

**GOVERNMENT OF INDIA
EARTH SCIENCES
LOK SABHA**

UNSTARRED QUESTION NO:2349
ANSWERED ON:11.03.2015
WATER LAKE IN ANTARCTICA
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Will the Minister of EARTH SCIENCES be pleased to state:

- (a) whether water lakes under 2300 feet of compressed snow have been discovered In Antarctica;
- (b) if so, the details thereof;
- (c) whether the Government has conducted or proposes to conduct a study in Antarctica in regard to the effects of global warming on the entire world;
- (d) if so, the details thereof; and
- (e) the steps taken by the Government in this regard?

Answer

MINISTER FOR MINISTRY OF SCIENCE AND TECHNOLOGY AND MINISTRY OF EARTH SCIENCES (DR. HARSH VARDHAN)

(a) Yes Madam.

(b) Till date more than 150 lakes have been identified beneath the thick Antarctic ice sheet and are termed as sub-glacial lakes i.e, discrete bodies of water that lie at the base of an ice sheet. Lake Vostok (location: 107.5oE: 88.5oS) which is the largest among these lakes, occupies an area of the about 14,000 km² and lies beneath about 4 km of ice. The water depth of the lake is over 900 m.

(c) Regular monitoring of meteorological and environmental parameters including the tropospheric ozone measurements are being carried out by Indian scientists from India's permanent station Maitri in Antarctica since 1984.

(d) Monitoring of Antarctic ozone hole area has led scientists to infer drop in the ozone levels of the Antarctic stratosphere to as low as 33% in the recent past of their pre-1975 values. The ozone hole occurs during the Antarctic spring, from September to early December, as strong westerly winds start to circulate around the continent and create an atmospheric vortex. It is considered by scientists that over 50% of the lower stratospheric ozone is destroyed during the Antarctic spring. Emissions of stratospheric ozone-depleting halocarbons have caused a net positive radiative forcing (RF, the change in energy fluxes for 2011 relative to 1750; Fifth Assessment Report of the IPCC, 2103) of 0.18 watts per square meter. The positive RF from all halocarbons is similar to the values in the 2007 IPCC Fourth Assessment Report, with a reduced RF from CFCs but increase from many of their substitutes. Lowest mean value of stratospheric ozone over Southern Hemisphere was 92.3 Dobson Units in 1994 (Spring) and the current (2014) levels are 128.6 Dobson Units.

In addition to the above Indian scientists have been involved in studies aimed at understanding the long-term variations in the snow accumulation changes in the ice shelves of the DronningMaudland Region of Antarctica and their possible linkages to the climate variabilities. For instance, near the erstwhile Indian station 'DakshinGangotri' (DG) site, a net accumulation of 62.7cm was recorded during 1999-2001 using stake measurements. Moving south towards the continental ice sheet, an average accumulation of 10cm/yr has been computed from the ice-core records for the past 500 yrs, and an average accumulation of approximately 70cm/yr during the past two decades. Such spatial and temporal differences in snow/ice accumulation pattern at the cDML suggest ablation due to wind scouring, or differential summer melting. Continuous monitoring of the glacier snout of one of the glaciers near the Indian Station Maitri for the past three decades from 1983, also show a recession of 6.5 to 7m per decade, indicative of the warming effects on this coastal region in Antarctica.

(e) India is the signatory to the Montreal Protocol that sets binding progressive phasing out obligations of ozone-depleting substances (ODS) globally. The Government of India has already taken a number of policy measures to encourage early adoption of non-ODS technologies.