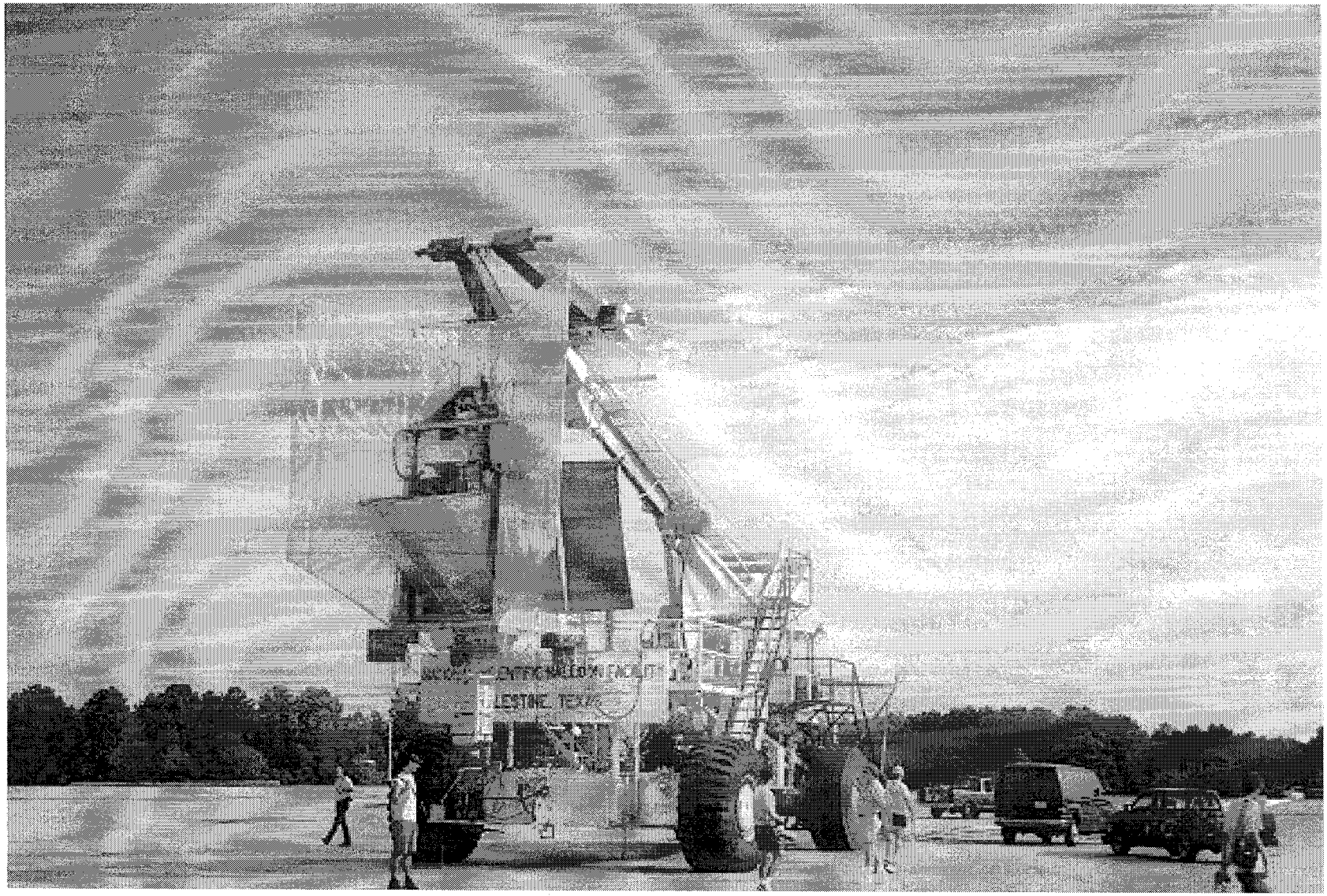
BOOMERANG



A measurement by BOOMERANG of multiple peaks in the angular power spectrum of the cosmic microwave background

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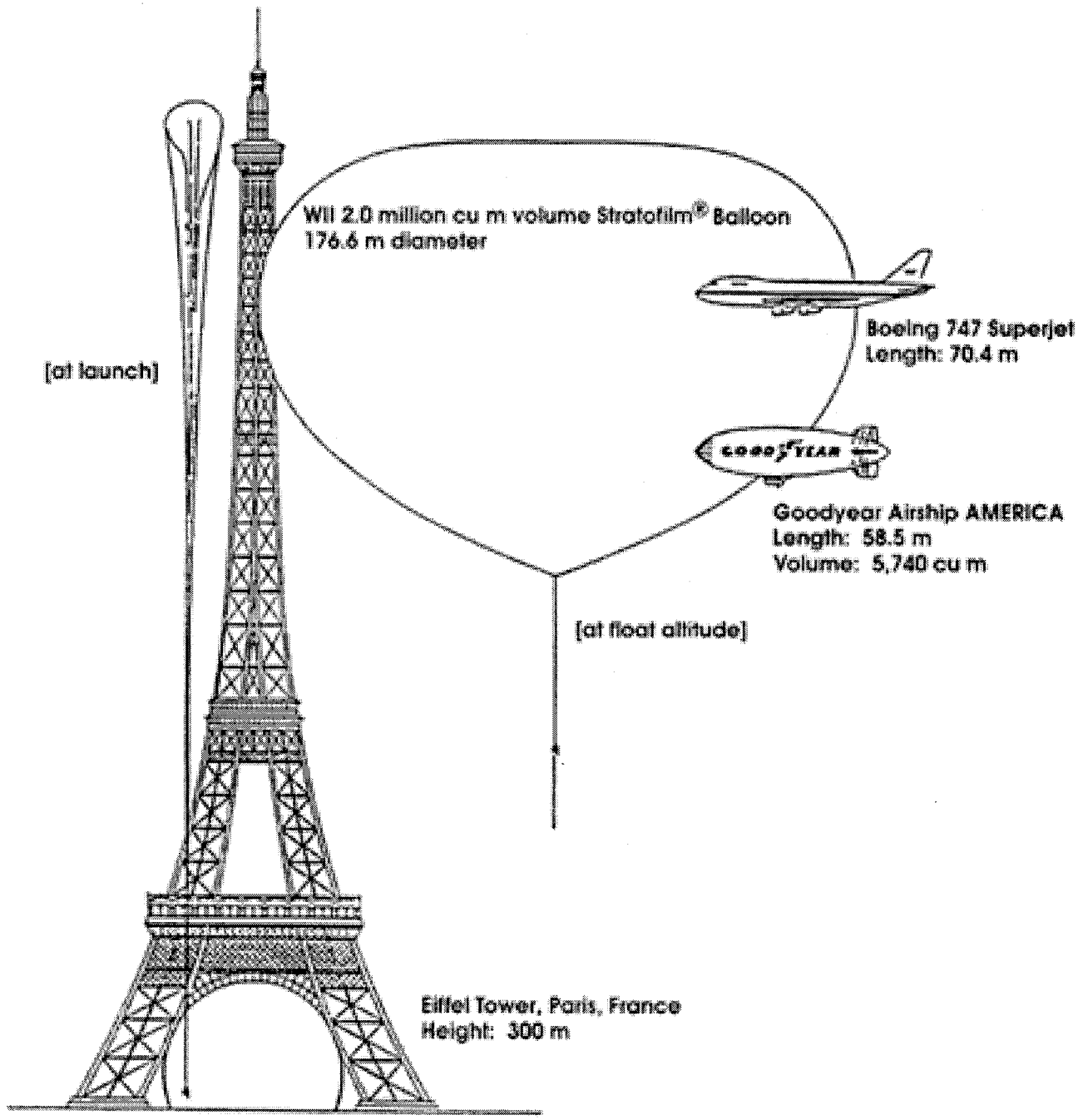
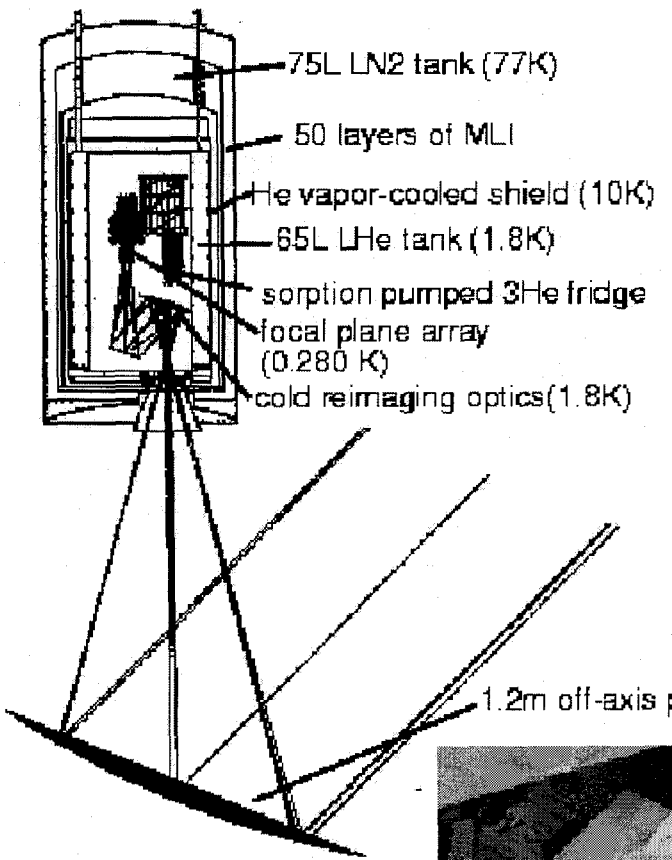
ABSTRACT

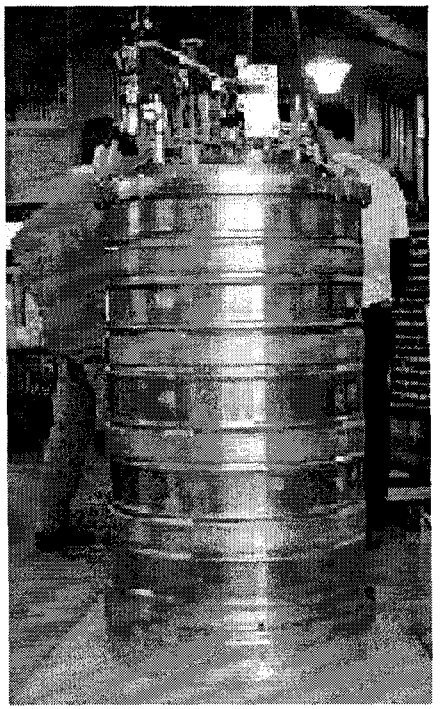
This paper presents a measurement of the angular power spectrum of the Cosmic Microwave Background from $\ell = 75$ to $\ell = 1025$ ($\sim 10'$ to 5°) from a combined analysis of four 150 GHz channels in the BOOMERANG experiment. The spectrum contains multiple peaks and minima, as predicted by standard adiabatic-inflationary models in which the primordial plasma undergoes acoustic oscillations. These results significantly constrain the values of $\Omega_{\rm tot}$, $\Omega_b h^2$, $\Omega_c h^2$ and n_s.



NASA balloon size

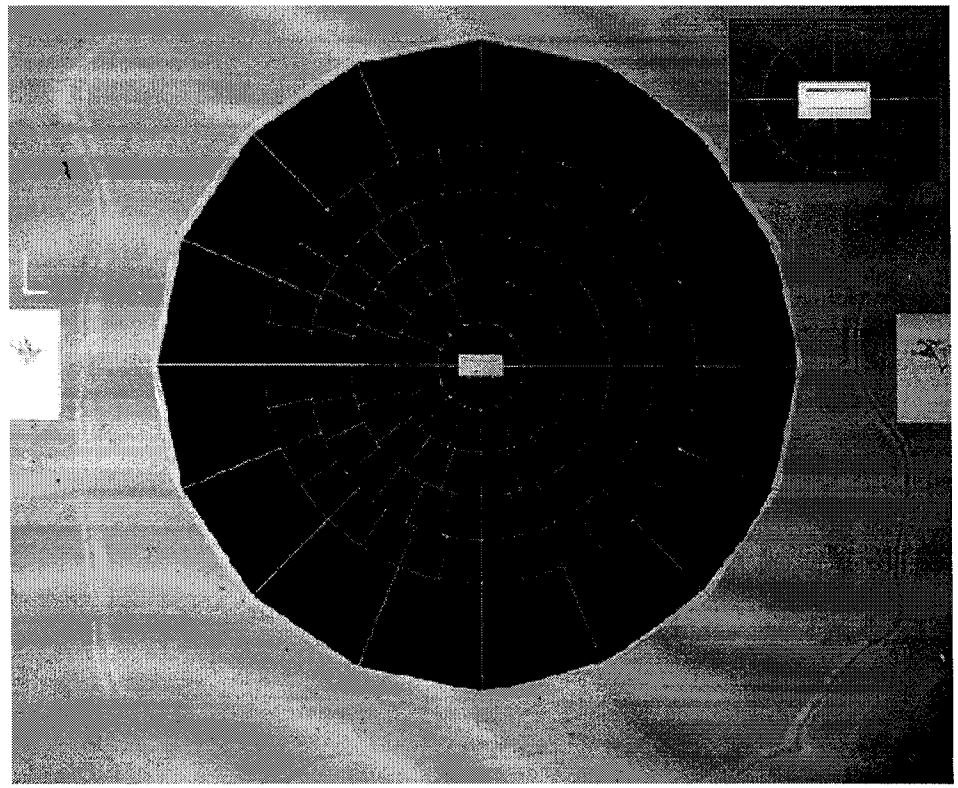
Boomerang Long-duration Cryostat and Telescope

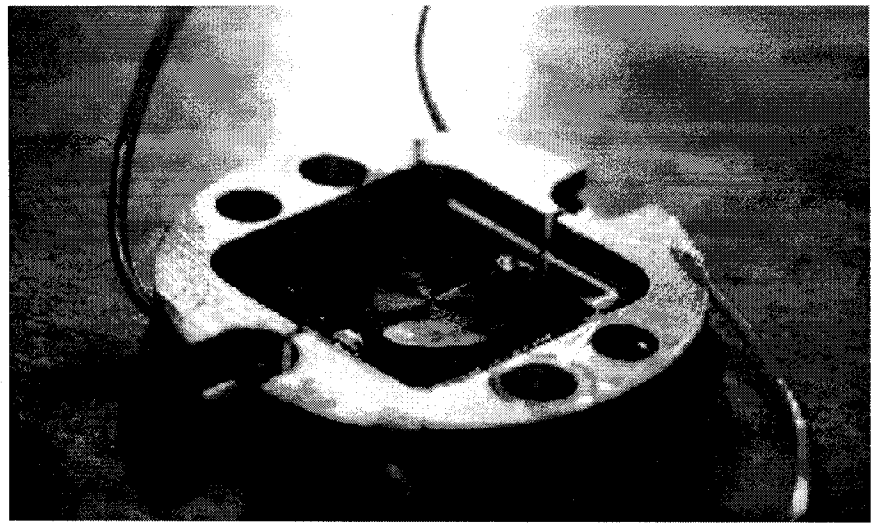




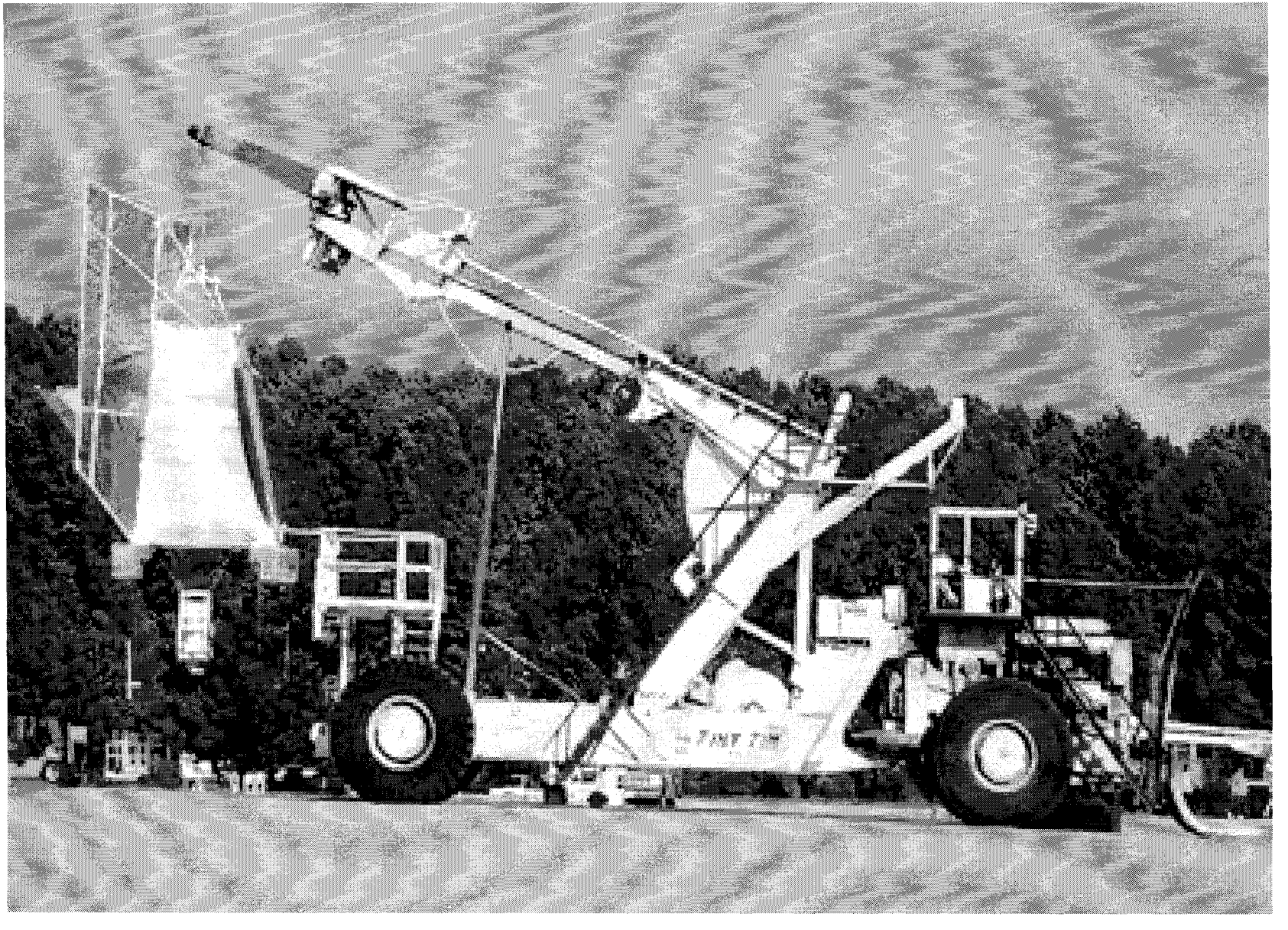
Spiderweb Bolometers

- *small cosmic ray cross section*
- *reduced mass ->faster,stronger*





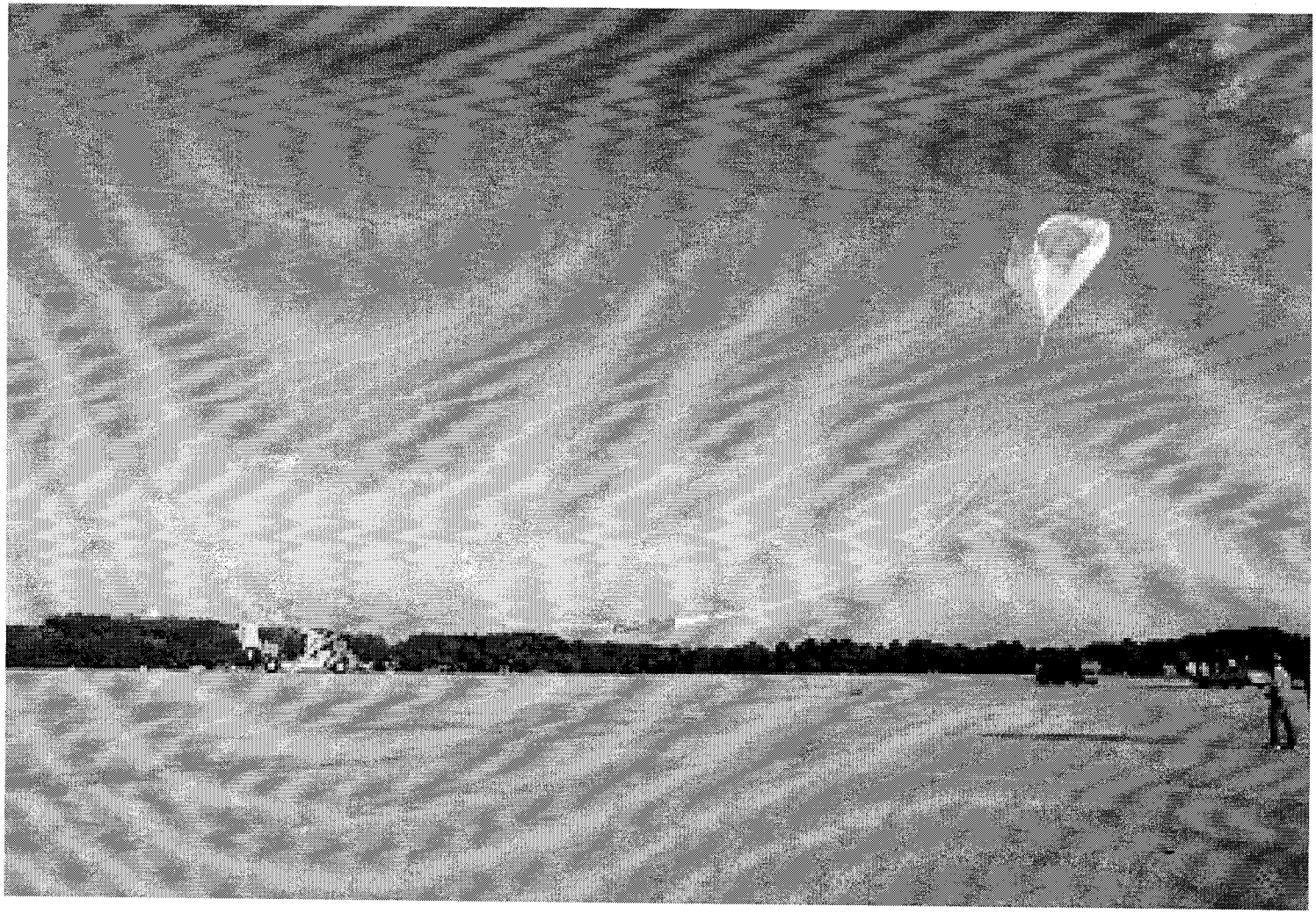
Launch Vehicle



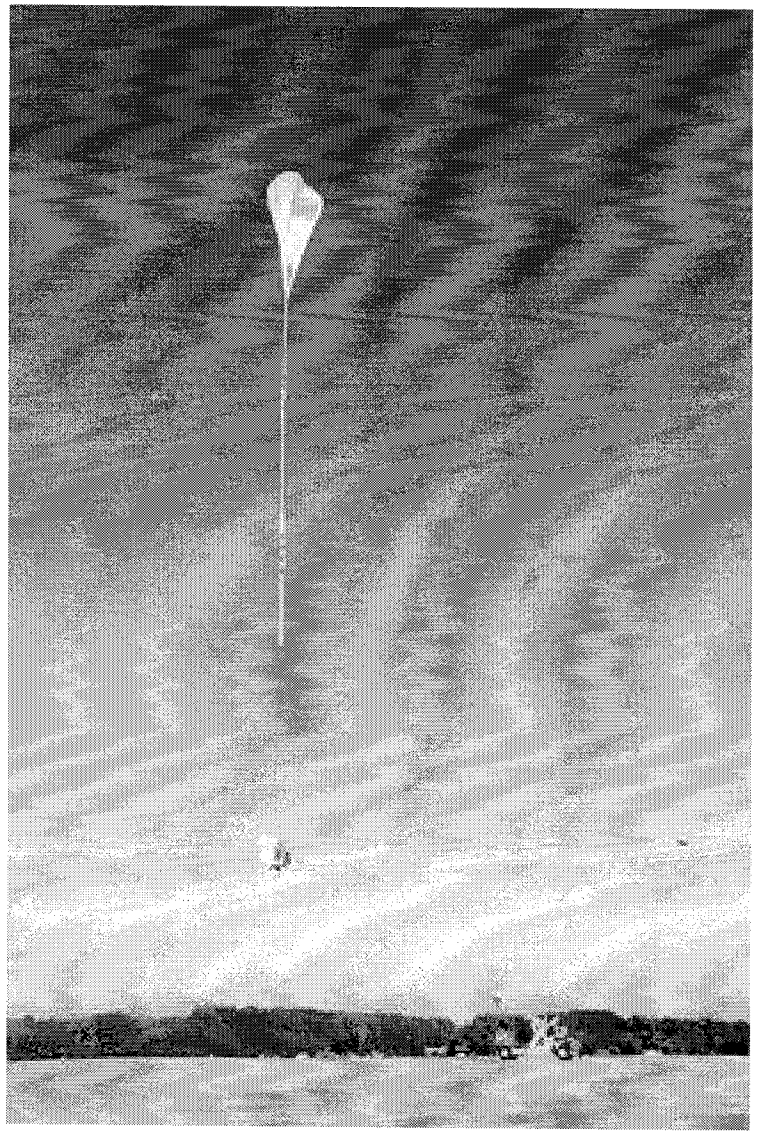
BOOMERANG Launch

BOOMERANG Launch

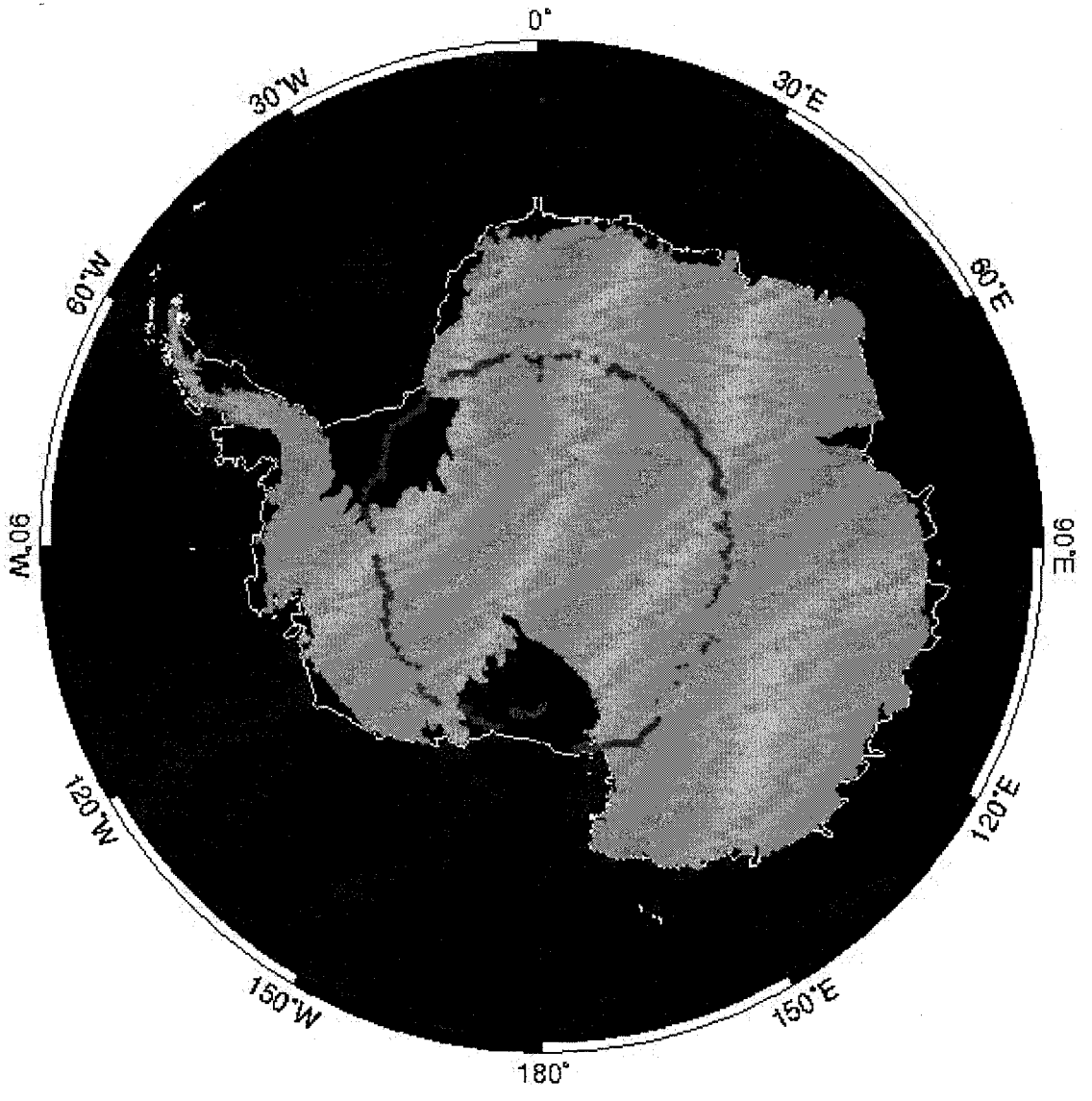
BOOMERANG Launch



BOOMERANG Launch



ANTARCIC Balloon Track



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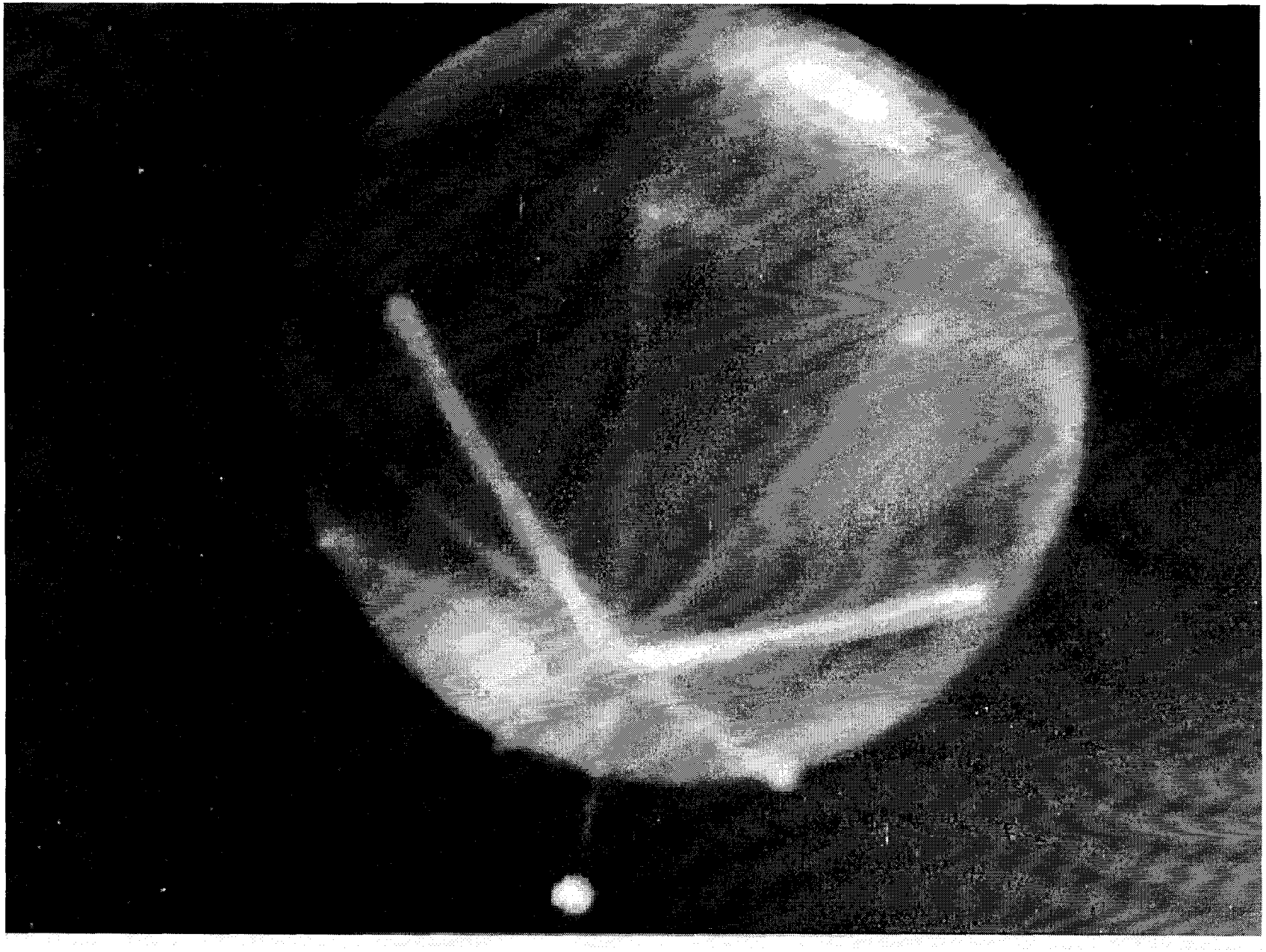
BALLOON at Float



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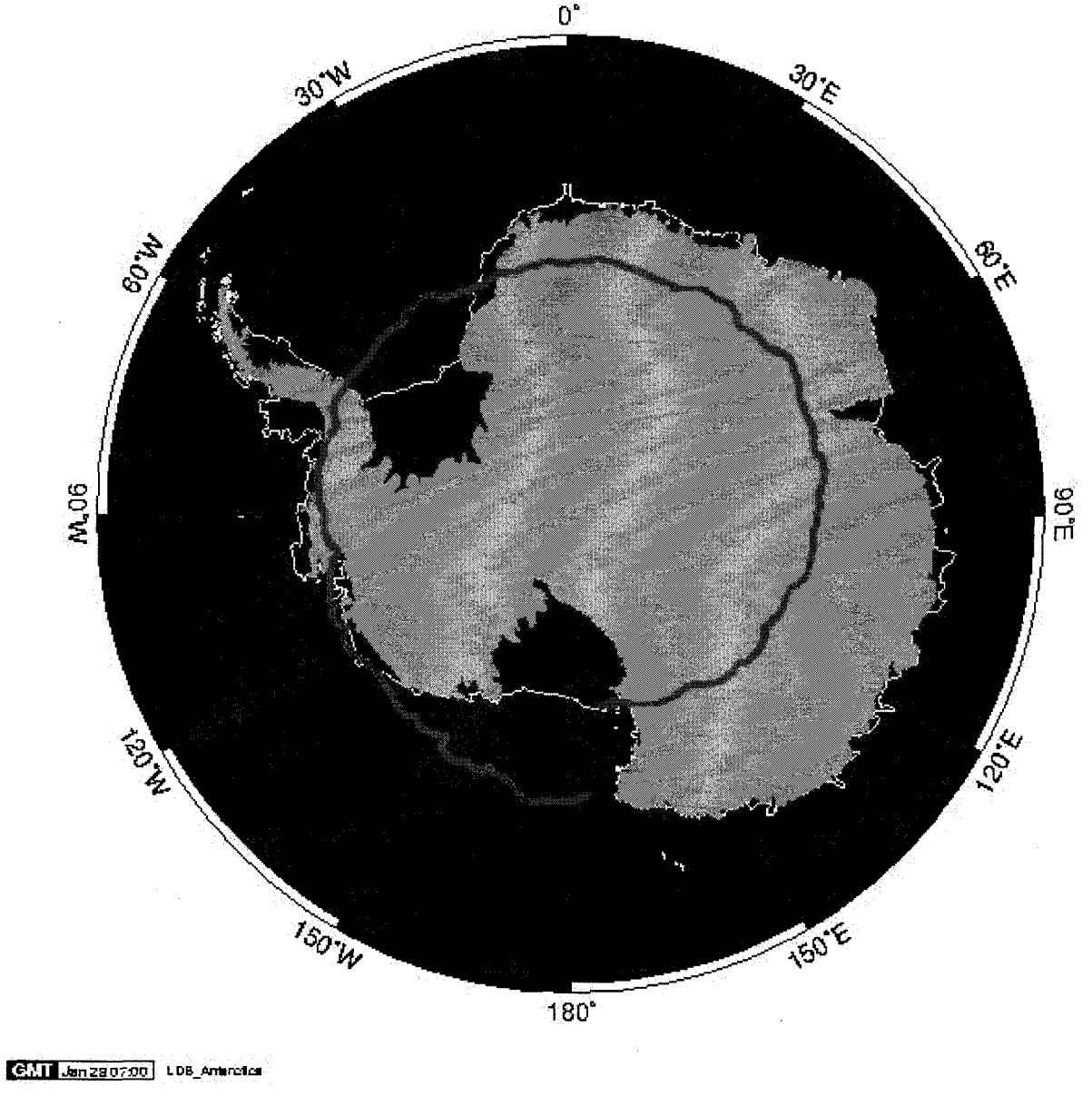
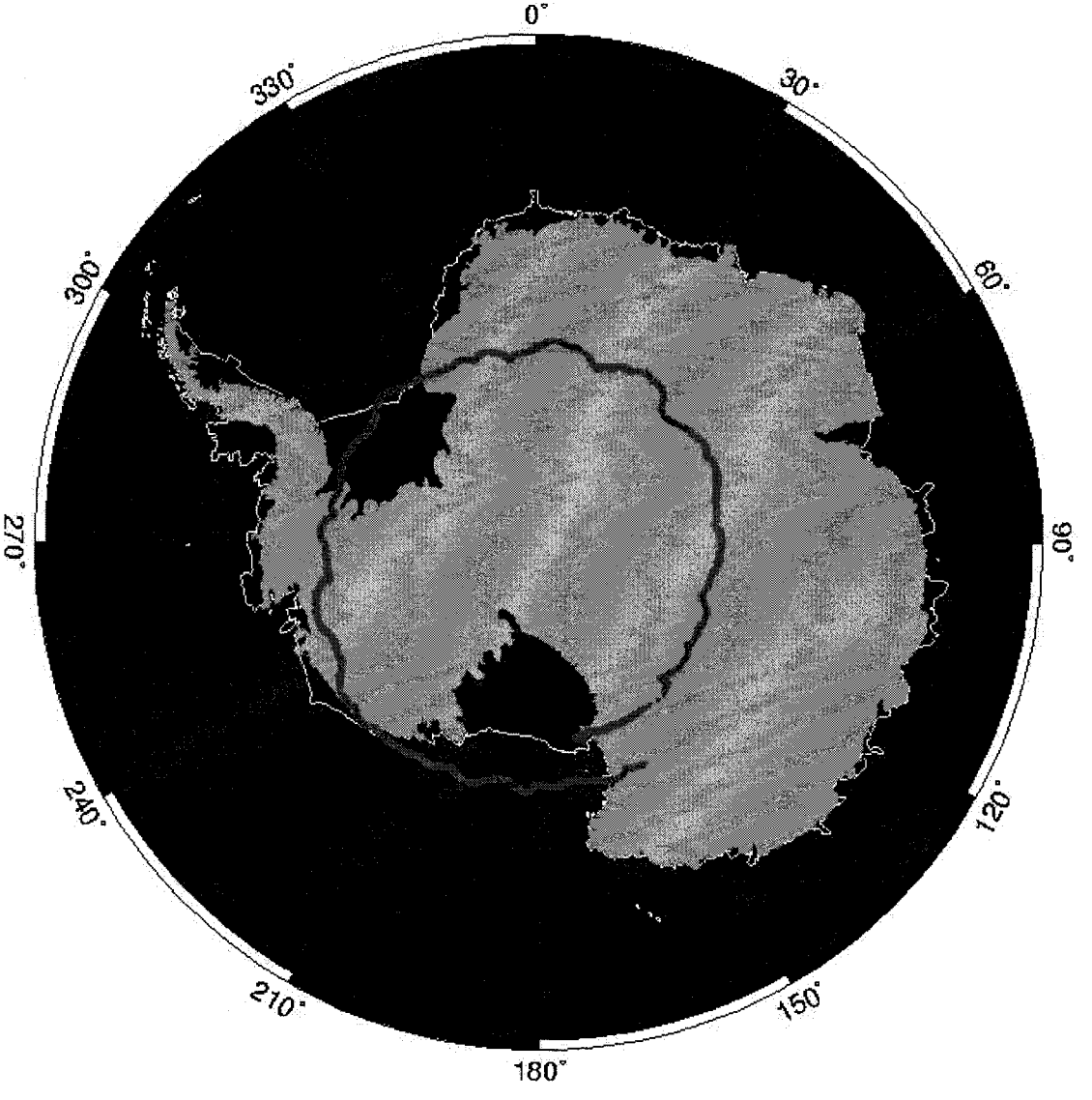


ANTARCIC Balloon Track



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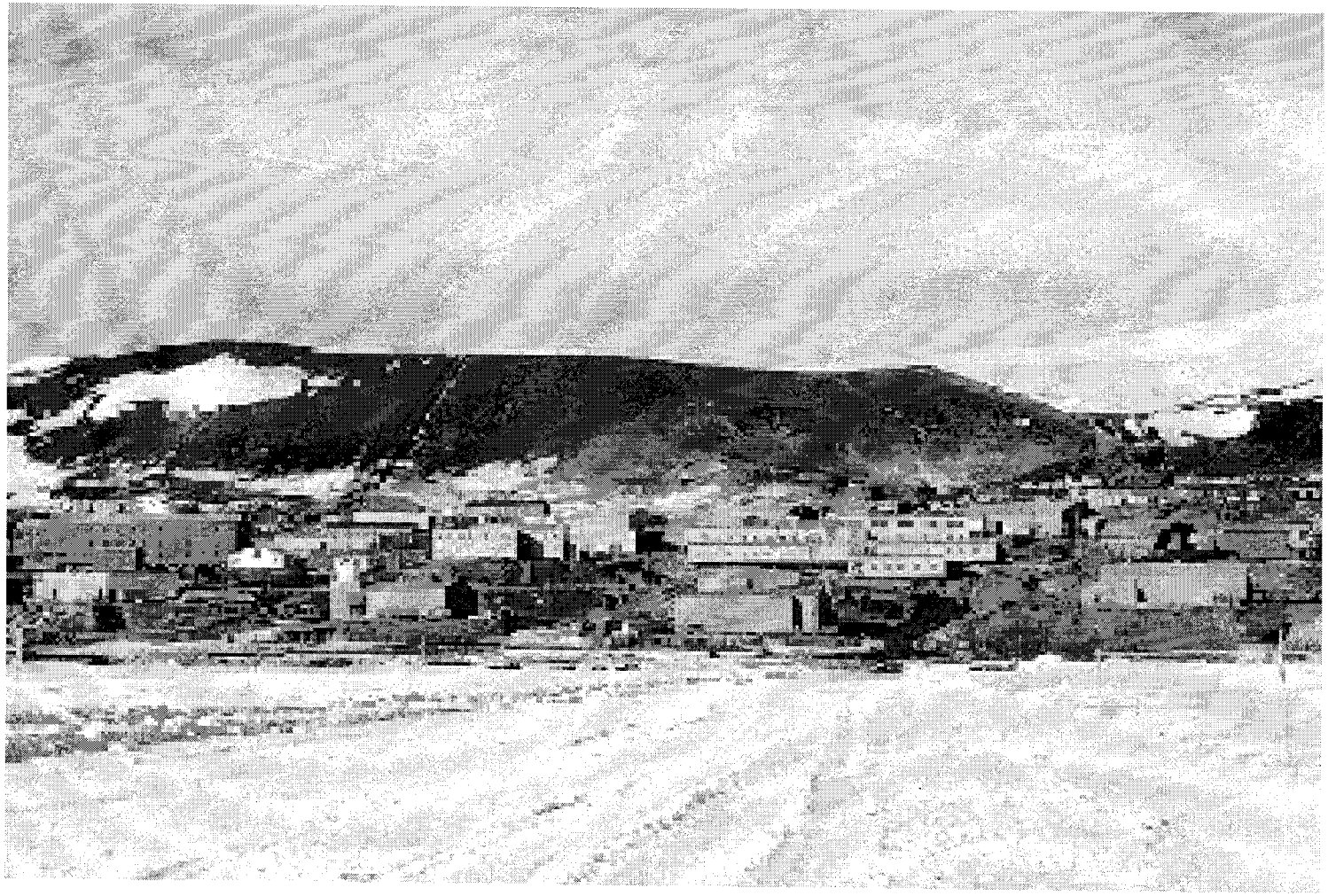
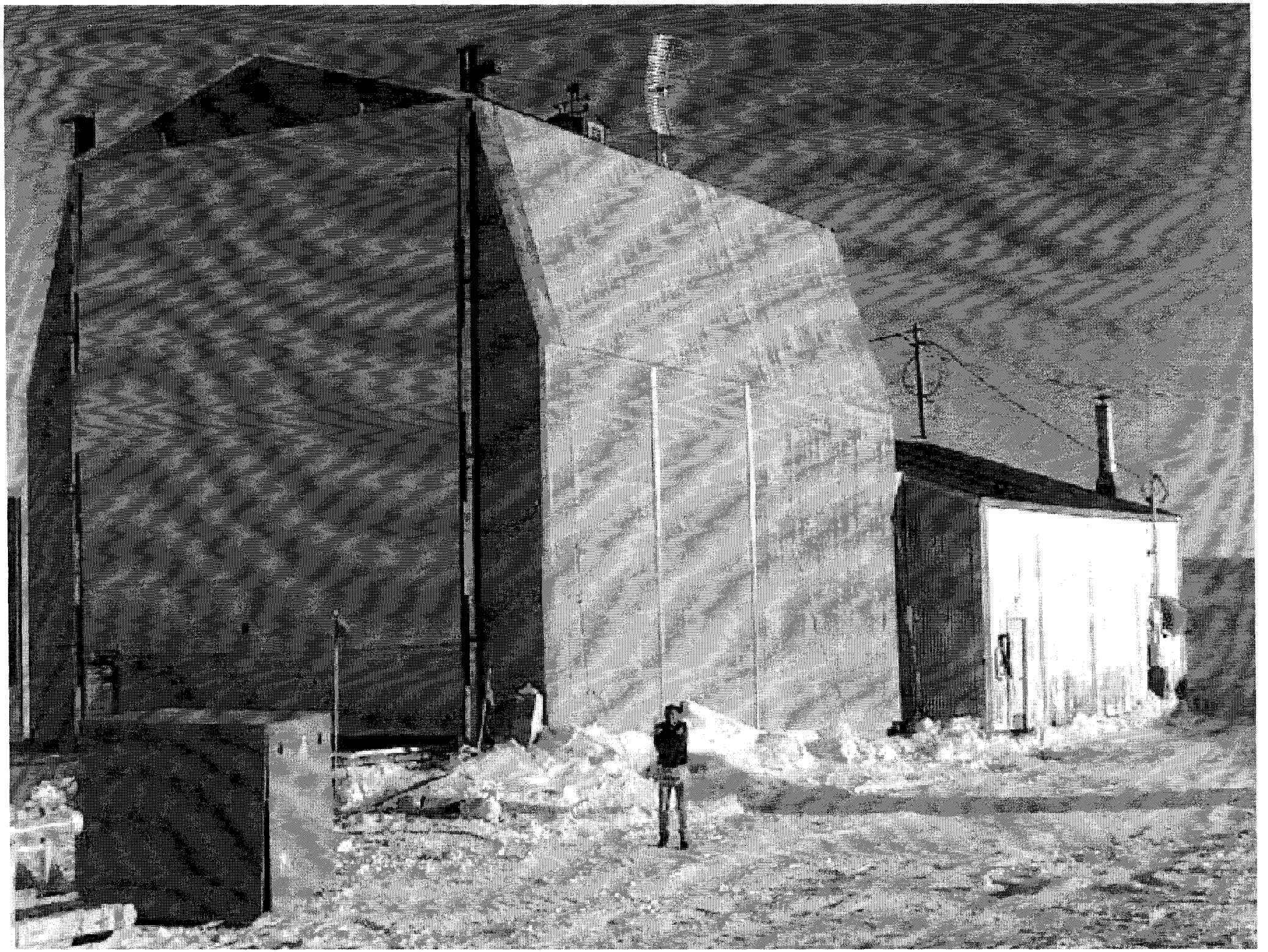
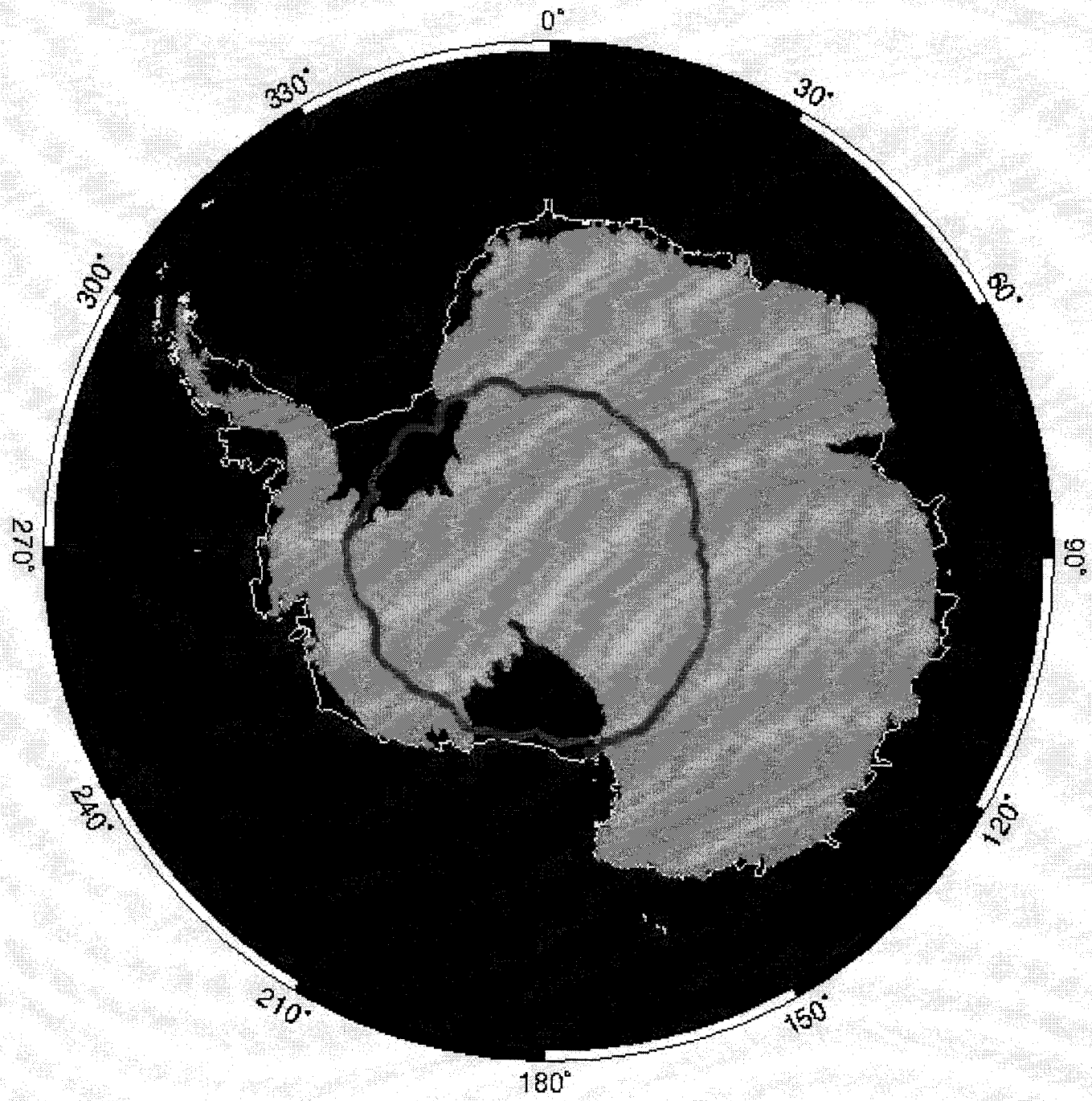
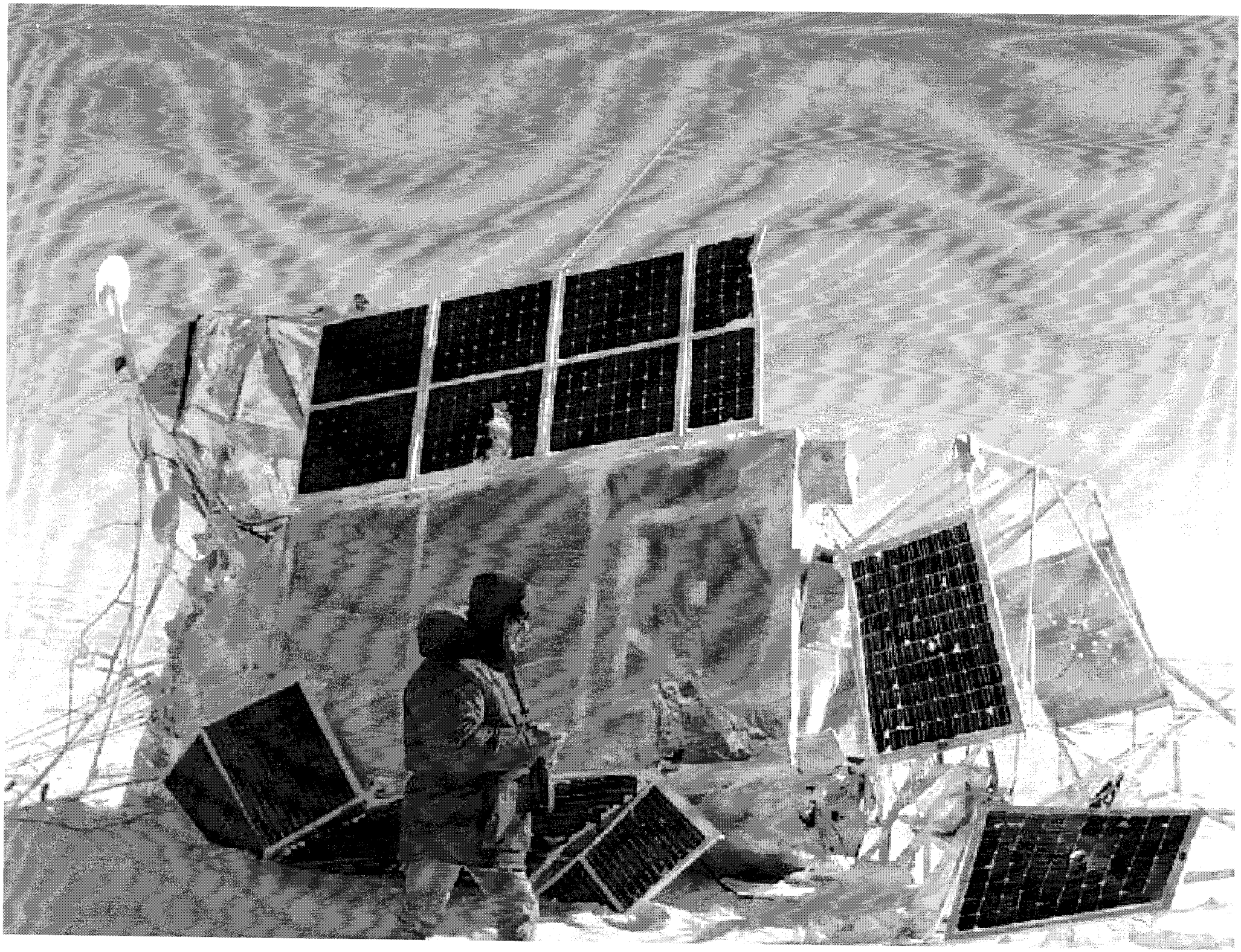
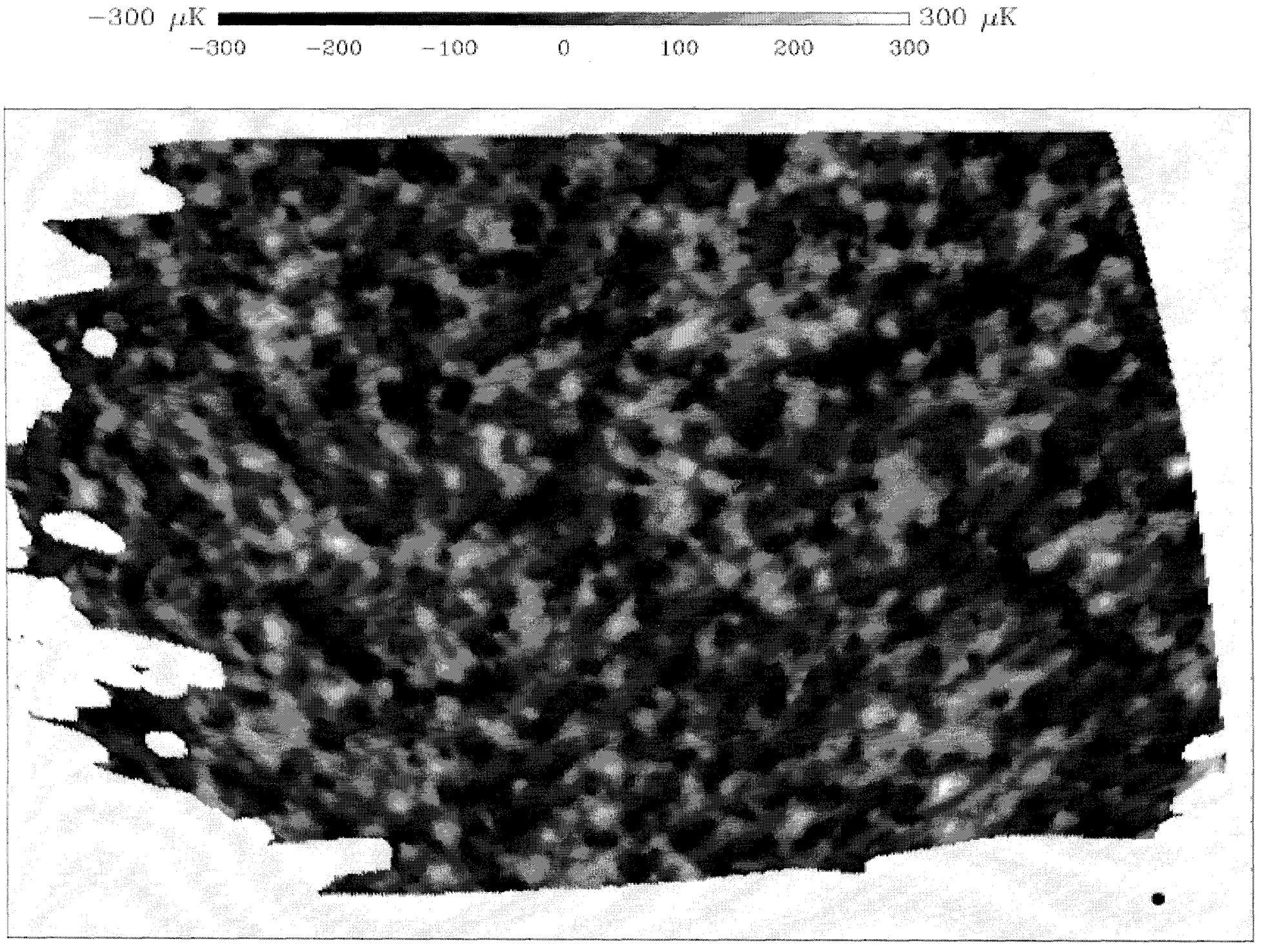
McMurdo Station, Antarctica

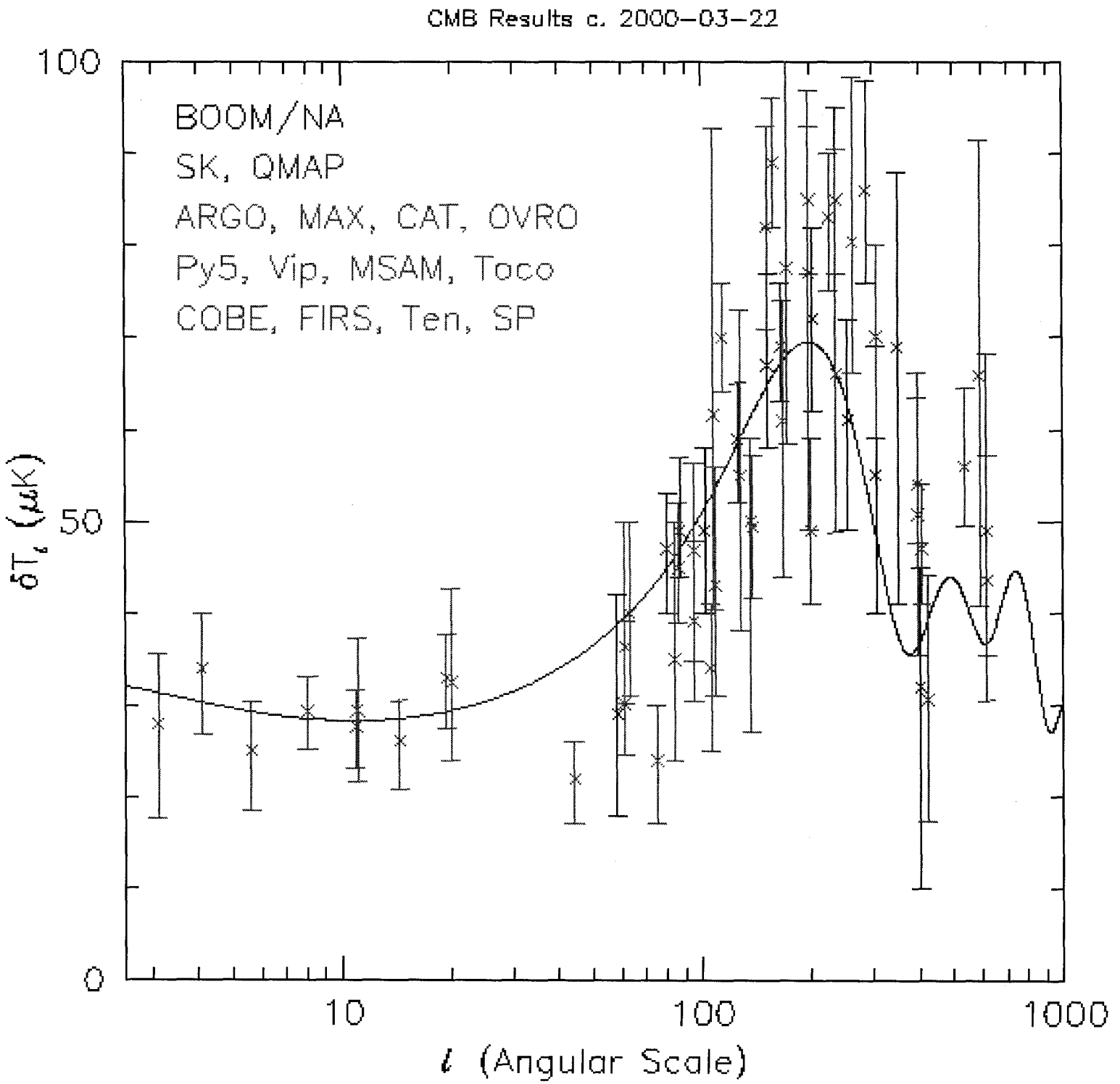


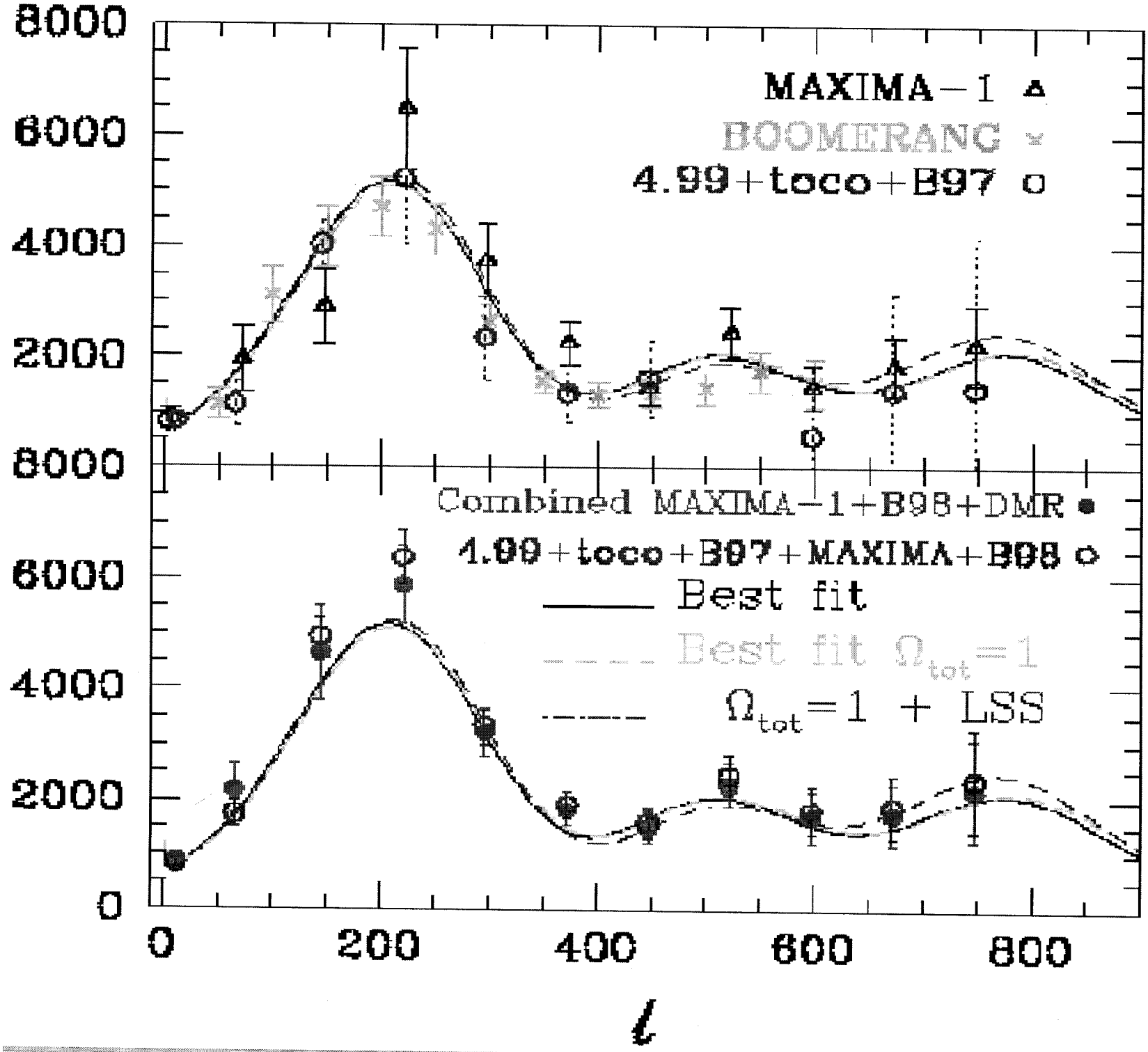



0°
30°
60°
90°
120°
150°
180°
210°
240°
270°
300°
330°




−300 μK
300 μK
−300
−200
−100
0
100
200
300


CMB Results c. 2000-03-22
BOOM/NA
SK, QMAP
ARGO, MAX, CAT, OVRO
Py5, Vip, MSAM, Toco
COBE, FIRS, Ten, SP
100
50
0
10
100
1000
δT_ℓ (μK)
ℓ (Angular Scale)


MAXIMA−1
BOOMERANG
4.99+toco+B97
Combined MAXIMA−1+B98+DMR
4.99+toco+B97+MAXIMA+B98
Best fit
Best fit $\Omega_{tot}=1$
$\Omega_{tot}=1$ + LSS
8000
6000
4000
2000
0
200
400
600
800
ℓ