Has the 2022 Hunga eruption impacted the noctilucent cloud season in 2023/24 and 2024?

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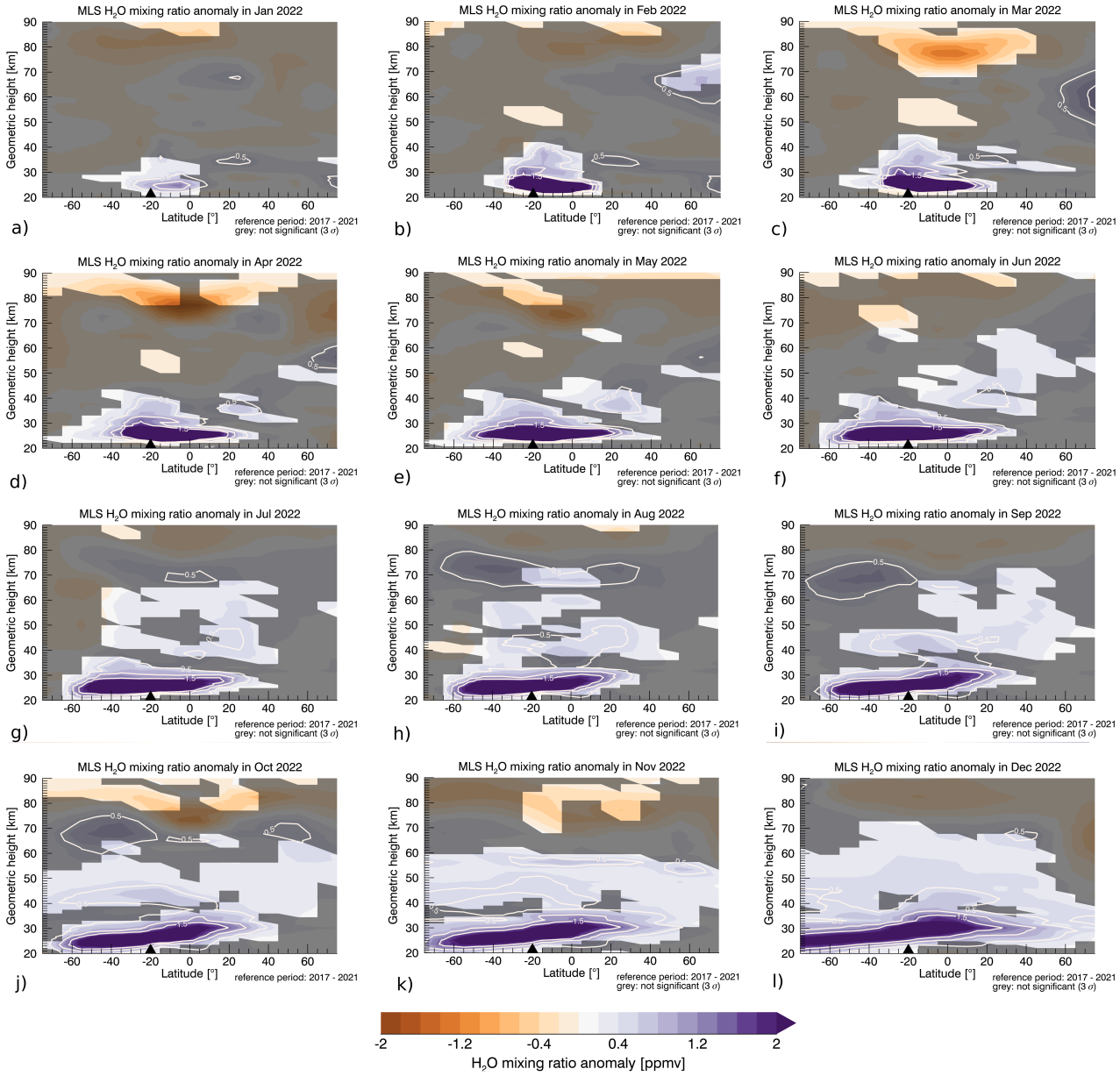

Figure S1. Monthly mean water vapour mixing ratio anomaly from MLS data for January to December 2022 (a - l). The reference period is 2017 - 2021 and anomalies that are less than 3 standard deviation of the reference period are considered not significant and marked with a dark grey colour. The triangle denotes the latitude position of the Hunga Tonga volcano.

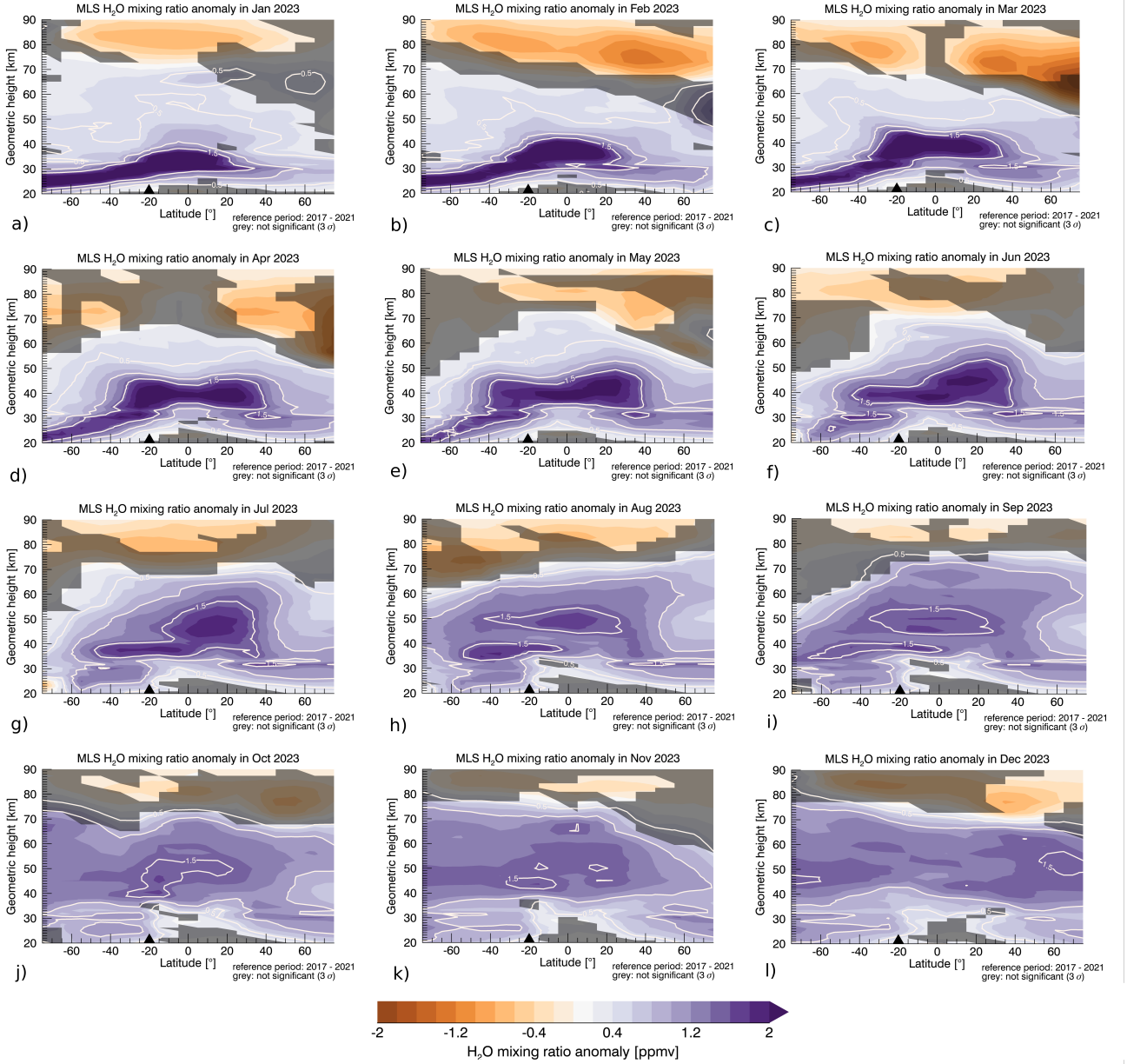

Figure S2. The same as in Figure S1, but for 2023.

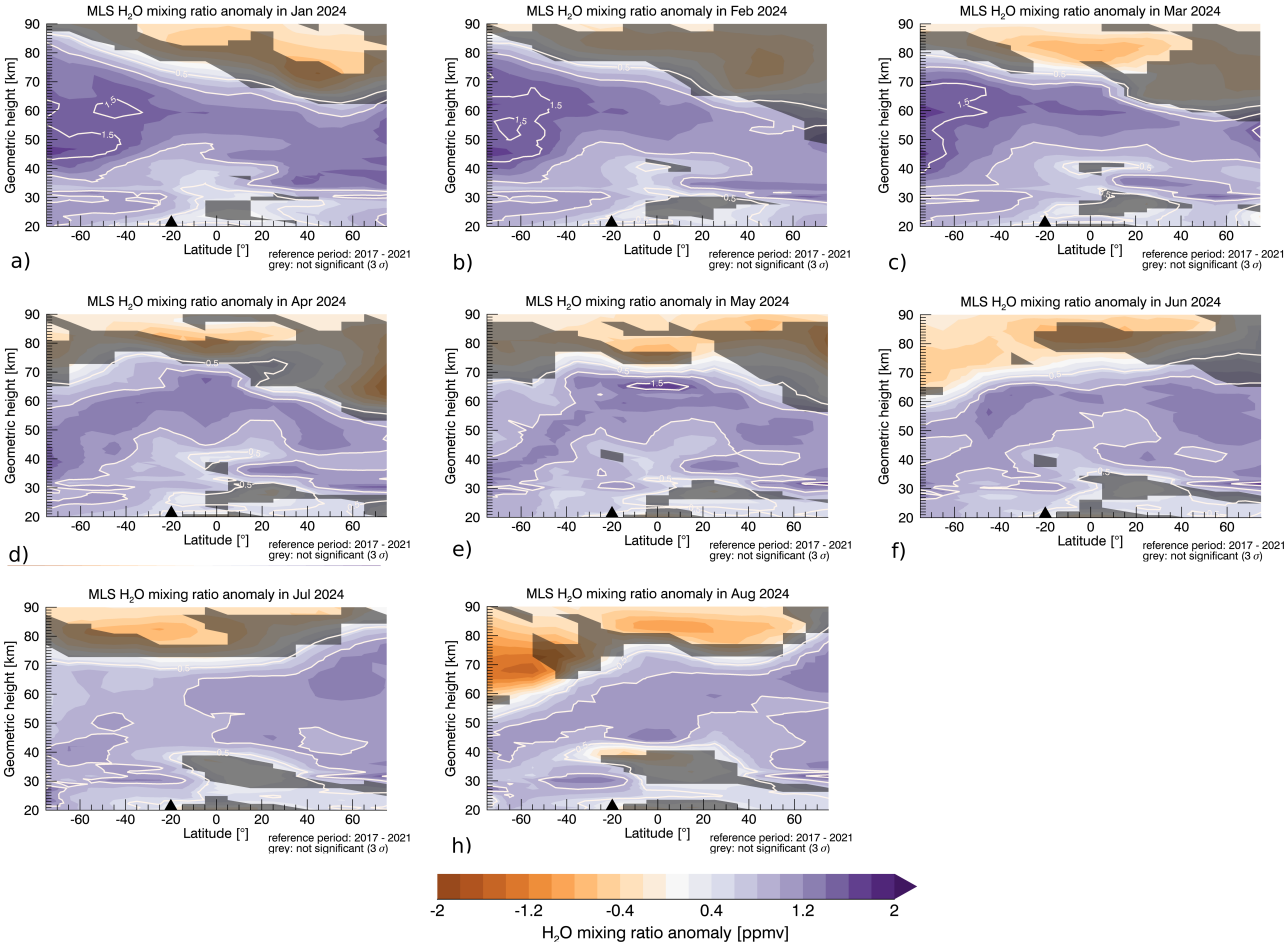

Figure S3. The same as in Figure S1, but for 2024.

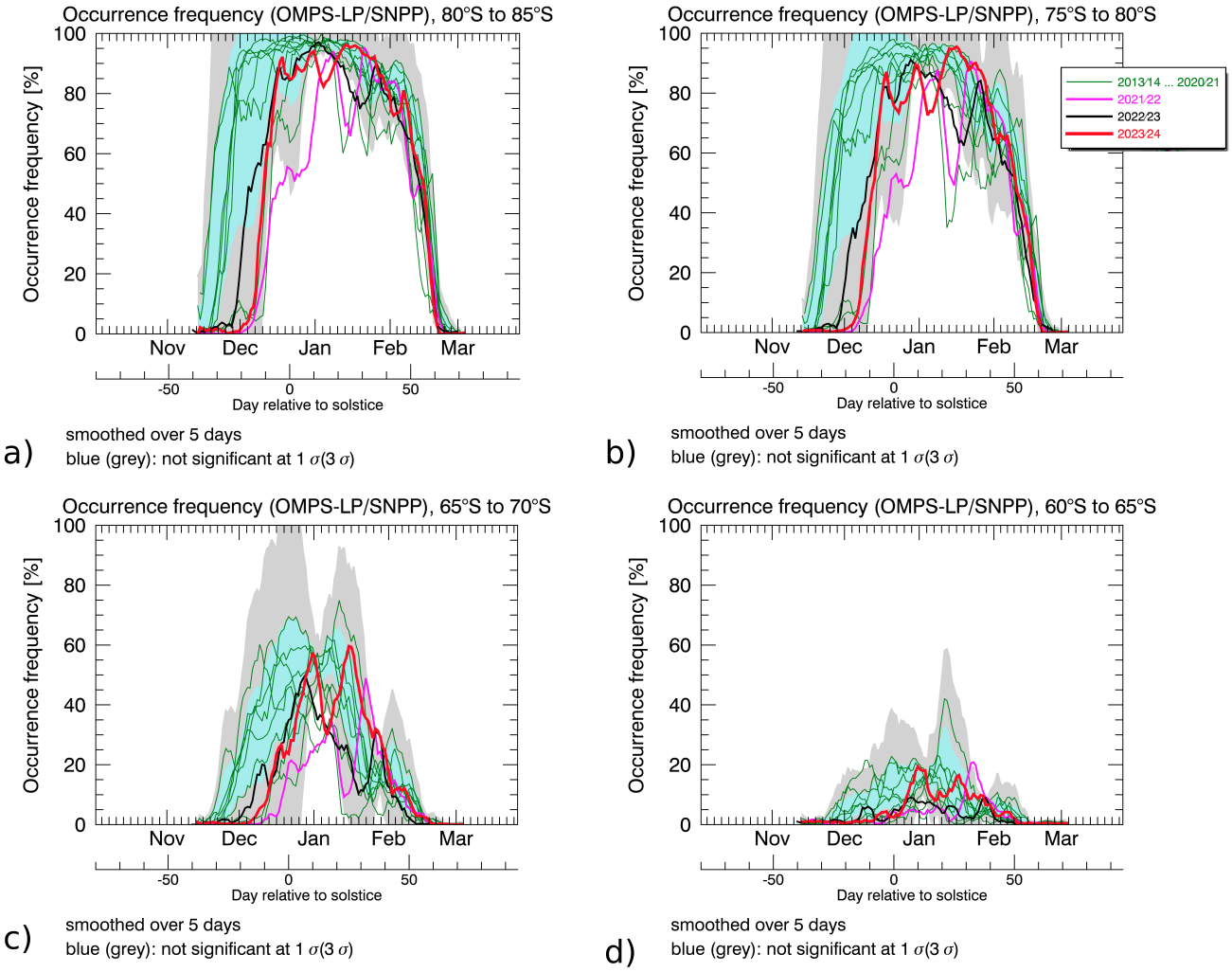

Figure S4. NLC occurrence frequency from OMPS-LP for latitudes between 85°S - 65°S. The thick lines indicates the occurrence frequency for the SH 2021/22 (magenta), 2022/23 (black) and 2023/24 (red) seasons, respectively. All seasons before are displayed as thin green lines. The blue (grey) shaded region contains the averaged occurrence frequency for the years 2016/17 to 2020/21 ± one (three) standard deviation from this period. The day of solstice is December 21.

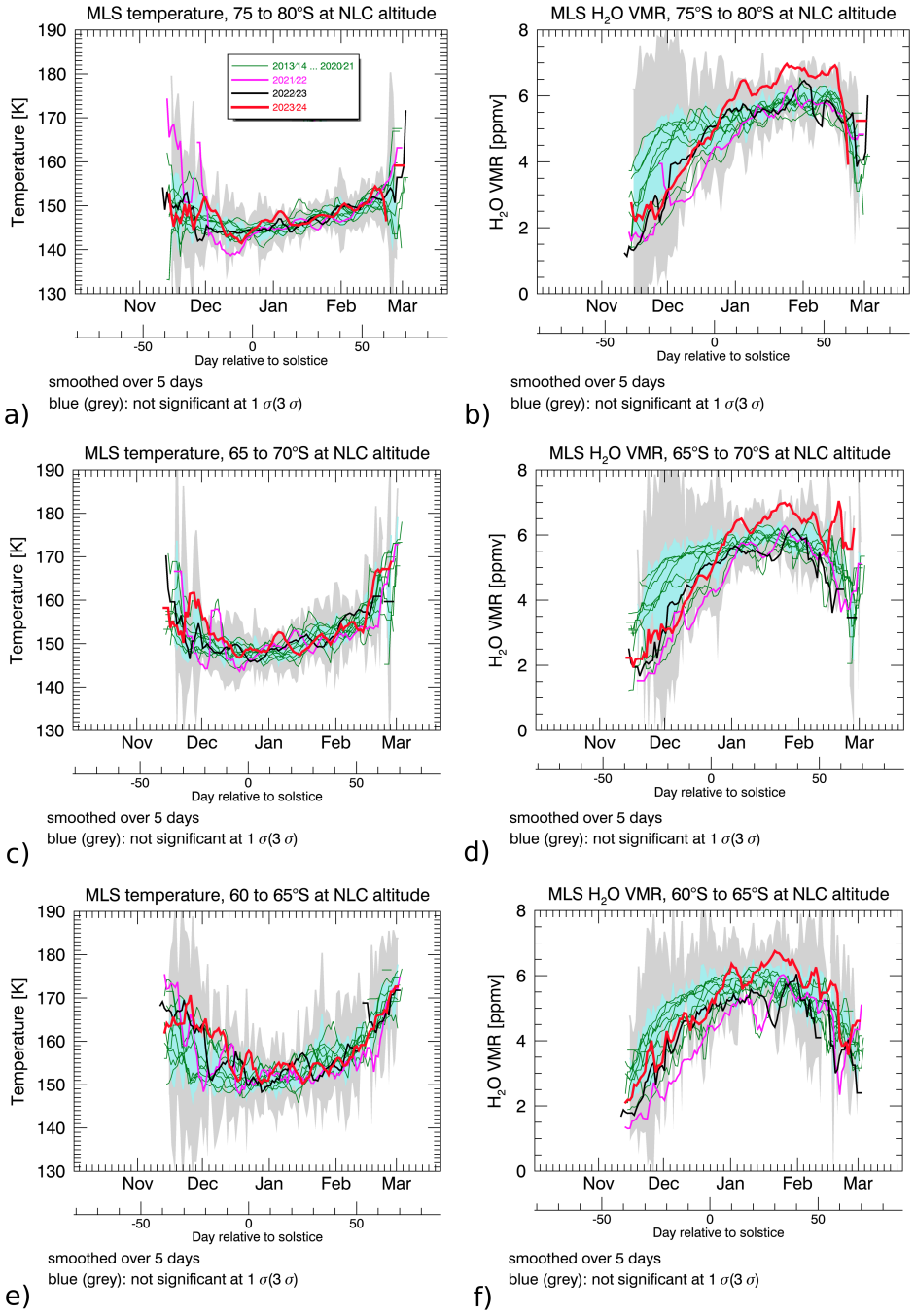

Figure S5. MLS temperature between 75°S - 80°S (a), 65°S - 70°S (c) and 60°S - 65°S (e) at NLC altitude determined from OMPS-LP measurements. The thick lines indicates the occurrence frequency for the SH 2021/22 (magenta), 2022/23 (black) and 2023/24 (red) seasons, respectively. All seasons before are displayed as thin green lines. Blue (grey) areas indicate the averaged temperature from 2016/17 to 2020/21 $\pm$ one (three) standard deviation. b), d) and f) depict the same latitude bins for MLS water vapour mixing ratios.

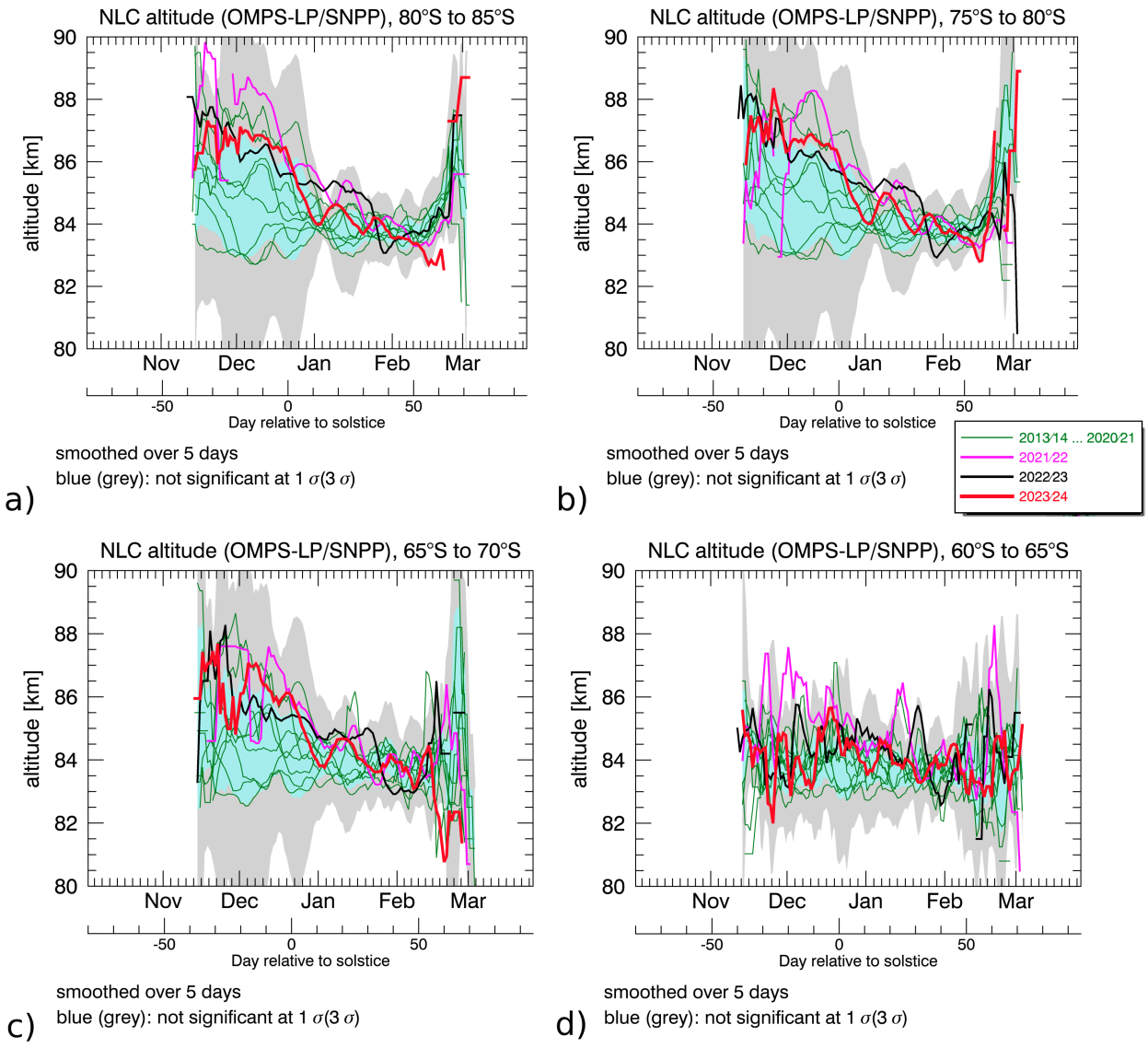

Figure S6. Altitude of the NLCs determined from OMPS-LP measurements for 80°S - 65°S (a - d). The thick red line shows the 2023/24 season. Blue (grey) areas indicate the mean NLC altitude from 2016/17 to 2020/21 ± one (three) standard deviation.

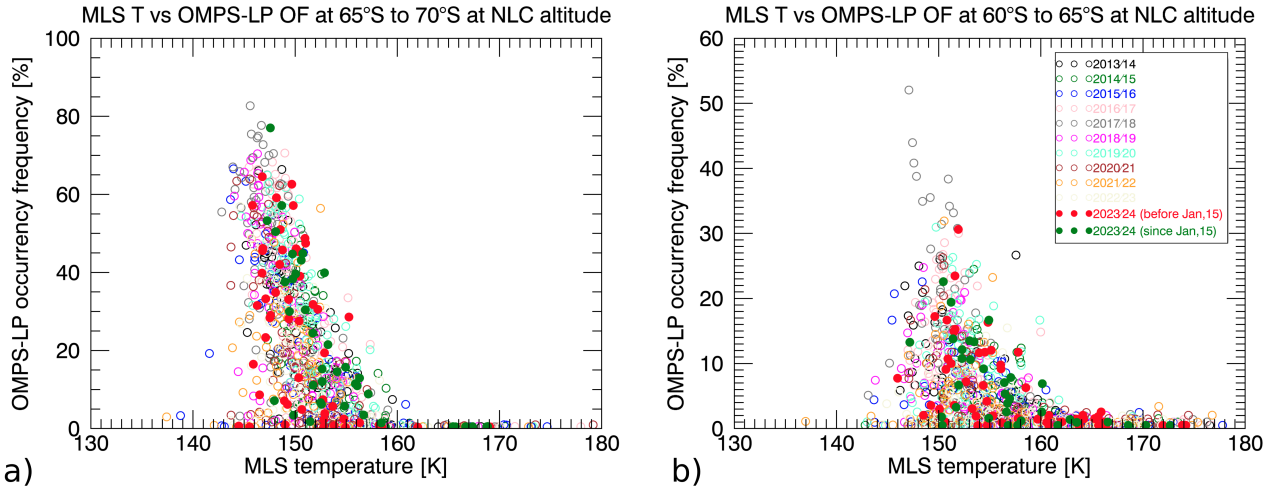

Figure S7. Scatterplot for OMPS-LP occurrence frequency versus MLS temperature at NLC altitude (determined from OMPS-LP measurements) for 65°S - 70°S and 60°S - 65°S. The measurements for 2023/24 are highlighted with filled circles using a red colour for measurements before January 15 and a green colour afterwards.

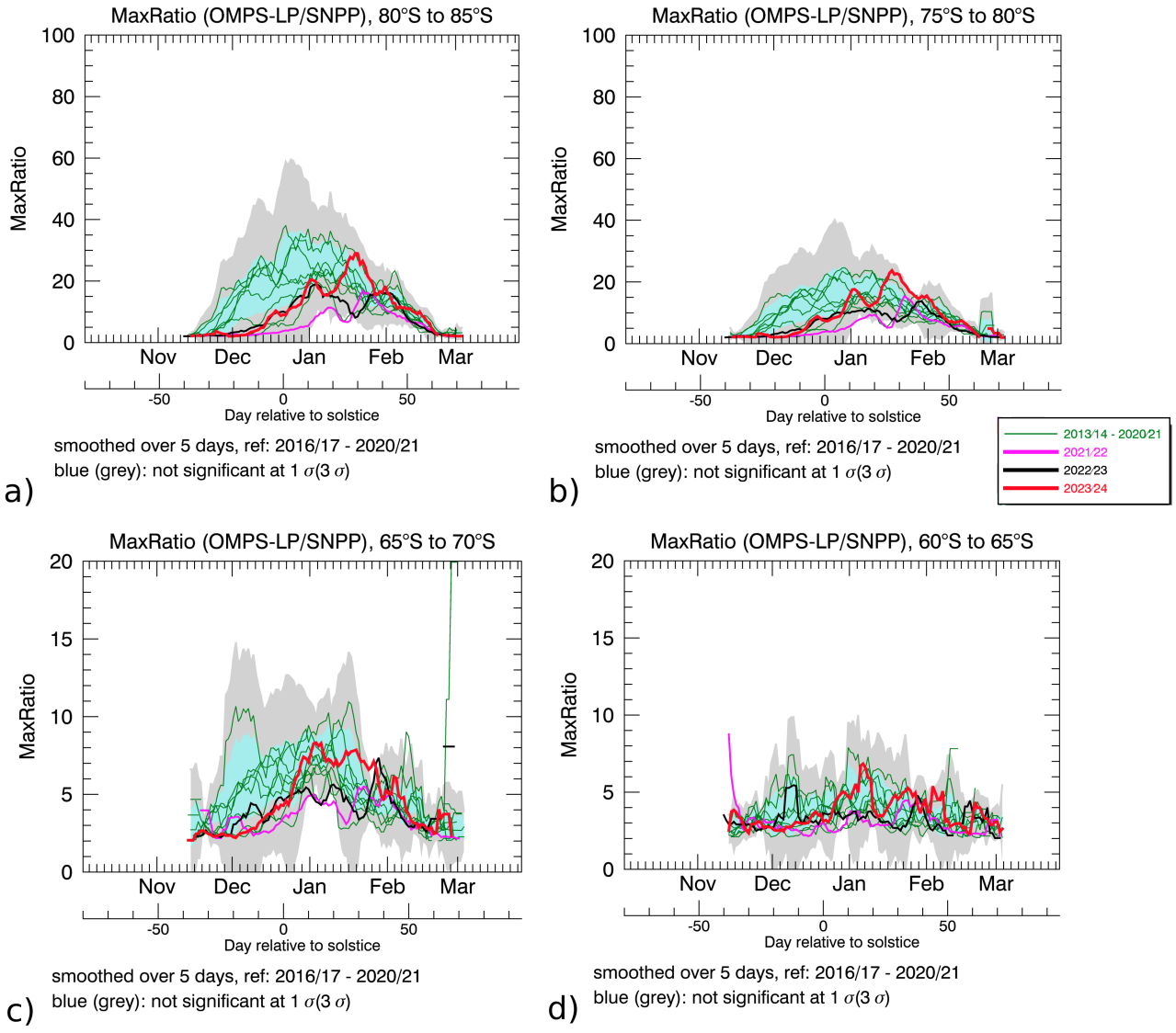

Figure S8. The maximum radiance ratio between the measured and background signal from OMPS-LP for each of the SH NLC seasons. The thick lines indicate zonally and daily mean maximum radiance ratios for 2021/22 (magenta), 2022/23 (black) and 2023/24 (red). All seasons before are displayed as thin green lines. The blue (grey) shaded region contains the averaged maximum radiance ratio for the years 2016/17 to 2020/21 $\pm$ one (three) standard deviations from this period. The day of solstice is December 21.

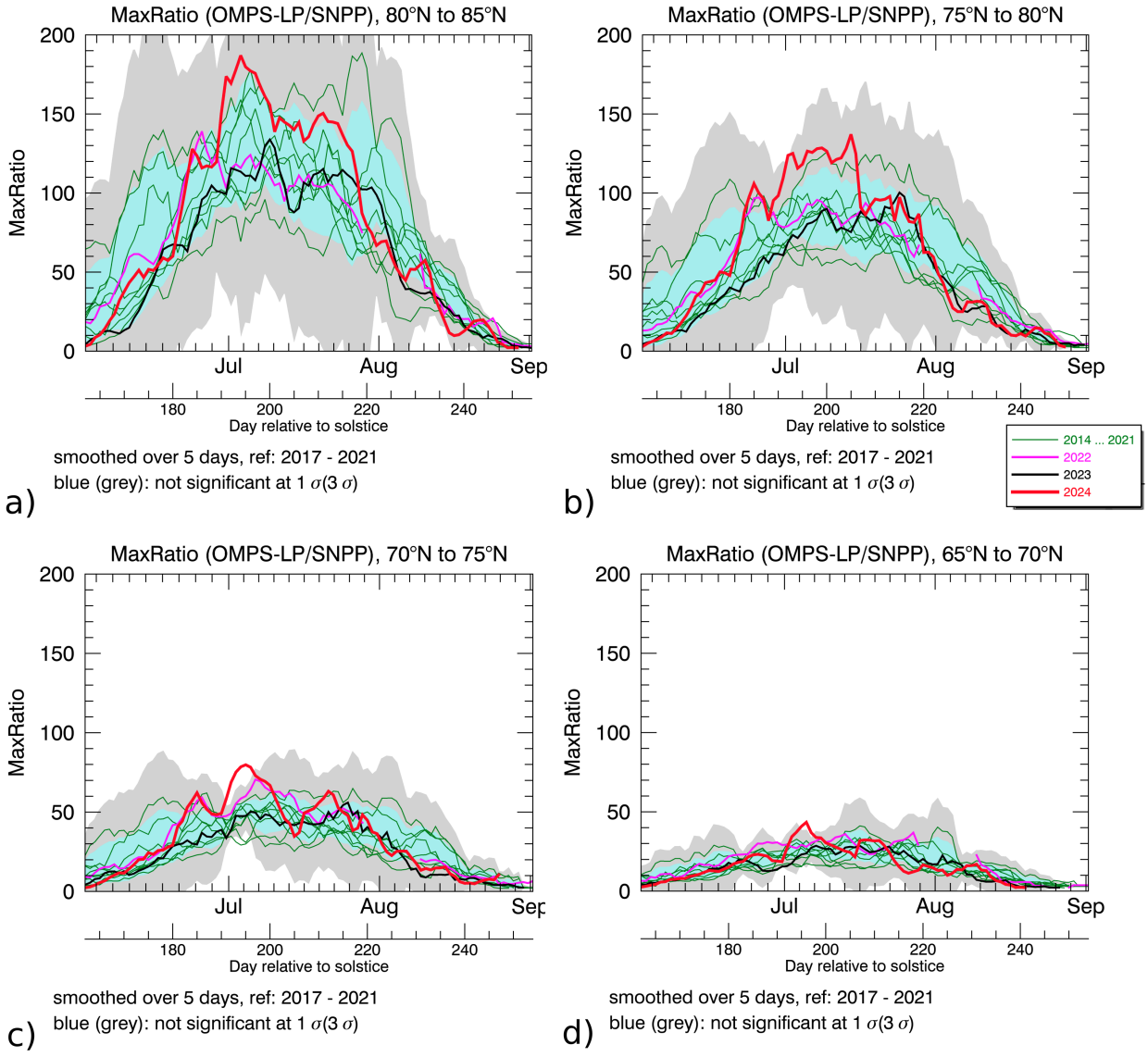

Figure S9. The same as in Figure S8 for the NH.