

**A Glaciological Project Proposed by the Geological Survey of
India for the International Polar Year 2007-08**

Major Theme: Global Climatic Change.

Scientific Objectives :

To study various glacial parameters in Antarctic and Arctic areas for evaluating the comparative impact of global warming patterns on the polar regions.

Area of Work:

Dakshin Gangotri Glacier region in Schirmacher Range of East Antarctica (South Latitude $70^{\circ} 45'$ and East Longitude $11^{\circ} 33'$); and the glacier-cluster on Spitsbergen Island in Svalbard Archipelago of Norwegian Arctic Islands (North Latitude $78^{\circ} 40'$ and East Longitude $10^{\circ} 05'$).

Background Information:

Dakshin Gangotri Glacier Snout in Schirmacher Range of Antarctica is being monitored by Indian Antarctic Expeditions since 1983. A **continuous record of two decades** for the behaviour of the snout is available. The snout is steadily **retreating at a rate** of 70 cm per annum. Besides, two sets of observations of **monthly variation patterns** throughout the year are also recorded. **GPS studies** are currently going on to find out the **velocity and stress** on the glacier. **Sediment samples** have been collected for **Thermoluminescence Dating** from recessional glacial moraines of nearby areas.

On the Norwegian side, an established facility is available at Spitsbergen Island for glacial studies. For the past three decades, Scandinavian and British glaciologists have recorded detailed observations on selected glaciers in this cluster. Reputable ice core analysis facilities are available in Denmark.

Work Proposed during the IPY:

In 2007-08, during the International Polar Year, investigations can be undertaken in this part of Antarctica with a **Ground Penetrating Radar** for delineating the internal structure and sub-surface topography of the glacier. More inputs can be added by **drilling shallow boreholes** generating a two-fold data from analysis of the **ice cores**, as well as from **thermal probes**. Recessional moraines in the downstream of the snout can be sampled in detail for **TL dating**. More **elaborate GPS data** can be collected on the glacier surface for velocity and stress patterns. Finally, all this information can be compiled to construct a **short range climatic model**. A comparative study of this Antarctic glacial data with that of the Arctic glaciers would provide useful insights about the impact of global warming patterns on both the polar regions of our planet.

Inputs Proposed from Indian Side:

Ground observations on snout recession, *GPS* studies for glacial velocity, TL dating of recessional glacial moraines, Glacial structure by GPR probes, generation of Ice cores of glacier from shallow boreholes, Thermal data from surface to bedrock for the glacier.

Inputs Required from Norwegian Side:

Supplementary Isotope Analysis of Ice cores in Scandinavian Labs, complementing the output of upcoming Indian Ice Core Lab. Comparative data about recession rate, structure, velocity, dating from the northern counterpart of Spitsbergen glaciers. Some Norwegian glaciologists may also participate in the field studies at Antarctica from Indian Antarctic Station, Maitri.