India's Antarctic Expedition

Why in News?

The South African vessel SA Agulhas set off on a two-month Indian Scientific Expedition to the Antarctic Ocean 2020.

What is to be known about this expedition?

- This is the 11th expedition of an Indian mission to the Southern Ocean, or Antarctic Ocean.
- On board the vessel is 34 scientific staff from India, which is an 18-institution team led by Dr Anoop Mahajan.
- The first mission took place between January and March 2004.

What is the objective?

- **Objective**- The mission mainly aims to understand the influence of the Southern Ocean across eco-system and atmospheric changes; and how it affects the tropical climate and weather conditions.
- **The cycle** - The carbon dioxide emitted into the atmosphere goes to the Antarctic and polar regions, through atmospheric circulation.
- Since the temperature is very low there, these gases are absorbed and converted into dissolved inorganic or organic carbon.
- Through water masses and circulation, it is coming back to tropical regions. Since it is warmer in these areas, it re-enters the atmosphere.
- It is this cycle, which the mission will help understand better.
- **Sampling** - For this, the team is collecting air and water samples from around 60 stations along the cruise track.

What are six core projects?

- **Study hydrodynamics and biogeochemistry** of the Indian Ocean sector of the Southern Ocean; involves sampling seawater at different depths.
- This will help understand the formation of Antarctic bottom water.
- **Observations of trace gases** in the atmosphere, such as halogens and dimethyl sulphur from the ocean to the atmosphere.
- This will help improve the parameterizations that are used in global

models.

- **Study of organisms** called coccolithophores that have existed in the oceans for several million years.
- Their concentrations in sediments will give a picture of past climate.
- **Investigate atmospheric aerosols** and their optical and radiative properties.
- Continuous measurements will quantify impact on Earth's climate.
- **Study the Southern Ocean's impact on Indian monsoons**.
- The sediment core taken from the bottom of the ocean will be looked for signs.
- **Dynamics of the food web** in the Southern Ocean.
- This is important for safeguarding catch and planning sustainable fishing.

What is the progress so far?

- The mission has extracted one of the largest sediment cores from the Southern Ocean measuring 3.4 metres.
- The changes that have occurred in the climate and the ocean over the years can be observed from the sediments collected.
- It is estimated that the sediments may date back to at least 30,000 years.
- When the samples collected are on shore, the first thing will be done is establishing the chronology using radio carbon dating.

Source: The Indian Express