GHOST Balloons Around Antarctica

by

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Abstract

Between 1966 and 1970 constant density GHOST balloons floating at a pressure of 100 and 200 mb were launched from Christchurch N.Z. The balloon positions were obtained from the sun's elevation angle and the radio direction to the balloon. The system is described and the balloon position data are given by Solot (1972).

The GHOST balloon position as a function of time data shows that the atmospheric circulation around the Antarctic Continent at the 100 mb and 200 mb levels is complex The GHOST balloons supposedly follow the horizontal trajectory of the air at the balloon level. Trajectories that are moving towards the South Pole could indicate air converging on the pole. The convergence would indicate a change in the vertical velocity at that level over Antarctica. The vertical motion could influence the processes associated with ozone growth and decay. The air moving towards the South Pole could also have an ozone content different from that of the displaced air.

Figure 1. shows the position of GHOST balloon 98Q for a three month period in 1968. The balloon moved to within 2 deg of the South Pole on 1 October 1968 and then by 9 December 1968 was 35 deg from the South Pole and close to its position on 1 September 1968. The balloon generally moved from west to east but on two occasions moved in the opposite direction for a few days.

Figure 2 gives the latitude of GHOST balloons 98Q and 149Z which was at 200 mb. Both balloons tended to get closer to the South Pole in September and October. Other GHOST balloons at the same pressure and time period may not indicate similar behavior.

GHOST balloon flights in adequete numbers should be made below, within, and above the ozone depletion region in Antarctica to possibly determine the role of the atmospheric circulation in the ozone depletion between June and December.

Reference:

Solot, S.B. (1972): "Complete 100- and 200- mb GHOST Balloon Data: 1966-1970", NCAR Technical Notes, National Center for Atmospheric Research, Boulder, Colorada.

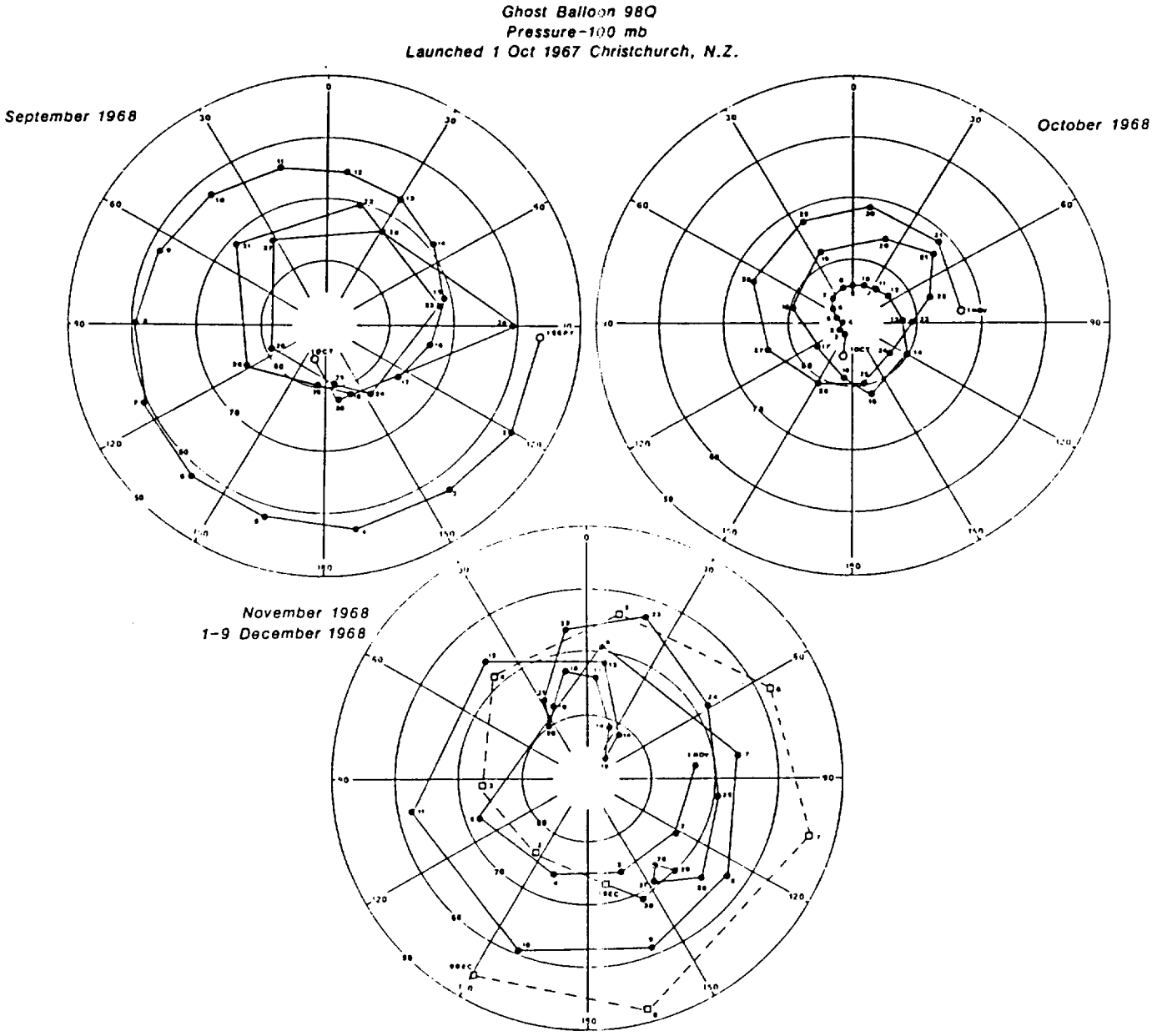

Figure 1. Position at 0000 GMT of GHOST balloon 98Q for September, October, November, and part of December 1968. The positions are connected by a straight line.

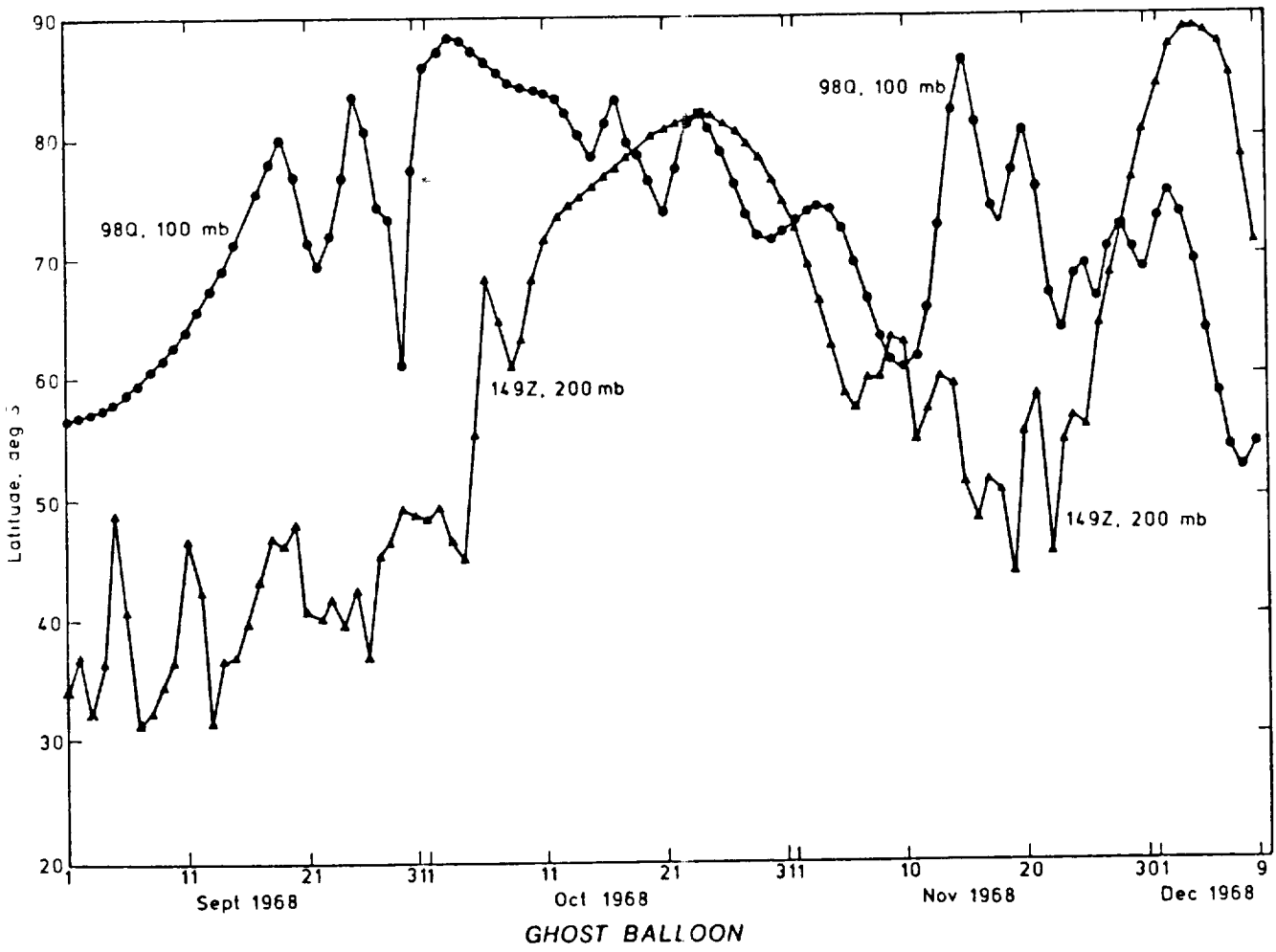

Figure 2. Latitude of GHOST balloons 98Q and 149Z for the period 1 September to 9 December 1968. Balloon 149Z was at a pressure of 200 mb.