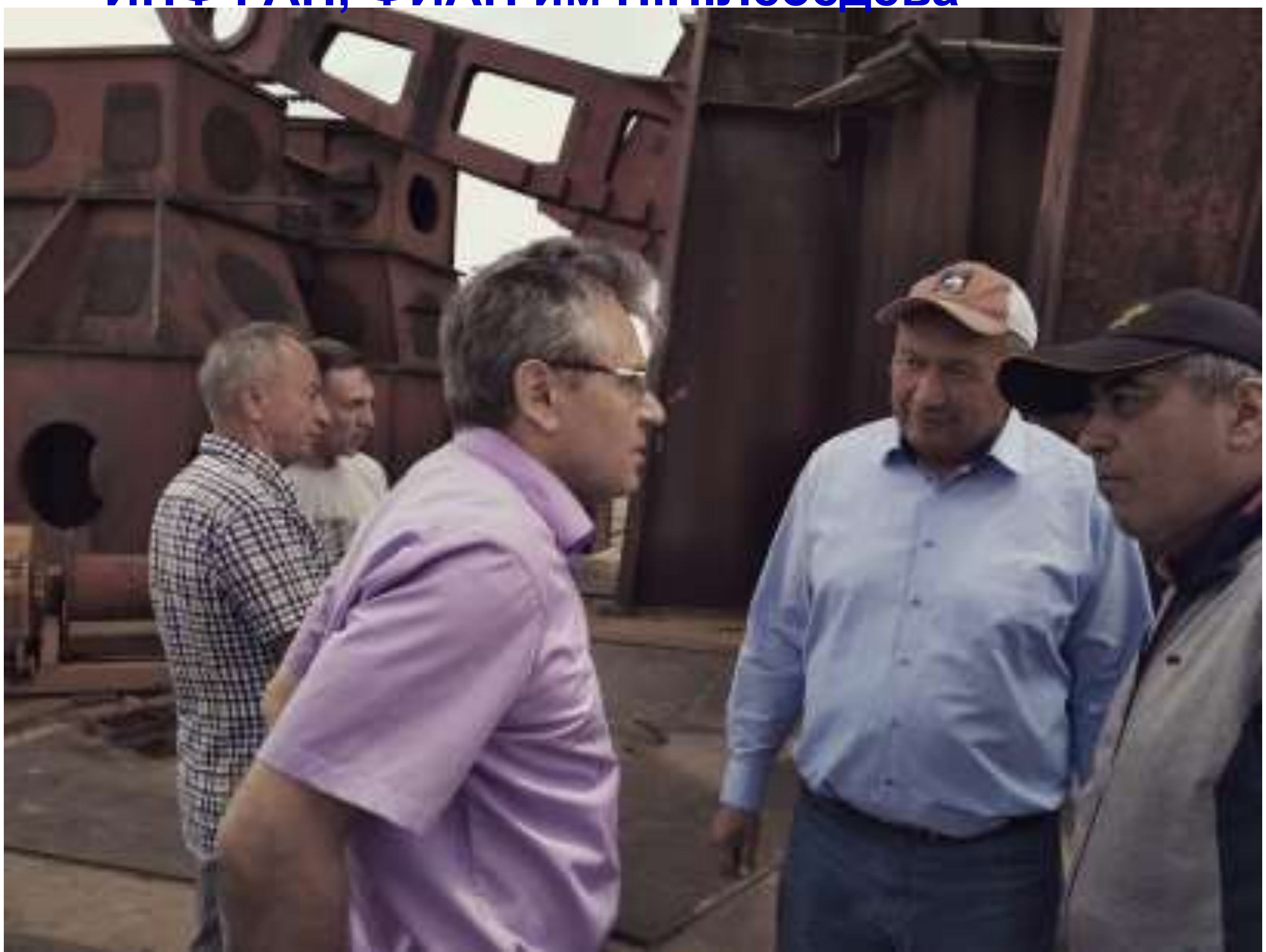
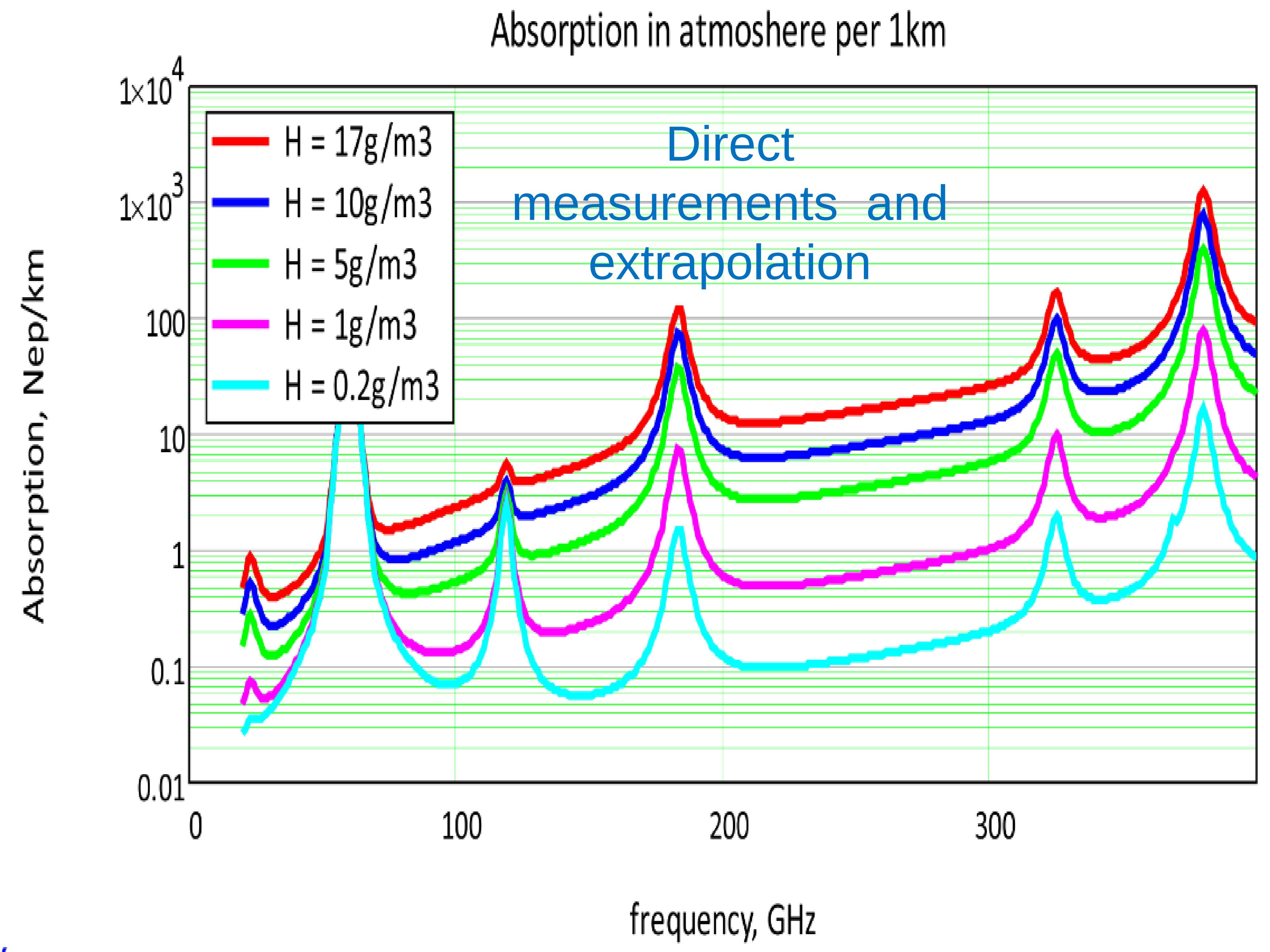
Исследования микроволнового астроклимата с целью выбора оптимального места размещения субТГц радиотелескопа

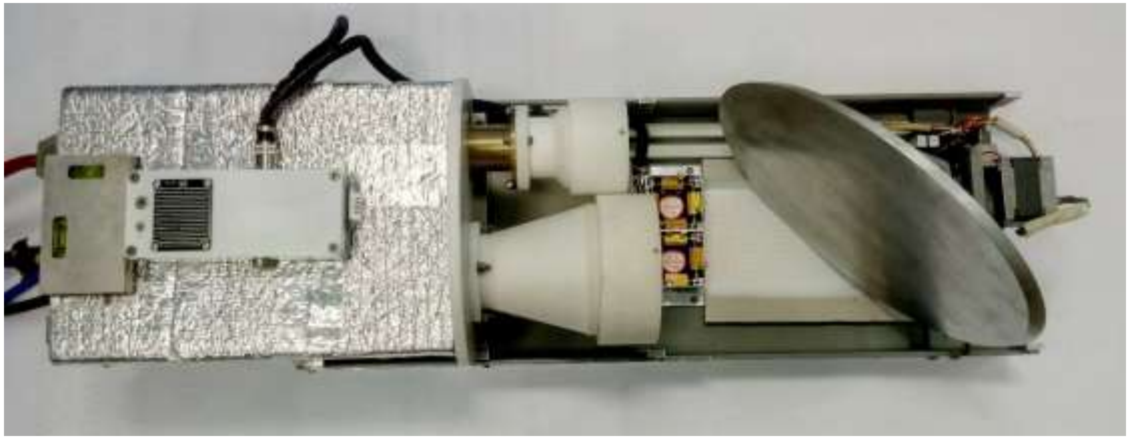
Вдовин В.Ф. д.ф.-м.н., г.н.с.,
ИПФ РАН, ФИАН им П.Н.Лебедева

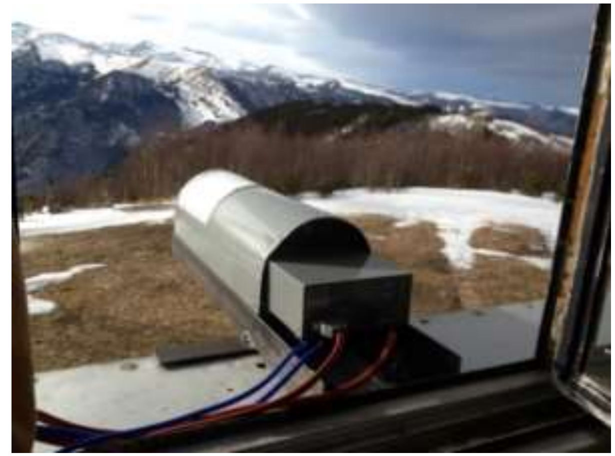



Absorption in atmoshere per 1km
1×10^4
1×10^3
100
10
1
0.1
0.01
Absorption, Nep/km
H = 17g/m3
H = 10g/m3
H = 5g/m3
H = 1g/m3
H = 0.2g/m3
Direct measurements and extrapolation
0
100
200
300
frequency, GHz

Equipment for direct subtHz atmosphere propagation researches

A Dual-Wave Atmosphere Transparency Radiometer of the Millimeter Wave Range





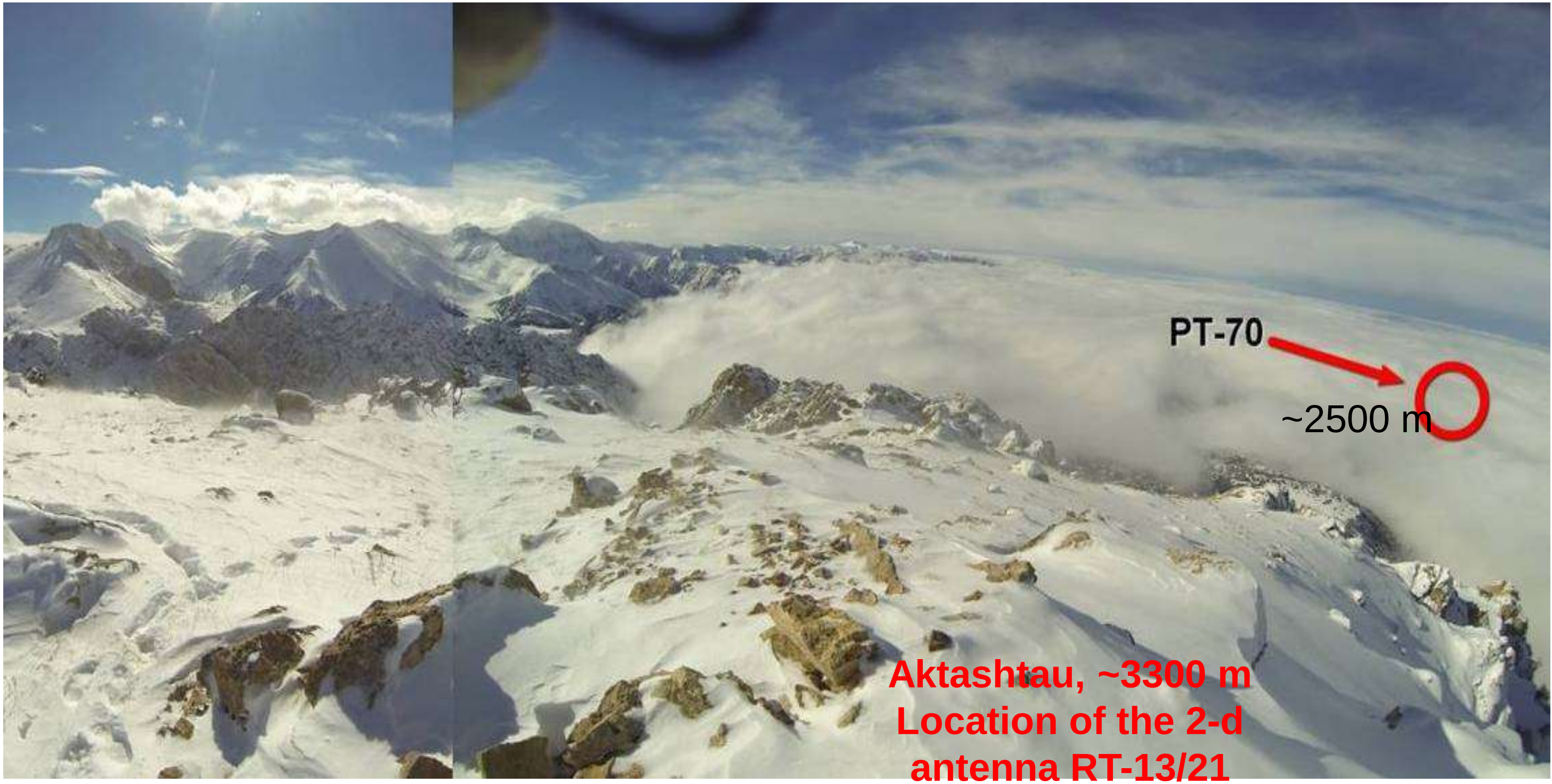
Main features:

- Fully automated Internet-controlled measurements under “Atmospheric-dip” method
- Noise temperature of 1300K@3mm & 5800K@2mm
- Averaging time 4-30 sec@ one angle, and ~3 minute for one “dip”
- Automatic DIY meteostation with heater control
- ~ 10% total accuracy.

- Nosov et al. Instruments and Experimental Techniques, 2016, Vol. 59, No. 3, pp. 374–380

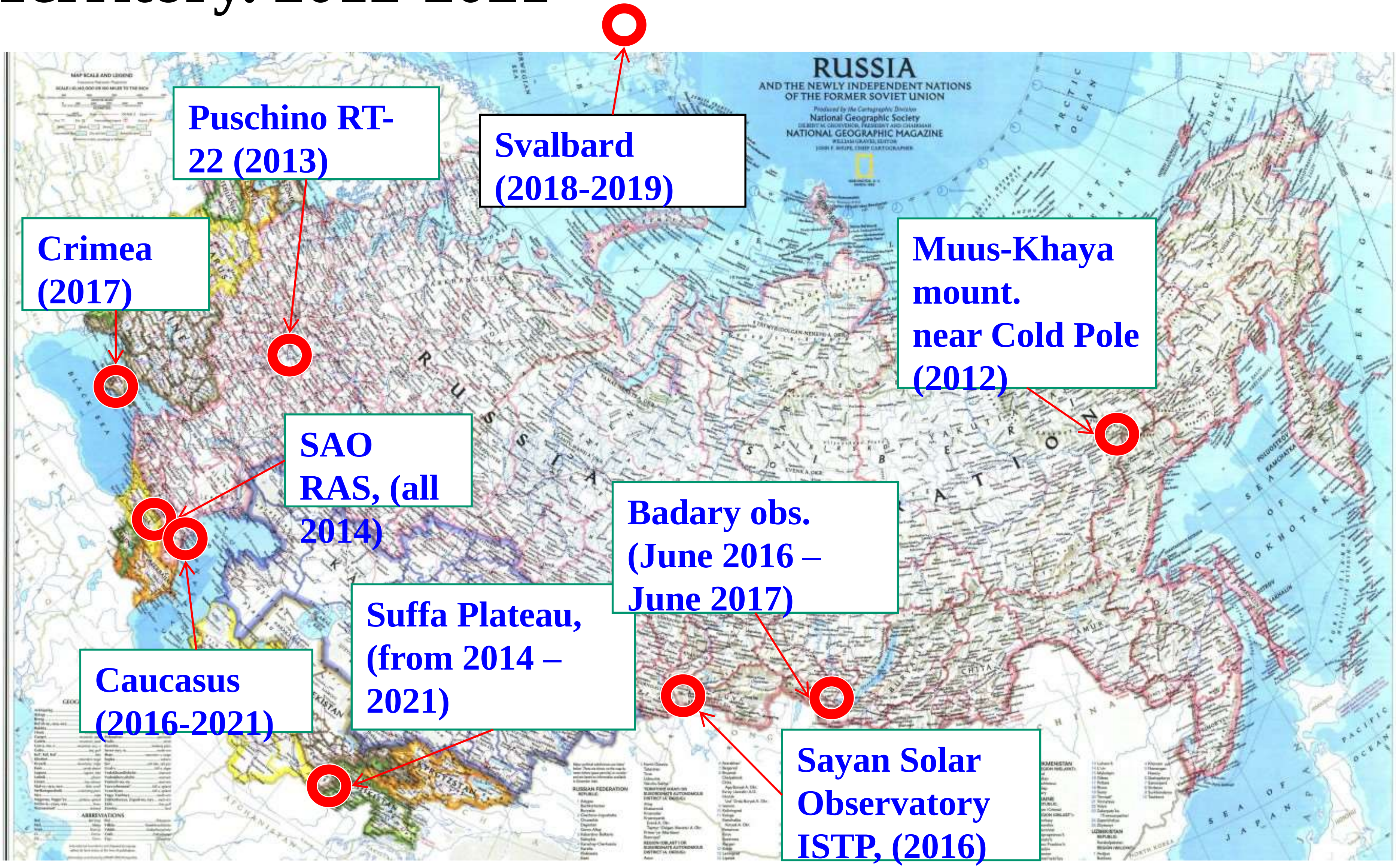
Suffa atmospheric conditions might be better

A view to Suffa plateau from the altitude of 3300m.
It's actually the best place for suTHz antenna.



Окрестности РТ-70 содержат удобные площадки для размещения малых СубТГц зеркал

Territory. 2012-2021



EHT, S.S.Doleman & Co, 2021

DRAFT VERSION FEBRUARY 11, 2021
Typeset using LaTeX **twocolumn** style in AASTeX63

Evaluation of New Submillimeter VLBI Sites for the Event Horizon Telescope

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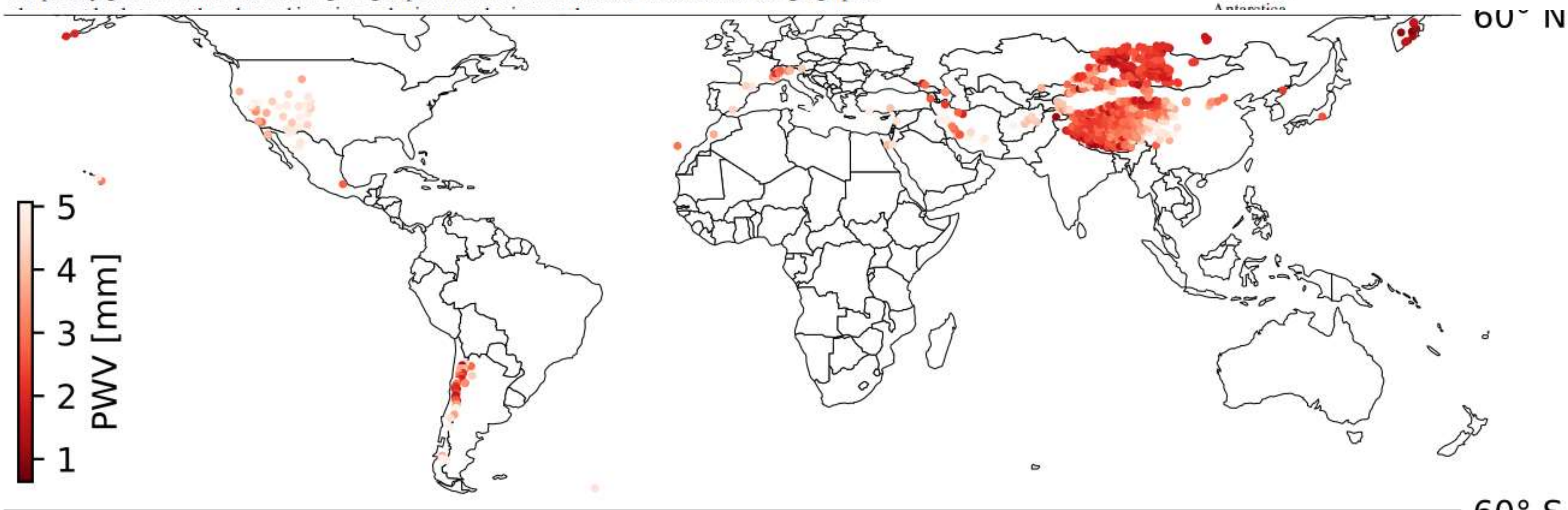
ABSTRACT

The Event Horizon Telescope (EHT) is a very long baseline interferometer built to image supermassive black holes on event-horizon scales. In this paper, we investigate candidate sites for an expanded EHT array with improved imaging capabilities. We use historical meteorology and radiative transfer analysis to evaluate site performance. Most of the existing sites in the EHT array have median zenith opacity less than 0.2 at 230 GHz during the March/April observing season. Seven of the existing EHT sites have 345 GHz opacity less than 0.5 during observing months. Out of more than forty candidate new locations analyzed, approximately half have 230 GHz opacity comparable to the existing EHT sites, and at least seventeen of the candidate sites would be comparably good for 345 GHz observing. A group of new sites with favorable transmittance and geographic

Table 1. Locations of Existing Sites (2021) in the Event Horizon Telescope Array (Event Horizon Telescope Collaboration et al. 2019a).

Site	Location (Region, Country)	Lat. (°)	Lon. (°)	Alt. (m)
ALMA	Antofagasta, CL	-23.03	-67.75	5070
APEX	Antofagasta, CL	-23.01	-67.76	5100
GLT[a]	Avannaata, GL	76.54	-68.69	90
IRAM-30m	Granada, ES	37.07	-3.39	2920
JCMT	Hawaii, US	19.82	-155.48	4120
KP	Arizona, US	31.96	-111.61	1900
LMT	Puebla, MX	18.98	-97.31	4600
NOEMA	Pr.-Alpes-Côte d'Azur, FR	44.63	5.91	2620
SMA	Hawaii, US	19.82	-155.48	4110
SMT	Arizona, US	32.70	-109.89	3160
SPT[b]	South Pole,	-90.00	45.00	2820



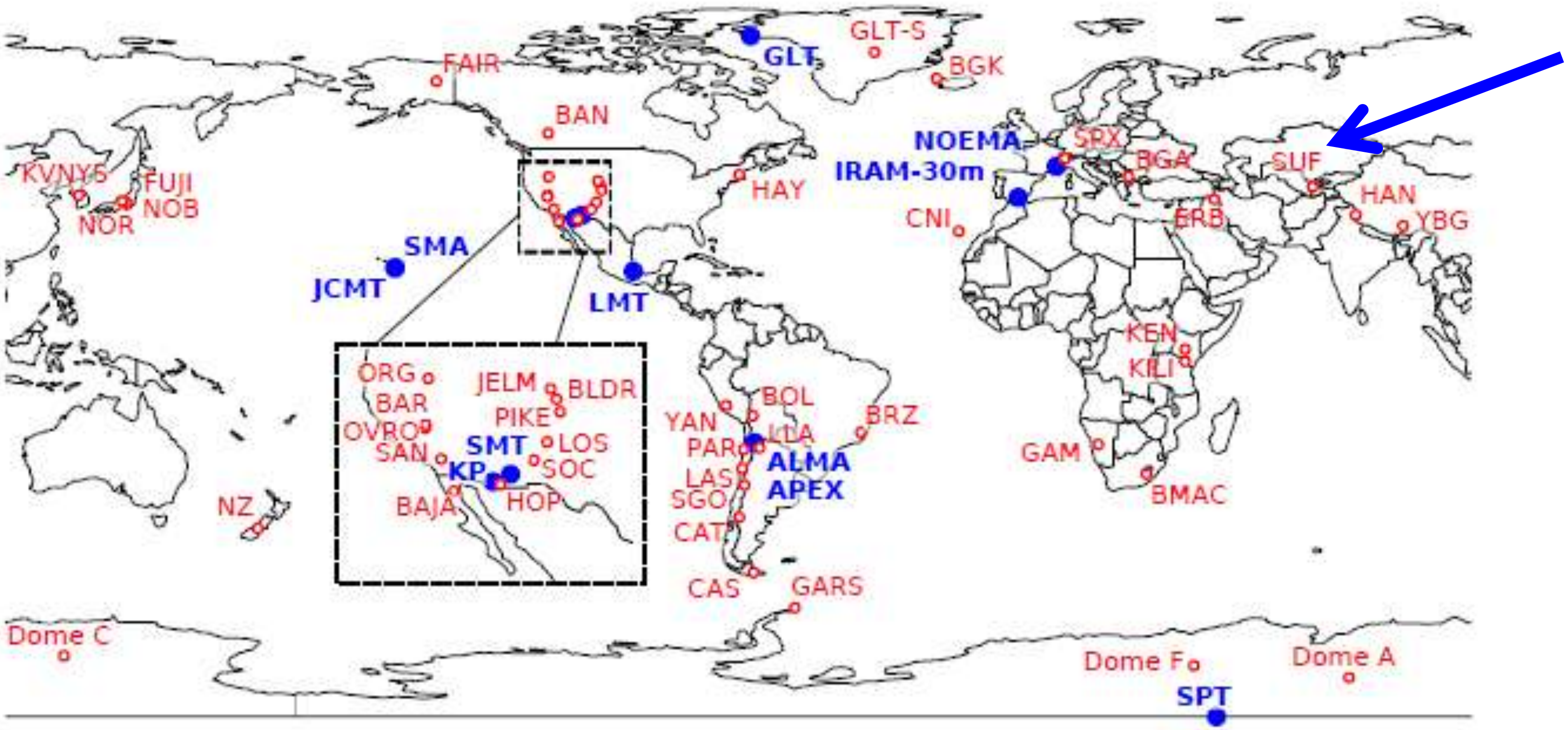
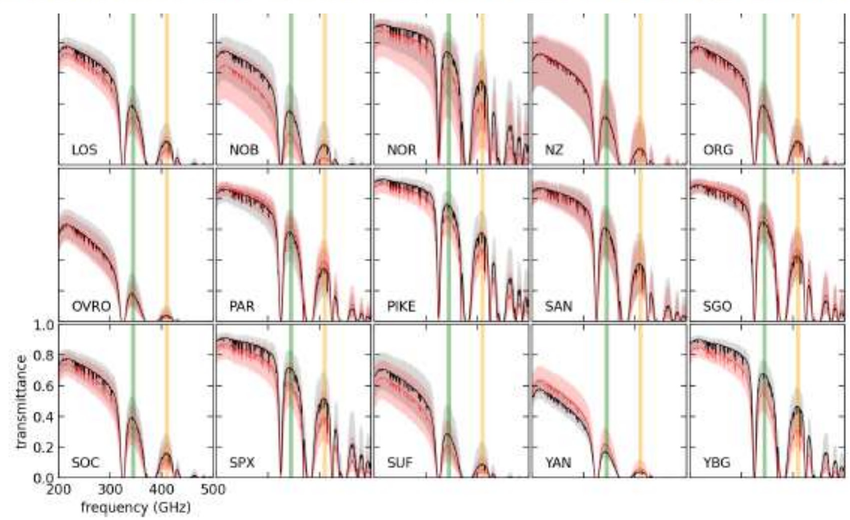
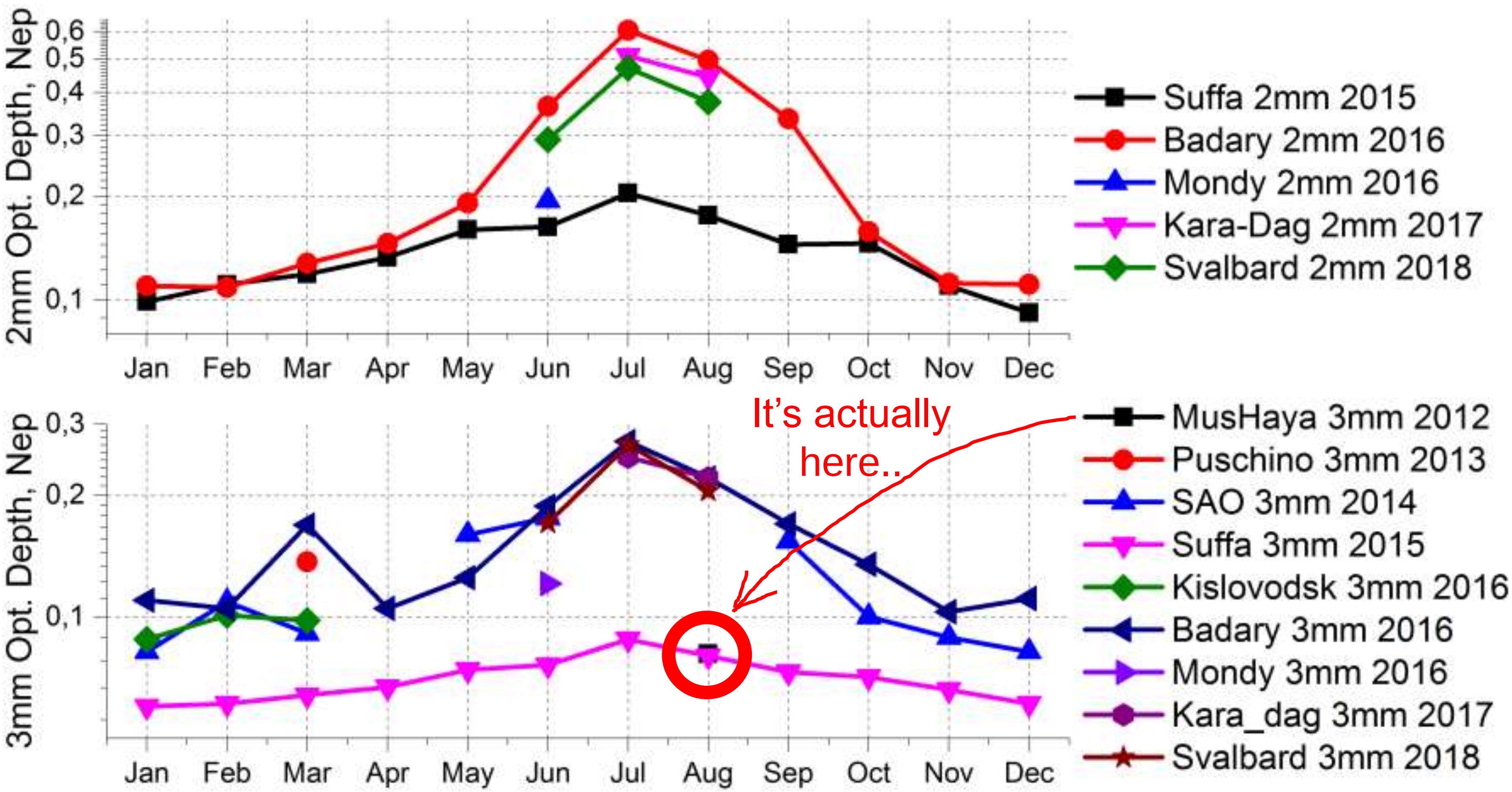


Figure 2. Map of planned 2021 EHT sites (blue, bold) listed in Table 1 and 45 potential new sites (red) for the ngEHT listed in Table 2. The map is centered on the 2021 EHT sites.

NZ	Canterbury, NZ	-44	171	2000
ORG	Oregon, US	42	-118	2000
OVRO	California, US	37	-118	1000
PAR	Antofagasta, CL	-25	-70	2500
PIKE	Colorado, US	39	-105	4000
SAN	California, US	34	-117	2500
SGO	Santiago, CL	-33	-70	3500
SOC	New Mexico, US	34	-108	2000
SPX	Bern, CH	47	8	3500
SUF	Jizzakh, UZ	40	68	2000
YAN	Huanca Sancos, PE	-14	-75	4500
YBG	Yangbajing Tibet, CN	30	91	4000



The 1st important pic (Opt.depth by MIAP-2)



Suffa plateau has **the lowest** values of Optical Depth ever measured by MIAP-2 Radiometers перспективы: горный Дагестан, Чечня и Осетия

ре 2021 уже состоялись экспедиции на г.Маяк (Гуниб) , Шалбуздаг, Столо

ле 2022 предполагаются новые измерения как на горах Ярыдаг и Базард
ничье с Азербайджаном), так и в направлении Чечни и Осетии

р.Физика, техника, 2022, №1