2005 Mt.Qomolangma Height Survey

•National Geomatics Centre of China

•zhangjiangqi

The history of Mt.Qomolangma height

NGCC

- 1717 : It was named “Qomolangma alin” on chinese map in Qing Dynasty,the name is Tibet local name.
- 1847: 8778 m was surveyed by English-India from 322km and 70m height ,(trigonometric height),to knew it was the heighest Mt. and named Mt.Everest
- 1849-1850: 8840m was surveyed by English-India from 177km and 250m height ,(used air refractive effects on trigonometric height)
- 1880-1883: 8882m was surveyed by English-India from 145km and 3000m height ,(levelling height on control stations)
- 1946-1953:8848m was surveyed by India,from 56 km and 4500m height (Astronomical Observations +levelling height on control network)

The history of Mt.Qomolangma height

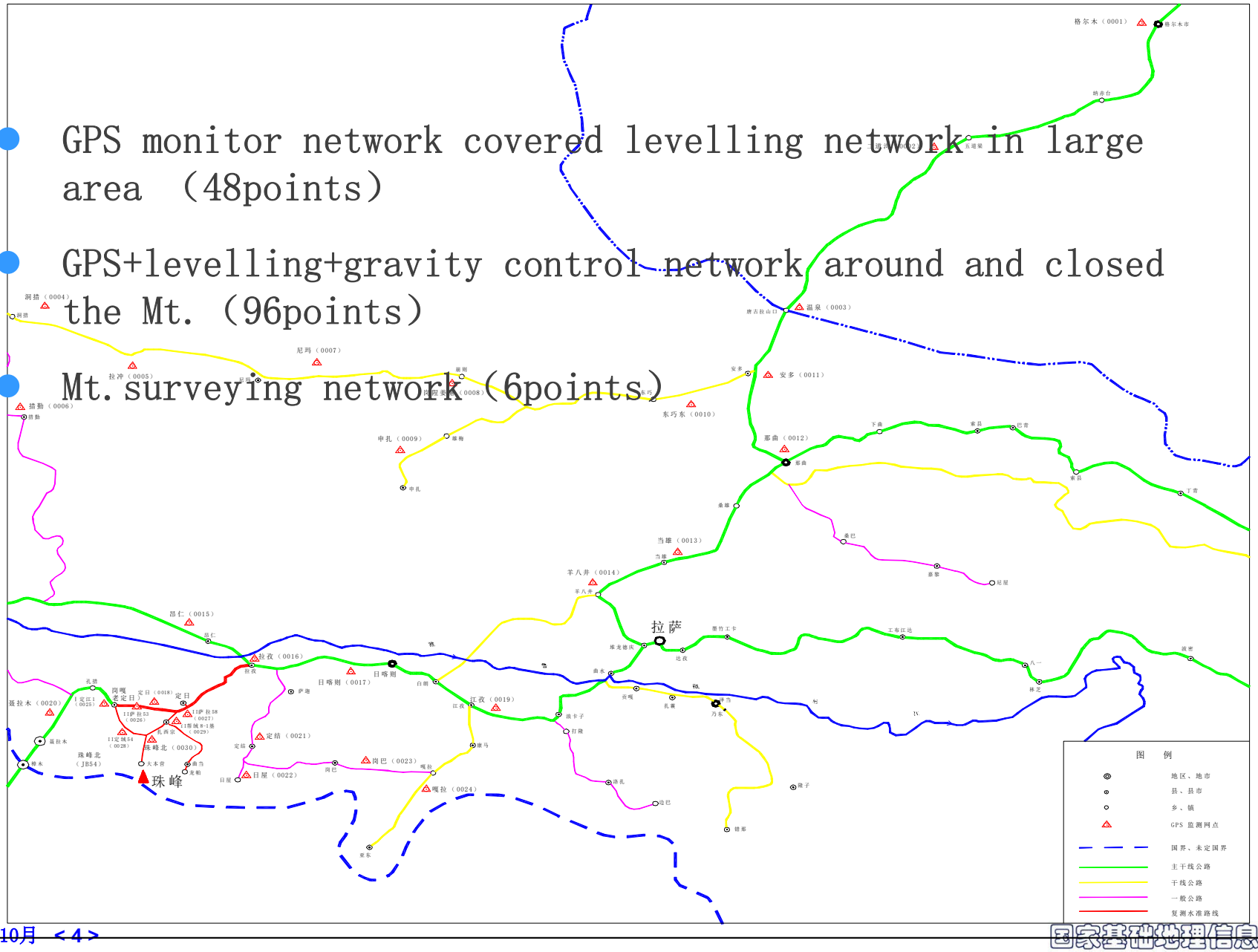
NGCC

- 1966-1968: 8850.32m was surveyed by China from 8.5 km and 5700-6242m height stations ,(Astronomical Observations +gravity +levelling height on trigonometric control network)
- 1975: 8848.13m(on rock) was surveyed by China from 8.5 km away and 5700-6242m height stations , first set up tripod taget and measured snow depth (92cm) on summit,the gravity was at 7100m height and 1.9km to summit)
- 1992: 8846.27m(on rock) was surveyed by China and Italy from China and Nepal twos sides (set up tripod with prism and GPS, measured snow depth (255cm) with a pole on summit,
- 1998-1999: 8850m(on snow) was surveyed by USA and China from China and Nepal sides ,the GPS and radar on top ,the two crustal movenment points set up on 7000-8000m height rock.
- 2004: 8848.5m(on rock) surveyed from China by Italy with GPS/GPR,have had a tripot on top.
- 2005:8844.43m(on rock) surveyed from China side by SBSM,

Mt.Qomolangma suvey project in 2005

NGCC

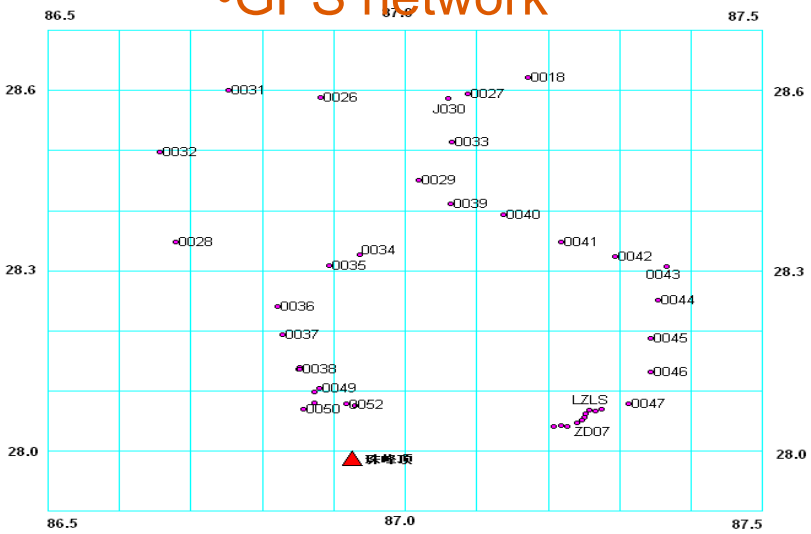
- GPS monitor network covered levelling network in large area （48points）
- GPS+levelling+gravity control network around and closed the Mt. （96points）
- Mt. surveying network（6points）

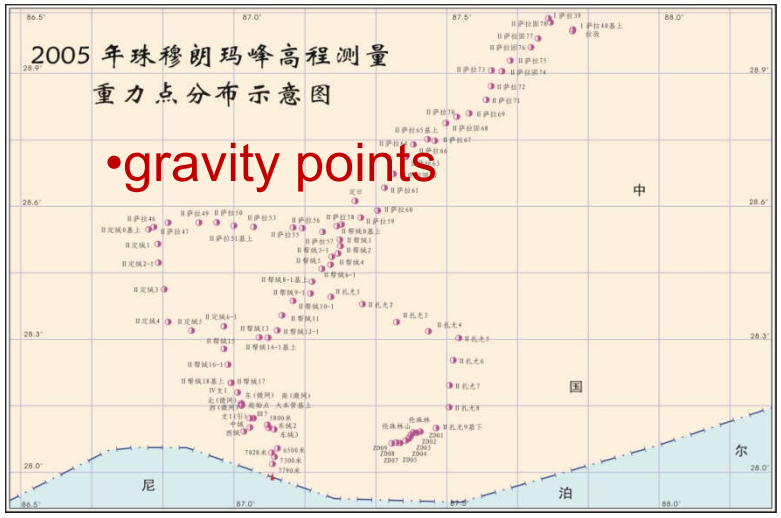


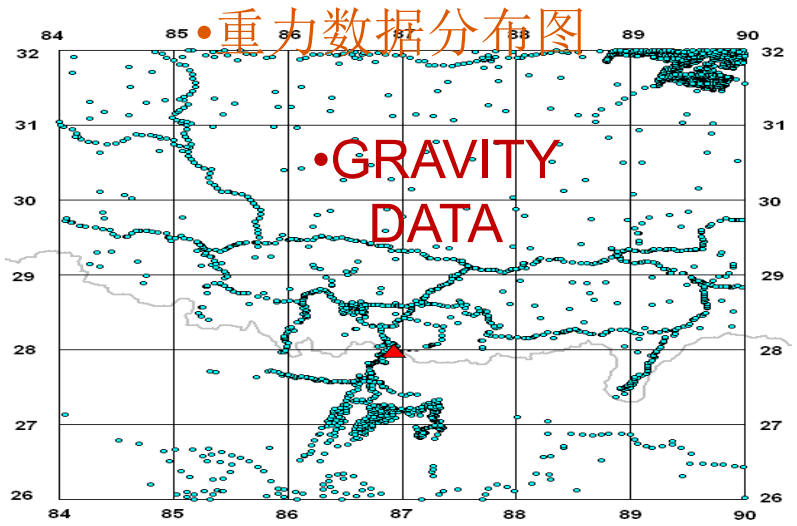
The control network in Mt.Qomolangma area

NGCC

•GPS network

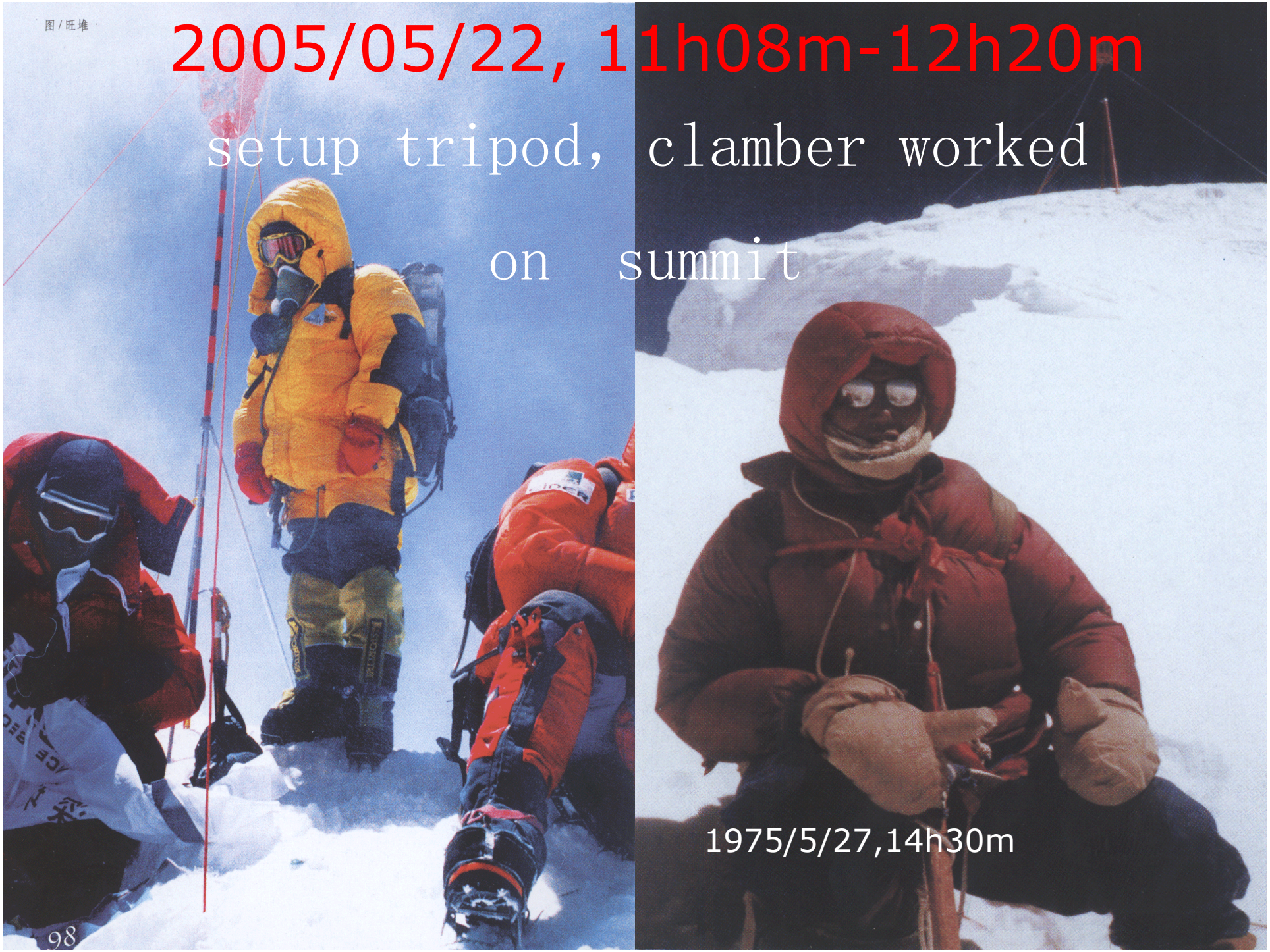




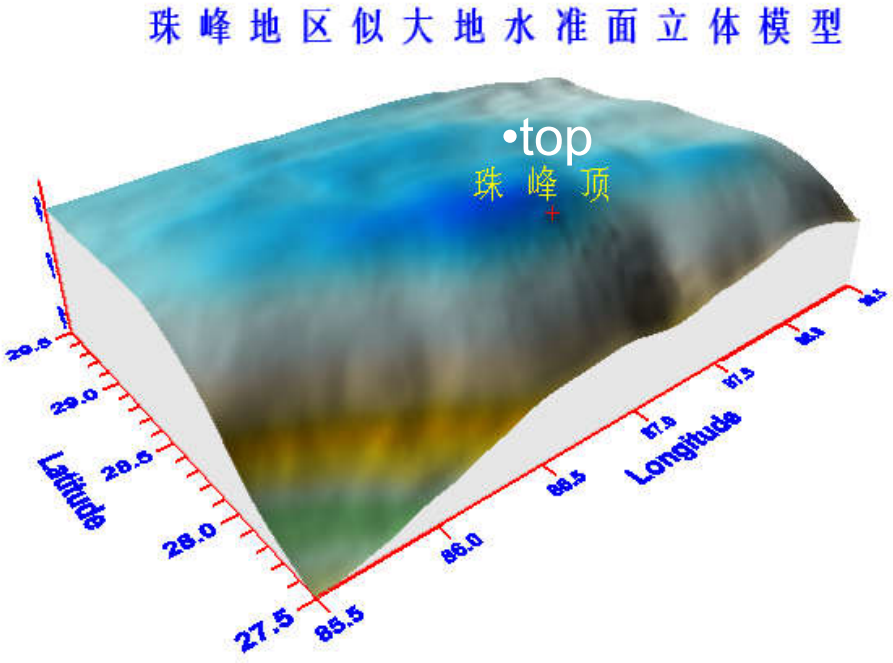


The survey technical

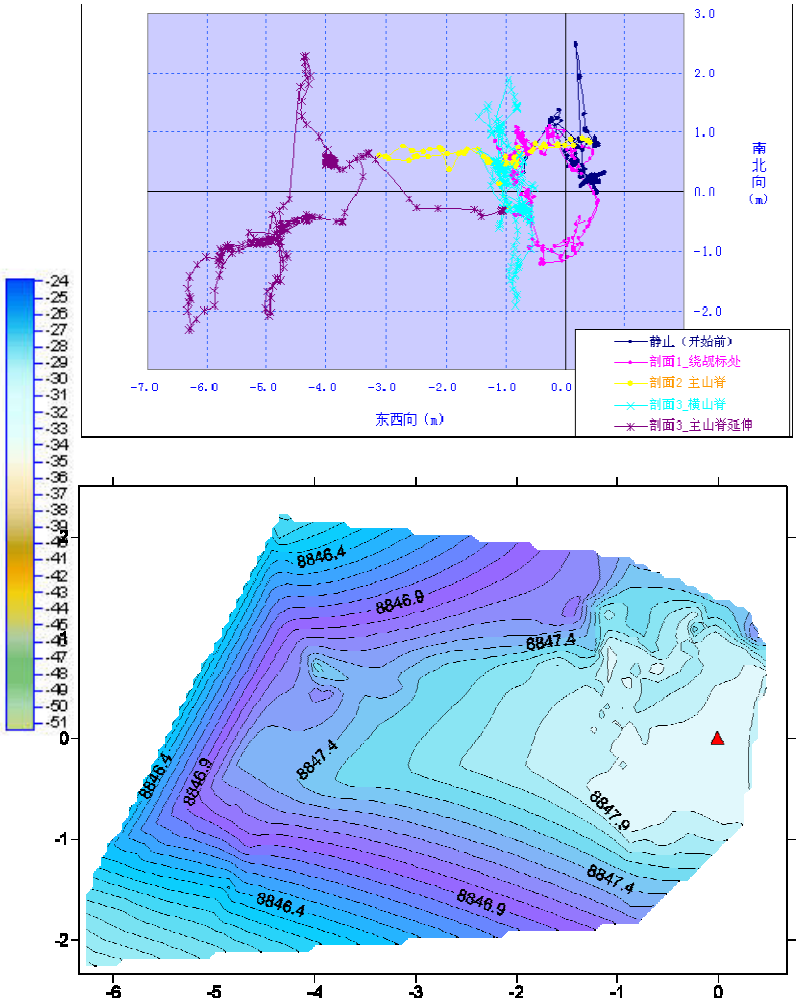
- GPS+Prisms on tripod
- GPS+Radar and timemark
- meteorologicalmeter+Beidou
- meteorological balloom
- Special power supply
- Gravity gradient
- To used relative gravity for high precise gravity model or gravity geoid
- To used GPS+levelling network, to contral the Geoid
- To used Vertical deviation for trigonometric height
- to get the aproximate Geoid height
- used gravity gradient to get the orthmetric height


图/旺堆
2005/05/22, 11h08m-12h20m
setup tripod, clamber worked
on summit
1975/5/27,14h30m
98

•Mt.Qm aproximate Geoid



•GPR track and topgraphy on summit



Mt.Qomolangma new height in 2005

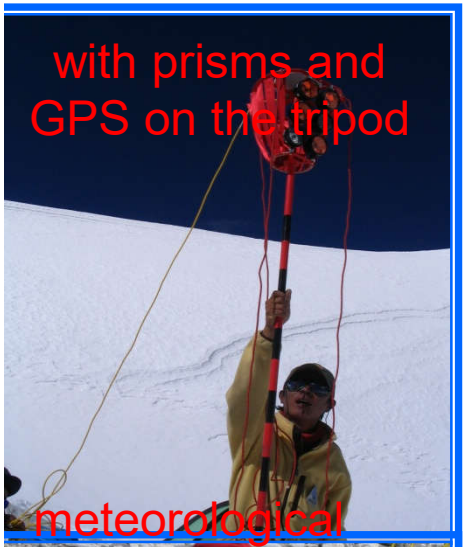
NGCC

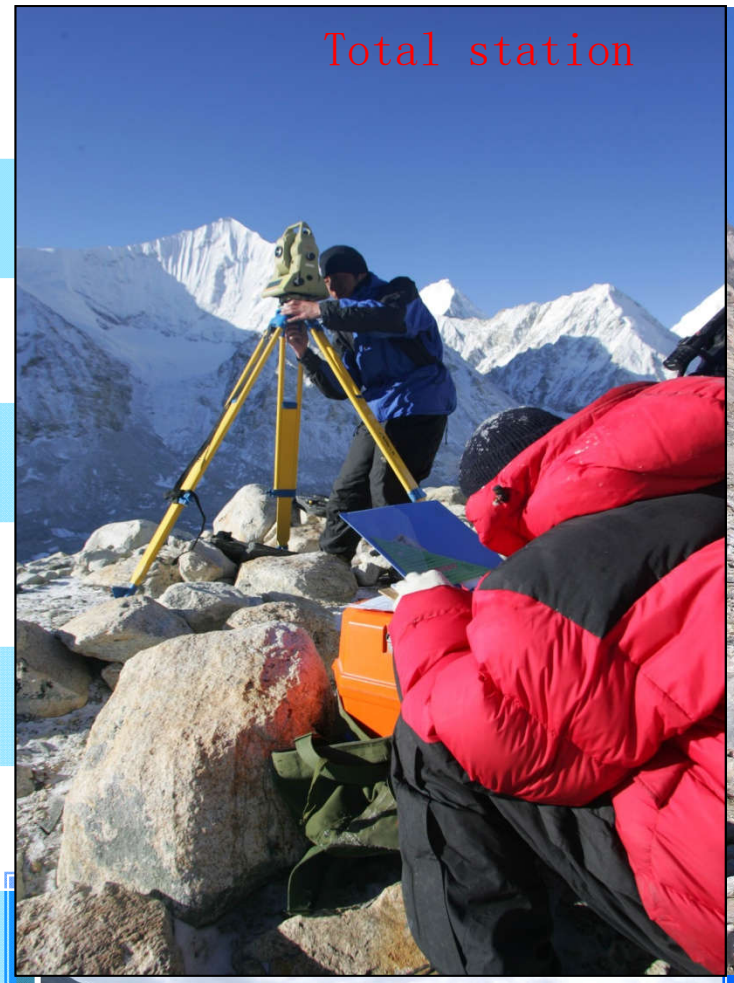
- 8844.43m±0.21m (height on summit rock,relative to China yellow sea)
- 3.50m±0.09m (snow depth by radar)
- 86° 55′30.7517″E±0.21m(top tripod)
- 27° 59′17.0828″N±0.11m (top tripod)
-

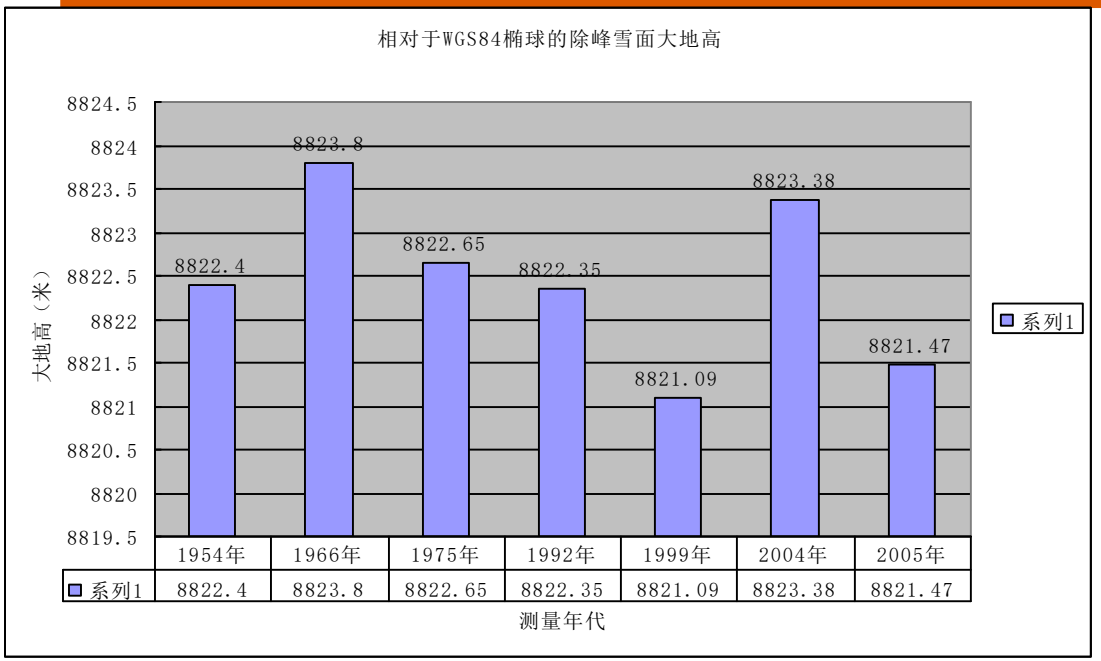
the geoid accuracy ±9cm (2005)， checked by 40 points

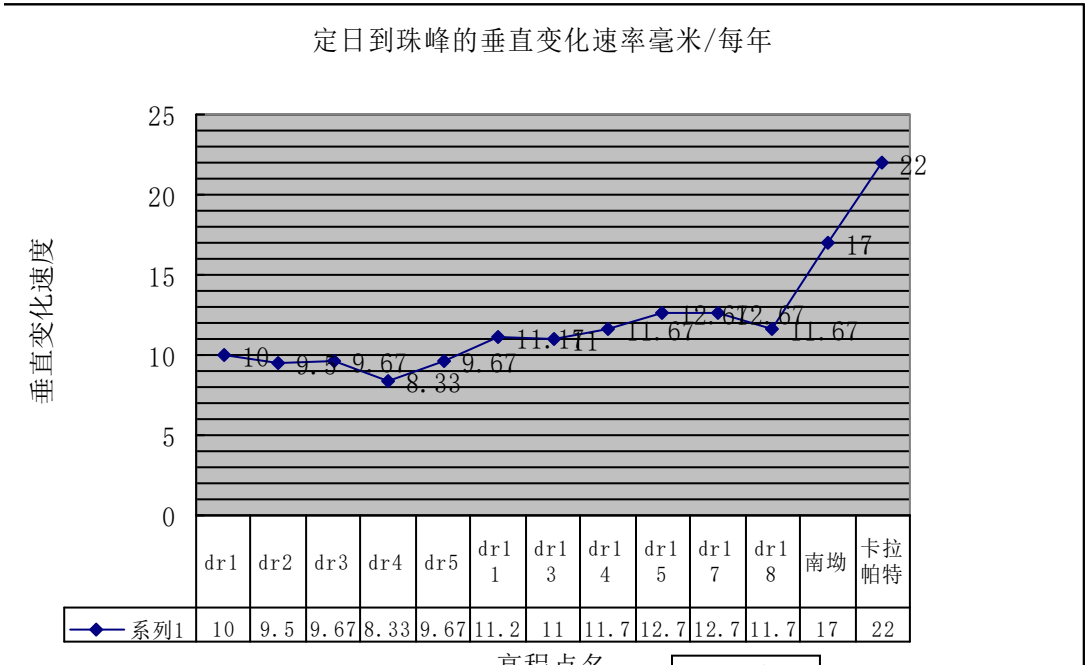
NGCC

the Instruments









Height changed reason:

snow surface changed on top

rock weathering

no tripod on the top by trigonometric

long distance trigonometric

air refractive effects

GPR sound speed in ice-snow correct

Gravity gradient correct

Geoid accuracy

crustal movement

different level system

2005 review ：Different height camp

NGCC

Physical test

NGCC

Technical Training

NGCC

Equipment transport

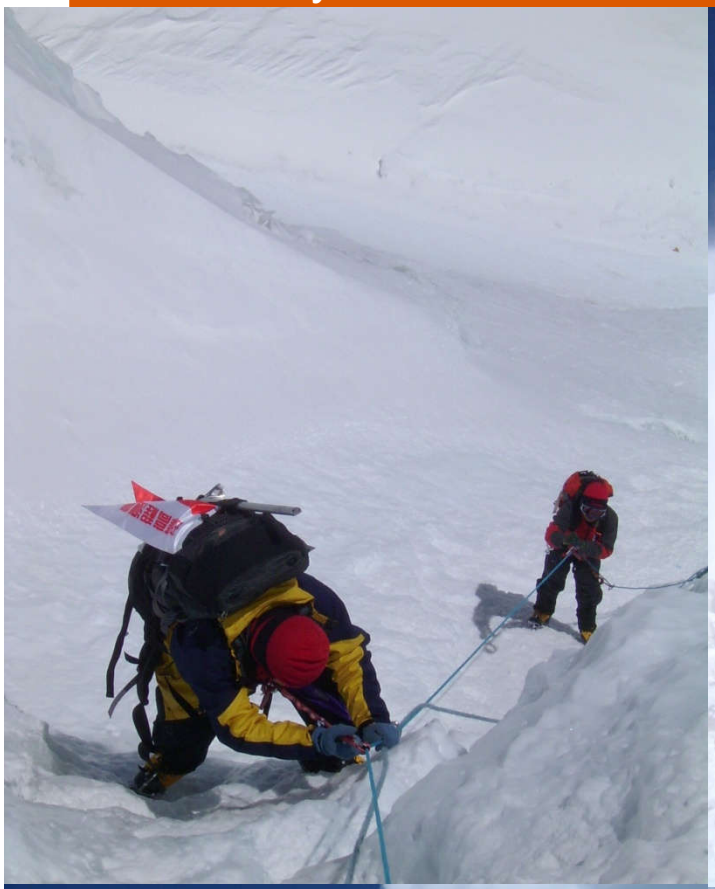
NGCC

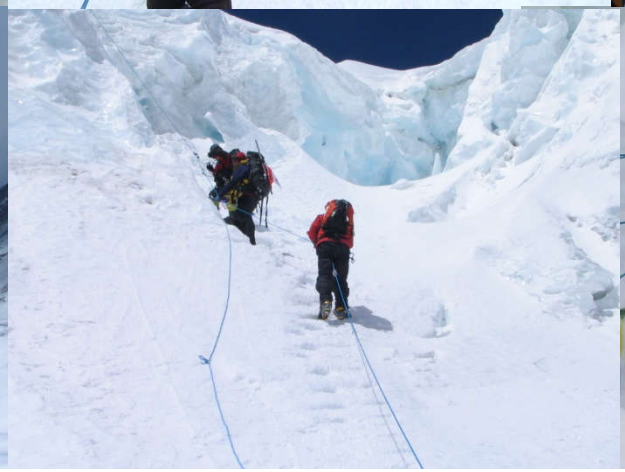
Ceremony before the summit

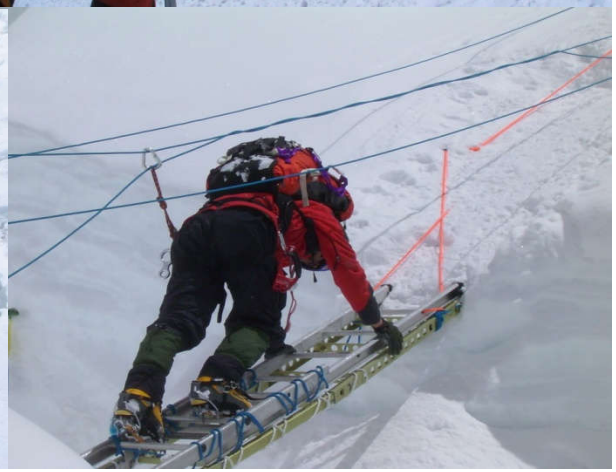
NGCC

on the way to summit

NGCC







5月22日11：08-12：20 on the summit

NGCC

total 47 surveyors for three month

NGCC

Build a monument

NGCC