Sulphur Dioxide Emissions from Caribbean Volcano

Why in News

The **Sulphur Dioxide (SO_2) emissions from a volcanic eruption in the Caribbean (La Soufriere Volcano)** have reached India, sparking fear of **increased pollution levels** in the northern parts of the country and **acid rain.**

> The **Caribbean is the region** roughly south of the United States, east of Mexico and north of Central and South America, consisting of the Caribbean Sea and its islands.

Key Points

About La Soufriere Volcano:

- It is **an active stratovolcano** on the **Caribbean island of Saint Vincent** in Saint Vincent and the Grenadines.
  - A **stratovolcano** is a tall, conical volcano composed of one layer of hardened lava, tephra, and volcanic ash. These volcanoes are characterized by a steep profile and periodic, explosive eruptions.
  - Saint Vincent and the Grenadines, **located in the southern Caribbean**, consists of more than 30 islands and cays, nine of which are inhabited.
- It is the **highest peak in Saint Vincent** and has had five recorded explosive eruptions since 1718, most recently in April 2021.

  The last time the volcano had **erupted was in 1979.**

- **Impact of the Eruption on Global Temperatures:**
  - **Volcanic emissions** reaching the stratosphere **can have a cooling effect on global temperatures.**
  - The most significant climate impacts from volcanic injections into the stratosphere come from the **conversion of sulphur dioxide** to **sulphuric acid**, which condenses rapidly in the stratosphere to form **fine sulphate aerosols.**
    - The **aerosols increase** the **reflection of radiation** from the Sun back into space, **cooling the Earth's** lower atmosphere or troposphere.
    - Bigger eruptions during the past century have caused a decrease in temperature of **0.27 degree Celsius** or more on the Earth's surface for up to three years.
- **Sulphur Dioxide and Pollution:**
  - SO_2 emissions that lead to high concentrations of SO_2 in the air generally also lead to the formation of other sulfur oxides (SO_x). SO_x can react with other compounds in the atmosphere to form small particles. These particles contribute to **Particulate Matter (PM) pollution.**
  - Small particles may penetrate deeply into the lungs and in sufficient quantities can contribute to health problems.

- **Sulphur Dioxide and Acid Rain:**
  - Acid rain results **when sulphur dioxide (SO_2) and nitrogen oxides (NO_X) are emitted into the atmosphere** and transported by wind and air currents.
  - The **SO_2 and NO_X react with water, oxygen and other chemicals** to form sulfuric and nitric acids. These then mix with water and other materials before falling to the ground.

Source: DTE