 hectares of cultivable area under drip irrigation during 2016-17 by offering a subsidy of Rs. 96.32 lakh to farmers.

'Decadal Swing' in North Indian Ocean (NIO)

Region: The NIO consists of the Arabian Sea, the Bay of Bengal and part of the Indian Ocean up till the 5°S latitude.

Issue: A unique phenomenon of decadal rise and fall has been observed in the North Indian Ocean (NIO).

From 1993 to 2003, when satellites observed a sea level rise in every other ocean, in NIO surprisingly there a fall in sea level was observed. After 2004, sea levels began an unprecedented, accelerated spike till 2014.

This rise and fall was even as global temperatures steadily climbed and registered their largest two-decadal jump in more than a century.

While Intergovernmental Panel on Climate Change reports have concluded that while unabated greenhouse gas emissions into the atmosphere would cause oceans to rise every year, there would be years during which some seas could register a fall. Scientists associated with the study said that such a “decadal swing” in the North Indian Ocean was unique and never observed in either the Pacific or Atlantic oceans.

Probable Reasons:

Melting Ice sheets - Sea levels primarily rise due to water expanding from atmospheric heat and, more water being added from, for instance, melting ice sheets and glaciers. 70% of the NIO's warming could be explained by expansion.

Unlike the Pacific and Atlantic, the NIO was hemmed in all sides, except for an outlet on the southern side. This influenced the rate at which heat was absorbed and flushed out from within the system. According to calculations, heat was moving out slower during after 2004 than during the 1990s.

Wind Flows - Wind flows, which welled warm water on the Indian Ocean surface, changed directions every decade and probably influenced sea level patterns. It could be that coming decades — in spite of rapid, rising temperatures — will see a fall in sea levels but that's still hypothetical.

El – Nino and La – Nina Event

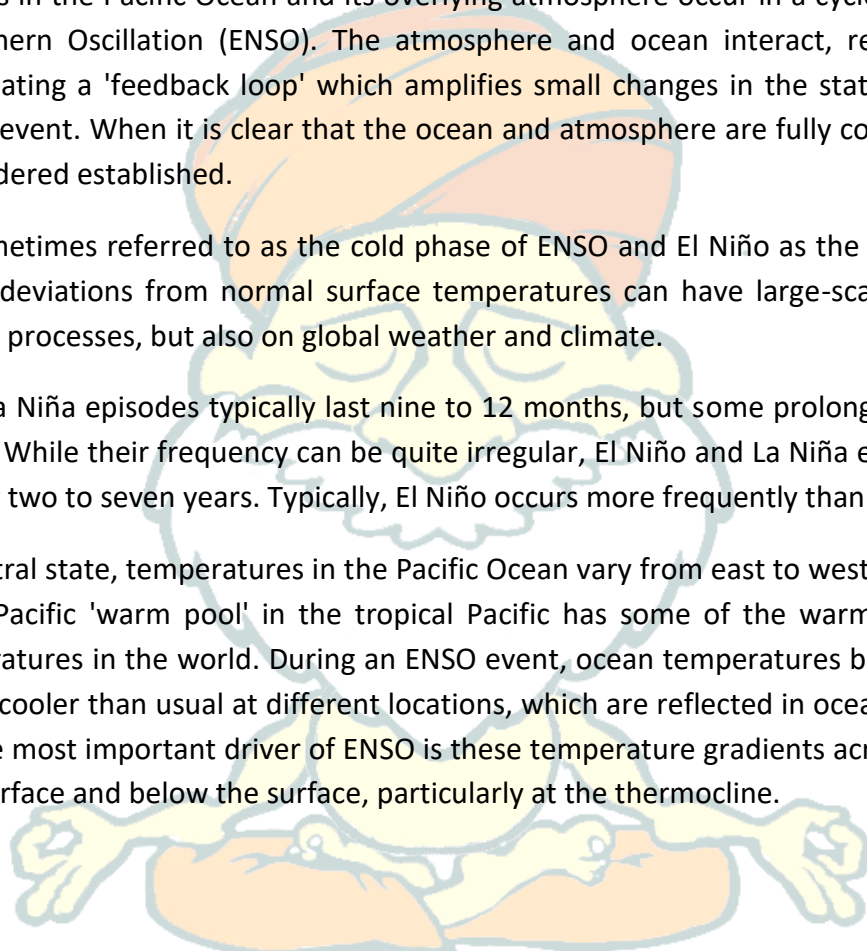
El Nino and La Nina events are a natural part of the global climate system. They occur when the Pacific Ocean and the atmosphere above it change from their neutral ('normal') state for several seasons. El Nino events are associated with a warming of the central and eastern tropical Pacific, while La Niña events are the reverse, with a sustained cooling of these same areas.

These changes in the Pacific Ocean and its overlying atmosphere occur in a cycle known as the El Niño–Southern Oscillation (ENSO). The atmosphere and ocean interact, reinforcing each other and creating a 'feedback loop' which amplifies small changes in the state of the ocean into an ENSO event. When it is clear that the ocean and atmosphere are fully coupled an ENSO event is considered established.

La Niña is sometimes referred to as the cold phase of ENSO and El Niño as the warm phase of ENSO. These deviations from normal surface temperatures can have large-scale impacts not only on ocean processes, but also on global weather and climate.

El Niño and La Niña episodes typically last nine to 12 months, but some prolonged events may last for years. While their frequency can be quite irregular, El Niño and La Niña events occur on average every two to seven years. Typically, El Niño occurs more frequently than La Niña.

Even in a neutral state, temperatures in the Pacific Ocean vary from east to west – for example, the western Pacific 'warm pool' in the tropical Pacific has some of the warmest large-scale ocean temperatures in the world. During an ENSO event, ocean temperatures become warmer than usual or cooler than usual at different locations, which are reflected in ocean temperature gradients. The most important driver of ENSO is these temperature gradients across the Pacific, both at the surface and below the surface, particularly at the thermocline.





Creation of warm pool during La – Nina event. (Normal condition)

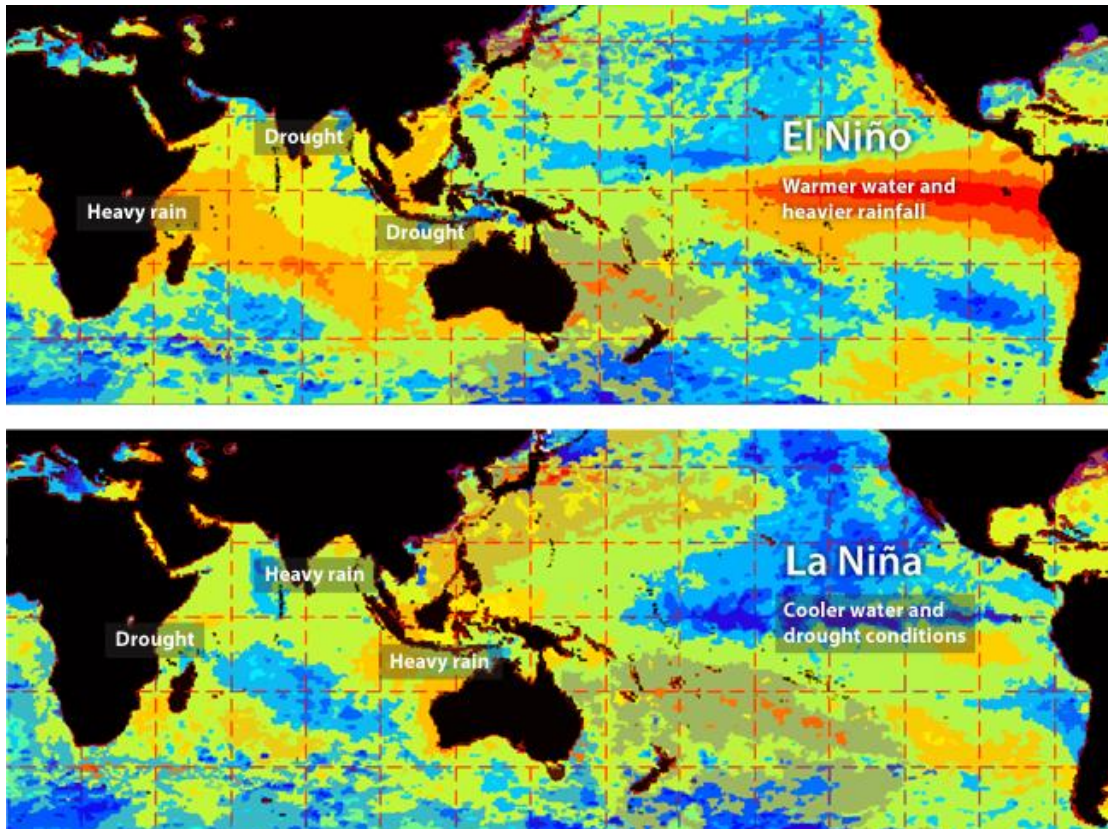
Effect on Indian Monsoon:

The Monsoon is a recurring event i.e. it repeats after a certain frequency of time – a year in our case. But, it may not be uniform in every period (year). There are a lot of factors which affect its duration and intensity over India.

The Monsoon is basically a result of the flow of moisture laden winds because of the variation of temperature across the Indian Ocean.

There are a number of climatic phenomena which affect it namely the Indian Ocean dipole, El nino, La nina, Equatorial Indian Ocean Oscillation (EQUINOO) etc. These phenomena affect the temperature distribution over the oceans and thus affecting the direction and intensity of flow of the moisture laden winds.

There have been recent reports that El Nino may disturb the Indian Monsoon and play badly with Indian agriculture.



For a normal monsoon season, the pressure distribution is as such:

1. The Peruvian coast has relatively high pressure than the areas near north Australia and South-East Asia.
2. The Indian Ocean is slightly warmer than the adjoining oceans (West pacific –see diagram) and thus the pressure is low relatively due to the warm seas. This is why the moisture laden winds move from near the west pacific to the Indian Ocean and from there on to the lands.
3. The pressure on heated Indian land is much lower than that on the Indian Ocean.

This facilitates the movement of monsoon winds from the sea to the Indian land without any significant diversion.

But if for some reason this normal distribution is affected, then there is a change in the way trade winds (or monsoon winds) would blow.

This is because of the following reasons (and its effects):

- Off the coast of Peru (read in Eastern Pacific and Central Pacific), there is normally cool surface water because of the cold Peruvian current. But El Niño makes it go warm.
- When the water becomes warm, the trade winds, which otherwise flow from East to west, either reverse their direction or get lost.
- Due to this warm water, the air gets up and surface air pressure above Eastern Pacific gets down. On the other hand, the waters cool off in western Pacific and off Asia. This leads to rise in surface pressure over the Indian Ocean, Indonesia, and Australia.
- Now as the pressure over the Peruvian coast reduces because of the warm sea water, the flow of moisture laden winds is directed to the Peruvian coasts from the western Pacific (the areas near North Australia and South-east Asia – refer to the diagrams above).
- Hence, the moisture laden winds that should have moved towards the Indian coast now move towards the Peruvian coast.
- The warm water causes lots of clouds getting formed in that area, causing heavy rains in Peruvian desert during El Niño years.
- This robs the Indian subcontinent of its share in the Monsoon rains. The greater the temperature and pressure difference, the greater would be the shortage in the rainfall in India.

La – Nina on the other hand is the opposite event. It intensifies the monsoon and India get more than average rain. La Nina condition may result in flooding in parts of India due to excessive rainfall.

Think!!

A question on Indian Monsoon is always probable. Kindly go through Indian Ocean dipole movement also. It is a similar phenomenon in Indian Ocean like El Niño and La Niña in Pacific ocean.

Agro – Meteorological Advisory Services

India Meteorological Department (IMD) started Integrated Agro-Meteorological Advisory Service (IAAS) in the country for the benefits of farmers. Agro-meteorological service rendered by IMD, Ministry of Earth Sciences is an innovative step to contribute to weather information based crop/livestock management strategies and operations dedicated to enhancing crop production by providing real time crop and location specific agromet services with outreach to village level. This indeed has a potential to change the face of India in terms of food security and poverty alleviation.

Structure of IAAS

This project is implemented through five tier structure to set up different components of the service spectrum. It includes

- Meteorological (weather observing & forecasting),
- Agricultural (identifying weather sensitive stress & preparing suitable advisory using weather forecast),
- Extension (two way communication with user) and
- Information dissemination (Media, Information Technology, Telecom) agencies.

The Agro-meteorological Advisory Services (AAS) under the Gramin Krishi Mausam Seva (GKMS) is operated to prepare biweekly weather based AAS bulletins for wider dissemination to the farmers at district scale through multimedia channels and also through SMS so as to plan farm operations accordingly.

A typical Agromet Advisory Bulletin enables farmers to reap benefits of benevolent weather and minimize or mitigate the impacts of adverse weather are:

- District specific weather forecast, in quantitative terms, for next 5 days for weather parameters like rainfall, cloud, maximum/minimum temperature, wind speed/direction and relative humidity, including forewarning of hazardous weather events (cyclone, hailstorm, heat/cold waves, drought and flood etc) likely to cause stress on standing crop and suggestions to protect the crop from them.
- Weather forecast based information on soil moisture status and guidance for application of irrigation, fertilizer and herbicides etc.

- Advisories on dates of sowing/planting and suitability of carrying out intercultural operations covering the entire crop spectrum from pre-sowing to post harvest to guide farmer in his day-to-day cultural operations.
- Weather forecast based forewarning system for major pests and diseases of principal crops and advises on plant protection measures.
- Propagation of techniques for manipulation of crop's microclimate e.g. shading, mulching, other surface modification, shelter belt, frost protection etc. to protect crops under stressed conditions.
- Reducing contribution of agricultural production system to global warming and environment degradation through judicious management of land, water and farm inputs, particularly pesticides, herbicides and fertilizers.
- Advisory for livestock on health, shelter and nutrition.

Winter Fog Experiment (WIFEX 2016-17)

Fog consists of visible cloud water droplets or ice crystals suspended in the air at or near the Earth's surface. Fog can be considered a type of low-lying cloud and is heavily influenced by nearby bodies of water, topography, and wind conditions. In turn, fog has affected many human activities, such as shipping, travel, and warfare.

Types of Fog:

Radiation fog is formed by the cooling of land after sunset by infrared thermal radiation in calm conditions with a clear sky. The cooling ground then cools adjacent air by conduction, causing the air temperature to fall below the dew point, forming fog. In perfect calm, the fog layer can be less than a meter thick, but turbulence can promote a thicker layer. Radiation fogs occur at night, and usually don't last long after sunrise, but it can persist all day in the winter months especially in areas bounded by high ground.

Advection fog occurs when moist air passes over a cool surface by advection (wind) and is cooled. It is common as a warm front passes over an area with significant snow-pack. It is most common at sea when moist air encounters cooler waters, including areas of cold water upwelling, such as along the California coast. A strong enough temperature difference over water or bare ground can also cause advection fog.

Upslope fog forms when moist air is going up the slope of a mountain or hill which condenses into fog on account of adiabatic cooling, and to a lesser extent the drop in pressure with altitude.

The presence of heavy and extended period fog in the northern regions of India is one of the major weather hazards, impacting aviation, road transportation, economy and public life in the world's most densely populated region.

WIFEX – 2016-17

The objectives of the Winter Fog Experiment (WIFEX) are to develop better now-casting (next 6 hours) and forecasting of winter fog on various time and spatial scales, and help reduce its adverse impact on aviation, transportation and economy, and loss of human life due to accidents.

The Ministry of Earth Sciences (MoES), Government of India has taken up a multi-institutional initiative to conduct an intensive ground-based measurement campaign at the Indira Gandhi International Airport (IGIA), Delhi, to understand different physical and chemical features of Fog and factors responsible for its genesis, intensity and duration.

Extensive sets of comprehensive ground-based instrumentation, including remote sensing platforms, are deployed at the Indira Gandhi International Airport (IGIA), New Delhi. Major in-situ sensors are deployed to measure surface micro meteorological conditions, radiation balance, turbulence, thermo-dynamical structure of the surface layer, fog droplet and aerosol microphysics, aerosol optical properties, real time sky images, and aerosol and fog water chemistry to describe the complete environmental conditions in which fog develops. These measurements will form the basis for understanding some of the key questions on fog formation and dispersion. With these measurements, modeling efforts also will be made with the ultimate aim to improve the prediction skill. These observations from intense campaign will be further used to validate model forecasts and to improve model capability. It is proposed to introduce this model for operational forecasts of Fog for the winter season of 2017-18.

Ozone

Ozone, or **trioxygen**, is an inorganic molecule with the chemical formula **O₃**.

It is a pale blue gas with a distinctively pungent smell. It is an allotrope of oxygen that is much less stable than the diatomic allotrope O₂, breaking down in the lower atmosphere to O₂ or dioxygen. Ozone is formed from dioxygen by the action of ultraviolet light and also atmospheric electrical discharges, and is present in low concentrations throughout the Earth's atmosphere (stratosphere). In total, ozone makes up only 0.6 ppm of the atmosphere.

Ozone Layer:

The highest levels of ozone in the atmosphere are in the stratosphere, in a region also known as the ozone layer between about 10 km and 50 km above the surface (or between about 6 and 31 miles). However, even in this "layer", the ozone concentrations are only two to eight parts per million, so most of the oxygen there remains of the dioxygen type.

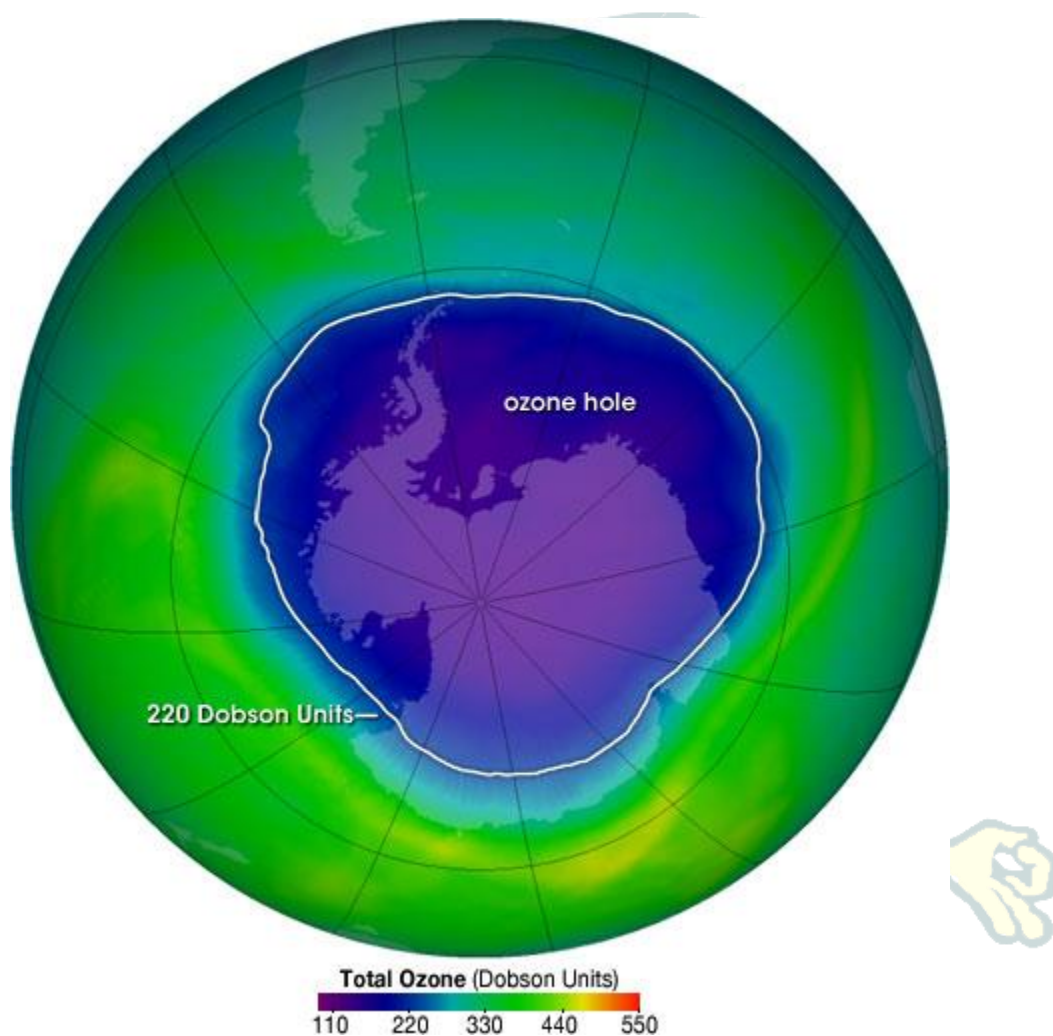
Ozone in the ozone layer filters out sunlight wavelengths from about 200 nm UV rays to 315 nm, with ozone peak absorption at about 250 nm. This ozone UV absorption is important to life, since it extends the absorption of UV by ordinary oxygen and nitrogen in air (which absorb all wavelengths < 200 nm) through the lower UV-C (200–280 nm) and the entire UV-B band (280–315 nm). The small unabsorbed part that remains of UV-B after passage through ozone causes sunburn in humans, and direct DNA damage in living tissues in both plants and animals. Ozone's effect on mid-range UV-B rays is illustrated by its effect on UV-B at 290 nm, which has radiation intensity 350 million times as powerful at the top of the atmosphere as at the surface. Nevertheless, enough of UV-B radiation at similar frequency reaches the ground to cause some sunburn, and these same wavelengths are also among those responsible for the production of vitamin D in humans.

The ozone layer has little effect on the longer UV wavelengths called UV-A (315–400 nm), but this radiation does not cause sunburn or direct DNA damage, and while it probably does cause long-term skin damage in certain humans, it is not as dangerous to plants and to the health of surface-dwelling organisms on Earth in general.

Ozone hole and Current Situation:

The ozone hole is not technically a "hole" where no ozone is present, but is actually a region of exceptionally depleted ozone in the stratosphere over the Antarctic that happens at the beginning of Southern Hemisphere spring (August–October). Satellite instruments provide us with daily images of ozone over the Antarctic region. The ozone hole image below shows the

very low values (blue and purple colored area) centered over Antarctica on 4 October 2004. From the historical record we know that total column ozone values of less than 220 Dobson Units were not observed prior to 1979. From an aircraft field mission over Antarctica we also know that a total column ozone level of less than 220 Dobson Units is a result of catalyzed ozone loss from chlorine and bromine compounds. For these reasons, we use 220 Dobson Units as the boundary of the region representing ozone loss. Using the daily snapshots of total column ozone, we can calculate the area on the Earth that is enclosed by a line with values of 220 Dobson Units.



The ozone hole is caused by chemicals called CFCs, short for chlorofluorocarbons. CFCs escape into the atmosphere from refrigeration and propellant devices and processes. In the lower atmosphere, they are so stable that they persist for years, even decades. This long lifetime allows some of the CFCs to eventually reach the stratosphere. In the stratosphere, ultraviolet light breaks the bond holding chlorine atoms (Cl) to the CFC molecule. A free chlorine atom

goes on to participate in a series of chemical reactions that both destroy ozone and return the free chlorine atom to the atmosphere unchanged, where it can destroy more and more ozone molecules.

The chlorine atoms freed from CFCs do ultimately destroy ozone, the destruction doesn't happen immediately. Most of the roaming chlorine that gets separated from CFCs actually becomes part of two chemicals that—under *normal* atmospheric conditions—are so stable that scientists consider them to be long-term reservoirs for chlorine.

Polar stratospheric clouds and Ozone:

Under normal atmospheric conditions, the two chemicals that store most atmospheric chlorine (hydrochloric acid, and chlorine nitrate) are stable. But in the long months of polar darkness over Antarctica in the winter, atmospheric conditions are unusual. An endlessly circling whirlpool of stratospheric winds called the polar vortex isolates the air in the center. Because it is completely dark, the air in the vortex gets so cold that clouds form, even though the Antarctic air is extremely thin and dry. Chemical reactions take place that could not take place anywhere else in the atmosphere. These unusual reactions can occur only on the surface of polar stratospheric cloud particles, which may be water, ice, or nitric acid, depending on the temperature.

These reactions convert the inactive chlorine reservoir chemicals into more active forms, especially chlorine gas (Cl_2). When the sunlight returns to the South Pole in October, UV light rapidly breaks the bond between the two chlorine atoms, releasing free chlorine into the stratosphere, where it takes part in reactions that destroy ozone molecules while regenerating the chlorine (known as a catalytic reaction). A catalytic reaction allows a single chlorine atom to destroy thousands of ozone molecules. Bromine is involved in a second catalytic reaction with chlorine that contributes a large fraction of ozone loss. The ozone hole grows throughout the early spring until temperatures warm and the polar vortex weakens, ending the isolation of the air in the polar vortex. As air from the surrounding latitudes mixes into the polar region, the ozone-destroying forms of chlorine disperse. The ozone layer stabilizes until the following spring.

Current Situation:

Scientists have found evidence that the hole in the ozone layer over Antarctica is finally beginning to heal. If progress continues, it should be closed permanently by 2050.

The news comes almost 30 years since the world worked together to phase out ozone-depleting chemicals.

In the '80s and '90s, the hole in the ozone layer was *the* environmental threat that everyone was worried about. After decades of pumping chlorofluorocarbons (CFCs) into the atmosphere - through dry cleaning, aerosols, and old refrigerators - scientists found that the ozone over Antarctica had become seriously thin.

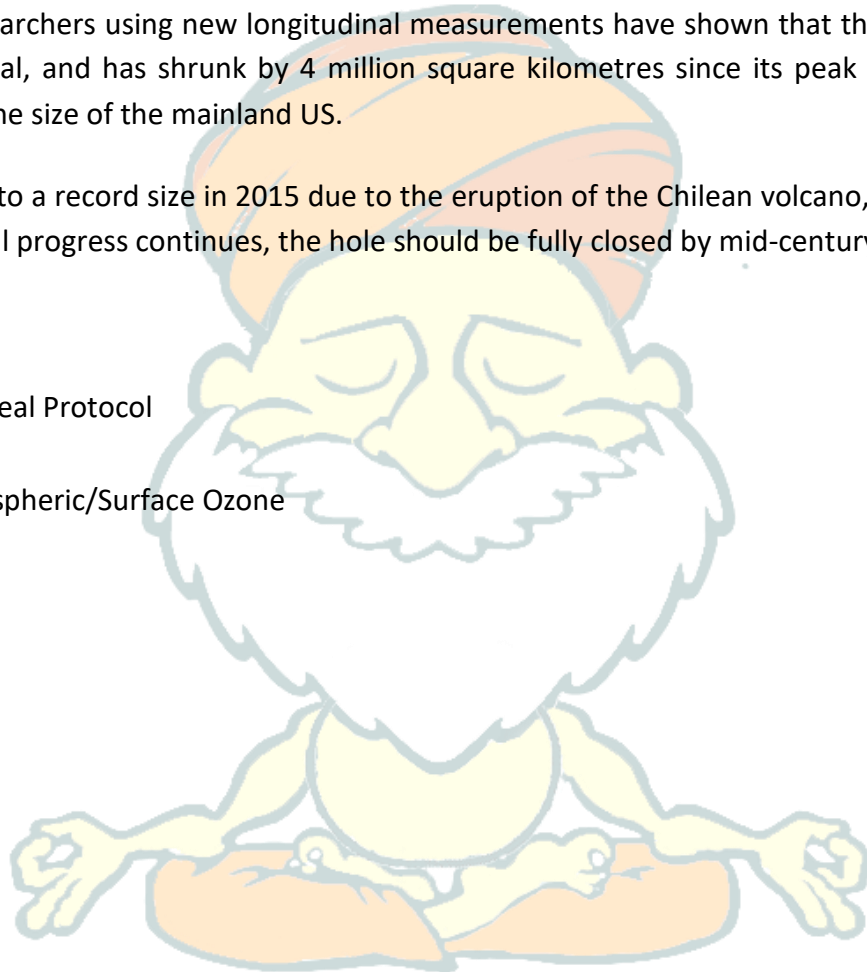
To combat the problem, most countries on the planet signed the Montreal Protocol in 1987, which was a global treaty that governed the gradual phase-out of CFCs and other ozone-damaging chemicals.

And now researchers using new longitudinal measurements have shown that the hole is finally starting to heal, and has shrunk by 4 million square kilometres since its peak in 2000. That's roughly half the size of the mainland US.

It did expand to a record size in 2015 due to the eruption of the Chilean volcano, Calbuco, but if environmental progress continues, the hole should be fully closed by mid-century.

Think!!

- Montreal Protocol
- CFCs
- Tropospheric/Surface Ozone



Spices Farmers Producer Companies (SFPCs)

SFPCs have been established under the Ministry of Commerce and Industry.

The objective of the programme is to operationalize SFPC on pilot basis in 3 districts viz. Ziro in Lower Subansiri District for large cardamom and Namsai in Namsai District for ginger in Arunachal Pradesh & West District in Sikkim for large cardamom for empowering the farmers, especially women farmers in the identified spices growing districts, for better price realization through post-harvest management, primary processing, value addition, packing, aggregation, organic certification etc.

Each SFPC will have 500 farmers as members in a sub-division or district. The farmers will be identified on cluster basis in a village, taluk or district by forming Farmer Interest Group(FIGs), each consisting of 20 farmers. 25 such FIGs will be formed to establish a SFPC.

Paramparagat Krishi Vikas Yojna

Paramparagat Krishi Vikas Yojana” is an elaborated component of Soil Health Management (SHM) of major project National Mission of Sustainable Agriculture (NMSA).

PKVY Organic farming is promoted through adoption of organic village by cluster approach and PGS certification.

Objectives:

- Promotion of commercial organic production through certified organic farming.
- The produce will be pesticide residue free and will contribute to improve the health of consumer.
- It will raise farmer's income and create potential market for traders.
- It will motivate the farmers for natural resource mobilization for input production.

Implementation:

- Groups of farmers would be motivated to take up organic farming under Paramparagat Krishi Vikas Yojana (PKVY).

- Fifty or more farmers will form a cluster having 50 acre land to take up the organic farming under the scheme. In this way during three years 10,000 clusters will be formed covering 5.0 lakh acre area under organic farming.
- There will be no liability on the farmers for expenditure on certification.
- Every farmer will be provided Rs. 20,000 per acre in three years for seed to harvesting of crops and to transport produce to the market.
- Organic farming will be promoted by using traditional resources and the organic products will be linked with the market.
- It will increase domestic production and certification of organic produce by involving farmers.

International Agro-biodiversity Congress

Objective:

To initiate and encourage a dialogue among relevant stakeholders – including farmers – to better understand everyone's role in agro biodiversity management and the conservation of genetic resources.

Agro biodiversity:

Agro biodiversity – is the foundation of sustainable agricultural development and is an essential natural resource to ensure current and future food and nutrition security. Increasing the sustainable use of agro biodiversity in production and consumption systems plays an important role in solving today's challenges: reducing global malnutrition, adapting to climate change, increasing productivity, reducing risk and increasing shrinking food security.

The Congress will provoke discussion and knowledge-sharing on issues for the effective and efficient management of gene banks; science-led innovations in the field of genetic resources; livelihood food and nutrition security through crop diversification; issues relating to quarantine, biosafety and biosecurity; and Intellectual Property Rights and Access and Benefit Sharing in the context of exchange of germ plasm; and many other related themes.

Agricultural Marketing & Farm Friendly Reforms Index

NITI Aayog has identified **three key areas for reform** and is now persuading states to undertake the reforms. The areas identified for immediate reforms are:

- **Agricultural market reforms**
- **Land lease reforms**
- **Reforms related to forestry on private land – felling and transit of trees.**

Agricultural Marketing and Farmer Friendly Reforms Index - It has a score which can have minimum value “0” implying no reforms and maximum value “100” implying complete reforms in the selected areas. States and UTs have been ranked in terms of the score of the index.

INDEX Parameters:

- It is based on implementation of seven provisions proposed under model APMC Act, joining eNAM initiative, special treatment to fruits and vegetables for marketing and level of taxes in mandis.
- These indicators also represent competitiveness, efficiency and transparency in agri markets.
- Relaxation in restrictions related to lease in and lease out agricultural land and change in law to recognise tenant and safeguard land owners liberalisation.
- The index represents freedom given to farmers for felling and transit of trees grown on private land. This represents opportunity to diversify farm business.

The state of Maharashtra achieved first rank in implementation of various reforms. The state has implemented most of the marketing reforms and it offers best environment for doing agribusiness among all the states and UTs. Gujarat ranks second with a score of 71.5 out of 100, closely followed by Rajasthan and Madhya Pradesh.

NOTE: Do read the pib article in the link below. It is very informative to tackle agriculture question in Paper 1 as well as paper 3.

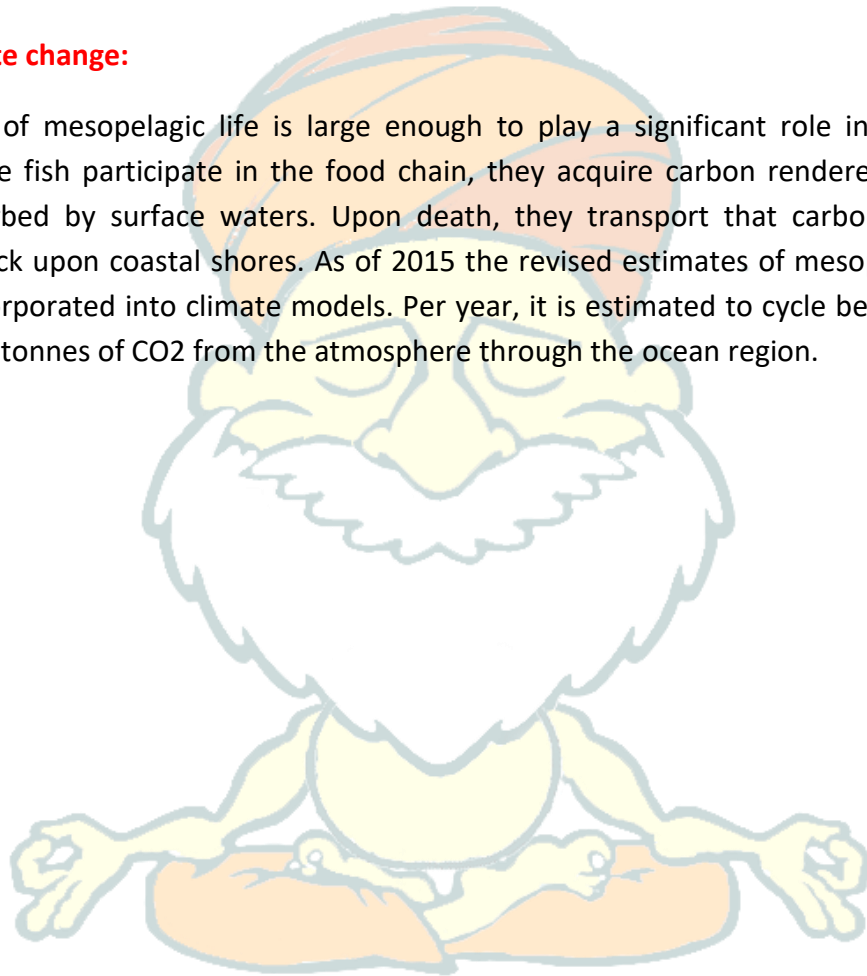
Mesopelagic Zone

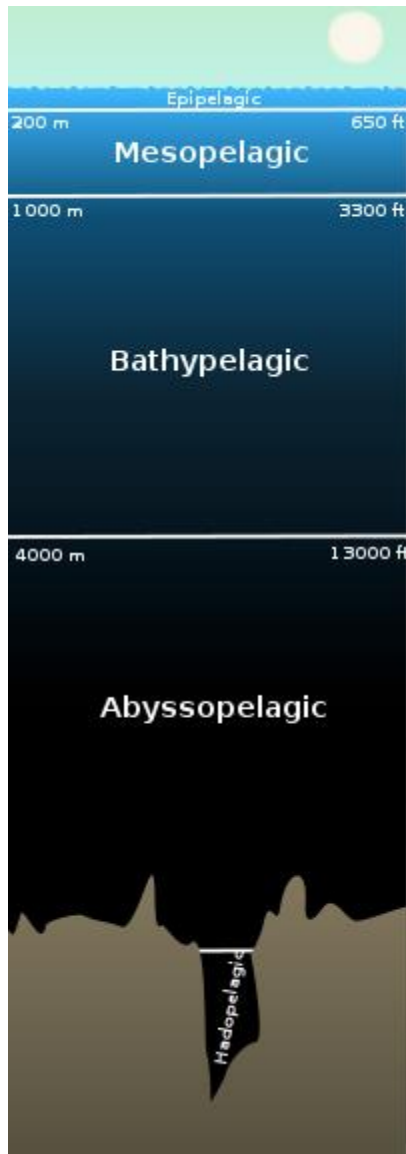
The **mesopelagic** (also known as the *middle pelagic* or *twilight zone*) is that part of the pelagic zone that extends from a depth of 200 to 1000 meters below the ocean surface. It lies between the photic epipelagic above and the aphotic bathypelagic below, where there is no light at all.

Although some light penetrates the mesopelagic zone, it is insufficient for photosynthesis. The general types of life forms found are daytime visiting herbivores, detritivores feeding on dead organisms and fecal pellets, and carnivores feeding on the former types. Algae do not reside inside the mesopelagic layer, due to lack of light.

Role in Climate change:

The quantity of mesopelagic life is large enough to play a significant role in global carbon cycling. As the fish participate in the food chain, they acquire carbon rendered from carbon dioxide absorbed by surface waters. Upon death, they transport that carbon into the sea bottom or back upon coastal shores. As of 2015 the revised estimates of mesopelagic life had yet to be incorporated into climate models. Per year, it is estimated to cycle between 5 billion and 12 billion tonnes of CO₂ from the atmosphere through the ocean region.





Role in Food Security:

The world's fishing powers are looking to the mesopelagic as a new frontier. The UN's Food and Agriculture Organisation reported in 2002 that the fish-meal and fish-oil industries would need to exploit this part of the ocean in order to feed fish farms. In the past nine months Norway has issued 46 new licences for vessels to fish there. In September the government of Sindh, a province that is home to most of Pakistan's fishing fleet, issued a draft policy on licensing mesopelagic fishing in its waters. And at the North Atlantic Seafood Forum, held in March, in Bergen, Norway's principal port, the session about fishing the mesopelagic was entitled "the Big Apple".

The mesopelagic is home to 10bn tonnes of animals. Cropping a mere 1% of this each year would double the landed catch of the ocean's fisheries. Most of this catch would probably not appeal to human palates.

Zealandia

Zealandia is not a new discovery – in fact, the idea of an eighth continent was first proposed in 1995 – but scientists have typically put it in one of two categories. One view is that it's made up of fragments of continental crust, while others believe it to be a microcontinent, since the generally well-defined landmass includes a continental crust that is geologically isolated from other continents.

The proponents of Zealandia-as-continent say it's much larger than other microcontinents, such as Madagascar (Zealandia is six times the size), believing that any landmass larger than 386,000 sq mi (1 million sq km) should be considered a continent. However, the defining minimum size of a continent has never been established. They also point to Antarctica, where much of its western half would be submerged without its surface ice.



Some Facts about Zealandia:

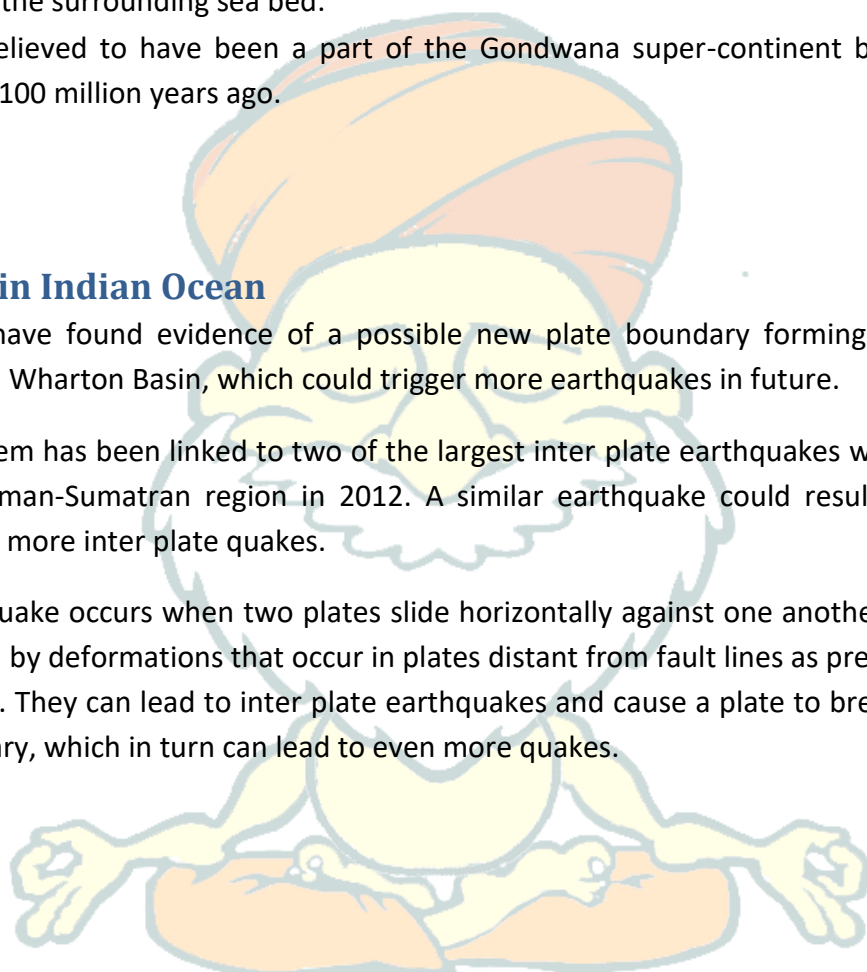
- Its only point above sea level is New Zealand's two main islands and New Caledonia – the proposed continent's highest 'mountain range'.
- A further five **MILLION** square kilometres – or 95 per cent of the landmass – are underwater.
- Its western ridge lies several hundred miles off Australia's east coast.
- The key characteristics of a continent, including a distinctive geology, and an elevation above the surrounding sea bed.
- It is believed to have been a part of the Gondwana super-continent but broke away about 100 million years ago.

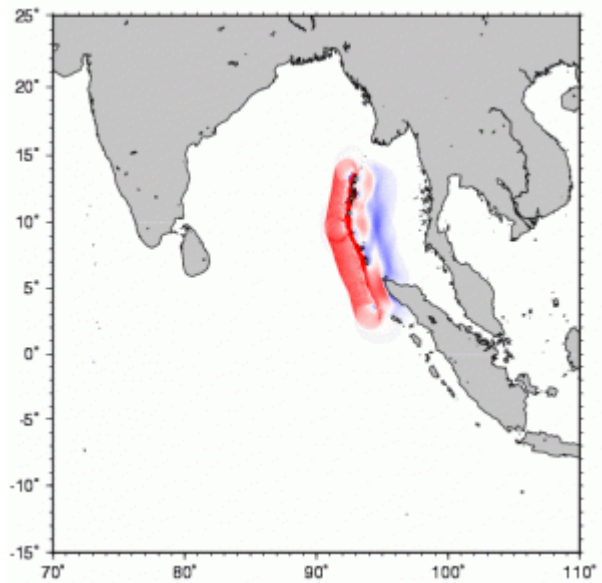
New Fault in Indian Ocean

Researchers have found evidence of a possible new plate boundary forming on the Indian Ocean floor in Wharton Basin, which could trigger more earthquakes in future.

The fault system has been linked to two of the largest inter plate earthquakes which struck the ocean's Andaman-Sumatran region in 2012. A similar earthquake could result in new plate boundary and more inter plate quakes.

A slip-strike quake occurs when two plates slide horizontally against one another. Such quakes can be caused by deformations that occur in plates distant from fault lines as pressure builds up across a plate. They can lead to inter plate earthquakes and cause a plate to break, resulting in a new boundary, which in turn can lead to even more quakes.





Researchers studied seismic data that was recorded before, during and after the 2012 quakes and conducted sea floor depth analysis by venturing into the ocean aboard a research vessel. They created a high-resolution imagery of the sea floor, which unveiled deformations that had occurred.

The analysis showed a new fault system had developed in the area off the coast of Sumatra that was involved in the 2012 quakes. The data also showed that the plate had broken along a 1,000 km fracture zone, resulting in a new plate boundary—one that is likely to be the site of future fault-slip quakes.

Note: A direct question might not be asked on this. Rather a question can be asked on strike slip fault and you can give this example.

Types of fault we have already covered in Geography VAN before.

Supermoon

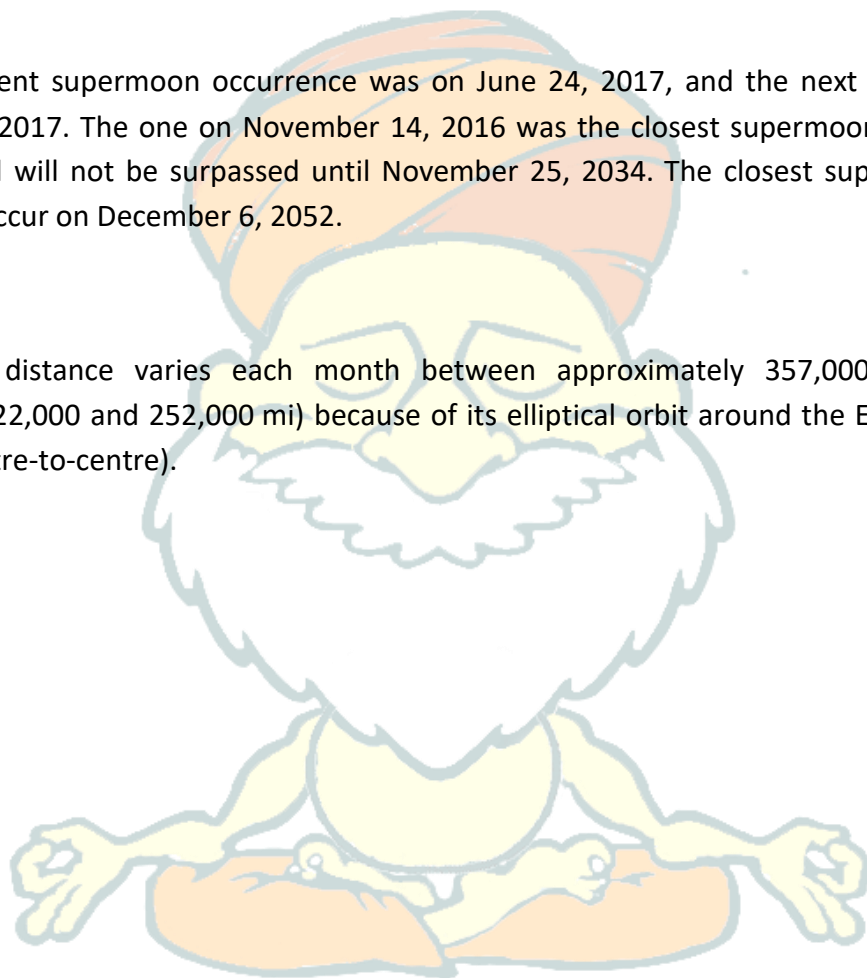
A **supermoon** is a full moon or a new moon that approximately coincides with the closest distance that the Moon reaches to Earth in its elliptic orbit, resulting in a larger-than-usual apparent size of the lunar disk as seen from Earth. The technical name is the **perigee syzygy** of the Earth–Moon–Sun system. The term *supermoon* is not astronomical, but originated in modern astrology.

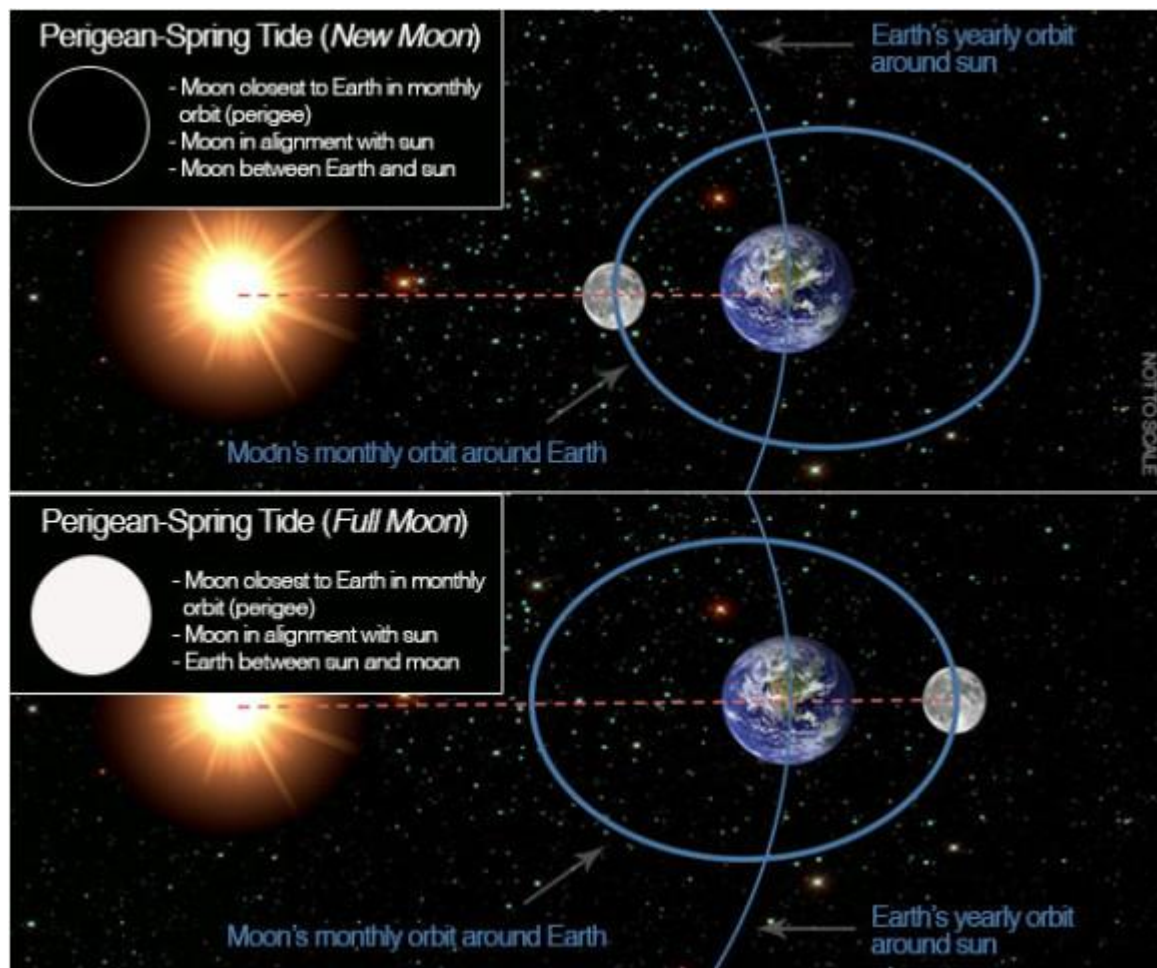
Occurrence:

The most recent supermoon occurrence was on June 24, 2017, and the next one will be on December 3, 2017. The one on November 14, 2016 was the closest supermoon since January 26, 1948, and will not be surpassed until November 25, 2034. The closest supermoon of the century will occur on December 6, 2052.

Distance:

The Moon's distance varies each month between approximately 357,000 and 406,000 kilometers (222,000 and 252,000 mi) because of its elliptical orbit around the Earth (distances given are centre-to-centre).





A full moon at perigee is visually larger up to 14% in diameter. While the moon's surface luminance remains the same, because of its larger size the illuminance is up to 30% brighter than one at its farthest point, or apogee.

Black Moon:

It's the name for the second of two *new moons* in one calendar month. January 2014, for example, had two new moon supermoons, the second of which was not only a supermoon, but a Black Moon.

Note: Generally Supermoons are linked with occurrence of natural disaster like earthquakes and Volcanic eruptions, there is no scientific base or explanation for that.

Regards

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