

Dome Fuji Updates

Hirofumi Okita

Subaru Telescope

SCAR AAA 2015, Volcano, Hawaii

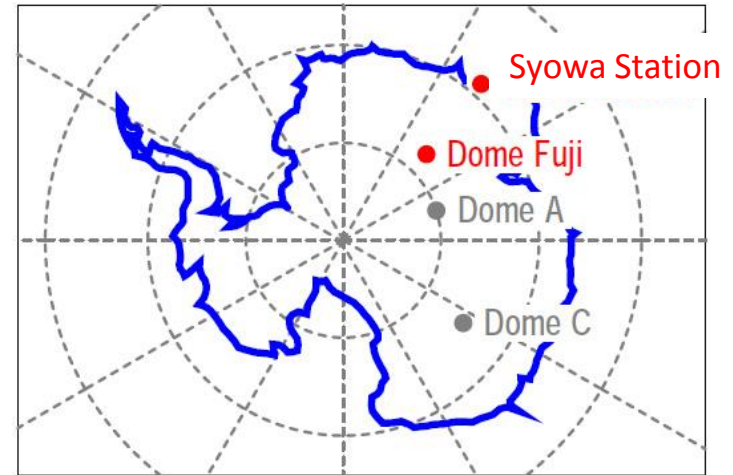
August 9th, 2015



Dome Fuji

- $77^{\circ}19'01''\text{S}$ $39^{\circ}42'12''\text{E}$
- 1,000km inland from Syowa Station.
- 3,810m above sea level
- Average -54.4°C , recorded -79.7°C

(Yamanouchi et al. 2003)



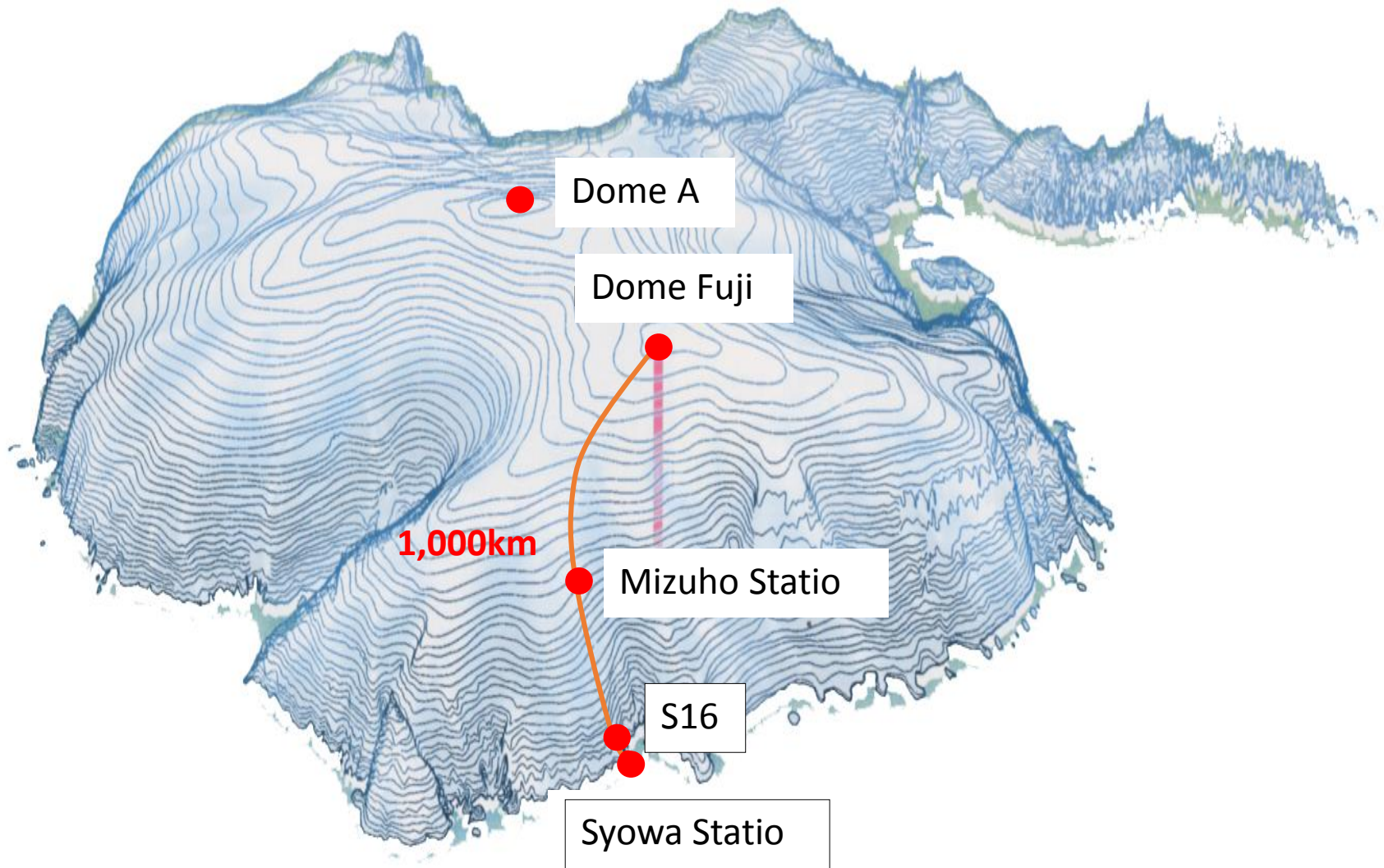
Syowa Station

<http://www.nipr.ac.jp/>



Dome Fuji Station
(1995-1997, 2003)

<http://www.nipr.ac.jp/jare/index.html>



Logistics

- One month journey from Perth to Syowa station, or several day flight from Cape town to Syowa station
- Two weeks drive from Syowa station to Dome Fuji
- Transportation, fuel, and network are limited.



PLATO-F

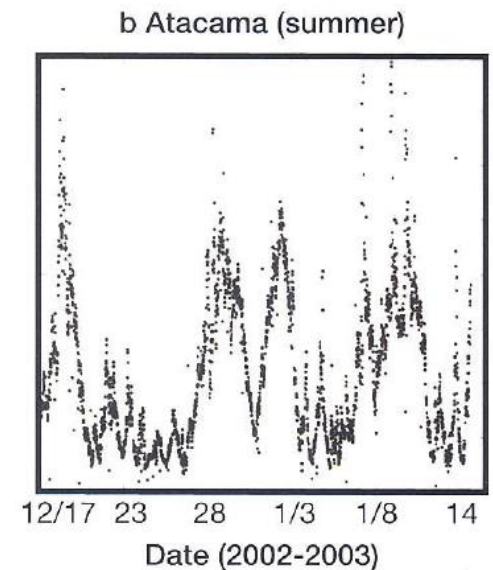
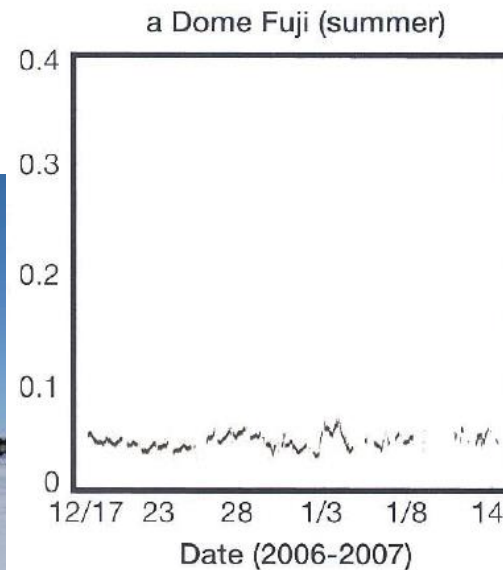
1kW power, Iridium Communication during 2011, 2013-2014

Site Testing

- Japanese communities have made a consortium for the Antarctic astronomy in 2005 (PI: Prof. Nakai, Univ. of Tsukuba).
- Site testing programs were started from 2006.

220 GHz Transparency

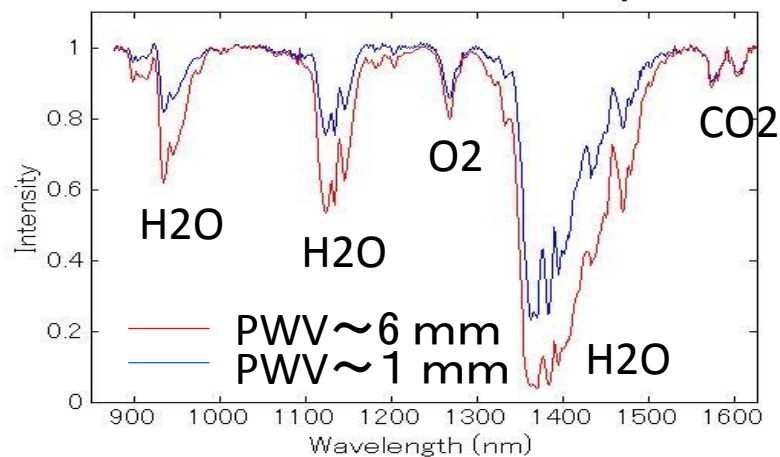
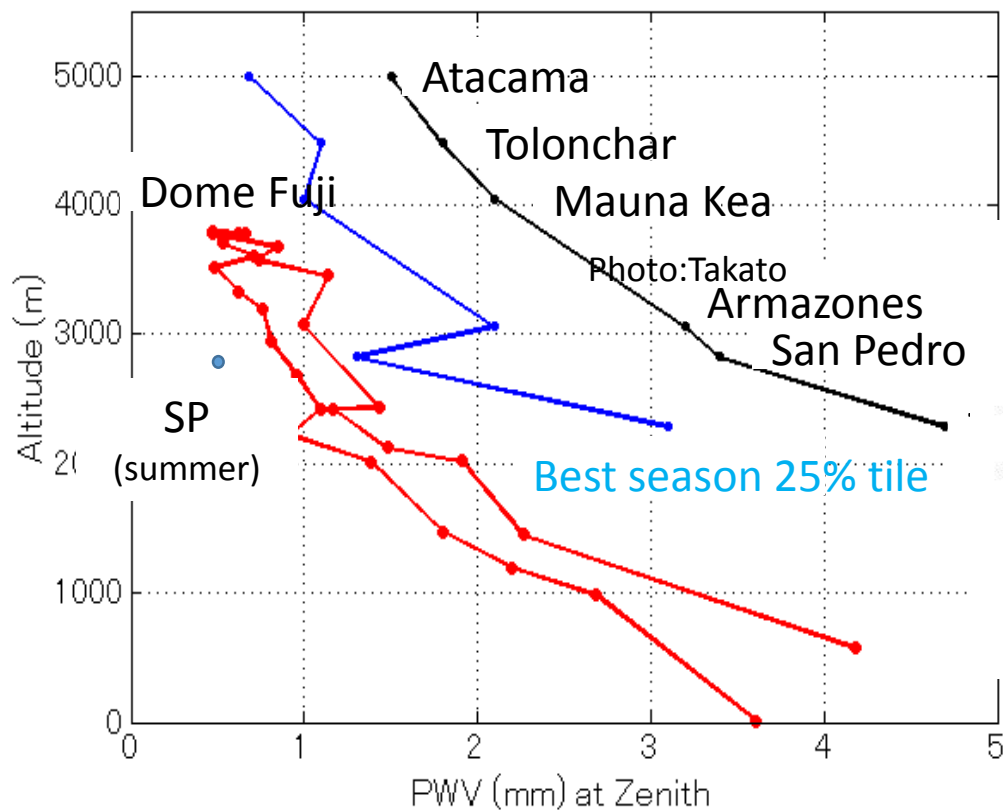
- $\tau = 0.045 \pm 0.007$ **SUMMER RESULT**
- More Stable compared with Atacama
- 2006/12-2007/01



Ishii et al. (2010)

PWV

- 0.6 mm PWV SUMMER RESULT
- Measured in January 2011



Boundary Layer

- 15.8m in median
- SNODAR
- January to May, 2011

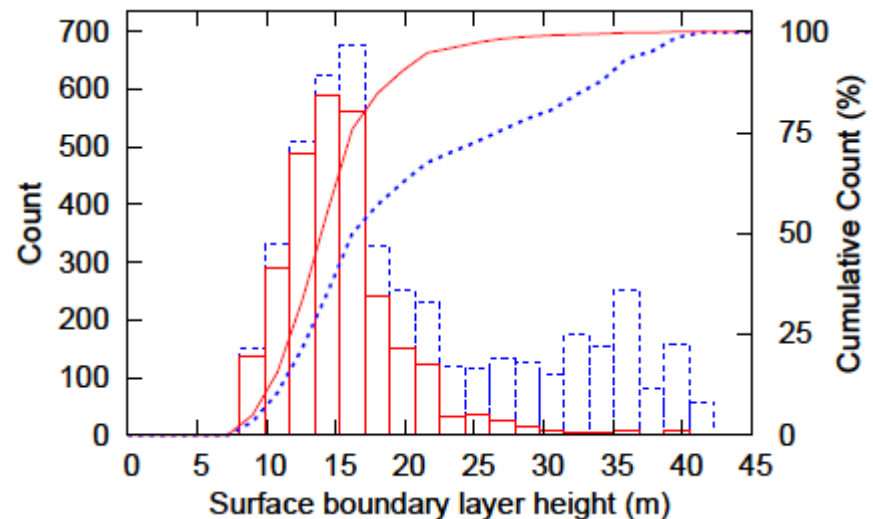
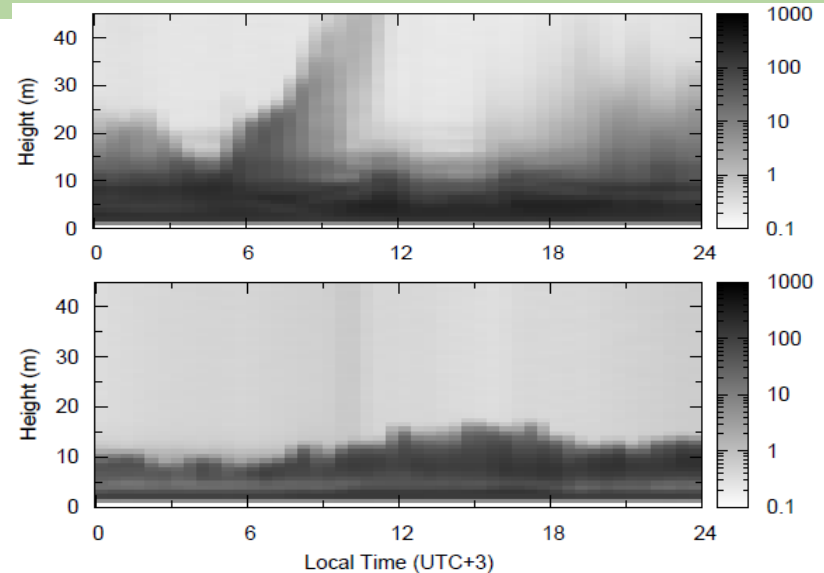
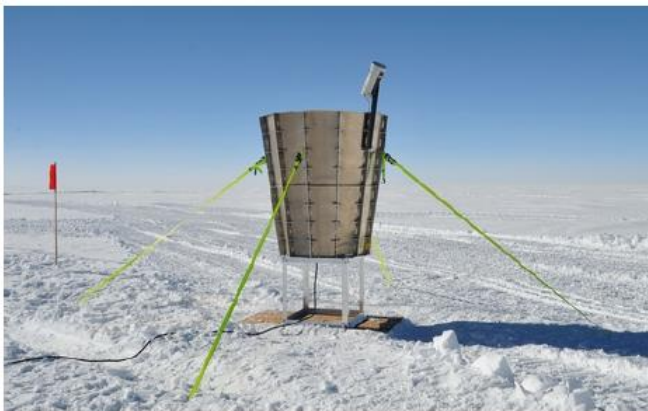
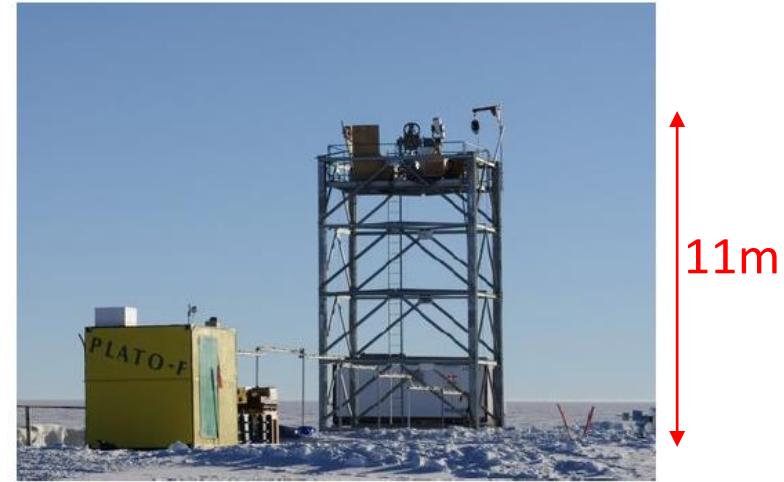


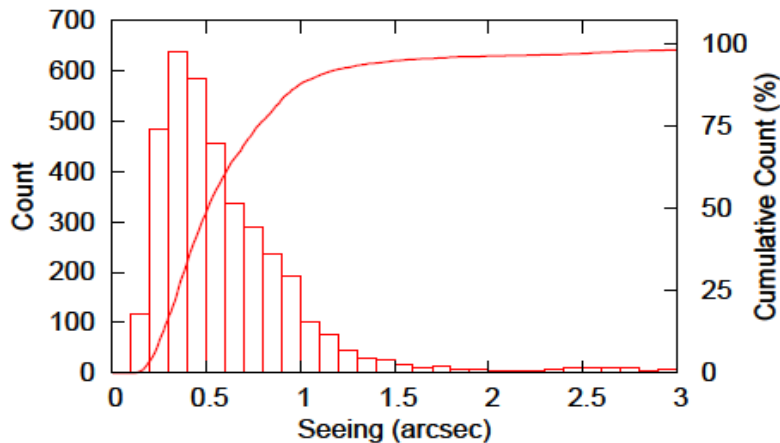
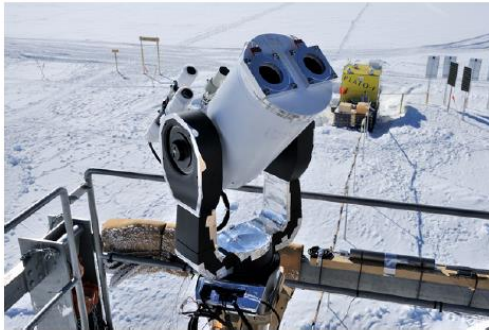
Figure 8.3: Histogram and cumulative histogram of the surface boundary layer height. Red solid line and boxes mean the histogram and cumulative histogram, which are under in fine weather in the Antarctic autumn and winter, and blue dot line and boxes mean those in all weather conditions for entire period.

Free Atmosphere

- 0.23" in median is estimated
- Observed in January 2013

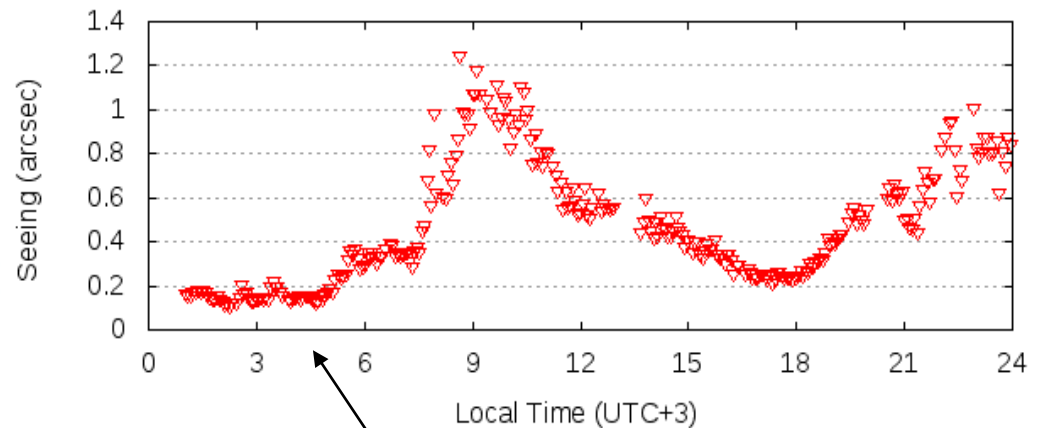


SUMMER RESULT



Median Summer Seeing = 0.52" @11m

Astronomical Seeing at Dome Fuji on January 6, 2013



The exceptional seeing would be occurred when the telescope height was higher than the height of the boundary layer.

Okita et al. (2013)

Future Projects

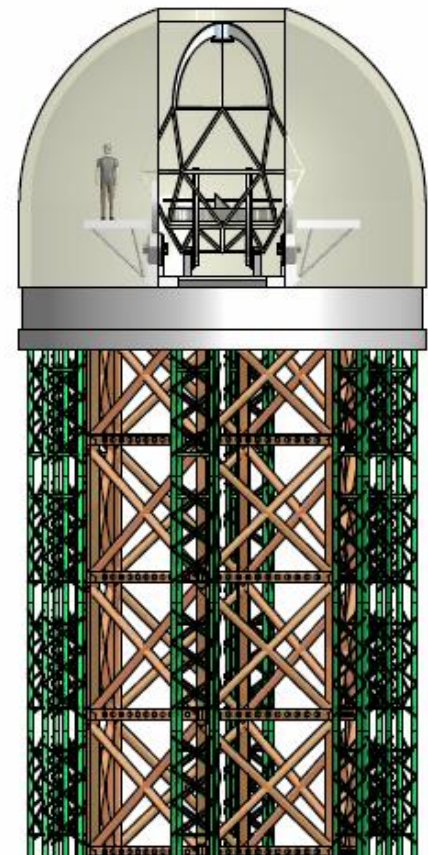
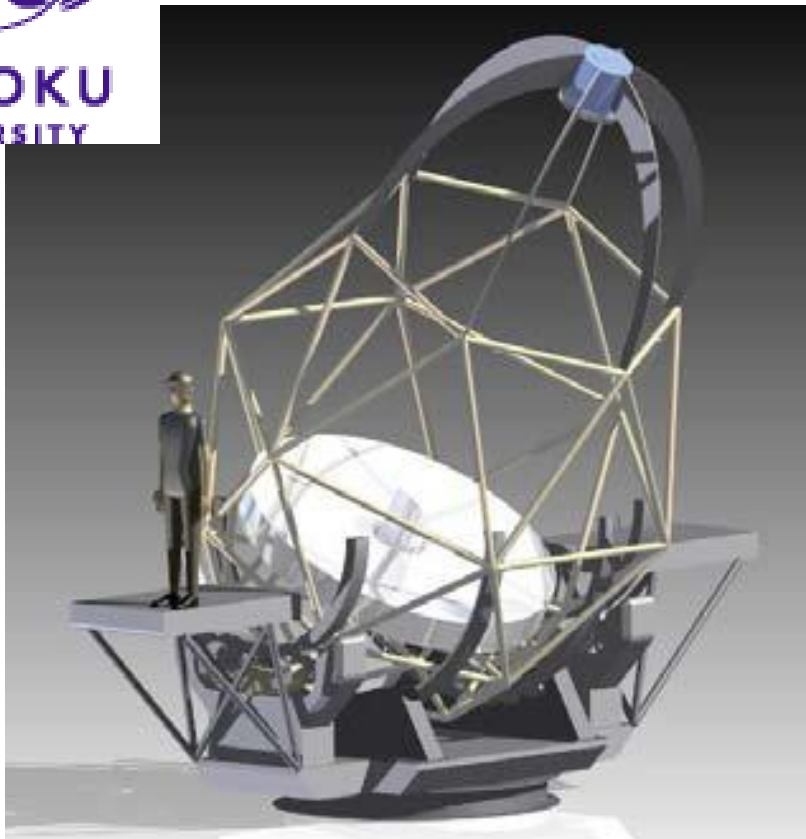
- 2.5m Infrared Telescope
- 10m Terahertz Telescope

2.5m Infrared Telescope



TOHOKU
UNIVERSITY

- 1-5um imaging & 10um spectrograph
- Unveil dust rich “Hidden” galaxies
- Detect H₂O in exoplanet atmosphere

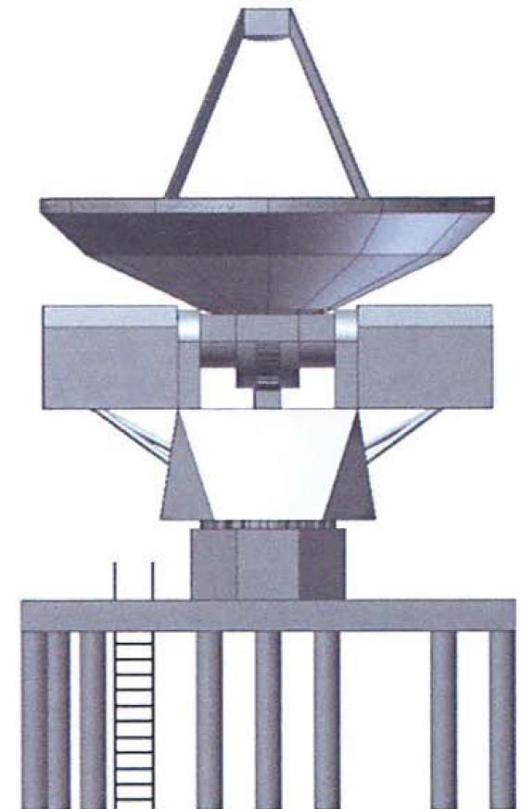
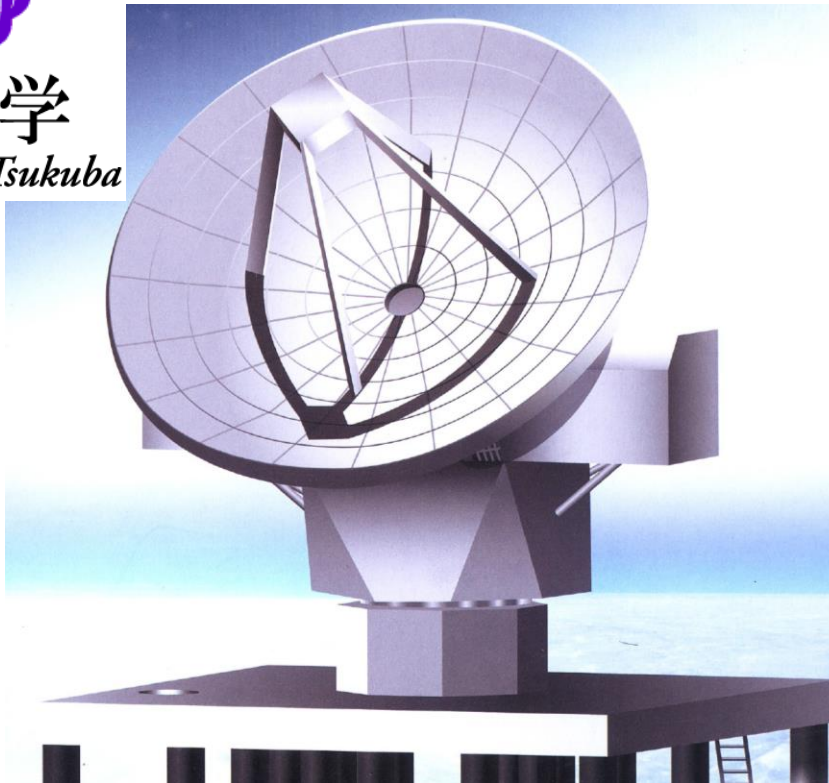


10m Terahertz Telescope



筑波大学
University of Tsukuba

- 200GHz – 1.5THz
- Wide Field (1sq.deg)
- Unveil dust rich galaxies



Unfortunately...

(THIS IS JUST MY PERSONAL UNDERSTANDING.)

- National Institute of Polar Research of Japan (NIPR) has a plan to construct a new winter-over station at Dome Fuji for both ice-core science and astronomy.
- Astronomy is one of the “Project Research” of NIPR in the current 6-year program (2010-2015).
- During the program, Japanese icebreaker could not reach Syowa station in 2012 and 2013. All activities were consequently re-allocated.
- It's really difficult situation for astronomy. I think Astronomy will be accepted as one of “Project Research” in the next 6-year program (2016-2021), and we may access Dome Fuji one or twice. However, I think, NIPR does not complete building the new station during the period. The telescope projects will be delayed due to the situation.

