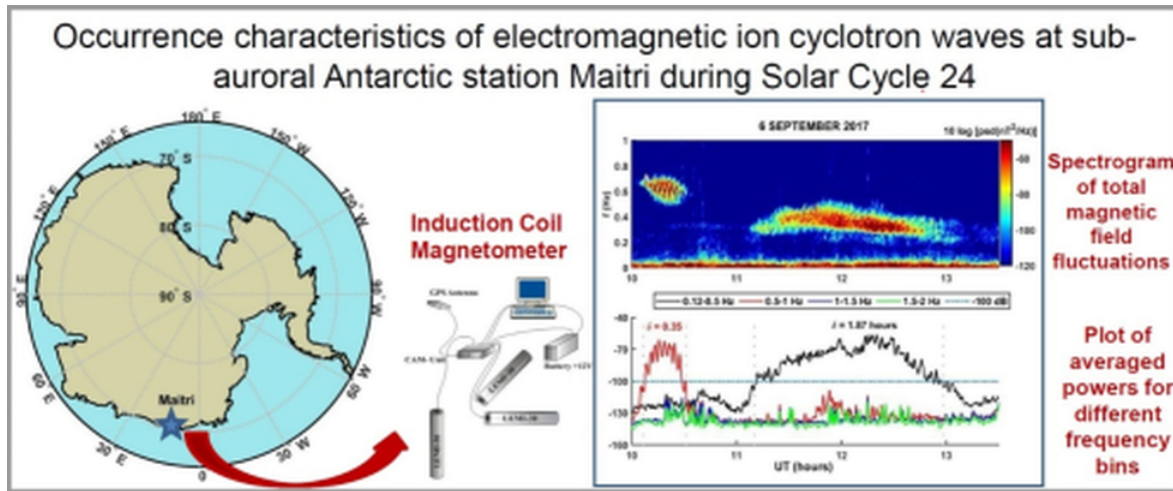


1. Electromagnetic Ion Cyclotron (EMIC) Waves

Topic: Science and Technology



InNews: Scientists have identified Electromagnetic Ion Cyclotron (EMIC) waves, a form of plasma waves in the Indian Antarctic station, Maitri, and studied its characteristics.

More on the Topic

- These waves play an important role in **precipitation of killer electrons (electrons having speed close to speed of light, which form the radiation belt of planet Earth)**, which are hazardous to our space-borne technology/instruments.
- **Killer electrons are electrons having speed close to speed of light**, which form the radiation belt of planet Earth.
- They are the discrete electromagnetic emissions (transverse plasma waves) observed in the Earth's inner magnetosphere.
- These **waves are generated in the equatorial latitudes and propagate along magnetic field lines to its footprint in the high latitude ionosphere (atmosphere)**.
- They can be recorded in both space as well as ground based magnetometers.

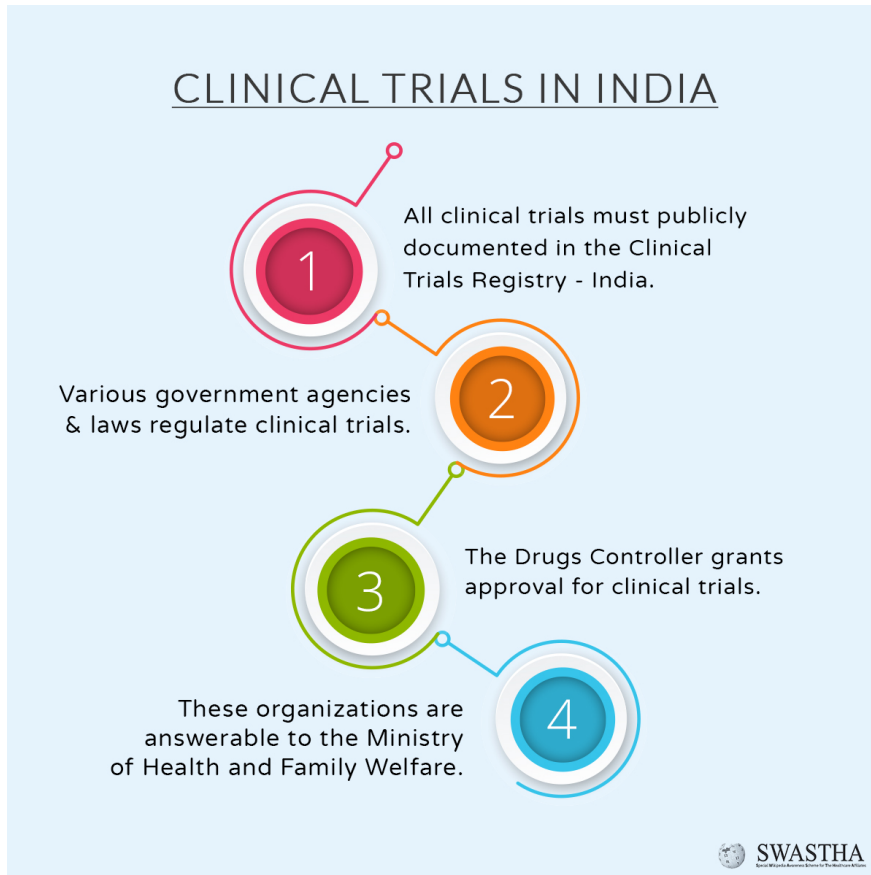
Significance of the Study:

- The study can help understand the impact of **energetic particles in the radiation belts on the low orbiting satellites**.
- More than 99% of the matter in the visible universe consists of plasma. Our Sun, solar wind, the interplanetary medium, near-Earth region, magnetosphere (the cavity in which the Earth lies and stays protected from the wrath of the Sun), and upper part of our atmosphere all consist of plasma—the fourth state of matter.
- The study of plasma waves provides with **information on regions inaccessible to us**, transport mass and energy across different regions, how they interact with charged particles, and control the overall dynamics of the Earth's magnetosphere.

Source: Indian Express

2. India's Clinical Trials Registry

Topic: Polity and Governance



In News: The haste with which some Covid-19 vaccine-related phases were cleared in India raised several questions regarding the transparency of the clinical trials and the safety and efficacy of the vaccines themselves.

More on the Topic:

- One way to ensure a clinical trial is transparent is to make sure all information about it is freely accessible in the public domain.
- Clinical Trials Registry-India (CTRI) is required to register each trial before commencing.

About Clinical Trial Registry of India (CTRI):

- Hosted with the Indian Council of Medical Research's National Institute of Medical Statistics, the CTRI is a **free, online public-record system to register clinical trials being conducted in India.**
- It was **launched in July 2007 for use on a voluntary basis.** In June 2009, the Drug Controller General of India (DCGI) **mandated all trials to be registered there.**



- Any trial that uses human participants and is testing drugs, surgical procedures, preventive measures, lifestyle modifications to devices, educational and behavioural treatment, and rehabilitation strategies must be enrolled in the registry.
- The CTRI is one of 17 public trial registries under the International Clinical Trials Registry Portal.

What are the problems with CTRI?

- **Missing data:** A review of available data a few years ago showed that CTRI records of enrollment are inconsistent, with only 281 of 606 (46%) trials being updated after final enrollment.
- **Classification of type of study** – For certain trials, it is important to know the nature of the intervention. Though this is an important field, the CTRI also marks it as ‘optional’, leading to a great number of trials not providing this information.
- **Internal consistencies** – Trials have also been known to have internal inconsistencies, such as filling the wrong type of trial.
- **Confusion over definitions** – There are number of entries that are inaccurate due to confusion over definitions. For example, some ‘interventional trials’ have been listed as ‘observational trials’ due to a “lack of understanding of the terms”.
- **Incomplete/non-standard information** – Non-standardised information about cities may also cause confusion and repetition in the registry.
- **Messy data** – Unclear data, such as the same acronym being used for two organisations.
- **Misleading information** – Wrong data about whether a trial is registered prospectively or retrospectively can be classified as misleading information. CTRI’s faulty search function has previously yielded incorrect results leading to misleading information.

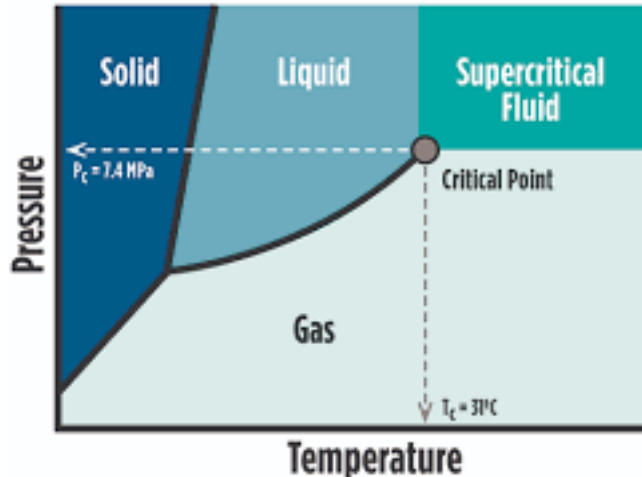
About the solutions Available:

- Comply with WHO regulations for primary registration.
- Improving the functions of CTRI.
- Ensure compliance with regulations: The CTRI should ensure registration of all clinical trials in India
- Make CTRI a permanent activity: The CTRI could be made a permanent activity with staff on a five-year contract, instead of relying on temporary staff for 15 years.

Source: PIB

3. Supercritical carbon dioxide

Topic: Environment and Ecology



In News: Researchers have found that supercritical carbon dioxide can be a good agent for simultaneous carbon dioxide sequestration and enhanced oil recovery (EOR) from depleted reservoirs.

More on the Topic:

- This is possible when the gas is used along with **surfactants in a 'surfactant-alternating gas (SAG) injection' approach.**
- (Above a certain temperature and pressure, carbon dioxide acquires properties that are midway between gas and liquid — denser and easy to pump — known as supercritical state.)
- In this process, carbon dioxide gas is injected in the reservoir, where it becomes supercritical, followed by injection of water or surfactant solution.
- The use of supercritical carbon dioxide for EOR resulted in greater storage of carbon dioxide for both water-alternating gas (WAG) and SAG approaches.
- However, SAG performed better at all pressures and temperatures as surfactant solution alters the interfacial tension between the oil and water phases, leading to a higher oil recovery percentage and more effective storage of carbon dioxide.

Significance:

- This method not only **promises improved recovery of oil but also safe, enhanced, and permanent storage of carbon dioxide gas emitted from human and other anthropological activities,** for both WAG and SAG approaches.
- The use of supercritical carbon dioxide reduces oil viscosity, induces in situ swelling of the oil, and reduces the interfacial tension of the in-situ fluid system.

Source: Indian Express

4. Blastomycosis

Topic: Environment and Ecology



In News: At least one person died and around a 100 were confirmed or suspected to be infected by fungus from Blastomycosis genus.

More on the Topic:

- The fungus is found in the moist soil and decomposing wood and leaves in the midwestern, south-central and southeastern states of the US.
- If disturbed, microscopic spores from the fungus can get dispersed in air and travel freely. Human beings can contract blastomycosis by inhaling the spores.
- But most people who breathe in the spores don't actually get sick.
- The disease causes fever, cough, breathing difficulty and muscle aches.
- It is **usually diagnosed through tests done on blood and urine samples or imaging work of lungs.**
- Body fluid and tissue culture tests can also indicate the infection but the report may take up to a couple of weeks to be generated.
- There are antifungal medications that work on blastomyces but the course of the treatment is long – lasting between six months and a year.

Source: Indian Express

5. Great Salt Lake

Topic: Environment and Ecology



In News: The Great Salt Lake is shrinking.

More on the Topic:

- Climate change has been making it increasingly difficult for the Great Salt Lake to fully bounce back.
- The impacts of the drying Great Salt Lake are already widespread. It threatens critical habitat for endangered species as well as the state's economy.
- The rapid drying of the lake bed also exposes toxic dust that threatens human health.
- The **Great Salt Lake** is the largest saltwater lake in the Western Hemisphere and the eighth-largest terminal lake in the world.
- It lies in the northern part of the S. state of Utah and has a substantial impact upon the local climate, particularly through lake-effect snow.

About Great Lakes:

- Great Lakes of North America are a series of interconnected freshwater lakes which connect to the Atlantic Ocean through the **Saint Lawrence Seaway**.
- Consisting of Lakes Superior, Michigan, Huron, Erie, and Ontario [in the order of west to east]. Superior, Huron, Michigan, Erie, and Ontario [In the order of largest to smallest].

Source: CNN



6. India-Brazil-South Africa forum

Topic: International Relations



INDIA BRAZIL SOUTH AFRICA FORUM

In News: The trilateral India-Brazil-South Africa forum is likely to receive increased diplomatic focus.

More on the Topic:

- The IBSA forum, which was established in the early 2000s as a means to strengthen cooperation among three key emerging economies, is seen to have become dormant in recent years.
- Between 2011 and 2022, the forum has held only four trilateral ministerial commission meetings.
- The IBSAMAR military exercise, which brings together the navies of the three countries, was held in October 2022 after a gap of over four years.
- A novel format, bringing together the national security advisers of the three countries, has only seen one meeting, in 2021.

About the IBSA forum:

- IBSA is a unique Forum which **brings together India, Brazil and South Africa**, three large democracies and major economies from three different continents, facing similar challenges.
- All three countries are developing, pluralistic, multi-cultural, multi-ethnic, multi-lingual and multi-religious nations.

Source: Business Standard



7. US Emerges as India's Largest Trading Partner

Topic: Economy



In News: According Commerce ministry data, the U.S. has emerged as India's biggest trading partner in 2022-23.

More on the Topic:

- Bilateral trade between India and the U.S. **has increased by 7.65%.**
- Exports to the US rose by 2.81 percent.
- Imports grew by about 16 percent.
- Major export items from India to the U.S. include petroleum, polished diamonds, pharmaceutical products, jewellery, light oils and petroleum, frozen shrimp, made ups etc.
- Increasing exports of goods such pharmaceuticals, gems and jewellery were helping India to push its shipments to America.
- Major imports from the U.S. include petroleum, rough diamonds, liquified natural gas, gold, coal, waste and scrap, almonds etc.
- America is one of the few countries with which India has a trade surplus.

Source: Business Standard
