



# Wildfires Triggering Pyrocumulonimbus Clouds

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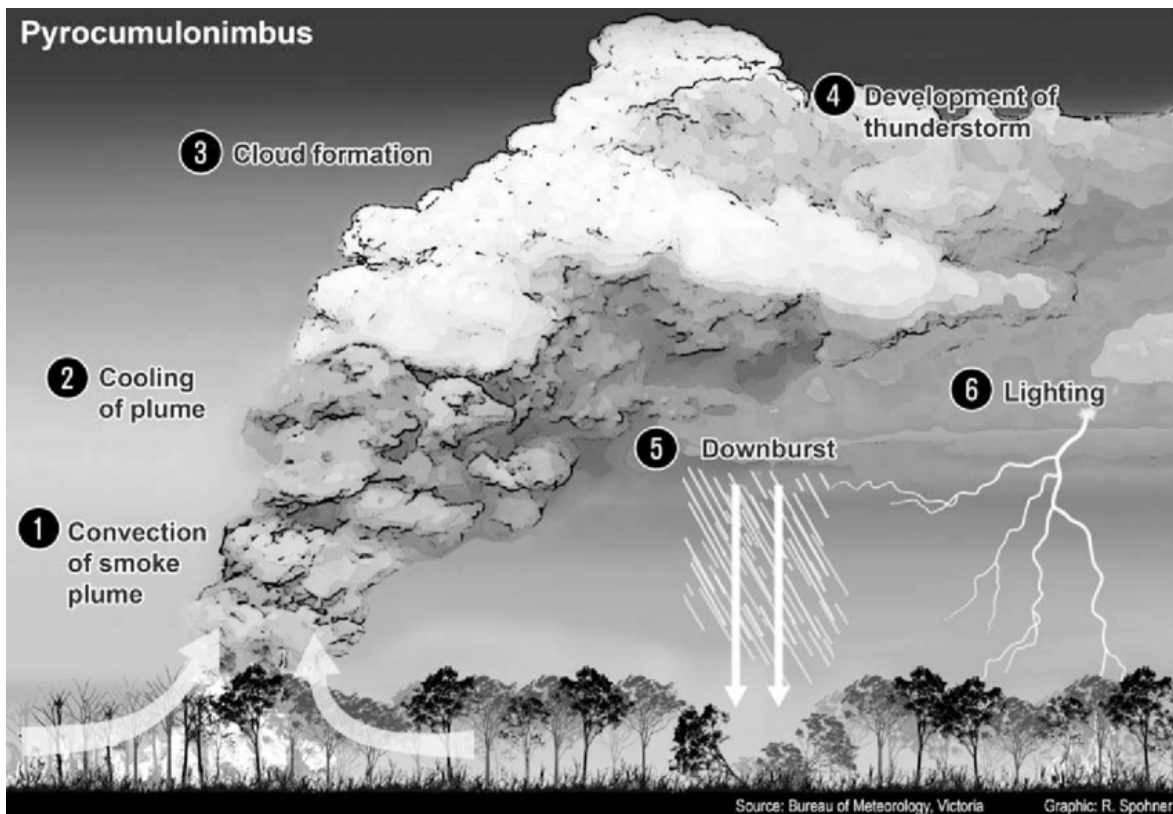
## Why in News?

Recently [wildfires](#) raging in the United States and Canada are so intense that they have created **pyrocumulonimbus clouds (pyroCbs)**, which have the potential to spit out thunder and spark more fires.

## What are Pyrocumulonimbus Clouds?

- **Definition:** Pyrocumulonimbus clouds are **thunder clouds created by intense heat from the Earth's surface**. They are also **called fire clouds**.
  - They are formed similarly to [cumulonimbus clouds](#), but the intense heat that results in the **vigorous updraft comes from fire**, either large wildfires or volcanic eruptions.
- **Conditions for its Formation:**
  - Pyrocumulonimbus clouds **form under extreme heat** (like wildfires).
    - **Not every wildfire produces these clouds**, temperatures need to exceed 800°C, as seen in the 2019-2020 [Australian bushfires](#).
  - Intense heat from the fire causes hot air to rapidly rise, **carrying water vapour, smoke, and ash that condense** into pyrocumulus clouds as they cool.
  - These clouds can **reach up to 50,000 feet and form thunderstorm systems** with lightning and strong winds.
- **Impacts and Characteristics:**
  - Pyrocumulonimbus clouds can produce lightning that may ignite new wildfires several kilometres away.
  - They **generally generate minimal rain, aiding wildfire spread rather than suppression**.
  - These clouds can trigger strong winds, accelerating and **complicating wildfire management**.

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## Why are Pyrocumulonimbus Cloud Events Occurring More Often?

- **Rising Temperatures and Extended Fire Seasons:** [Global warming](#) leads to higher temperatures and **longer dry periods, creating drier conditions** that increase the frequency and intensity of wildfires and **provide more opportunities for pyrocumulonimbus cloud formation.**
- **Increased vegetation and Drought Conditions:** Warmer temperatures and changing **precipitation patterns increase vegetation growth, which serves as fuel for wildfires.**
  - Additionally, **persistent droughts** dry out forests and grasslands, making them **more susceptible to ignition.**
- **Extreme Weather Patterns:** Intense and frequent **heatwaves, along with altered wind patterns,** can trigger and spread wildfires more rapidly, **increasing the likelihood of pyrocumulonimbus clouds forming.**
- **Human Activities: Deforestation, land use changes, and urbanization** exacerbate wildfire risks by increasing the **likelihood of human-caused fires** and indirectly contributing to pyrocumulonimbus cloud formation.

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## UPSC Civil Services Examination Previous Year Question (PYQ)

### Prelims

**Q. Consider the following: (2019)**

1. Carbon monoxide
2. Methane
3. Ozone
4. Sulphur dioxide

**Which of the above are released into atmosphere due to the burning of crop/biomass residue?**

- (a)** 1 and 2 only
- (b)** 2, 3 and 4 only
- (c)** 1 and 4 only
- (d)** 1, 2, 3 and 4

**Ans: (d)**

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