



## PYROCUMULONIMBUS - GEOGRAPHY

**News:** *The wildfires currently raging in the United States and Canada are so intense that they have created 'pyrocumulonimbus' clouds, which have the potential to spit out thunder and spark more fires.*

### What's in the news?

#### PYROCUMULUS CLOUDS

- A **flammagenitus cloud** also known as a **pyrocumululus** or **fire cloud**, forms from intense heat during wildfires or volcanic eruptions.
- It develops when surface heating **causes convection, aided by moisture and low-level jet streams.**
- These clouds contain severe turbulence, creating strong surface gusts that can worsen fires.
- **Large flammagenitus clouds** may produce lightning due to charge separation and ice formation.
- They **appear grayish to brown** from ash and smoke, and can grow larger as ash provides condensation nuclei.

They can **either help extinguish fires** with rain or **worsen them by increasing wind speeds and causing lightning.**

#### Formation

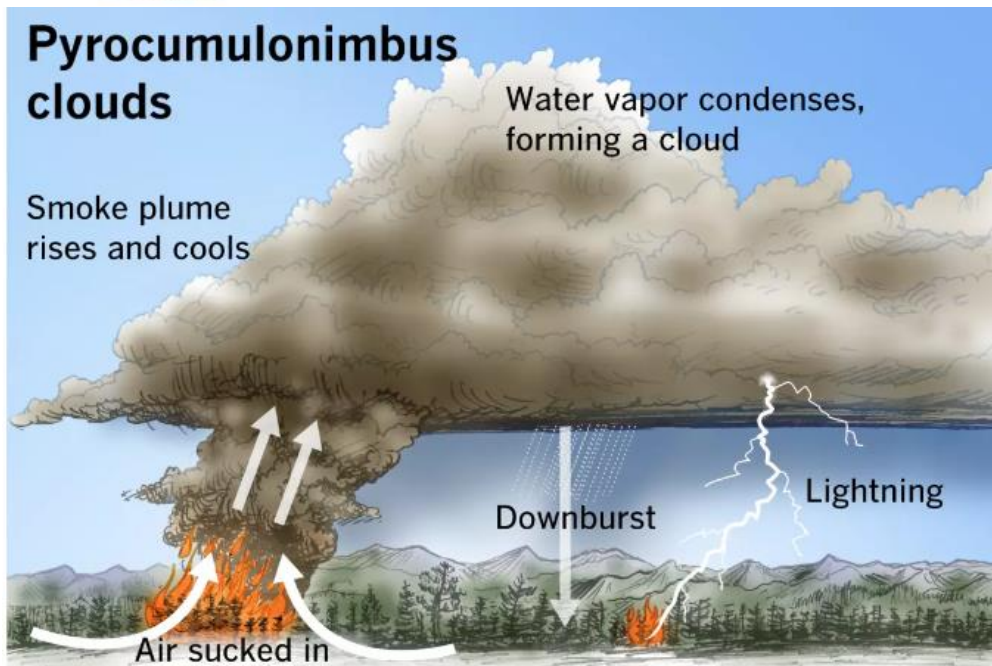
- These clouds occur only when there is an extremely hot wildfire.

#### Process of formation:

- The intense heat from the fire warms the surrounding air which moves upward into the atmosphere.
- As this hot and very **buoyant air rises, it expands and cools down.**
- It is composed of **water vapour, smoke, and ash.**
- Once it is cool enough, water vapour condenses on ash, forming a grey or brown cloud.
- At this stage, the cloud is known as a **pyrocumululus cloud**, also known as **'fire cloud'.**
- But if there is sufficient water vapour available and the upward movement of hot air intensifies, pyrocumululus clouds can evolve into a **pyrocumulonimbus cloud** (pyroCbs).
- These clouds can reach heights of **50,000 feet and generate** their own systems of thunderstorms.

#### Cascading Effect.

- Pyrocumulonimbus clouds can **produce lightning, they do not generate much rain.** As a result, they can **spark new wildfires many kilometres away from the main blaze.**
- These clouds can **also trigger strong winds** that can make the **spread of the wildfire faster** and unpredictable.



## Impacts

- Responsible for “a huge volume” of the **pollutants in the upper atmosphere and lower atmosphere as well.**
- Their **plumes damage the ozone layer.**
- They might actually have a temporary **cooling effect on the planet by blocking sunlight.**
- Particulate matter 2.5 microns in diameter from the gas is capable of penetrating deep into a person’s lungs resulting into **pulmonary disease.**

## Instances of this events

- These clouds were formed during the Australian bushfires of 2019-2020 when temperatures crossed **800 degrees Celsius.**
- Before 2023, **102 pyrocumulonimbus** were recorded globally in a single year on average, 50 of them were seen in Canada.
- During the year 2023 extreme wildfire season, **140 pyrocumulonimbus clouds** were recorded in **Canada alone.**

## Impact of climate change

- Scientists believe that climate change could have a role to play in the increase of their frequency.
- **During La-Nina period instances of this phenomena increased.**

Source: <https://indianexpress.com/article/explained/explained-sci-tech/pyrocumulonimbus-cloud-when-wildfires-spit-storms-lightning-9501605/>