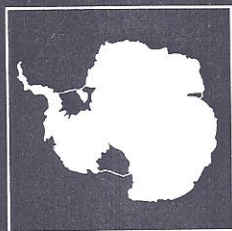


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**TERRA ANTARTICA
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The Italian ITASE Expedition from Terra Nova Station to Talos Dome

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As a part of the International Trans-Antarctic Scientific Expedition (ITASE), the Italian *Programma Nazionale di Ricerche in Antartide* undertook a traverse from Terra Nova Station (164°06'E 74°41'S) to Talos Dome (159°06'E 72°48'S). The scientific objectives of the traverse programme are to develop a high resolution interpretation and 3-D map documenting the last 100-200 years of the climate, atmosphere and surface conditions over the Talos Dome area and along the David Glacier drainage area. The scientific programme has several major objectives:

- to refine the understanding of surface mass balance, characteristics and dynamics over the David Glacier basin;
- to develop a high resolution basis for assessing recent (<200 years) and monitoring future change over the Talos Dome area in terms of climate, atmospheric chemistry, and the role of anthropogenic activity;
- to enhance the interpretation of regional to continental scale influences on isotopic composition and chemical impurities over East Antarctic Ice Sheet versus hemispheric influences;
- to provide ground truth for satellite remote sensing study.

During the 1993/1994 season the Italian Antarctic Programme undertook a first scouting traverse (Frezzotti et al., 1994) from Terra Nova Station (164°06'E 74°41'S) to the plateau (157°30'E 74°38'S 2050 m; GPS 2 in Fig. 1), the covered distance was 280 km. The 1996 traverse was performed from 3 to 30 November, 1996 and the covered distance was about 600 km. The traverse team consisted of six people: two diesel mechanics and four researchers (glaciologists and geophysicists). The traverse consisted of four articulated sledges, two containers pulled by two Pisten Bully 330 Kassbohrers and two Caterpillar Challengers 55C. One of the main logistic purpose of this traverse was to verify the accessibility of the plateau from Terra Nova Station with heavy vehicles (about 17 tons) and sledges (more than 20 tons).

The first 280 km of the traverse follow the same route of the 1993/94 traverse. The route was identified and surveyed in Italy from georeferenced satellite images analysis (Landsat TM, ERS1 SAR and AVHRR) and a land and helicopter survey performed in October 1996. During these surveys the route was located by GPS and the track in the main crevasse area was marked with stakes.

The traverse started on November 3, 1996 from Terra Nova Station (164°06.8'E, 74°41.66'S) and crossing the Nansen Ice Sheet, Backstairs Passage (162°45.3'E 75°02.4'S) and the Larsen Glacier arrived on the plateau (160°39.6'E 74°48.9'S about 1 400 m) on November 8. The party

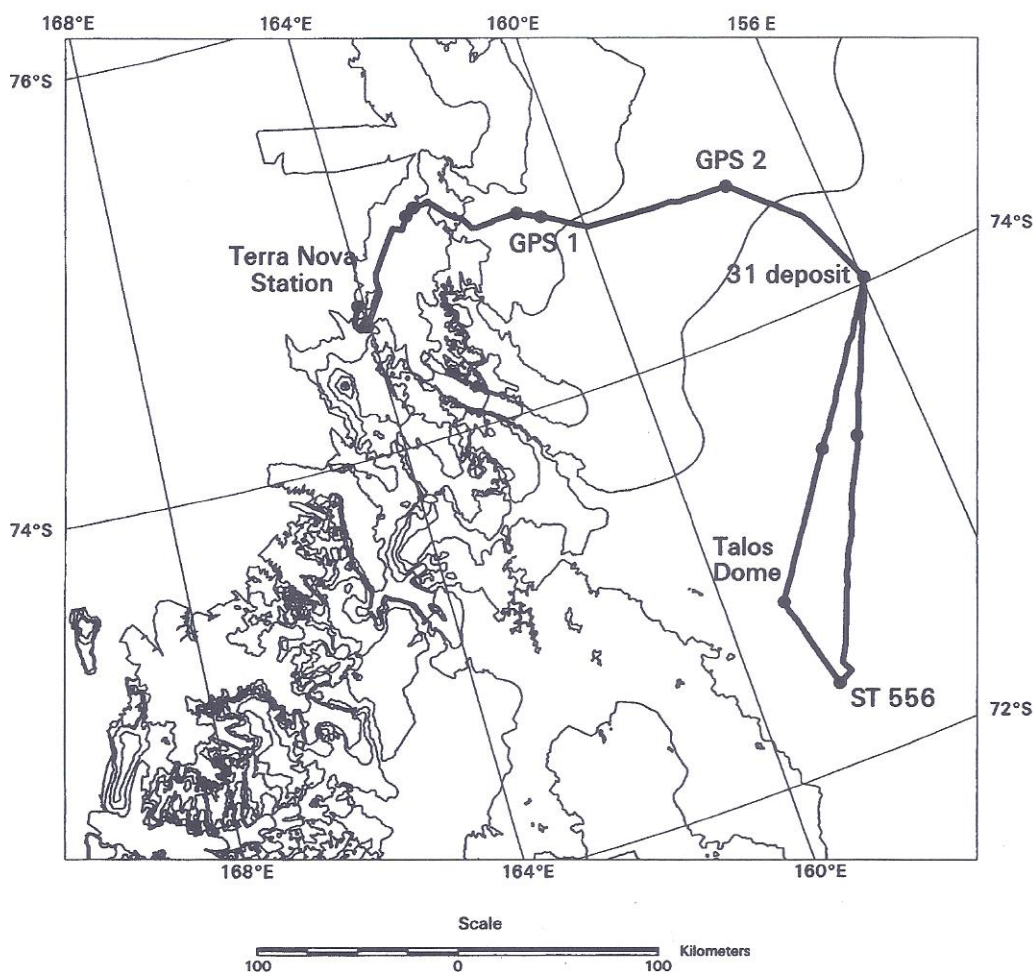


Fig. 1 - Schematic map of travelling route of ITASE, including ice core locations.

arrived on November 12 at Talos Dome 159°06'E 72°48'S (2 300 m). The location of the dome has been surveyed using Digital Elevation Model derived by ERS1 Radar Altimeter data provided by Federique Remy. (Brisset & Remy, 1996). The traverse was extended up to location ST 556 (158°45'E 72°22'S) on November 24 and 25; the return traverse to Terra Nova Station (November 30) followed the same route from 31 deposit (Fig. 1). Some troubles with the Caterpillar in the first part of the traverse have pointed out that these vehicles are too heavy for the crevassed area of Nansen Ice Sheet.

In the original plan a 150 m deep core were planned at Talos Dome but the drill was blocked at 90 m depth, using 5 litres of warm pure glycol twice the drill was pulled out. An additional core 20 m deep was drilled at the same location of an ice core performed during 1959-1960 US Victoria Land Traverse (St. 556 158°45'E 72°22'S; Stuart & Heine, 1961). Temperature values of -41.1°C and -38.1°C in the cores at 10 m depth respectively were recorded. Around drilling site of Talos Dome, we have performed snow radio sounding for 3D spatial variations in snow accumulation

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Tab. 1 - List of measurements.

Site	Coordinates Long. East Lat. South	Date	A: ablation stakes every 5 km M: meteorological conditions	M: surface condition survey and snow density every 5 km S: spectrometry C: snow size sample and snow profile	GPS P: topographic survey V: ice flow S: strain net	P: ice core and core temperature R: high resolution radio- echo sounding survey	Surficial snow sample E: trace elements I: stable isotope
Terra Nova St.	164°06.8' - 74°41.24'	3/11/96	M		P		
GPS 1	160°39.55' - 74°48.91'	8/11/96	M	C	P-V		
RN 2	159°11.3' - 74°41.1'	9/11/96	M	M	P		
GPS 2	157°30' - 74°38.65'	9/11/96	A-M	M-C-F	P-V		
RN 7	156°30' - 74°23'	10/11/96	A-M	M	P		
31 Deposit	155°57.6' - 74°01.52'	10/11/96	A-M	M-C-F	P-V		
Priestley Neve	156°48' - 73°42'	11/11/96	A-M	M	P		
PN 1	157°40.1' - 73°22.86'	11/11/96	A-M	M-C	P-V		
PN 2	158°18.2' - 73°07.76'	12/11/96	A-M	M	P		
Talos Dome	159°06' - 72°48'	12/11/96	A-M	M-C-F-S	P-V-S	P-R	
St 556	158°45' - 72°22'	24/11/96	M	M-C	P	P	
PN 3	157°59' - 72°51'	26/11/96	M	M	P		
PN 4	157°05' - 73°23'	26/11/96	M	M	P		
PN 5	156°23' - 73°47'	27/11/96	M	M	P		
31 Deposit	155°57.6' - 74°01.52'	27/11/96	A-M	M-S	P-V		
RN 8	156°44.3' - 74°26.8'	28/11/96	A-M		P		
RN 9	158°20.3' - 74°39.5'	28/11/96	A-M		P		
Reeves Neve	161°02' - 74°52'	29/11/96	A-M		P		
BackStairs 1	162°37' - 75°02'	30/11/96	M		P		

in the top 50 m, the survey has been carried out with a 200 MHz antenna for about 100 km and with a 900 MHz antenna for 12 km. A strain net of 9 stakes for a deformation study has been measured using GPS technique, the location of the central reference stake of the strain net has been surveyed by GPS using the reference stations of Terra Nova and Frontier Mountain. A vertical profile of Talos Dome area more than 250 km in length was measured with GPS in differential, taking the reference stake of the strain net as the reference point. Along the traverse snow accumulation stakes spaced at 5 km and topographic survey using GPS technique have been performed. Remote sensing ground truth has been collected with survey of surface micro relief, sampling of snow for grain size, VIS-IR spectrometry measurements and near surface temperature measurements. Snow samples for trace elements and stable isotopes have been collected every 40 km along the traverse.

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