

Cardiopulmonary resuscitation (CPR)

Cardiopulmonary resuscitation (CPR) is a lifesaving technique that's useful in many emergencies in which someone's breathing or heartbeat has stopped.

- For example, when someone has a heart attack or nearly drowns.
- The American Heart Association recommends starting CPR with hard and fast chest compressions.



The Hindu

Weather forecast



Why weather forecasts still go wrong

IMD's forecasts have improved vastly in the last few years due to technological upgradation

- IMD currently operates only around 800 automatic weather stations, 1,500 automatic rain gauges, and 37 doppler weather radars
- Over 300,000 ground stations (either automatic weather stations or automatic rain gauges) and around 70 doppler weather radars are required for reliable weather forecast
- Several State governments and private companies together operate over 20,000 ground stations, many of which are not currently used by IMD
- New ground stations need to be installed by IMD and the available data need to be shared seamlessly with IMD to improve the accuracy of forecasts
- The Ministry of Agriculture & Farmers Welfare has initiated the WINDS system to generate long-term, hyperlocal weather data
- Under the WINDS programme, over 200,000 ground stations will be installed

Slips: Indian forecasts are not accurate especially during winter and summer monsoon

IMD GETS A HELPING HAND



FOR BETTER ACCURACY: Wind profiler installed in National Atmospheric Research Laboratory (NARL), Gadanki

- ▶ The India Meteorological Department will install wind profilers at nine locations in the country, including Chennai, Delhi, Mumbai and Kolkata
- ▶ The Indian Space Research Organisation will design and develop these wind profilers
- ▶ The wind profiler can measure wind speed, direction, temperature, and humidity up to troposphere (17km above sea level)
- ▶ The instrument uses microwave signals to measure the parameters at different altitudes up to the troposphere
- ▶ The data will help improve weather forecast accuracy and track the movement of cyclones
- ▶ Indigenous wind profilers will eventually replace imported radiosonde instruments attached to weather balloons
- ▶ Isro has a wind profiler installed in National Atmospheric Research Laboratory, Gadanki near Tirupati

- One of the major hurdles is the lack of weather monitoring ground stations

- Currently, most of the prediction software used in forecasting are based on the global forecasting system and weather research and forecasting models, both of which are not the most modern

- A promising step forward was that recently, the Department of Agriculture & Farmers Welfare and the Ministry of Agriculture & Farmers Welfare have initiated the weather information network and data system (WINDS) to generate long-term, hyper-local weather data.

- The system will also promote the data for wider applications in agriculture and other sectors, it will

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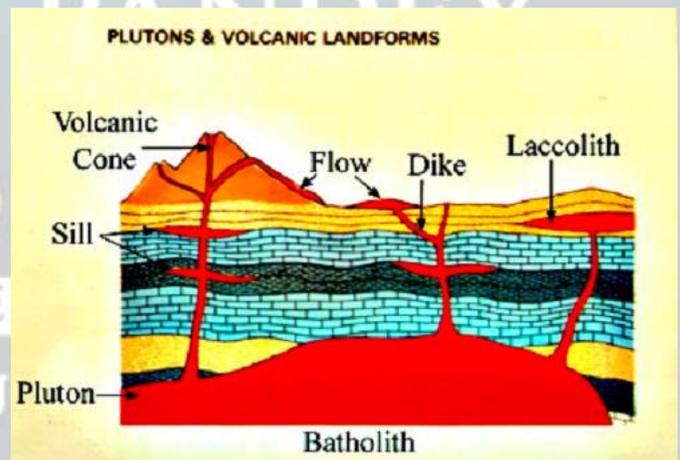
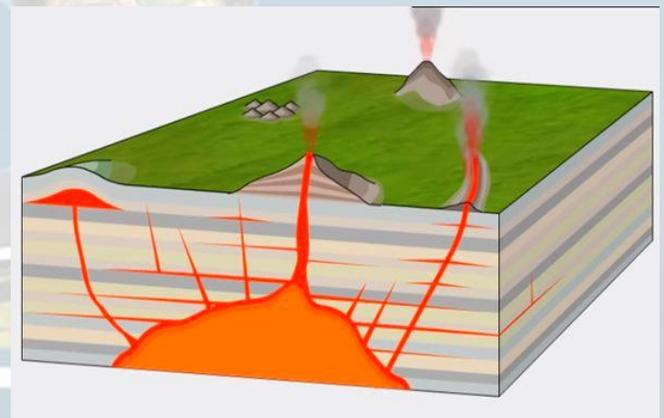
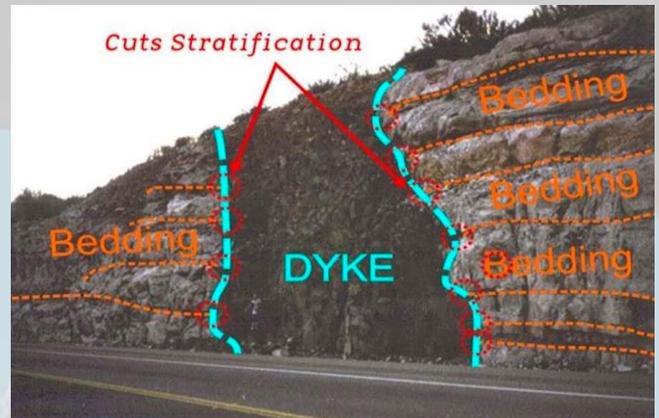
help in creating a national-level data base, and it will assist in establishing the protocols required to access the country-wide data by the various public and private concerns.

- Under this programme, more than 200,000 ground stations (AWS and ARG) will be installed, which can help in enhancing weather data utilization and thus in improving weather predictions and decision making.

- The Hindu

Dike & Grindavík, Iceland

- The 15-km-long magma dike that formed beneath Grindavík, Iceland, in November 2023 reached an unprecedented subsurface magma low rate of 7,400 cubic meters per second.
- The dike formation preceded the more recent Sundhnúkur eruptions in December 2023 and January 2024.
- The study shows how tectonic stress can drive magma low into dikes with only modest overpressure in the feeding magma body.
- The measurement of such low rates provides insight into the formation of major dikes.



Grindavík is a currently abandoned fishing town on the Southern Peninsula of Iceland.



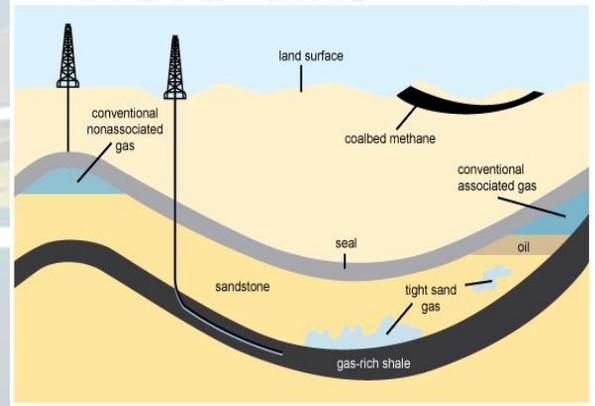
• **The Hindu**

Bulqizë chromium mine in Albania

- Direct measurements from deep within the Bulqizë chromium mine in Albania have revealed large quantities of outgassing natural hydrogen, researchers report, suggesting the presence of a faulted reservoir of the gas deeply rooted in the surrounding ophiolite massif.
- The Findings shed light on the geological contexts in which other natural hydrogen sources may be found.
- At least 200 tonnes of nearly pure hydrogen gas are released from the mine each year.



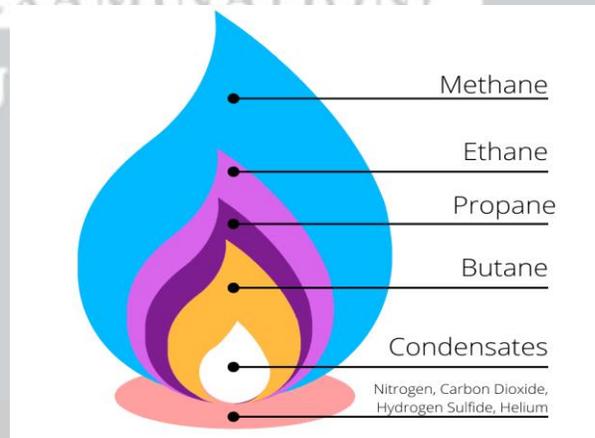
Schematic geology of natural gas resources



Source: Adapted from United States Geological Survey factsheet 0113-01 (public domain)

The Hindu

Natural gas composition



The Hindu

• **Human papillomavirus (HPV) and vaccine**

- The Cervavac vaccine is a quadrivalent vaccine that targets four HPV (Human papillomavirus) subtypes 6, 11, 16, and 18, and was compared with Gardasil vaccine which contains the same four HPV subtypes.
- Serum Institute of India's human papillomavirus (HPV) vaccine Cervavac.
- Merck's Gardasil vaccine
- GARDASIL 9 helps protect individuals ages 9 to 45 against the following diseases caused by 9 types of HPV

The Hindu

Sturtian glaciation & Rodinia

- Australian geologists have used plate tectonic modeling to determine what most likely caused an extreme ice-age climate in Earth's history, more than 700 million years ago.
- The researchers have proposed that all-time low volcanic carbon dioxide emissions triggered the 57 million year-long global 'Sturtian' ice age.
- The extended ice age stretched from 717 to 660 million years ago, a period well before the dinosaurs and complex plant life on land existed.

- The team went back to a plate tectonic model that shows the evolution of continents and ocean basins at a time after the breakup of the ancient supercontinent Rodinia.

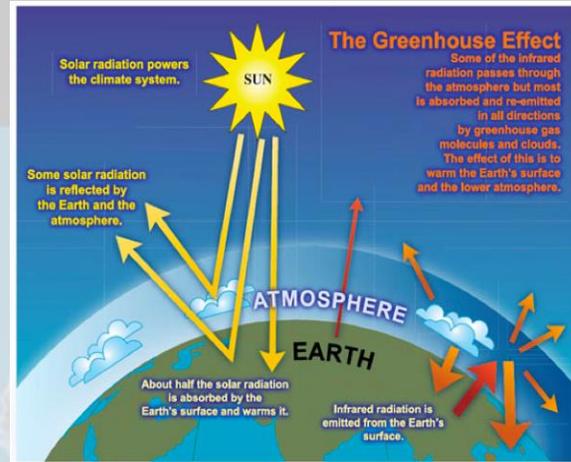
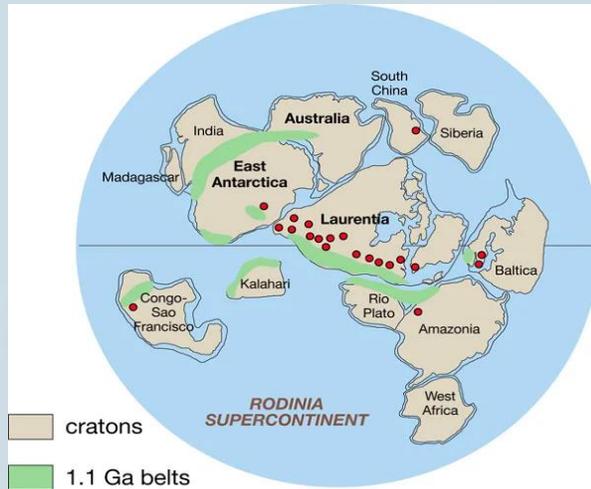
The Sturtian glaciation

- The Sturtian glaciation was a worldwide glaciation during the Cryogenian Period when the Earth experienced repeated large-scale glaciations.
- As of January 2023, the Sturtian glaciation is thought to have lasted from c. 717 Ma to c. 660 Ma, a period of approximately 57 million years.
- It is hypothesized to have been a Snowball Earth event, or contrastingly multiple regional glaciations, and is the longest and most severe known glacial event preserved in the geologic record, after the much earlier Huronian glaciation.

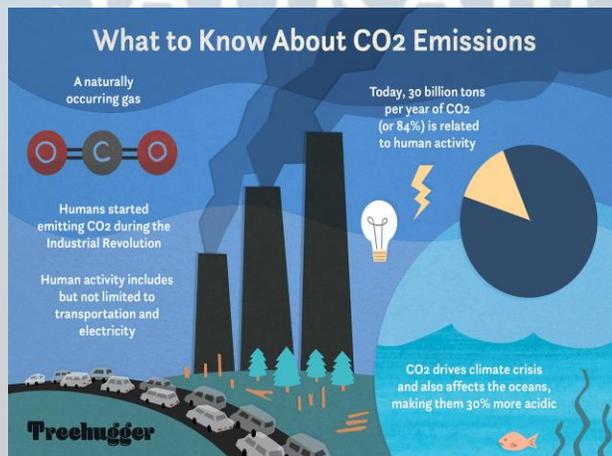
Rodinia

- Rodinia was a Mesoproterozoic and Neoproterozoic supercontinent that assembled 1.26–0.90 billion years ago and broke up 750–633 million years ago.
- Valentine & Moores 1970 were probably the first to recognise a Precambrian supercontinent, which they named 'Pangaea I'.

It was renamed 'Rodinia' by **McMenamin & McMenamin 1990** who also were the first to produce a **reconstruction** and propose a temporal framework for the supercontinent.



About CO₂



- Water (Prevention and Control of Pollution) Amendment Act, 2024.
- The Lok Sabha this week passed the Water (Prevention and Control of Pollution) Amendment Act, 2024.
- The legislation, which was introduced and passed in the Rajya Sabha on February 5, makes important changes to the Water (Prevention and Control of Pollution) Act, 1974.

What is the Water (Prevention and Control of Pollution) Act, 1974?

- This Act was the first piece of legislation in independent India that identified the need to have an institutional structure to address contamination of water bodies.
- This led to the creation, in September 1974, of the Central Pollution Control Boards (CPCB) and State Pollution Control Boards (SPCB) that were charged with monitoring and preventing public water

resources from getting contaminated by sewage and industrial effluents.

- This Act made it mandatory for industrial units to get permission from their respective State boards before setting up factories and submitting themselves to checks on whether their manufacturing and other processes were complying with prescribed norms.
- “The Parliament of India in its wisdom enacted the Water (Prevention and Control of Pollution) Act in 1974 with a view to maintaining and restoring wholesomeness of our water bodies.
- One of the mandates of the Central Pollution Control Board (CPCB) is to collect, collate and disseminate technical and statistical data relating to water pollution,” the website of the CPCB notes.
- While the CPCB is empowered to conduct checks and provide guidance on technical standards to be adhered to, the SPCB files cases and is expected to enforce compliance.
- Violating the provisions of the Water Act can mean industries being shut down; monetary fines as well as imprisonment of up to six years.
- That said, there have been no instances of companies or people in

India having been imprisoned due to environmental violations.

- **What are the amendments?**
- Water is a State subject, and the Centre cannot directly pass legislative laws influencing water management.
- However, the Centre can create legislation, if two or more States demand it, and this can be made applicable by States over their territories if they adopt the legislation in their Assemblies.
- The amended version of the Act, passed by both Houses of Parliament, will currently apply to Himachal Pradesh and Rajasthan and the Union territories.
- The original Act, passed in 1974, is applicable in 25 States.
- The most important change is that it removes the provisions of imprisonment for several violations, deemed “minor”, and replaces them with ones, to the tune of ₹10,000 extending up to ₹15 lakh.
- As per the original Act, the SPCB’s permission is needed for establishing any industry or treatment plant, which could discharge sewage into a water body, sewer, or land.

Current Affairs 11th February 2024 by Saurabh Pandey

- In the amendment, the Bill specifies that the Centre, "... in consultation with the CPCB, may exempt certain categories of industrial plants from obtaining such consent...."
- However, operating or establishing an industrial unit without SPCB consent can still land you in jail for six years along with a fine.
- The Bill also adds that the Centre may issue guidelines for the grant, refusal, or cancellation of consent granted by the SPCB.
- It also penalizes tampering with monitoring devices used in determining whether any industry or treatment plant can be set up.
- The penalty will be between ₹10,000 and ₹15 lakh.
- The amended Act also empowers the Centre to frame rules to select the chairpersons of SPCBs and frame guidelines that States can follow on matters for establishing industries and new operating processes.

The Hindu
