



India's #1 Self-Study Notes

**crack**  
**IAS**.com

📞 **92170 70707**  
crackiasquery@gmail.com

[www.crackIAS.com](http://www.crackIAS.com)

Introduces the most scientific & easiest way of preparing

**CURRENT AFFAIRS**

**Topic Wise NEWS**

← SOURCES →

**PIB » The Hindu » Live Mint » HT » TOI » RBI ET » Indian Express  
PRS Blog » IDSA » Government of India & UNO Official Sites  
NASA & Nature into these subject separately.**



**Topic Wise News** for  
**GS (Pre-cum-Mains)**  
every Month

Download your copy from [crackIAS.com](http://crackIAS.com)

Monthly Archive on **topic** wise news for **GS Pre & Mains**

# Index

Scientists uncover clue of how first extreme-UV light appeared.....	2
Watch.....	7
Goa becomes first 'Har Ghar Jal' State across the nation by providing tap water connection to every rural household; Sets an example for other States to emulate.....	9
Sunspots help understand life around other stars.....	12
Fertility has been declining in India for some time now.....	14
Supermassive black hole at center of Milky Way is low-spinning: Study.....	16
Newly identified tectonically active zone in Himalayas could alter earthquake study & predictions	18
More water on the moon? New finding deepens puzzle.....	21
Black Holes don't move around sucking in objects like a vacuum cleaner: Director, IUCAA.....	23
Coral reef taller than Eiffel Tower found in Australia.....	27
New coral species discovered on seabed marked for deep-sea mining.....	29

# SCIENTISTS UNCOVER CLUE OF HOW FIRST EXTREME-UV LIGHT APPEARED

Relevant for: Geography | Topic: The Earth and the Solar System

Scientists have uncovered an important clue on how the dark ages of the Universe ended and how the first extreme-UV light appeared.

India's first multi-wavelength satellite, AstroSat, has detected extreme-UV (EUV) light from a galaxy, called AUDFs01, 9.3 billion light-years away from Earth. At the time, our universe was forming stars at its peak rate. Such EUV radiation has enough energy to ionize a hydrogen atom by liberating its electron from the nucleus's influence. The EUV photons emitted by galaxies like AUDFs01 could play a crucial role in reionizing the early universe soon after the Cosmic Dark Age and emitting the first light.

A collaboration of researchers from different countries under the project CEFIPRA funded by Indo-French Centre for the Promotion of Advanced Research (CEFIPRA) a bilateral organization set up by the Department of Science & Technology, Government of India and the Ministry for Europe and Foreign Affairs, Government of France delved into how galaxies like AUDFs01 grow their stellar mass when the first stars and galaxies became visible.

The team consisting of Prof. Combes from Observatoire de Paris, Laboratory for Studies of Radiation and Matter in Astrophysics and Atmospheres (LERMA), France, and Prof. Kanak Saha from Inter-University Centre for Astronomy and Astrophysics (IUCAA), India connected by CEFIPRA estimated the recent star-formation rate and mass of the gas reservoir in the galaxy. Star formation rate provides a quantitative measure of the stellar mass growth in galaxies. The typical star formation rate (or gas consumption rate) in those first galaxies is not known. By studying galaxies like AUDFs01 and many more, we could get an idea of how star formation rate, gas consumption rate, and growth of stellar mass in those primitive galaxies. **Their work has been recently published in the journal 'Nature Astronomy'.**

The multi-wavelength satellite AstroSat, which was launched on September 28, 2015, by the Indian Space Research Organisation (ISRO) has five unique X-ray and ultraviolet telescopes working in tandem and has onboard the UltraViolet Imaging Telescope (UVIT).

According to Prof. Saha, the redshift gap from 0.4 to 2.5 remained barren until the wide-field UltraViolet Imaging Telescope (UVIT) onboard AstroSat made its first discovery of AUDFs01 at redshift 1.42. The galaxy is not only bridging the gap between the low and high redshift regime at present, but it is also the beginning of a whole new exploration of star-forming galaxies at EUV wavelength. This extreme UV wavelength regime is crucial to understand models of the stellar population, especially the massive, hot stars in early galaxies.

AUDFs01 is the first example of a leaking galaxy with clumpy morphology. This galaxy has four clumps and, perhaps, typical of star-forming galaxies in this redshift range. The current version of the AUDF-south (AUDFs) can be used to detect a number of such EUV galaxies from redshift 1 and 2, when the cosmic star-formation rate had its peak, and thus, AstroSat may allow further to refine the scenario of cosmic reionization.

"While technology is often developed and adopted keeping in view local needs, deep science is often global requiring strong international collaborations such as this one supported by CEFIPRA. There are indeed many compelling stories of profound science resulting from India's

active international collaborations in the frontier areas with over 40 countries,” said Prof Ashutosh Sharma, Secretary, DST.

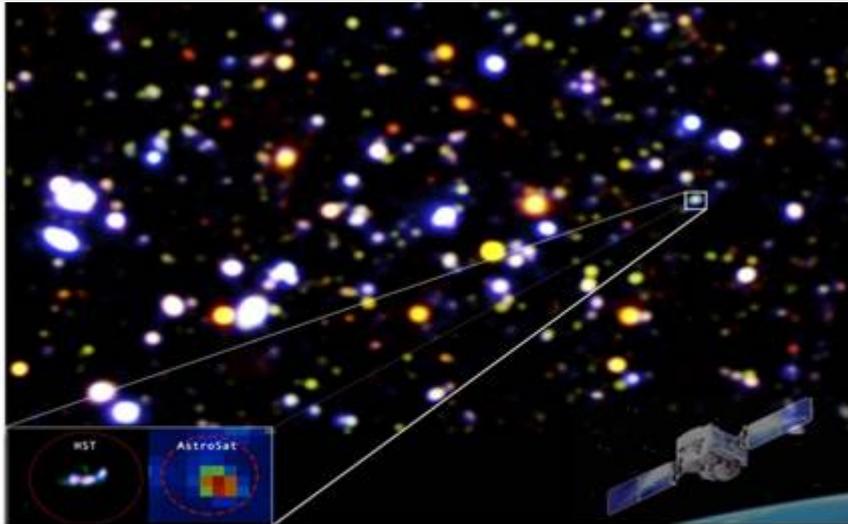


Figure: Combined four-colour image of the AstroSat Uv Deep Field (AUDF). Red and green colours from HST while cyan and dark blue are from AstroSat. AUDFs01 is in the square box. Highlighted images in the boxes below are from HST and AstroSat. Image Credit: Kanak Saha (IUCAA).



*Prof. Kanak Saha PI of the present research work published in the journal 'Nature Astronomy'*

[Publication link: <https://www.nature.com/articles/s41550-020-1173-5>]

*Team members:*

*Kanak Saha, Shyam Tandon & Abhishek Paswan (all from IUCAA, India); Anshuman Borgohain (Tezpur University, India); Anne Verhamme, Charlotte Simmonds & Daniel Schaerer (all from Geneva Observatory, Switzerland); Françoise Combes (Observatoire de Paris, LERMA, France); Michale Rutkowski (Minnesota State University-Mankato, USA); Bruce Elmegreen (IBM*

Research Division, USA); Debra Elmegreen (Dept. of Physics and Astronomy, Vassar College, USA); Akio Inoue (Waseda Research Institute for Science and Engineering, Japan); Mieke Paalvast (Leiden Observatory, The Netherlands)]

\*\*\*\*\*

NB/KGS(DST Media Cell)

Scientists have uncovered an important clue on how the dark ages of the Universe ended and how the first extreme-UV light appeared.

India's first multi-wavelength satellite, AstroSat, has detected extreme-UV (EUV) light from a galaxy, called AUDFs01, 9.3 billion light-years away from Earth. At the time, our universe was forming stars at its peak rate. Such EUV radiation has enough energy to ionize a hydrogen atom by liberating its electron from the nucleus's influence. The EUV photons emitted by galaxies like AUDFs01 could play a crucial role in reionizing the early universe soon after the Cosmic Dark Age and emitting the first light.

A collaboration of researchers from different countries under the project CEFIPRA funded by Indo-French Centre for the Promotion of Advanced Research (CEFIPRA) a bilateral organization set up by the Department of Science & Technology, Government of India and the Ministry for Europe and Foreign Affairs, Government of France delved into how galaxies like AUDFs01 grow their stellar mass when the first stars and galaxies became visible.

The team consisting of Prof. Combes from Observatoire de Paris, Laboratory for Studies of Radiation and Matter in Astrophysics and Atmospheres (LERMA), France, and Prof. Kanak Saha from Inter-University Centre for Astronomy and Astrophysics (IUCAA), India connected by CEFIPRA estimated the recent star-formation rate and mass of the gas reservoir in the galaxy. Star formation rate provides a quantitative measure of the stellar mass growth in galaxies. The typical star formation rate (or gas consumption rate) in those first galaxies is not known. By studying galaxies like AUDFs01 and many more, we could get an idea of how star formation rate, gas consumption rate, and growth of stellar mass in those primitive galaxies. **Their work has been recently published in the journal 'Nature Astronomy'.**

The multi-wavelength satellite AstroSat, which was launched on September 28, 2015, by the Indian Space Research Organisation (ISRO) has five unique X-ray and ultraviolet telescopes working in tandem and has onboard the UltraViolet Imaging Telescope (UVIT).

According to Prof. Saha, the redshift gap from 0.4 to 2.5 remained barren until the wide-field UltraViolet Imaging Telescope (UVIT) onboard AstroSat made its first discovery of AUDFs01 at redshift 1.42. The galaxy is not only bridging the gap between the low and high redshift regime at present, but it is also the beginning of a whole new exploration of star-forming galaxies at EUV wavelength. This extreme UV wavelength regime is crucial to understand models of the stellar population, especially the massive, hot stars in early galaxies.

AUDFs01 is the first example of a leaking galaxy with clumpy morphology. This galaxy has four clumps and, perhaps, typical of star-forming galaxies in this redshift range. The current version of the AUDF-south (AUDFs) can be used to detect a number of such EUV galaxies from redshift 1 and 2, when the cosmic star-formation rate had its peak, and thus, AstroSat may allow further

to refine the scenario of cosmic reionization.

“While technology is often developed and adopted keeping in view local needs, deep science is often global requiring strong international collaborations such as this one supported by CEFIPRA. There are indeed many compelling stories of profound science resulting from India's active international collaborations in the frontier areas with over 40 countries,” said Prof Ashutosh Sharma, Secretary, DST.

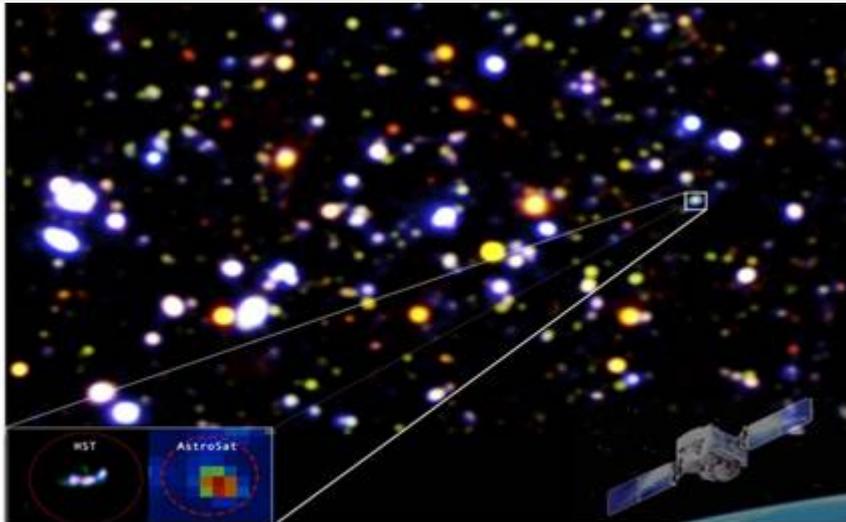


Figure: Combined four-colour image of the AstroSat Uv Deep Field (AUDF). Red and green colours from HST while cyan and dark blue are from AstroSat. AUDFs01 is in the square box. Highlighted images in the boxes below are from HST and AstroSat. Image Credit: Kanak Saha (IUCAA).



*Prof. Kanak Saha PI of the present research work published in the journal 'Nature Astronomy'*

[Publication link: <https://www.nature.com/articles/s41550-020-1173-5>]

Team members:

*Kanak Saha, Shyam Tandon & Abhishek Paswan (all from IUCAA, India); Anshuman Borgohain (Tezpur University, India); Anne Verhamme, Charlotte Simmonds & Daniel Schaerer (all from Geneva Observatory, Switzerland); Françoise Combes (Observatoire de Paris, LERMA, France); Michale Rutkowski (Minnesota State University-Mankato, USA); Bruce Elmegreen (IBM Research Division, USA); Debra Elmegreen (Dept. of Physics and Astronomy, Vassar College, USA); Akio Inoue (Waseda Research Institute for Science and Engineering, Japan); Mieke Paalvast (Leiden Observatory, The Netherlands)]*

\*\*\*\*\*

NB/KGS(DST Media Cell)

**END**

Downloaded from **crackIAS.com**

© **Zuccess App** by crackIAS.com

CrackIAS

## WATCH

Relevant for: Geography | Topic: The Earth and the Solar System

Images sent by Chandrayaan-1, India's first lunar mission, suggest that the [Moon may be rusting along the poles](#).

A recent study published in Science Advances found an oxidised iron mineral called hematite at high latitudes on the Moon. The team analysed the data acquired by the Moon Mineralogy Mapper onboard Chandrayaan-1.

Researchers say that this lunar hematite is formed through oxidation of the iron on the Moon's surface by the oxygen from Earth's upper atmosphere.

Hematite is a heavy and relatively hard oxide mineral found on Earth and Mars. The mineral is a form of iron oxide, or rust, produced when iron is exposed to oxygen and water.

Even though the surface of the Moon is known to have iron-rich rocks, it is not known for the presence of water and oxygen, which are the two elements needed to interact with iron to create rust. The Earth's atmosphere could be protecting the Moon as well.

The Moon is constantly bombarded by solar particles coming off the Sun, known as solar wind. This results in the Earth and Moon being bombarded with hydrogen which is a reducer. Without an atmosphere to protect itself, the hydrogen should make it difficult for rust to form on the Moon.

But Earth's magnetotail is capable of blocking out 99% of the solar wind aimed at the Moon when it is in its Full Moon phase which provides [windows of opportunity for rust to form](#).

While the Moon lacks an atmosphere, it is in fact home to trace amounts of oxygen from Earth's upper atmosphere carried by the Earth's trailing magnetotail.

The Chandrayaan-1 data indicate that the Moon's poles are home to water ice, but the hematite was detected far from that water ice.

The scientists propose that fast-moving dust particles that regularly pelt the Moon could release surface-borne water molecules, mixing them with iron in the lunar soil. Thus creating an opportunity for rust to form.

Dear reader,

We have been keeping you up-to-date with information on the developments in India and the world that have a bearing on our health and wellbeing, our lives and livelihoods, during these difficult times. To enable wide dissemination of news that is in public interest, we have increased the number of articles that can be read free, and extended free trial periods. However, we have a request for those who can afford to subscribe: please do. As we fight disinformation and misinformation, and keep apace with the happenings, we need to commit greater resources to news gathering operations. We promise to deliver quality journalism that stays away from vested interest and political propaganda.

Dear subscriber,

Thank you!

Your support for our journalism is invaluable. It's a support for truth and fairness in journalism. It has helped us keep pace with events and happenings.

The Hindu has always stood for journalism that is in the public interest. At this difficult time, it becomes even more important that we have access to information that has a bearing on our health and well-being, our lives, and livelihoods. As a subscriber, you are not only a beneficiary of our work but also its enabler.

We also reiterate here the promise that our team of reporters, copy editors, fact-checkers, designers, and photographers will deliver quality journalism that stays away from vested interest and political propaganda.

Suresh Nambath

Please enter a valid email address.

You can support quality journalism by turning off ad blocker or purchase a subscription for unlimited access to The Hindu.

[Sign up for a 30 day free trial.](#)

**END**

Downloaded from **crackIAS.com**

© **Zuccess App** by crackIAS.com

Crackin

## GOA BECOMES FIRST 'HAR GHAR JAL' STATE ACROSS THE NATION BY PROVIDING TAP WATER CONNECTION TO EVERY RURAL HOUSEHOLD; SETS AN EXAMPLE FOR OTHER STATES TO EMULATE

Relevant for: Geography | Topic: Distribution of key natural resources - Water Resources incl. Rivers & related issues in world & India



Goa has earned itself the unique distinction of becoming first 'Har Ghar Jal' State in the country as it successfully provides 100% Functional Household Tap Connections (FHTCs) in the rural areas covering 2.30 lakh rural households. Harnessing the immense benefits of efficiently utilising the Jal Jeevan Mission (JJM) which aims to improve the quality of life and bring 'ease-of-living' to rural communities, the Chief Minister of Goa, Shri Pramod Sawant announced that all rural homes in the State now have a tap water supply. State's commitment and brisk efforts have ensured advancement and achievement of targets well before time.

In June, 2020, the Union Minister of Jal Shakti, Shri Gajendra Singh Shekhawat wrote to the Chief Minister of Goa expressing his happiness on the State's Annual Action Plan (AAP) to provide 100% Functional Household Tap Connections (FHTCs) in rural areas by 2021 and extended full support for the implementation of Mission reiterating that providing potable water is a national priority for the Union Government. Accordingly, fund allocation to Goa in 2020-21 has been increased to Rs. 12.40 Crore. Besides, the State could also explore through convergence of various programmes like MGNREGS, SBM (G), 15<sup>th</sup> FC Grants to PRIs, District Mineral Development Fund, CAMPA, CSR Fund, Local Area Development Fund, etc. for strengthening of drinking water sources, water supply, grey water treatment & re-use and operation & maintenance.

The two districts of Goa i.e. North Goa with 1.65 lakh rural households and South Goa with 98,000 rural households in 191 Gram Panchayats are fully saturated with assured piped water supply through tap connections. To strengthen the water testing facilities, the State is in process

of getting 14 water quality testing laboratories NABL accredited. Jal Jeevan Mission mandates training 5 persons in every village especially women to be trained in using Field Test Kits, so that water can be tested in the villages.

Goa's achievement is an example for other States to emulate and ensure every rural home gets tap connection and especially in these times of CoVid-19 pandemic, it is all the more imperative to have assured safe water supply within households. This silent revolution happening in rural India in terms of household tap water connections is a work in progress for a 'New India'.

Having achieved the universal access, the State now plans for sensor-based service delivery monitoring system so as to monitor the functionality of water supply i.e. potable water in adequate quantity and of prescribed quality being provided to every rural household on regular and long-term basis.

\*\*\*\*\*

### APS/MG/AS



Goa has earned itself the unique distinction of becoming first 'Har Ghar Jal' State in the country as it successfully provides 100% Functional Household Tap Connections (FHTCs) in the rural areas covering 2.30 lakh rural households. Harnessing the immense benefits of efficiently utilising the Jal Jeevan Mission (JJM) which aims to improve the quality of life and bring 'ease-of-living' to rural communities, the Chief Minister of Goa, Shri Pramod Sawant announced that all rural homes in the State now have a tap water supply. State's commitment and brisk efforts have ensured advancement and achievement of targets well before time.

In June, 2020, the Union Minister of Jal Shakti, Shri Gajendra Singh Shekhawat wrote to the Chief Minister of Goa expressing his happiness on the State's Annual Action Plan (AAP) to provide 100% Functional Household Tap Connections (FHTCs) in rural areas by 2021 and extended full support for the implementation of Mission reiterating that providing potable water is a national priority for the Union Government. Accordingly, fund allocation to Goa in 2020-21 has been increased to Rs. 12.40 Crore. Besides, the State could also explore through convergence of various programmes like MGNREGS, SBM (G), 15<sup>th</sup> FC Grants to PRIs, District Mineral

Development Fund, CAMPA, CSR Fund, Local Area Development Fund, etc. for strengthening of drinking water sources, water supply, grey water treatment & re-use and operation & maintenance.

The two districts of Goa i.e. North Goa with 1.65 lakh rural households and South Goa with 98,000 rural households in 191 Gram Panchayats are fully saturated with assured piped water supply through tap connections. To strengthen the water testing facilities, the State is in process of getting 14 water quality testing laboratories NABL accredited. Jal Jeevan Mission mandates training 5 persons in every village especially women to be trained in using Field Test Kits, so that water can be tested in the villages.

Goa's achievement is an example for other States to emulate and ensure every rural home gets tap connection and especially in these times of CoVid-19 pandemic, it is all the more imperative to have assured safe water supply within households. This silent revolution happening in rural India in terms of household tap water connections is a work in progress for a 'New India'.

Having achieved the universal access, the State now plans for sensor-based service delivery monitoring system so as to monitor the functionality of water supply i.e. potable water in adequate quantity and of prescribed quality being provided to every rural household on regular and long-term basis.

\*\*\*\*\*

**APS/MG/AS**

**END**

Downloaded from [crackIAS.com](http://crackIAS.com)

© **Zuccess App** by crackIAS.com

Crack

# SUNSPOTS HELP UNDERSTAND LIFE AROUND OTHER STARS

Relevant for: Geography | Topic: The Earth and the Solar System

A new study [published in The Astrophysical Journal](#) has shown how sunspots - which are relatively cooler and darker patches on the Sun - can help us understand more about conditions for life on exoplanets, planets that are outside the solar system.

As sunspots are precursors to solar flares, monitoring them can help decode how and why flares occur. On young stars, superflares happen almost daily, whereas, on more mature ones like our Sun, they may occur once in 1,000 years. A few flares may help in building RNA and DNA on planets whereas too many strong flares can damage the atmosphere, thus turning the planet uninhabitable.

High-resolution data of the Sun from NASA's Solar Dynamics Observatory and JAXA/NASA's Hinode mission was used for the study.

The team studied the different layers of the Sun using 14 different wavelengths including visible, ultraviolet (UV), and X-rays.

"We wanted to know what a sunspot region would look like if we couldn't resolve it in an image," said Shin Toriumi, lead author on the study and scientist at the Institute of Space and Astronautical Science at Japan Aerospace Exploration Agency in a release. "So, we used the solar data as if it came from a distant star to have a better connection between solar physics and stellar physics."

Putting all these data together, the team created a plot which they named light curves which showed how the light changed as the sunspot passed across the Sun's rotating face. This also shows what a passing sunspot would look like if it were many light-years away.

"The Sun is our closest star. Using solar observing satellites, we can resolve signatures on the surface 100 miles wide," said Vladimir Airapetian, a co-author of the study and astrophysicist at NASA's Goddard Space Flight Center in Greenbelt, Maryland. "On other stars, you might only get one pixel showing the entire surface, so we wanted to create a template to decode activity on other stars."

Studying stellar activity could also help explain the beginning of life on Earth four billion years ago. Many scientists have suggested that intense solar activity may have been a trigger.

"So far we've done the best-case scenarios, where there's only one sunspot visible," Toriumi said. "Next we are planning on doing some numerical modeling to understand what happens if we have multiple sunspots."

You have reached your limit for free articles this month.

To get full access, please subscribe.

Already have an account ? [Sign in](#)

Start your 14 days free trial. [Sign Up](#)

Dear reader,

We have been keeping you up-to-date with information on the developments in India and the world that have a bearing on our health and wellbeing, our lives and livelihoods, during these difficult times. To enable wide dissemination of news that is in public interest, we have increased the number of articles that can be read free, and extended free trial periods. However, we have a request for those who can afford to subscribe: please do. As we fight disinformation and misinformation, and keep apace with the happenings, we need to commit greater resources to news gathering operations. We promise to deliver quality journalism that stays away from vested interest and political propaganda.

Dear subscriber,

Thank you!

Your support for our journalism is invaluable. It's a support for truth and fairness in journalism. It has helped us keep apace with events and happenings.

The Hindu has always stood for journalism that is in the public interest. At this difficult time, it becomes even more important that we have access to information that has a bearing on our health and well-being, our lives, and livelihoods. As a subscriber, you are not only a beneficiary of our work but also its enabler.

We also reiterate here the promise that our team of reporters, copy editors, fact-checkers, designers, and photographers will deliver quality journalism that stays away from vested interest and political propaganda.

Suresh Nambath

Please enter a valid email address.

Subscribe to The Hindu now and get unlimited access.

Already have an account? [Sign In](#)

Start your 14 days free trial [Sign Up](#)

**END**

Downloaded from **crackIAS.com**

© **Zuccess App** by crackIAS.com

# FERTILITY HAS BEEN DECLINING IN INDIA FOR SOME TIME NOW

Relevant for: Geography | Topic: Demography of the World - Growth of Population

Recently, there has been discussion in the media on India's population future prompted by release of the Sample Registration System (SRS) Statistical Report (2018) and global population projections made by the Institute of Health Metrics and Evaluation (IHME), US.

Fertility has been declining in India for some time now. SRS report estimated the Total Fertility Rate (TFR), the number of children a mother would have at the current pattern of fertility during her lifetime, as 2.2 in the year 2018. Fertility is likely to continue to decline and it is estimated that replacement TFR of 2.1 would soon be, if not already, reached for India as a whole. As fertility declines, so does the population growth rate. This report estimated the natural annual population growth rate to be 1.38 per cent in 2018. With India's estimated population of 137 crore, this means that net 1.9 crore persons would have been added that year.

A comparison of 2011 and 2018 SRS statistical reports shows that TFR declined from 2.4 to 2.2 during this period. Fertility declined in all major states. In 2011, 10 states had a fertility rate below the replacement rate. This increased to 14 states (including two new newly carved states — Telangana and Uttarakhand). The annual natural population growth rate also declined from 1.47 to 1.38 per cent during this period.

**Explained Ideas:** [Why India must urgently step up efforts to improve its sex ratio](#)

Many people believe that the population would stabilise or begin to reduce in a few years once replacement fertility is reached. This is not so because of the population momentum effect, a result of more people entering the reproductive age group of 15-49 years due to the past high-level of fertility. For instance, the replacement fertility level was reached in Kerala around 1990, but its annual population growth rate was 0.7 per cent in 2018, nearly 30 years later. The UN Population Division has estimated that India's population would possibly peak at 161 crore around 2061 at the medium-fertility variant, and will be lower by about 10 per cent at the low fertility variant. Recently, IHME estimated that it will peak at 160 crore in 2048. Needless to add that estimates so far out in time have considerable uncertainty. Some of this momentum effect can be mitigated if young people delay childbearing and space their children.

The six states with higher than national fertility rate (and their TFR) in 2018 are Bihar (3.2), Uttar Pradesh (2.9) Madhya Pradesh (2.7), Rajasthan (2.5), Jharkhand (2.5) and Chhattisgarh (2.4) (Table 1). Fertility largely depends upon social setting and programme strength. Female education is a key indicator for social setting. Broadly, higher the female education level, lower the fertility. For instance, illiterate women in the reproductive age group of 15-49 years have higher fertility than literate women in almost all states. The percentage of illiterate women in the reproductive age group declined from 31.5 in 2011 to 13.0 per cent in 2018 as the cohort of older women with high illiteracy exited and younger women with a high proportion of them literate entered this age group. The percentage of illiterate women in this age group was higher than 15 per cent in all the high-fertility states, which comprise nearly 40 per cent of India's population. As the literacy of women in the reproductive age group is improving rapidly, we can be sanguine about continued fertility reduction.

Programme strength is indicated by the unmet need for contraception, which has several components. The most important of them is the proportion of married women who are neither

pregnant nor amenorrhoeic and do not desire a child in the next two years or ever but are not practising contraception. The National Family Health Survey (2015-16) provides us estimates for the unmet need at 12.9 per cent and contraceptive prevalence of 53.5 per cent for India. Together, this puts the total demand for contraception at 66.4 per cent.

Bihar, with the highest fertility rate, also has the highest unmet need at 21.1 per cent and the lowest contraceptive prevalence rate of 24.1 per cent among all the major states. Although female education levels are improving in Bihar, fertility for women with any education level is higher in 2018 compared to 2011. The programme is somewhat stronger in UP as unmet need is 18 per cent and contraceptive prevalence is 45.5 per cent. Strangely, fertility among women with Class 10 or higher education in UP is greater in 2018 compared to 2011. Programmes in these two states need to respond to this. Programme's ability to reach younger people and provide them with good quality reproductive health education and services needs to be urgently strengthened in these states.

The most troubling statistics in the report are for sex ratio at birth. Biologically normal sex ratio at birth is 1,050 males to 1,000 females or 950 females to 1,000 males. The SRS reports show that sex ratio at birth in India, measured as the number of females per 1,000 males, declined marginally from 906 in 2011 to 899 in 2018. There is considerable son preference in all states, except possibly in Kerala and Chhattisgarh. The UNFPA State of World Population 2020 estimated the sex ratio at birth in India as 910, lower than all the countries in the world except China. This is a cause for concern because this adverse ratio results in a gross imbalance in the number of men and women and its inevitable impact on marriage systems as well as other harms to women.

Thus, much more attention is needed on this issue. Increasing female education and economic prosperity help to improve the ratio. It is hoped that a balanced sex ratio at birth could be realised over time, although this does not seem to be happening during the period 2011-18. In view of the complexity of son preference resulting in gender-biased sex selection, government actions need to be supplemented by improving women's status in the society.

In conclusion, there is an urgent need to reach young people both for reproductive health education and services as well as to cultivate gender equity norms. This could reduce the effect of population momentum and accelerate progress towards reaching a more normal sex-ratio at birth. India's population future depends on it.

***This article first appeared in the print edition on October 17 under the title "The real population worry." Rangarajan is former Chairman, Prime Minister's Economic Advisory Council and former Governor, Reserve Bank of India. Satia is Professor Emeritus, Indian Institute of Public Health, Gandhinagar***

***The Indian Express is now on Telegram. Click [here to join our channel \(@indianexpress\)](#) and stay updated with the latest headlines***

**END**

Downloaded from [crackIAS.com](http://crackIAS.com)

© Zuccess App by crackIAS.com

# SUPERMASSIVE BLACK HOLE AT CENTER OF MILKY WAY IS LOW-SPINNING: STUDY

Relevant for: Geography | Topic: The Earth and the Solar System

Washington: New research has revealed that the supermassive black hole at the center of the Milky Way galaxy is not spinning much, providing more evidence that it is unlikely to have a jet.

The research, by scientists at the Center for Astrophysics | Harvard & Smithsonian (CfA), and the Center for Interdisciplinary Exploration and Research in Astrophysics (CIERA) at Northwestern University has been published in the *Astrophysical Journal Letters*.

Supermassive black holes like Sgr A\* -- the monstrous black hole at the center of the Milky Way galaxy -- are characterized by just two numbers: mass and spin, but have a critical influence on the formation and evolution of galaxies.

"Black holes release a huge amount of energy that removes gas from galaxies and therefore shapes their star formation history," said Dr. Avi Loeb, Frank B. Baird Jr. Professor of Science at Harvard and CfA astronomer, and co-author on the research.

While scientists know that the mass of central black holes has a critical influence on their host galaxy, measuring the impact of their spin isn't easy.

"The effect of black hole spin on the orbits of nearby stars is subtle and difficult to measure directly," said Loeb.

To get a better understanding of how Sgr A\* has impacted the formation and evolution of the Milky Way, Loeb and Dr. Giacomo Fragione, of CIERA, studied instead the stellar orbits and spatial distribution of S-stars -- the closest stars orbiting Sgr A\* and traveling at a speed of up to a few percent of the speed of light -- to constrain, or place limits on the spin of the black hole.

"We concluded that the supermassive black hole in the center of our galaxy is spinning slowly. This can have major implications for the detectability of activity in the center of our galaxy and the future observations of the Event Horizon Telescope," said Fragione.

The S-stars appear to be organized into two preferred planes. Loeb and Fragione showed that if Sgr A\* had a significant spin, the preferred orbital planes of the stars at birth would become misaligned by the present time.

"For our study we used the recently discovered S-stars to show that the spin of the black hole Sgr A\* must be smaller than 10 percent of its maximal value, corresponding to a black hole spinning at the speed of light. Otherwise, the common orbital planes of these stars would not stay aligned during their lifetime, as seen today," said Loeb.

The results of the research also point to another important detail about Sgr A\*: it is unlikely to have a jet.

"Jets are thought to be powered by spinning black holes, which act as giant flywheels," said Loeb, with Fragione adding that, "Indeed there is no evidence of jet activity in Sgr A\*. Upcoming analysis of data from the Event Horizon Telescope will shed more light on this issue."

The find was published just days before the announcement of the 2020 Nobel Prize in Physics, which was awarded in part to scientists Reinhard Genzel and Andrea Ghez for their ground-breaking research which demonstrated that Sgr A\* is a black hole.

"Genzel and Ghez monitored the motion of stars around it," said Loeb. "They measured its mass but not its spin. We have derived the first tight limit on Sgr A\*'s spin," adding that the find wouldn't be possible without Genzel and Ghez's original Nobel Prize-winning work.

*This story has been published from a wire agency feed without modifications to the text. Only the headline has been changed.*

Click here to read the [Mint ePaper](#) Mint is now on Telegram. Join [Mint channel](#) in your Telegram and stay updated with the latest [business news](#).

Log in to our website to save your bookmarks. It'll just take a moment.

Your session has expired, please login again.

You are now subscribed to our newsletters. In case you can't find any email from our side, please check the spam folder.

**END**

Downloaded from **crackIAS.com**

© **Zuccess App** by crackIAS.com

CrackIAS

## NEWLY IDENTIFIED TECTONICALLY ACTIVE ZONE IN HIMALAYAS COULD ALTER EARTHQUAKE STUDY & PREDICTIONS

Relevant for: Geography | Topic: Important Geophysical phenomena - Earthquakes, Tsunamis & Volcanoes

The suture zone of the Himalayas or the Indus Suture Zone (ISZ) in the Ladakh region where Indian and Asian Plates are joined has been found to be tectonically active, as against current understanding that it is a locked zone.

This could have major implications in terms of earthquake study, prediction, understanding the seismic structure of the mountain chains well as its evolution.

A group of Scientists from Wadia Institute of Himalayan Geology (WIHG), Dehradun, an autonomous institute under the Department of Science and Technology, Government of India, have found through observations and detailed mapping of geological features that the suture zone of Himalaya that was conventionally thought to be locked is tectonically active. They carried out the mapping of the remote regions of Ladakh that forms the most hinterland part of the Himalaya. The study was published recently in the journal '**Technophysics**'.

The geologists observed that sedimentary beds are tilted and thrust broken, the rivers are associated with uplifted terraces, and the bedrock shows brittle deformation that occurred at much shallower depths. These deformed geological features were then dated in the laboratory at Dehradun using a technique called Optically Stimulated Luminescence (OSL) (method for carrying [Luminescence dating](#) of geological sediments) and data of seismicity and denudation rate reviewed. The combination of field and lab data suggested the region of the Indus Suture Zone (ISZ) has been neo-tectonically active since the last 78000 -- 58000 years and a recent earthquake in 2010 of low magnitude 4.0 near the village of Upshi that occurred due to a thrust rupture.

Himalaya were known to be made up of north dipping thrusts like the Main Central Thrust (MCT), the Main Boundary Thrust (MBT), and the Main Frontal Thrust (MFT). As per the established models, all of these thrusts except MFT are locked, and overall deformation in Himalaya is being accommodated only along with the MFT. The new findings, which suggest a more remote fault at the suture zone being neo-tectonically active, could call for a serious relook into the existing evolutionary models using new techniques and a larger geological database.

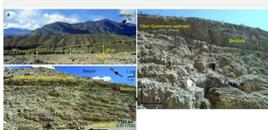


Figure 1. (a) River valley located in the north of Ladakh region, where a thrust rupture occurred in 2010. The (b) of the tilted sedimentary beds in the north of Ladakh region, where a thrust rupture occurred in 2010. The (c) of the tilted sedimentary beds in the north of Ladakh region, where a thrust rupture occurred in 2010. The (d) of the tilted sedimentary beds in the north of Ladakh region, where a thrust rupture occurred in 2010.

\*\*\*\*\*

NB/KGS/(DST Media Cell)

The suture zone of the Himalayas or the Indus Suture Zone (ISZ) in the Ladakh region where Indian and Asian Plates are joined has been found to be tectonically active, as against current understanding that it is a locked zone.

This could have major implications in terms of earthquake study, prediction, understanding the seismic structure of the mountain chains well as its evolution.

A group of Scientists from Wadia Institute of Himalayan Geology (WIHG), Dehradun, an autonomous institute under the Department of Science and Technology, Government of India, have found through observations and detailed mapping of geological features that the suture zone of Himalaya that was conventionally thought to be locked is tectonically active. They carried out the mapping of the remote regions of Ladakh that forms the most hinterland part of the Himalaya. The study was published recently in the journal '**Technophysics**'.

The geologists observed that sedimentary beds are tilted and thrust broken, the rivers are associated with uplifted terraces, and the bedrock shows brittle deformation that occurred at much shallower depths. These deformed geological features were then dated in the laboratory at Dehradun using a technique called Optically Stimulated Luminescence (OSL) (method for carrying [Luminescence dating](#) of geological sediments) and data of seismicity and denudation rate reviewed. The combination of field and lab data suggested the region of the Indus Suture Zone (ISZ) has been neo-tectonically active since the last 78000 -- 58000 years and a recent earthquake in 2010 of low magnitude 4.0 near the village of Upshi that occurred due to a thrust rupture.

Himalaya were known to be made up of north dipping thrusts like the Main Central Thrust (MCT), the Main Boundary Thrust (MBT), and the Main Frontal Thrust (MFT). As per the established models, all of these thrusts except MFT are locked, and overall deformation in Himalaya is being accommodated only along with the MFT. The new findings, which suggest a more remote fault at the suture zone being neo-tectonically active, could call for a serious relook into the existing evolutionary models using new techniques and a larger geological database.

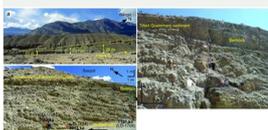


Figure 1. Geological features observed in the Ladakh region. The figure shows a wide landscape (top left), a close-up of tilted sedimentary rock layers (top right), a river valley with terraced banks (bottom left), and a close-up of a fault line or thrust rupture in the rock (bottom right).

\*\*\*\*\*

NB/KGS/(DST Media Cell)

**END**

Downloaded from **crackIAS.com**

© **Zuccess App** by crackIAS.com

CrackIAS.com

## MORE WATER ON THE MOON? NEW FINDING DEEPENS PUZZLE

Relevant for: Geography | Topic: The Earth and the Solar System

Astronomers from the National Aeronautics and Space Administration for the first time have detected water molecules on the sunlit surface of the moon, raising hopes that water there may be more plentiful than previously believed, the space agency said Monday.

Until now, scientists had only detected water in the cold, dark shadows of craters at the lunar poles. The new findings published Monday in the journal *Nature Astronomy* involve the detection of water molecules in one of the largest, sunniest lunar craters that is visible from Earth.

"To be clear, they are not puddles of water but instead they are water molecules that are so far apart that they do not [form] ice or liquid water," said Casey Honniball, lead author of the study and a postdoctoral fellow at NASA's Goddard Space Flight Center in Greenbelt, Md. The study formed part of her graduate thesis work at the University of Hawaii at Mnoa in Honolulu.

Scientists said the finding only deepened the puzzle of lunar water.

"The discovery raises new questions about how water is created and how it can persist in the harsh airless conditions of the sunlit lunar surface," said Paul Hertz, director of NASA's astrophysics division.

Since 2008, scientists have known that ice deposits existed in the deep freeze of lunar polar craters. But space agency planners preparing for crewed missions to the moon have expected that astronauts will have to bring their own water with them to survive because such caches of lunar ice may be too inaccessible or hazardous to mine.

"We know there's water on the Moon, but we don't know exactly how accessible lunar water is for our future explorers," said Jacob Bleacher, chief exploration scientist for NASA's Human Exploration and Operations Mission Directorate. "So, finding water that is easier to reach is really important to us."

In a news briefing Monday, the agency scientists offered two theories. A steady rain of micrometeorites over millions of years may have deposited the water on the lunar surface in a pitter-patter of tiny but violent impacts. The water molecules also might have been created in a series of chemical reactions between hydrogen borne on the solar wind and oxygen-bearing minerals, the scientists said.

Using an infrared telescope aboard a NASA jet flying over Nevada, the researchers spotted the distinctive spectral wavelength emitted by water molecules on the sun-bleached surface of the moon. That suggested water may be locked inside grains of lunar grit, just like liquid in a thermos bottle, the scientists said.

Dr. Honniball and her colleagues detected the water molecules in Clavius Crater, one of the largest craters visible from Earth, located in the moon's sunny southern hemisphere. By extrapolating from the infrared signal, the scientists calculated that the concentration appeared to be roughly equivalent to a 12-ounce bottle of water within a cubic meter of lunar soil. If that estimation is correct, the Sahara Desert contains about 100 times more water.

The aerial observatory used to spot the new water deposits—a modified Boeing 747 jet—is called the Stratospheric Observatory for Infrared Astronomy. Operating at an altitude of up to 45,000 feet, it normally studies some of the most distant, dim objects in the universe, such as black holes and far-flung galaxies.

“This was actually the first time that SOFIA observed the Moon,” said SOFIA project scientist Naseem Rangwala at NASA’s Ames Research Center near Mountain View, Ca. “And we did it as a test case because the questions surrounding the Moon’s water were so compelling.”

*This story has been published from a wire agency feed without modifications to the text*

Click here to read the [Mint ePaper](#) Mint is now on Telegram. Join [Mint channel](#) in your Telegram and stay updated with the latest [business news](#).

Log in to our website to save your bookmarks. It'll just take a moment.

Your session has expired, please login again.

You are now subscribed to our newsletters. In case you can't find any email from our side, please check the spam folder.

**END**

Downloaded from **crackIAS.com**

© **Zuccess App** by crackIAS.com

Crackin

# BLACK HOLES DON'T MOVE AROUND SUCKING IN OBJECTS LIKE A VACUUM CLEANER: DIRECTOR, IUCAA

Relevant for: Geography | Topic: The Earth and the Solar System

**Mumbai, 27 October 2020**

“Unlike being portrayed in many science-fiction movies, Black Holes don't move around sucking in objects like a vacuum cleaner. If the Sun turns into a black hole today, it won't suck the other planets; the earth will still be revolving around the sun as if nothing happened, except that there won't be any light and that the earth will turn very cold...but still we will be revolving.”

Director, Inter University Centre for Astronomy and Astrophysics, Pune, Somak Raychaudhury began his Nehru Science Centre, Mumbai lecture by busting some myths about Black Holes. NSC Mumbai, Ministry of Culture's online lecture on 'The Nobel Prize 2020: Physics' – Unravelling the Mythical Black Holes by Somak Chaudhury, focussed on how the contribution of different scientists over different periods of time, right from Isaac Newton till date, have resulted in a better understanding of the black holes.

This year, three scientists have won the 2020 Nobel Prize in Physics for their contribution in understanding Black Holes: **Roger Penrose** (for the discovery that black hole formation is a robust prediction of the general theory of relativity), **Andrea Ghez** and **Reinhard Genzel** (for the discovery of a supermassive black hole at the centre of our galaxy).

While talking about the relevance of the lecture being organised, Shri Chawdhury also pointed out the 'Calcutta connection' of Nobel Prize for Black Holes. He mentioned that in their study about black holes, both Stephen Hawking and Roger Penrose used the formalism laid down in 1955 by Amalkumar Raychaudhuri, a famous professor of physics at Ashutosh College under the University of Calcutta. His paper 'Relativistic Cosmology Paper 1' is about Einstein's theory of general relativity.

“The paper says nothing about black holes, instead it is a concept of 'differential geometry'. Hawking used this concept to define how a spinning star with angular momentum collapses and distorts the space time to finally end up in a singularity, and showed how singularity is quite natural and that it is not an unusual happening in the universe. This was explained by both Hawkins and Penrose in their paper, which was cited by Nobel committee this year.” said Chaudhury.

A black hole has two basic parts: the singularity and the event horizon. The singularity is at the centre and is where the mass resides. It was Stephen Hawking and R. Penrose who wrote the first paper on Singularities”, he added.

Black holes are of three types, classified on the basis of their mass - Stellar mass black holes, Mid- size black holes and Super Massive black holes.

“Findings of Andrea Ghez and Reinhard Genzel have shown the super massive black hole in the middle of our galaxy. One cannot see the black hole since no light comes from it. Hence the scientists thought of watching the stars very close to the black holes and observe their movement and believed that from their mass, the mass of the galaxy and the black holes can be

measured. They have been observing the movement of stars in the galaxy since 30 years”, he added. Shri Chaudhury also said that how technologies like adaptive optics helped in getting a clear image of the black holes, even when it is tough to obtain one, due to dust.

He also mentioned about Laser Interferometer Gravitational Wave Observatory - India and the role of India in the findings and research of black holes. “India is part of the biggest research in the world that is working in the field of black holes. The construction of the LIGO is coming up in Hingoli district, Maharashtra. Land has been acquired for this purpose and work has already started”, he added.

Shri Somak Raychaudhury proudly claimed that all three of the eminent personalities who had contributed to the black holes were his teachers. “I learnt my General Relativity from Amalkumar Raychaudhuri, I took mathematics course at Oxford University from Penrose and studied about black holes from Stephen Hawking.”

**Laser Interferometer Gravitational Wave Observatory - India** is a planned advanced gravitational-wave observatory to be located in India as part of the worldwide network. The LIGO-India project will be built by the Department of Atomic Energy and the Department of Science and Technology, Government of India, with a Memorandum of Understanding with the National Science Foundation (NSF), USA, along with several national and international research and academic institutions. The three institutes leading the project in India are Inter-University Centre for Astronomy and Astrophysics in Pune, Raja Ramanna Centre for Advanced Technology in Indore and the Institute of Plasma Research in Ahmedabad.

The lecture can we watched here

DJM/DL/PM

Follow us on social media:  [@PIBMumbai](https://twitter.com/PIBMumbai)  [/PIBMumbai](https://www.facebook.com/PIBMumbai)  [/pibmumbai](https://www.instagram.com/pibmumbai)  [pibmumbai@gmail.com](mailto:pibmumbai@gmail.com)

**Mumbai, 27 October 2020**

“Unlike being portrayed in many science-fiction movies, Black Holes don't move around sucking in objects like a vacuum cleaner. If the Sun turns into a black hole today, it won't suck the other planets; the earth will still be revolving around the sun as if nothing happened, except that there won't be any light and that the earth will turn very cold...but still we will be revolving.”

Director, Inter University Centre for Astronomy and Astrophysics, Pune, Somak Raychaudhury began his Nehru Science Centre, Mumbai lecture by busting some myths about Black Holes. NSC Mumbai, Ministry of Culture's online lecture on 'The Nobel Prize 2020: Physics' – Unravelling the Mythical Black Holes by Somak Chaudhury, focussed on how the contribution of different scientists over different periods of time, right from Isaac Newton till date, have resulted in a better understanding of the black holes.

This year, three scientists have won the 2020 Nobel Prize in Physics for their contribution in

understanding Black Holes: **Roger Penrose** (for the discovery that black hole formation is a robust prediction of the general theory of relativity), **Andrea Ghez** and **Reinhard Genzel** (for the discovery of a supermassive black hole at the centre of our galaxy).

While talking about the relevance of the lecture being organised, Shri Chawdury also pointed out the 'Calcutta connection' of Nobel Prize for Black Holes. He mentioned that in their study about black holes, both Stephen Hawking and Roger Penrose used the formalism laid down in 1955 by Amalkumar Raychaudhuri, a famous professor of physics at Ashutosh College under the University of Calcutta. His paper 'Relativistic Cosmology Paper 1' is about Einstein's theory of general relativity.

"The paper says nothing about black holes, instead it is a concept of 'differential geometry'. Hawking used this concept to define how a spinning star with angular momentum collapses and distorts the space time to finally end up in a singularity, and showed how singularity is quite natural and that it is not an unusual happening in the universe. This was explained by both Hawkins and Penrose in their paper, which was cited by Nobel committee this year." said Chaudhury.

A black hole has two basic parts: the singularity and the event horizon. The singularity is at the centre and is where the mass resides. It was Stephen Hawking and R. Penrose who wrote the first paper on Singularities", he added.

Black holes are of three types, classified on the basis of their mass - Stellar mass black holes, Mid- size black holes and Super Massive black holes.

"Findings of Andrea Ghez and Reinhard Genzel have shown the super massive black hole in the middle of our galaxy. One cannot see the black hole since no light comes from it. Hence the scientists thought of watching the stars very close to the black holes and observe their movement and believed that from their mass, the mass of the galaxy and the black holes can be measured. They have been observing the movement of stars in the galaxy since 30 years", he added. Shri Chaudhury also said that how technologies like adaptive optics helped in getting a clear image of the black holes, even when it is tough to obtain one, due to dust.

He also mentioned about Laser Interferometer Gravitational Wave Observatory - India and the role of India in the findings and research of black holes. "India is part of the biggest research in the world that is working in the field of black holes. The construction of the LIGO is coming up in Hingoli district, Maharashtra. Land has been acquired for this purpose and work has already started", he added.

Shri Somak Raychaudhury proudly claimed that all three of the eminent personalities who had contributed to the black holes were his teachers. "I learnt my General Relativity from Amalkumar Raychaudhuri, I took mathematics course at Oxford University from Penrose and studied about black holes from Stephen Hawking."

**Laser Interferometer Gravitational Wave Observatory - India** is a planned advanced gravitational-wave observatory to be located in India as part of the worldwide network. The LIGO-India project will be built by the Department of Atomic Energy and the Department of Science and Technology, Government of India, with a Memorandum of Understanding with the National Science Foundation (NSF), USA, along with several national and international research and academic institutions. The three institutes leading the project in India are Inter-University Centre for Astronomy and Astrophysics in Pune, Raja Ramanna Centre for Advanced Technology in Indore and the Institute of Plasma Research in Ahmedabad.

The lecture can we watched here

DJM/DL/PM

Follow us on social media:  [@PIBMumbai](https://twitter.com/PIBMumbai)  [/PIBMumbai](https://www.facebook.com/PIBMumbai)  [/pibmumbai](https://www.instagram.com/pibmumbai)  [pibmumbai@gmail.com](mailto:pibmumbai@gmail.com)

END

Downloaded from **crackIAS.com**

© **Zuccess App** by crackIAS.com

CrackIAS.com

# CORAL REEF TALLER THAN EIFFEL TOWER FOUND IN AUSTRALIA

Relevant for: Geography | Topic: Islands & Coral Reefs, changes therein and in Flora & Fauna and the Effects of such changes

A view of the surface of a 500-metre-tall coral reef discovered by Australian scientists, off Australia's Great Barrier Reef, in this still image taken from video provided on social media, October 25, 2020. | Photo Credit: [REUTERS](#)

Australian scientists found a detached coral reef on the Great Barrier Reef that exceeds the height of the Empire State Building and the Eiffel Tower, the Schmidt Ocean Institute said this week, the first such discovery in over 100 years. The “blade like” reef is nearly 500 metres tall and 1.5 kilometres wide, said the institute.

It lies 40 metres below the ocean surface and about six kilometres from the edge of Great Barrier Reef.

A team of scientists from James Cook University, led by Dr. Robin Beaman, were mapping the northern seafloor of the Great Barrier Reef on board the institutes research vessel Falkor, when they found the reef on October 20. “We are surprised and elated by what we have found,” said Beaman.

He said it was the first detached reef of that size to be discovered in over 120 years and that it was thriving with a “blizzard of fish” in a healthy ecosystem.

The discovery comes after a study earlier this month found the Great Barrier Reef had lost more than half its coral in the last three decades.

Using the underwater robot known as SuBastian, the scientists filmed their exploration of the new reef, collecting marine samples on the way, which will be archived and placed in the Queensland Museum and the Museum of Tropical Queensland.

“To not only 3D map the reef in detail, but also visually see this discovery with SuBastian is incredible,” Beaman added.

Although the northern section of the Great Barrier Reef suffered from bleaching in 2016, Beaman said this detached reef didn't display any evidence of damage.

The Great Barrier Reef runs 2,300 km down Australia's northeast coast spanning an area half the size of Texas. It was world heritage listed in 1981 by UNESCO as the most extensive and spectacular coral reef ecosystem on the planet.

You have reached your limit for free articles this month.

To get full access, please subscribe.

Already have an account ? [Sign in](#)

Start your 14 days free trial. [Sign Up](#)

Dear reader,

We have been keeping you up-to-date with information on the developments in India and the world that have a bearing on our health and wellbeing, our lives and livelihoods, during these difficult times. To enable wide dissemination of news that is in public interest, we have increased the number of articles that can be read free, and extended free trial periods. However, we have a request for those who can afford to subscribe: please do. As we fight disinformation and misinformation, and keep apace with the happenings, we need to commit greater resources to news gathering operations. We promise to deliver quality journalism that stays away from vested interest and political propaganda.

Dear subscriber,

Thank you!

Your support for our journalism is invaluable. It's a support for truth and fairness in journalism. It has helped us keep apace with events and happenings.

The Hindu has always stood for journalism that is in the public interest. At this difficult time, it becomes even more important that we have access to information that has a bearing on our health and well-being, our lives, and livelihoods. As a subscriber, you are not only a beneficiary of our work but also its enabler.

We also reiterate here the promise that our team of reporters, copy editors, fact-checkers, designers, and photographers will deliver quality journalism that stays away from vested interest and political propaganda.

Suresh Nambath

Please enter a valid email address.

In Season Fish has put together a marine-themed colouring book to be distributed to children across Tamil Nadu's coast

Subscribe to The Hindu now and get unlimited access.

Already have an account? [Sign In](#)

Start your 14 days free trial [Sign Up](#)

**END**

Downloaded from **crackIAS.com**

© **Zuccess App** by crackIAS.com

## NEW CORAL SPECIES DISCOVERED ON SEABED MARKED FOR DEEP-SEA MINING

Relevant for: Geography | Topic: Islands & Coral Reefs, changes therein and in Flora & Fauna and the Effects of such changes

(From left) *Antipathes sylospongia* sp. nov., *Umbellapathes litocrada* sp. nov., *Alternatipathes venusta* sp. nov. | Photo Credit: [Zootaxa/www.mapress.com/](https://www.zootaxa.com/)

Three species of black coral have been discovered on the seabed of the northern Pacific Ocean, an area where several countries have contracts to explore for metals including cobalt and nickel as they race to find new supplies of the key battery elements.

The corals were discovered on deep seamounts and ridges in the mineral-rich Prime Crust Zone, which stretches from the Mariana Trench to the Hawaiian islands, [according to a paper published](#) in scientific journal *Zootaxa* on Thursday.

Also read: [Explained | What is India's Deep Ocean Mission](#)

The new black coral species are so named because of their black skeletons, but they can appear pink, white, or various other colours because of the living tissues growing over the skeleton. Previous studies have found a black coral species more than 4,250 years old, Conservation International said.

Authors Dennis Opresko of the Smithsonian Institute and Daniel Wagner of Conservation International said they aimed to identify deep-sea habitats in the zone which holds the highest concentrations on Earth of cobalt-rich ferromanganese crusts.

“These long-living corals are much like the redwoods of the ocean. They're not only slow-growing and long-lived, but also provide important habitat for many other species,” Wagner said. “Mining their habitat could potentially wipe them out before we know their true value.”

China, Japan, Russia, and South Korea all hold exploration contracts in the Prime Crust Zone, according to the International Seabed Authority (ISA), a U.N. body in charge of regulating the ocean floors. Environmentalists have called for a ban on deep-sea mining which would extract prized resources including cobalt, copper, nickel, and manganese from seabed nodules and crusts. Deep-sea mining could destroy as yet undiscovered species, the Ocean Panel said in June. Only around 20% of the ocean floor has been mapped to date, according to Conservation International.

The Jamaica-headquartered ISA has drawn up regulations on exploration but has yet to establish the rules for exploitation needed for deep-sea mining to go ahead. An in-person ISA assembly was postponed from July due to the COVID-19 pandemic, and would now “most likely” take place in early December, according to the ISA website.

You have reached your limit for free articles this month.

To get full access, please subscribe.

Already have an account ? [Sign in](#)

Start your 14 days free trial. [Sign Up](#)

Dear reader,

We have been keeping you up-to-date with information on the developments in India and the world that have a bearing on our health and wellbeing, our lives and livelihoods, during these difficult times. To enable wide dissemination of news that is in public interest, we have increased the number of articles that can be read free, and extended free trial periods. However, we have a request for those who can afford to subscribe: please do. As we fight disinformation and misinformation, and keep apace with the happenings, we need to commit greater resources to news gathering operations. We promise to deliver quality journalism that stays away from vested interest and political propaganda.

Dear subscriber,

Thank you!

Your support for our journalism is invaluable. It's a support for truth and fairness in journalism. It has helped us keep apace with events and happenings.

The Hindu has always stood for journalism that is in the public interest. At this difficult time, it becomes even more important that we have access to information that has a bearing on our health and well-being, our lives, and livelihoods. As a subscriber, you are not only a beneficiary of our work but also its enabler.

We also reiterate here the promise that our team of reporters, copy editors, fact-checkers, designers, and photographers will deliver quality journalism that stays away from vested interest and political propaganda.

Suresh Nambath

Please enter a valid email address.

In Season Fish has put together a marine-themed colouring book to be distributed to children across Tamil Nadu's coast

Subscribe to The Hindu now and get unlimited access.

Already have an account? [Sign In](#)

Start your 14 days free trial [Sign Up](#)

**END**

Downloaded from **crackIAS.com**

© **Zuccess App** by crackIAS.com