1

$1,2$

1,

th

α

T_B

$$F(\nu) = \pi\,\theta_{maj}\,\theta_{min}\,\frac{2\,h\,\nu^3}{c^2}\,\left[\frac{1}{e^{\frac{h\nu}{kT_B}}-1} - \frac{1}{e^{\frac{h\nu}{kT_{BG}}}-1}\right]$$

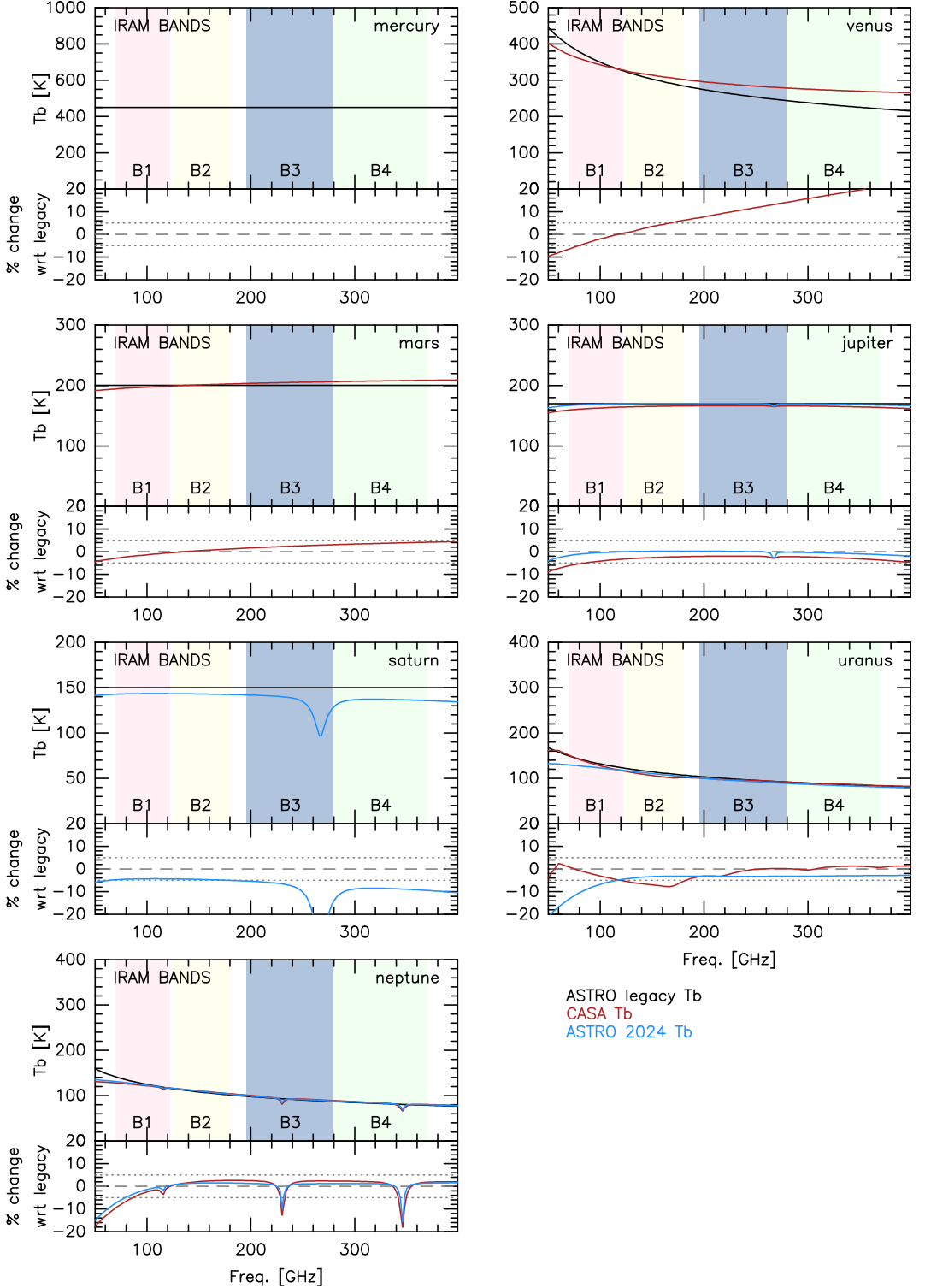
$$\theta_{maj} = \frac{R_{Maj}}{\Delta}$$

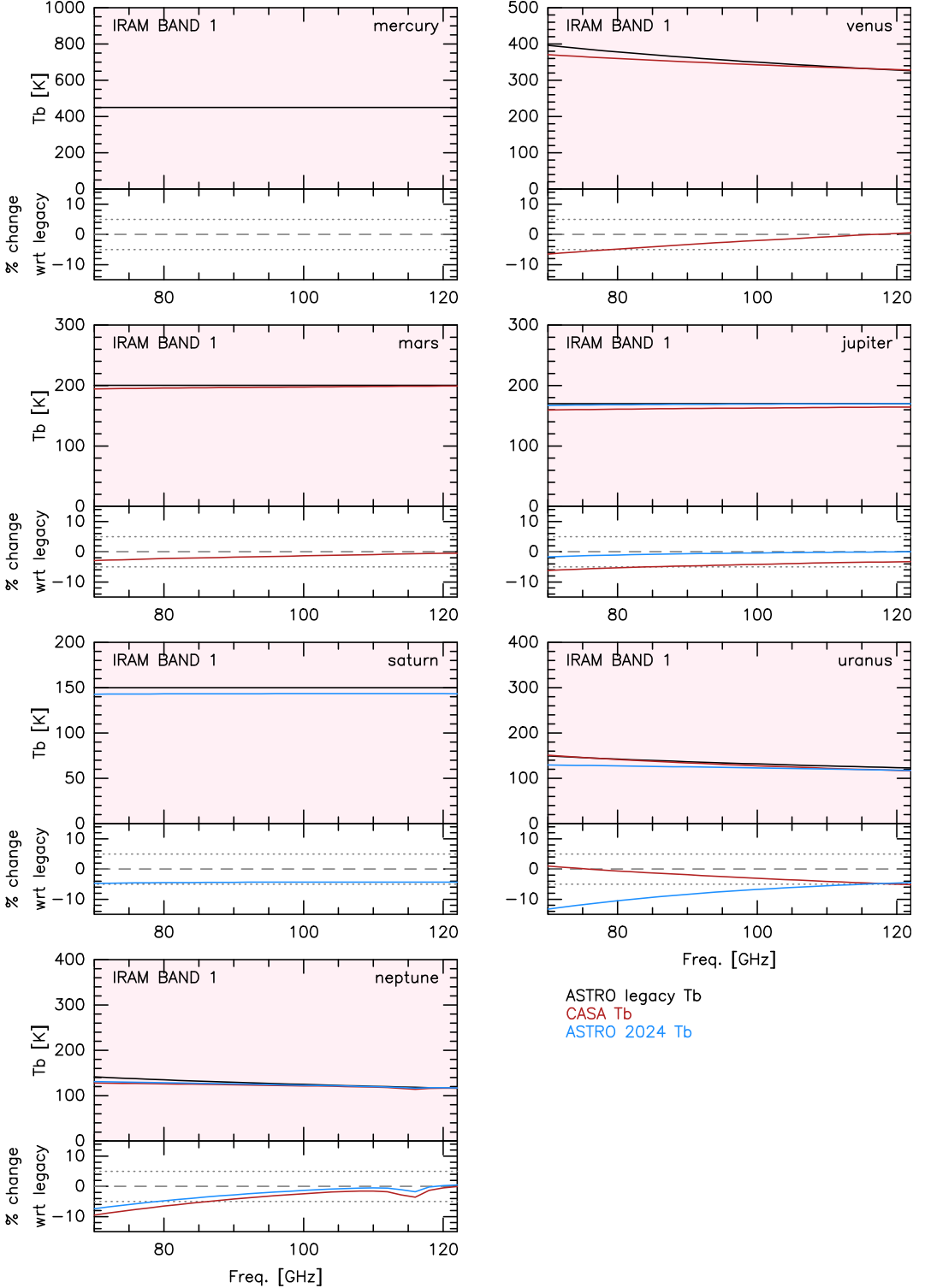
$$\theta_{min} = \frac{R_{Min}}{\Delta}$$

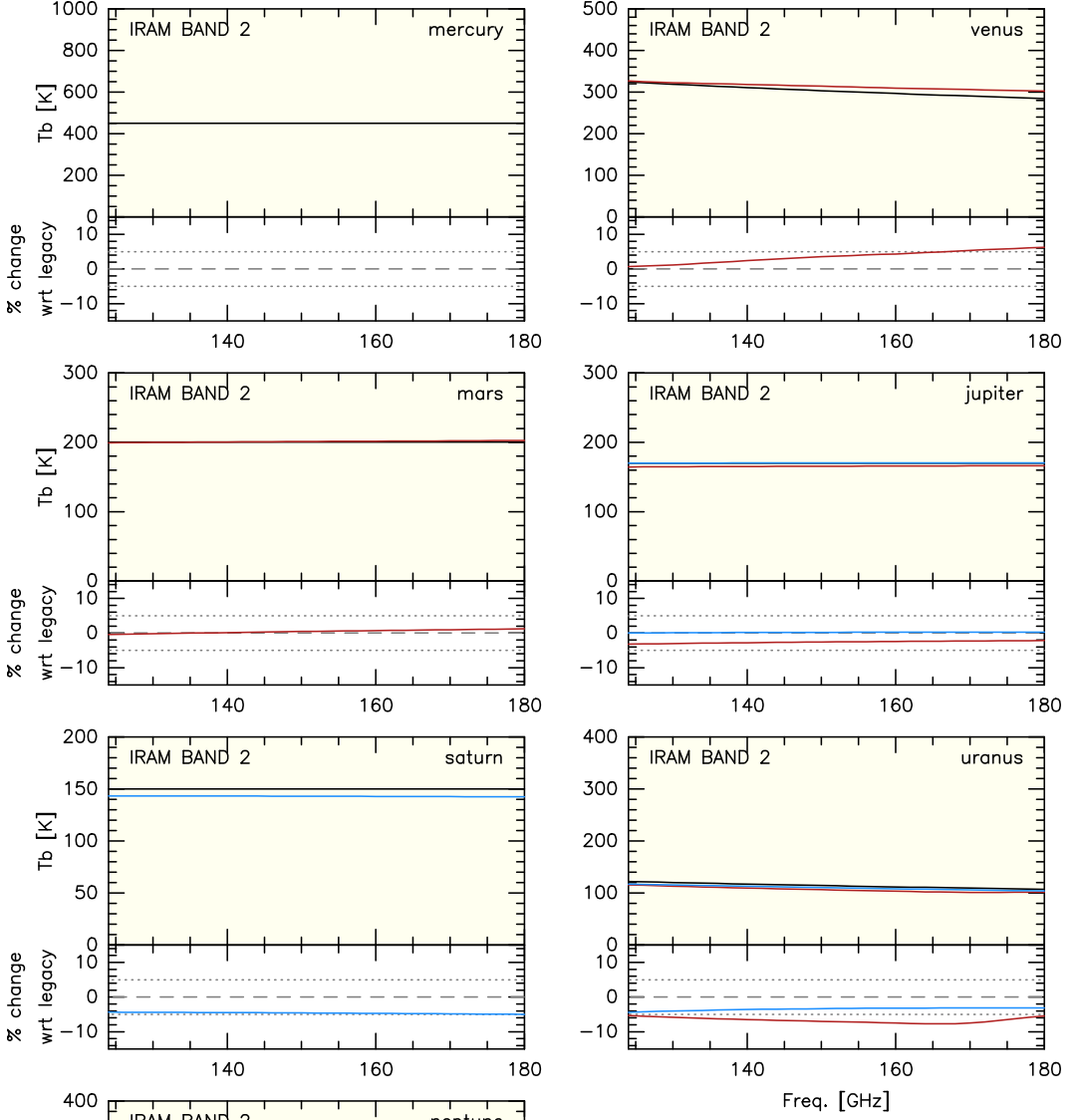
R

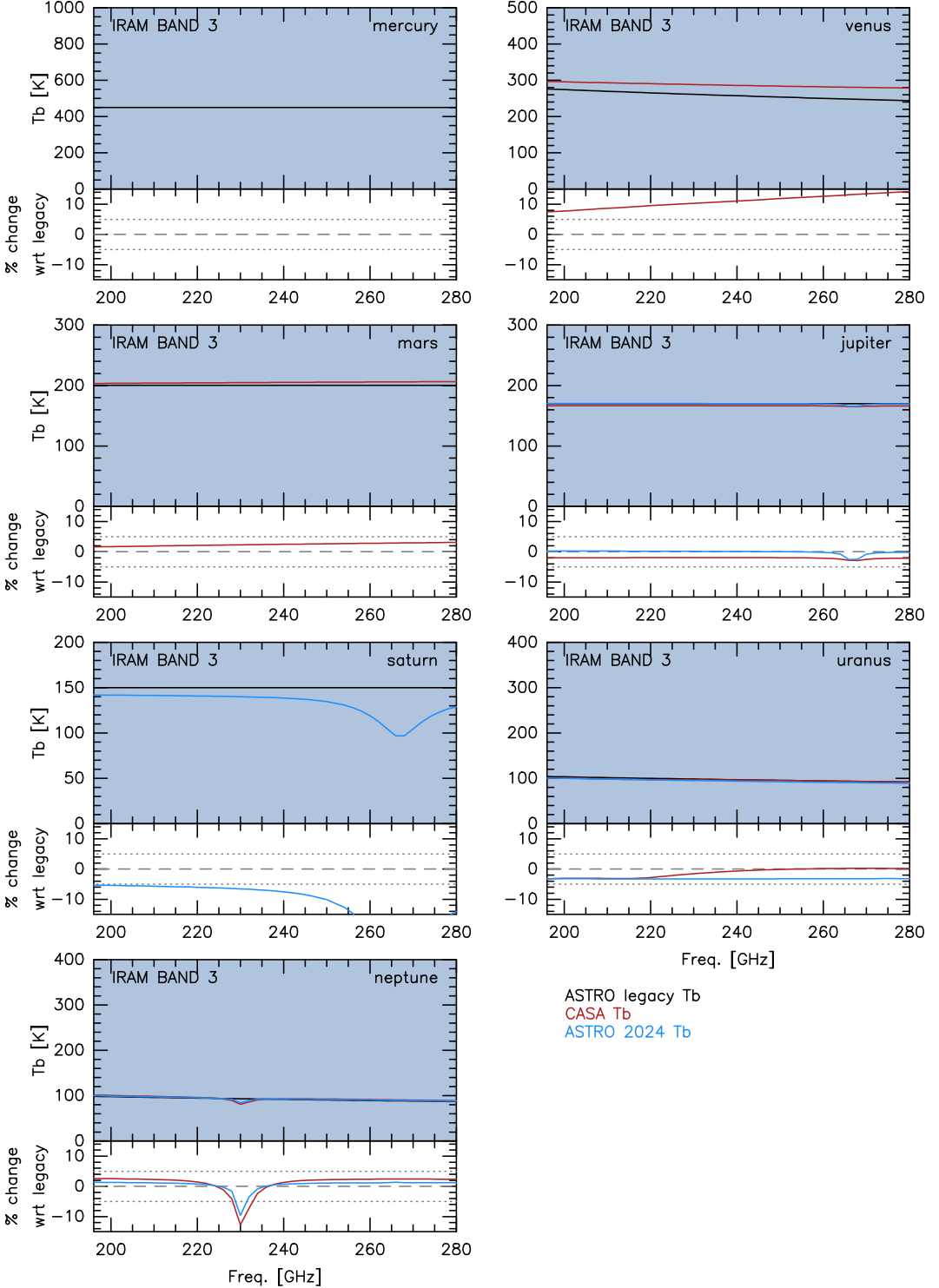
T_{BG}

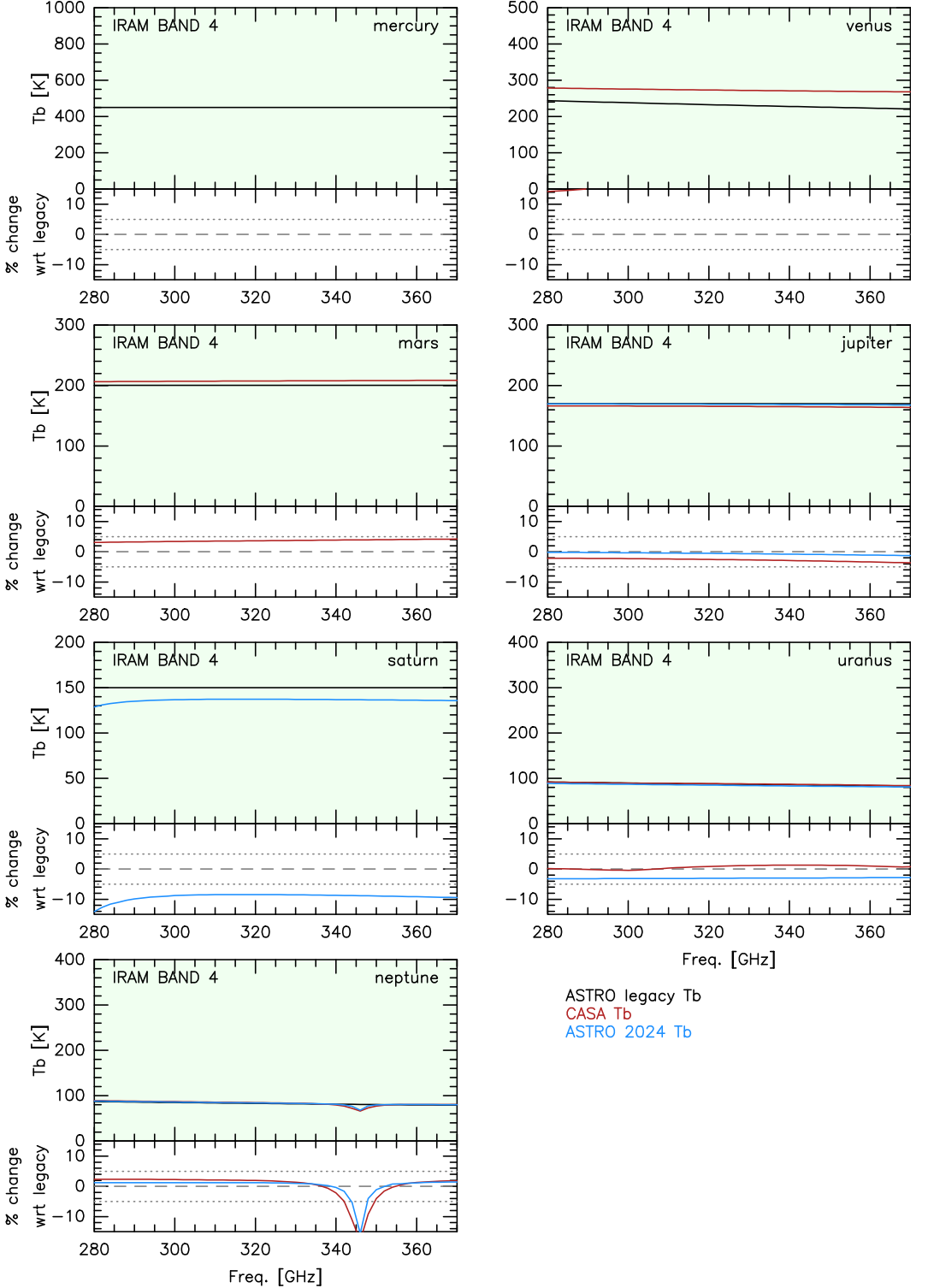
r_h

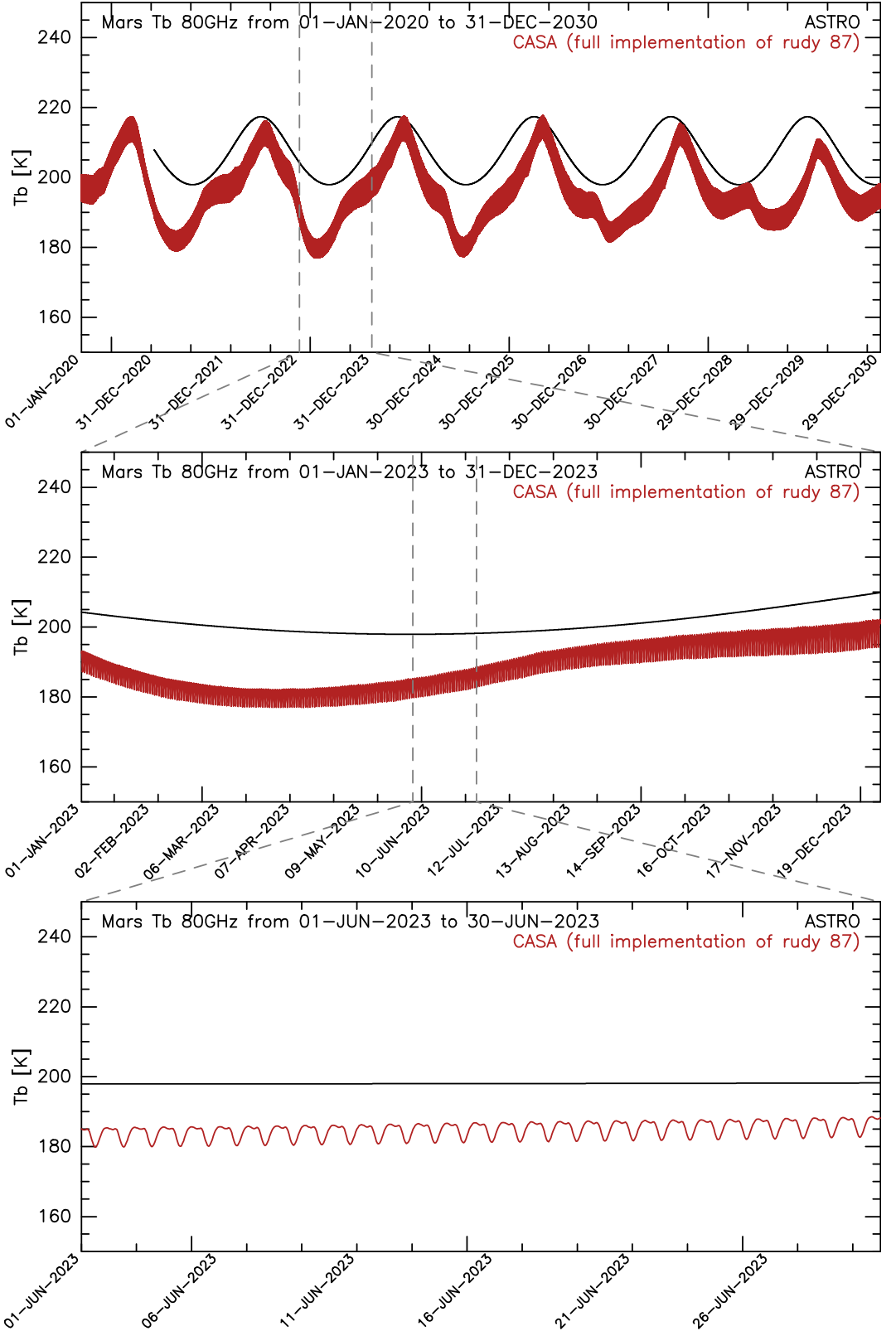

IRAM BANDS
mercury
venus
mars
jupiter
saturn
uranus
neptune
B1
B2
B3
B4
Tb [K]
% change wrt legacy
Freq. [GHz]
ASTRO legacy Tb
CASA Tb
ASTRO 2024 Tb

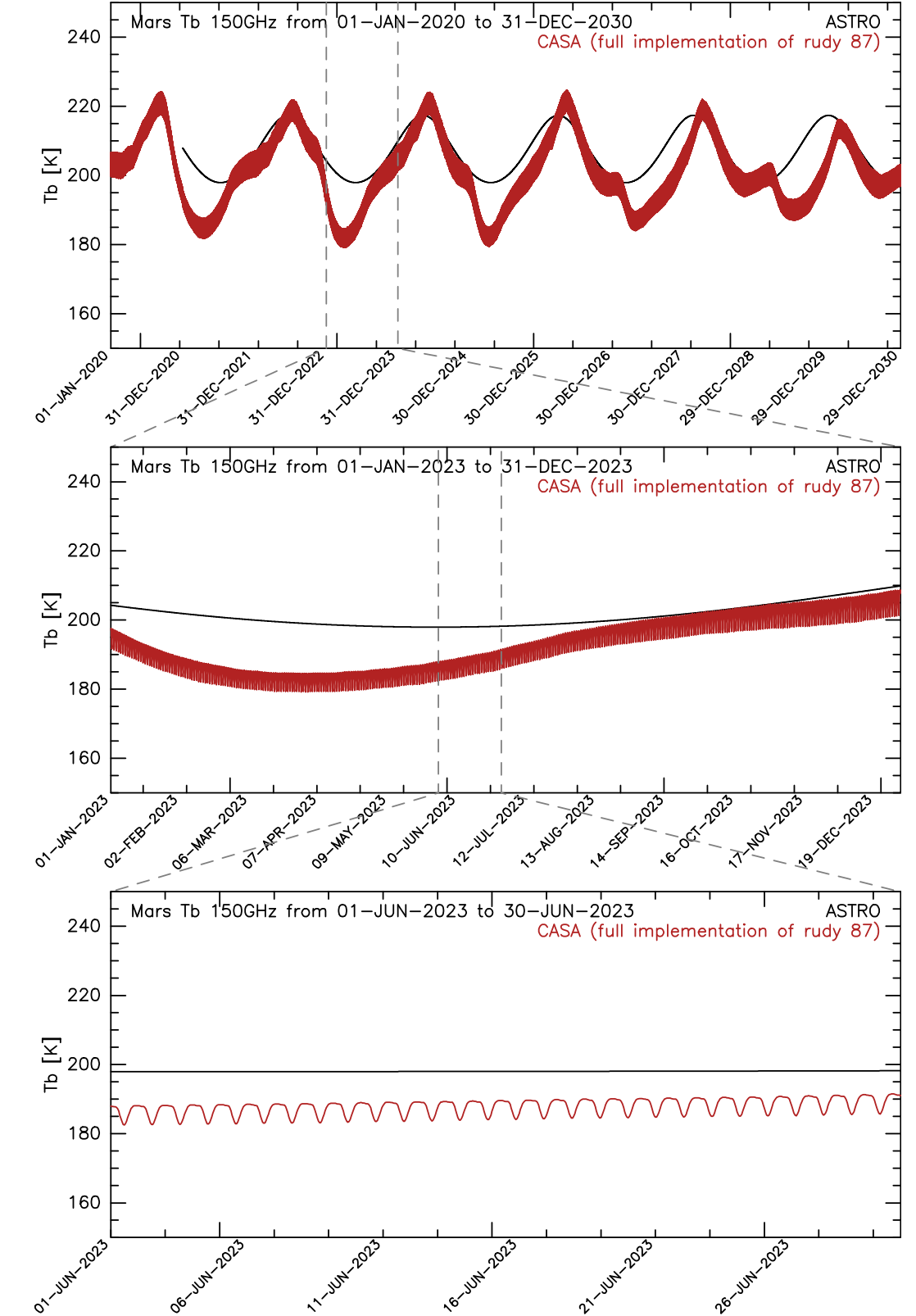

IRAM BAND 1
mercury
venus
mars
jupiter
saturn
uranus
neptune
Tb [K]
% change wrt legacy
Freq. [GHz]
ASTRO legacy Tb
CASA Tb
ASTRO 2024 Tb

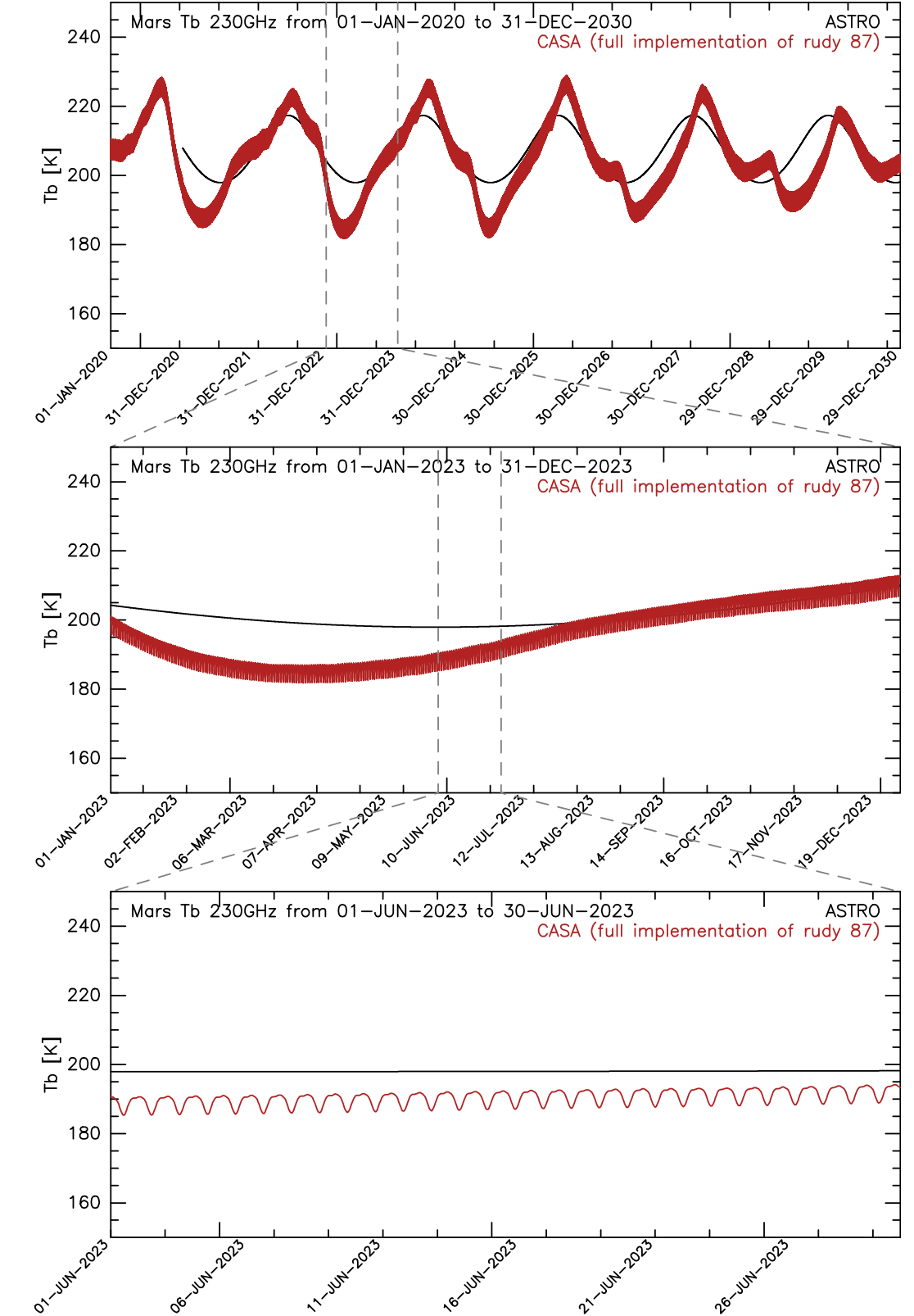

IRAM BAND 2
mercury
venus
mars
jupiter
saturn
uranus
neptune
Tb [K]
% change wrt legacy
Freq. [GHz]
ASTRO legacy Tb
CASA Tb
ASTRO 2024 Tb

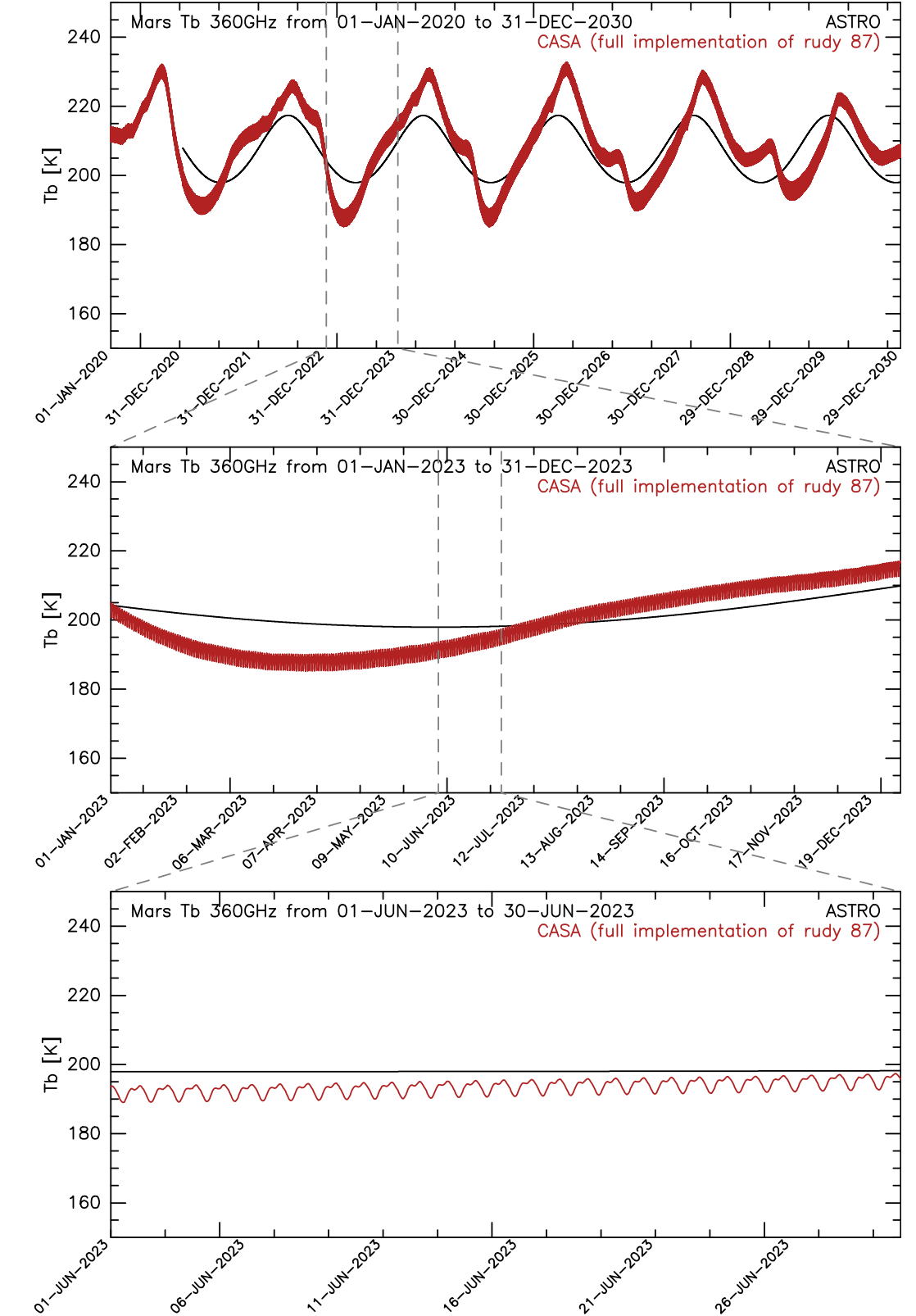

IRAM BAND 3
mercury
venus
mars
jupiter
saturn
uranus
neptune
Tb [K]
% change wrt legacy
Freq. [GHz]
ASTRO legacy Tb
CASA Tb
ASTRO 2024 Tb


IRAM BAND 4
mercury
venus
mars
jupiter
saturn
uranus
neptune
Tb [K]
% change wrt legacy
Freq. [GHz]
ASTRO legacy Tb
CASA Tb
ASTRO 2024 Tb


Mars Tb 80GHz from 01-JAN-2020 to 31-DEC-2030
ASTRO
CASA (full implementation of rudy 87)
Tb [K]
240
220
200
180
160
01-JAN-2020
31-DEC-2020
31-DEC-2021
31-DEC-2022
31-DEC-2023
30-DEC-2024
30-DEC-2025
30-DEC-2026
30-DEC-2027
29-DEC-2028
29-DEC-2029
29-DEC-2030
Mars Tb 80GHz from 01-JAN-2023 to 31-DEC-2023
ASTRO
CASA (full implementation of rudy 87)
Tb [K]
240
220
200
180
160
01-JAN-2023
02-FEB-2023
06-MAR-2023
07-APR-2023
09-MAY-2023
10-JUN-2023
12-JUL-2023
13-AUG-2023
14-SEP-2023
16-OCT-2023
17-NOV-2023
19-DEC-2023
Mars Tb 80GHz from 01-JUN-2023 to 30-JUN-2023
ASTRO
CASA (full implementation of rudy 87)
Tb [K]
240
220
200
180
160
01-JUN-2023
06-JUN-2023
11-JUN-2023
16-JUN-2023
21-JUN-2023
26-JUN-2023

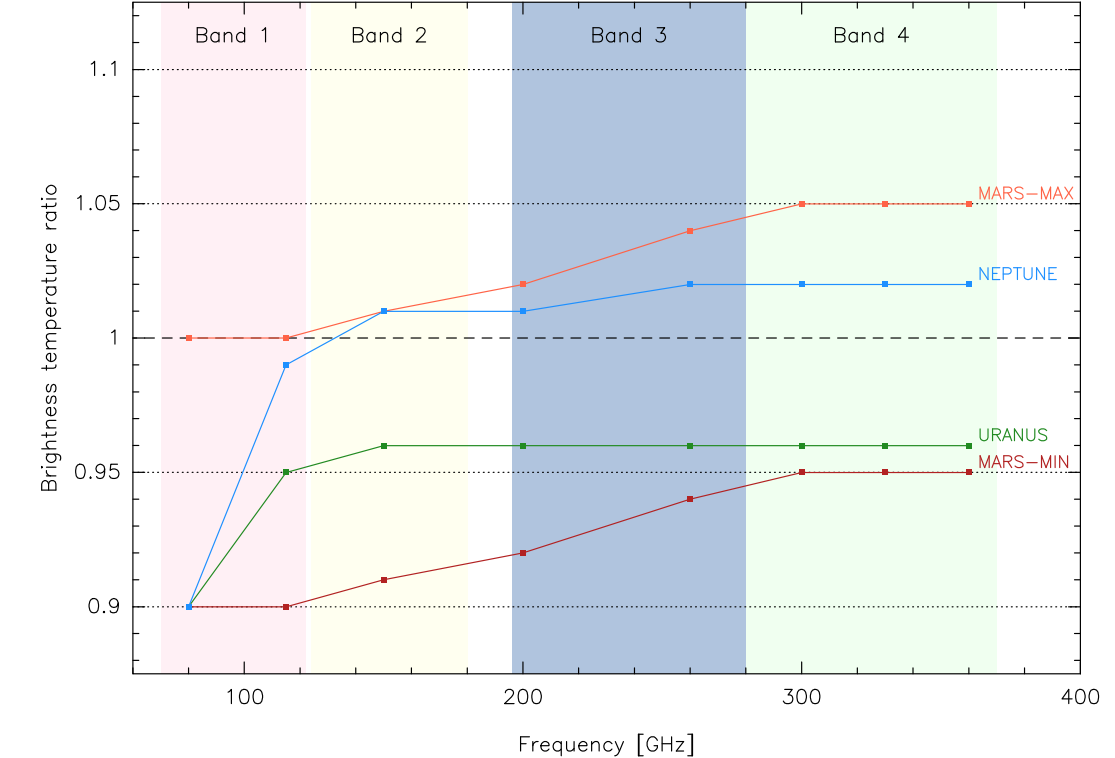

Mars Tb 150GHz from 01−JAN−2020 to 31−DEC−2030
ASTRO
CASA (full implementation of rudy 87)
Tb [K]
240
220
200
180
160
01−JAN−2020
31−DEC−2020
31−DEC−2021
31−DEC−2022
31−DEC−2023
30−DEC−2024
30−DEC−2025
30−DEC−2026
30−DEC−2027
29−DEC−2028
29−DEC−2029
29−DEC−2030
Mars Tb 150GHz from 01−JAN−2023 to 31−DEC−2023
ASTRO
CASA (full implementation of rudy 87)
Tb [K]
240
220
200
180
160
01−JAN−2023
02−FEB−2023
06−MAR−2023
07−APR−2023
09−MAY−2023
10−JUN−2023
12−JUL−2023
13−AUG−2023
14−SEP−2023
16−OCT−2023
17−NOV−2023
19−DEC−2023
Mars Tb 150GHz from 01−JUN−2023 to 30−JUN−2023
ASTRO
CASA (full implementation of rudy 87)
Tb [K]
240
220
200
180
160
01−JUN−2023
06−JUN−2023
11−JUN−2023
16−JUN−2023
21−JUN−2023
26−JUN−2023


Mars Tb 230GHz from 01−JAN−2020 to 31−DEC−2030
ASTRO
CASA (full implementation of rudy 87)
Tb [K]
240
220
200
180
160
01−JAN−2020
31−DEC−2020
31−DEC−2021
31−DEC−2022
31−DEC−2023
30−DEC−2024
30−DEC−2025
30−DEC−2026
30−DEC−2027
29−DEC−2028
29−DEC−2029
29−DEC−2030
Mars Tb 230GHz from 01−JAN−2023 to 31−DEC−2023
ASTRO
CASA (full implementation of rudy 87)
Tb [K]
240
220
200
180
160
01−JAN−2023
02−FEB−2023
06−MAR−2023
07−APR−2023
09−MAY−2023
10−JUN−2023
12−JUL−2023
13−AUG−2023
14−SEP−2023
16−OCT−2023
17−NOV−2023
19−DEC−2023
Mars Tb 230GHz from 01−JUN−2023 to 30−JUN−2023
ASTRO
CASA (full implementation of rudy 87)
Tb [K]
240
220
200
180
160
01−JUN−2023
06−JUN−2023
11−JUN−2023
16−JUN−2023
21−JUN−2023
26−JUN−2023


Mars Tb 360GHz from 01−JAN−2020 to 31−DEC−2030
ASTRO
CASA (full implementation of rudy 87)
Tb [K]
240
220
200
180
160
01−JAN−2020
31−DEC−2020
31−DEC−2021
31−DEC−2022
31−DEC−2023
30−DEC−2024
30−DEC−2025
30−DEC−2026
30−DEC−2027
29−DEC−2028
29−DEC−2029
29−DEC−2030
Mars Tb 360GHz from 01−JAN−2023 to 31−DEC−2023
ASTRO
CASA (full implementation of rudy 87)
Tb [K]
240
220
200
180
160
01−JAN−2023
02−FEB−2023
06−MAR−2023
07−APR−2023
09−MAY−2023
10−JUN−2023
12−JUL−2023
13−AUG−2023
14−SEP−2023
16−OCT−2023
17−NOV−2023
19−DEC−2023
Mars Tb 360GHz from 01−JUN−2023 to 30−JUN−2023
ASTRO
CASA (full implementation of rudy 87)
Tb [K]
240
220
200
180
160
01−JUN−2023
06−JUN−2023
11−JUN−2023
16−JUN−2023
21−JUN−2023
26−JUN−2023


$$Tb_{CASA}/Tb_{Legacy}$$

Tb_{2024}/Tb_{Legacy}


Band 1
Band 2
Band 3
Band 4
1.1
1.05
1
0.95
0.9
Brightness temperature ratio
MARS−MAX
NEPTUNE
URANUS
MARS−MIN
100
200
300
400
Frequency [GHz]

