



GOES R

GOES-17 Saturation Prediction Reference Tools

Matthew Seybold, Seth Iacangelo, Dan Lindsey



Data are based on NESDIS/OSPO File "Published_2020_ABI_Thermal_Model_2020-01-06.xls"



Outline of Saturation Prediction Reference Tools

- Caveats & Assumptions
- Daily Maximum Temperatures
- Daily Maximum Temperatures with Band Thresholds
- Hour-by-Hour Band Saturation
- Interpretation of Marginal and Unusable Hours
- Example Images of “Marginal” and “Unusable” Hours



Important Caveat

- NOTE: All of the information in this slide deck is predictive.
- The actual extent of saturation will differ from the predictions by both temperature magnitude and time of day
- Differences between actual and prediction may also have seasonal variations
- The data in this slide deck indicate “marginal” saturation when imagery is still useful, but some saturation artifacts are present (see example imager at end of slide deck)
- In coming months the predicted data will be revisited and in cases where the predictions may be improved, this slide deck will be updated and redistributed

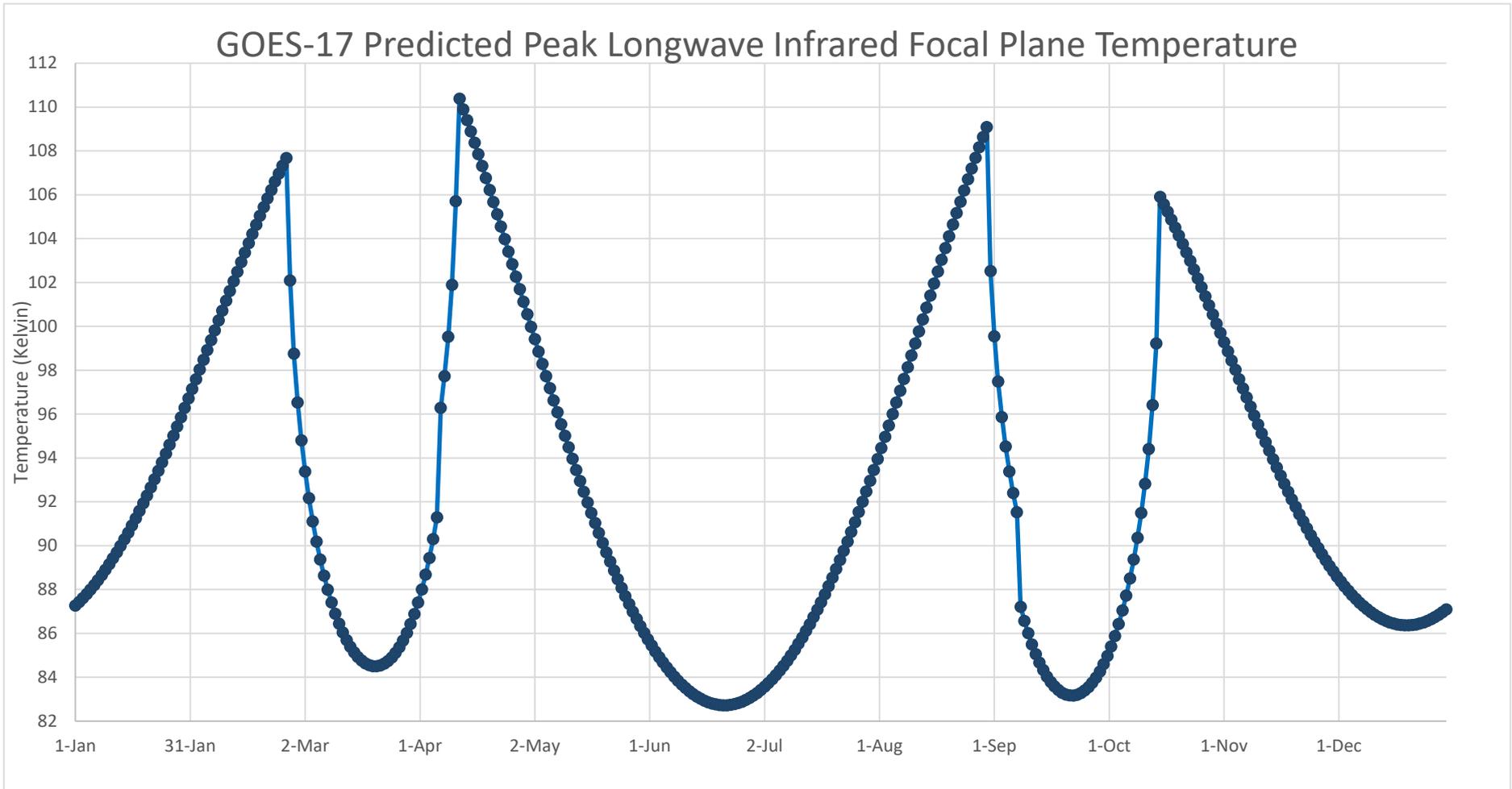


Assumptions

- Inclusions reflect current (Jan 9, 2020) operational status
 - Thermal model uses Mode 6 with GOES-West mesoscale domain sector default locations over Alaska and California
 - Predictive Calibration is included in setting the “marginal” and “unusable” per-band imagery thresholds
- Exclusions omit non-operational improvements currently (Jan 9, 2020) under consideration
 - Mode 3 Cooling Timeline (15 minute Full Disk, 2 MDS Domains x 2 minutes)



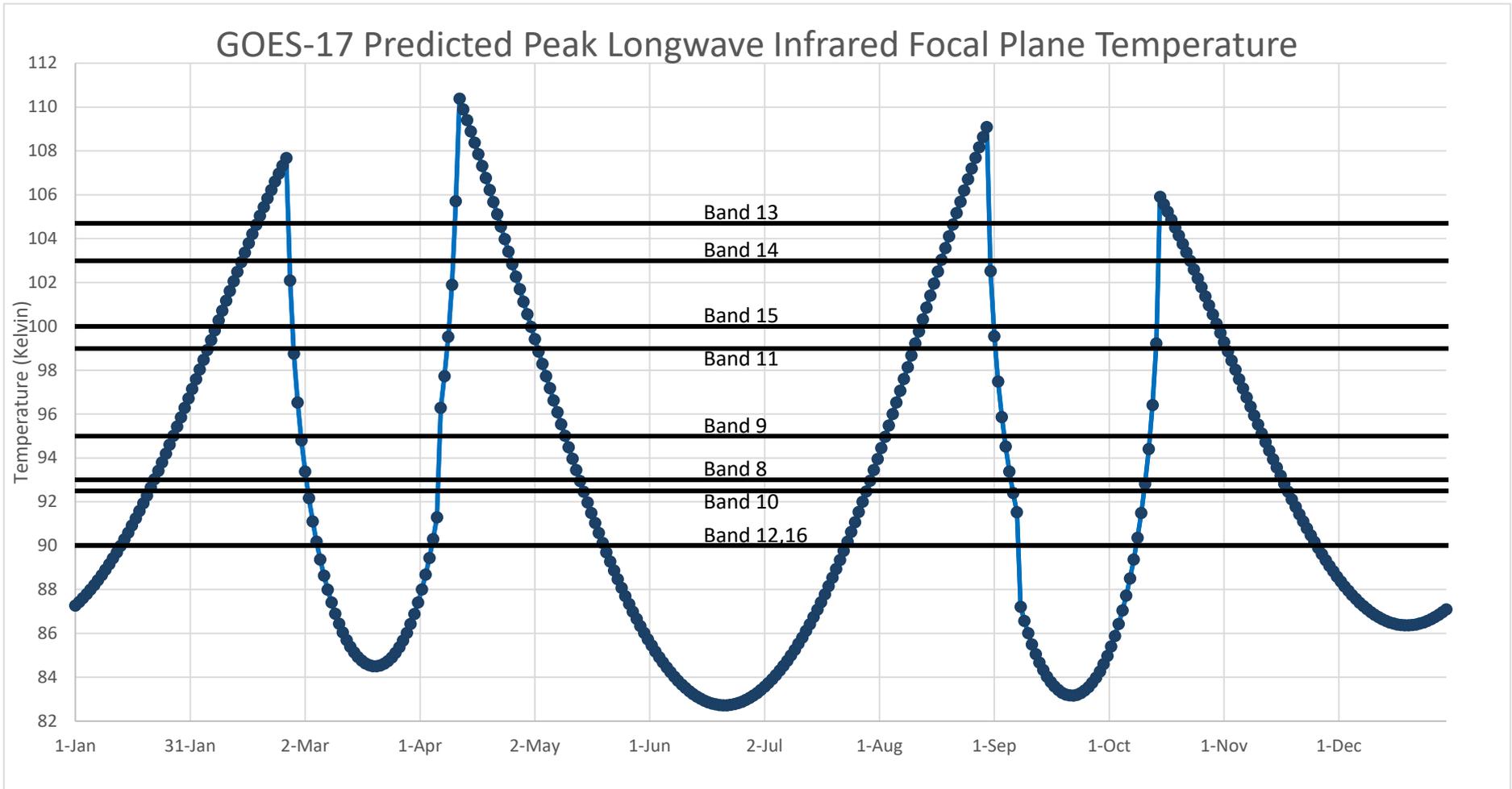
Predicted Daily Maximum Temperatures of Focal Plane Module (FPM)



This plot shows daily maximum temperature of the ABI focal plane module. These maximums occur at night. The higher the temperature, the more saturated imagery becomes.



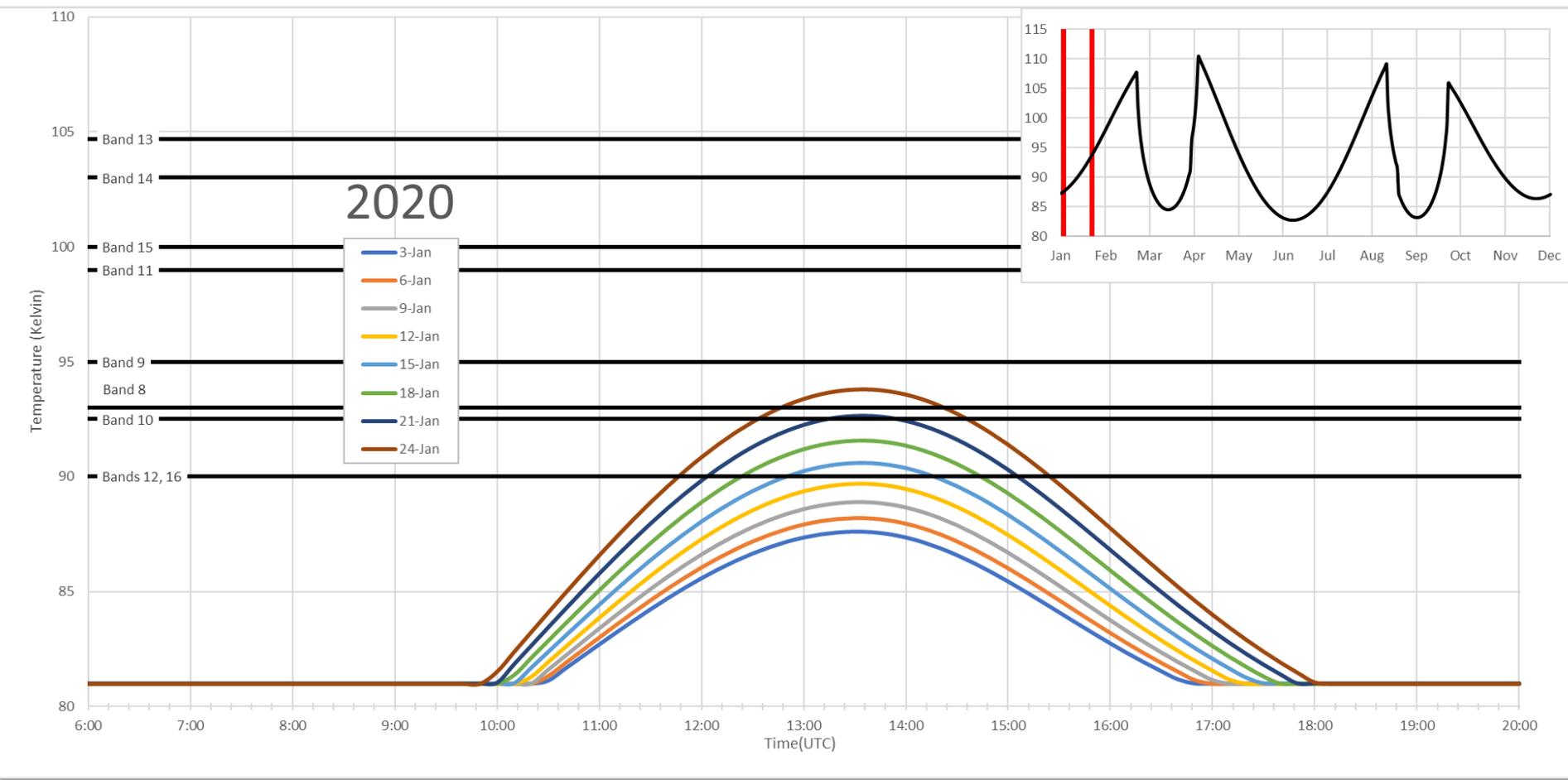
Predicted Daily Maximum Temperatures of Focal Plane Module (FPM) with Marginal Saturation Thresholds for Each Band



This plot shows daily maximum temperature of the ABI focal plane module. These maximums occur at night. The higher the temperature, the more saturated imagery becomes. Where the temperature rises to approach a black line for each band, marginal saturation may be observed in imagery. Where the temperature curve exceeds a black line for each band, the imagery may begin to saturate so much that it becomes unusable.



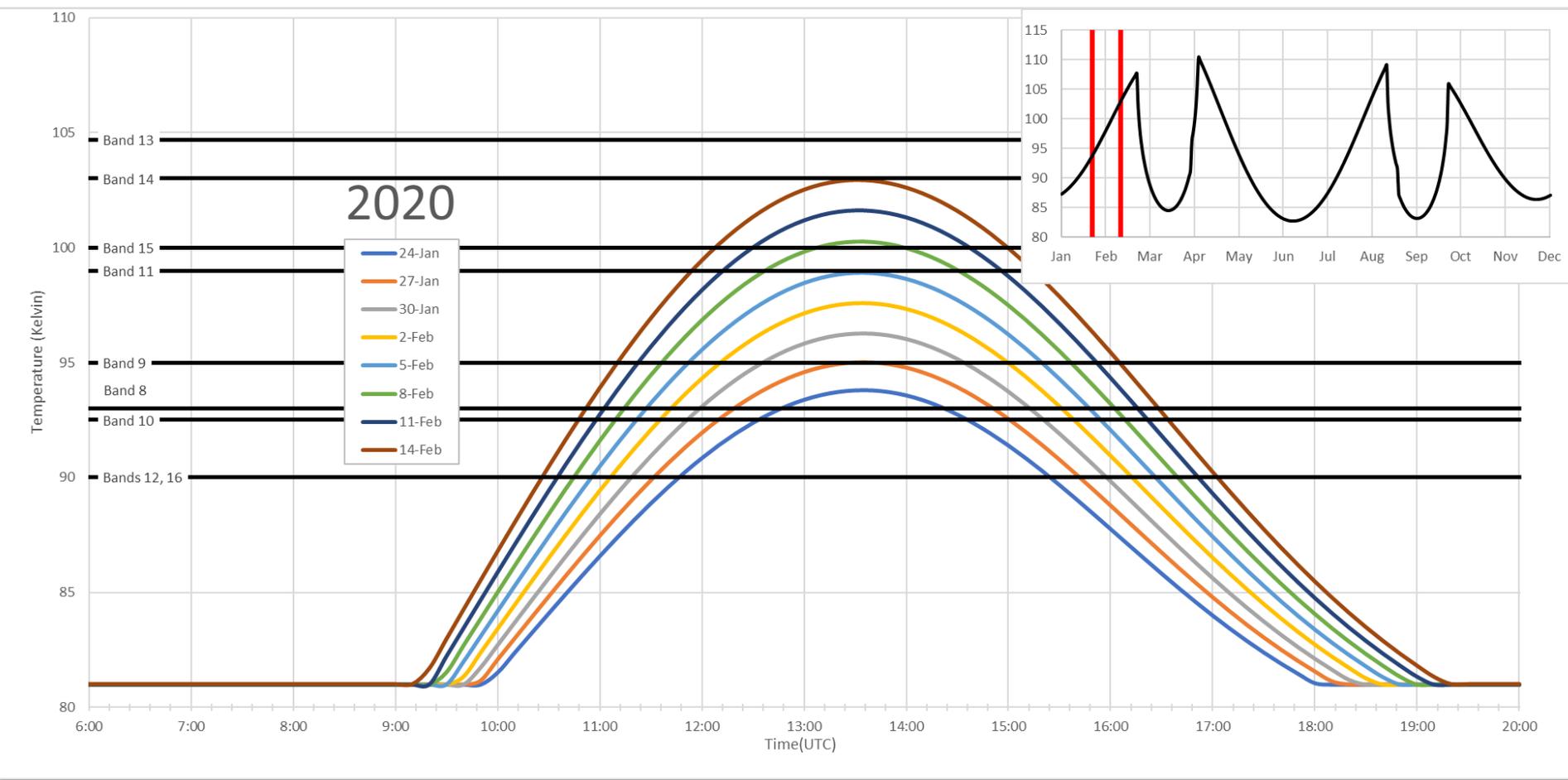
Predicted Marginally Saturated Hours by Band



This plot shows hourly maximum temperature of the ABI focal plane module. The higher the temperature, the more saturated imagery becomes. Where the temperature rises to approach a black line for each band, marginal saturation may be observed in imagery. Where the temperature curve exceeds a black line for each band, the imagery may begin to saturate so much that it becomes unusable.



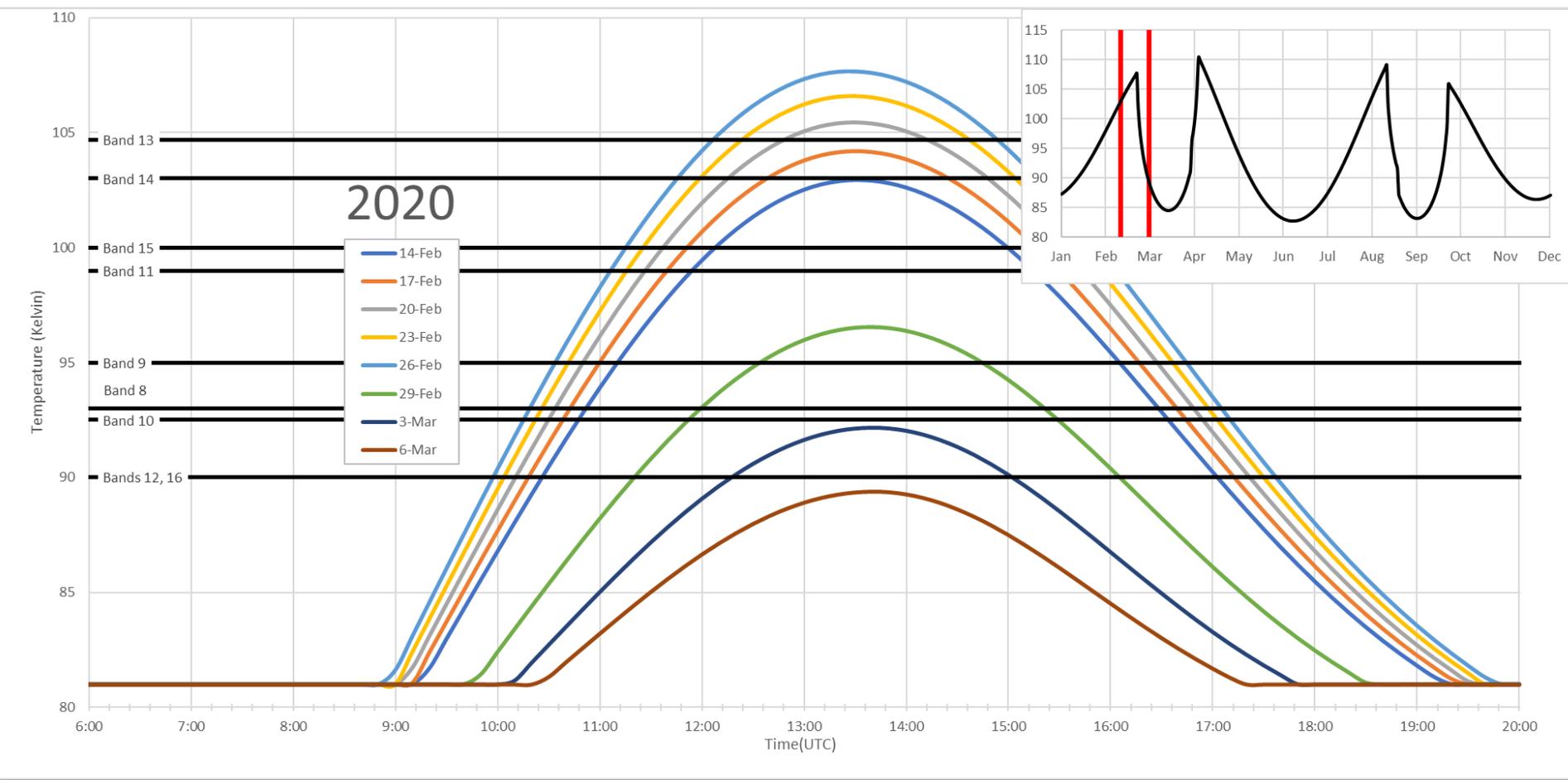
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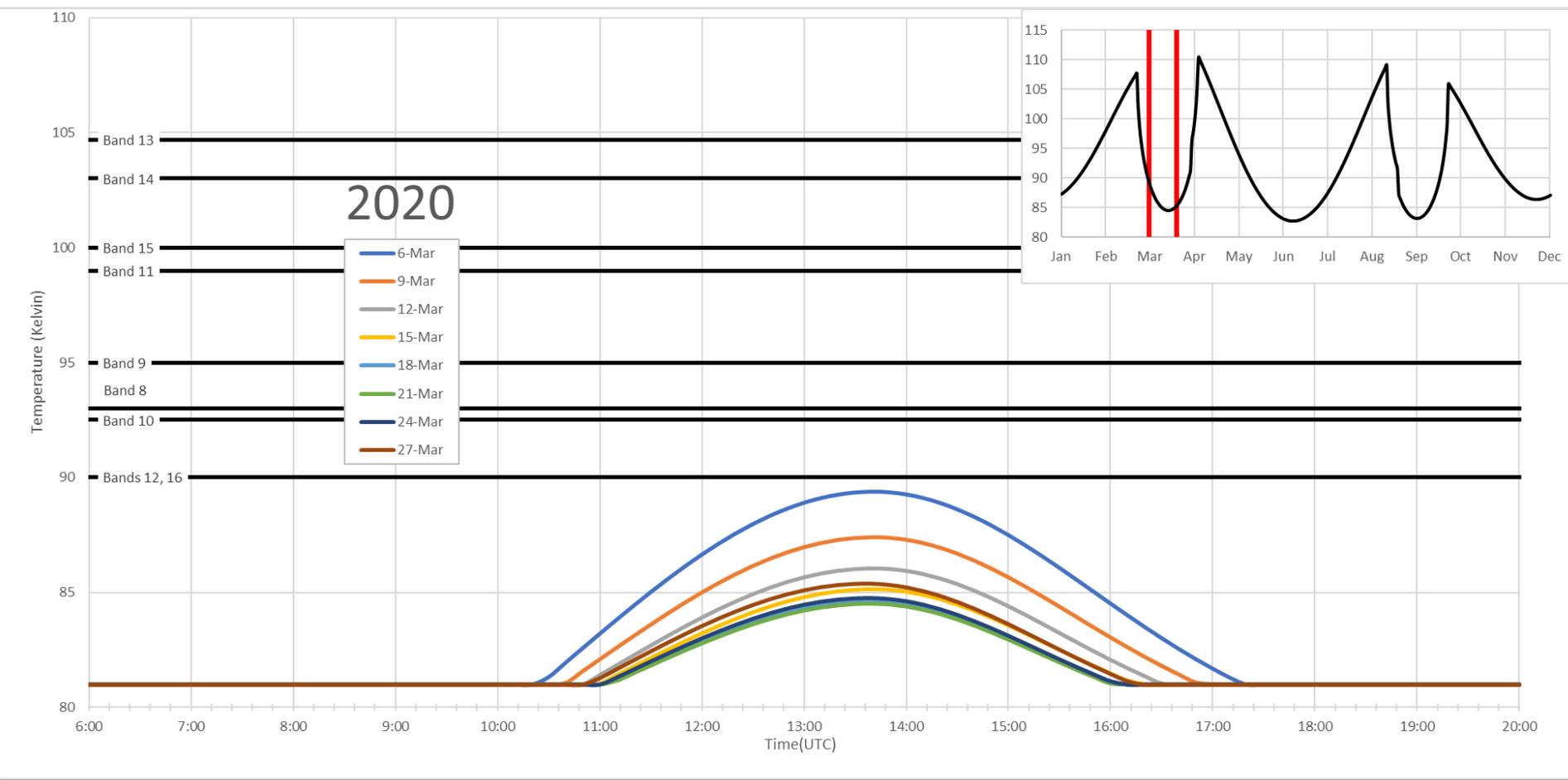
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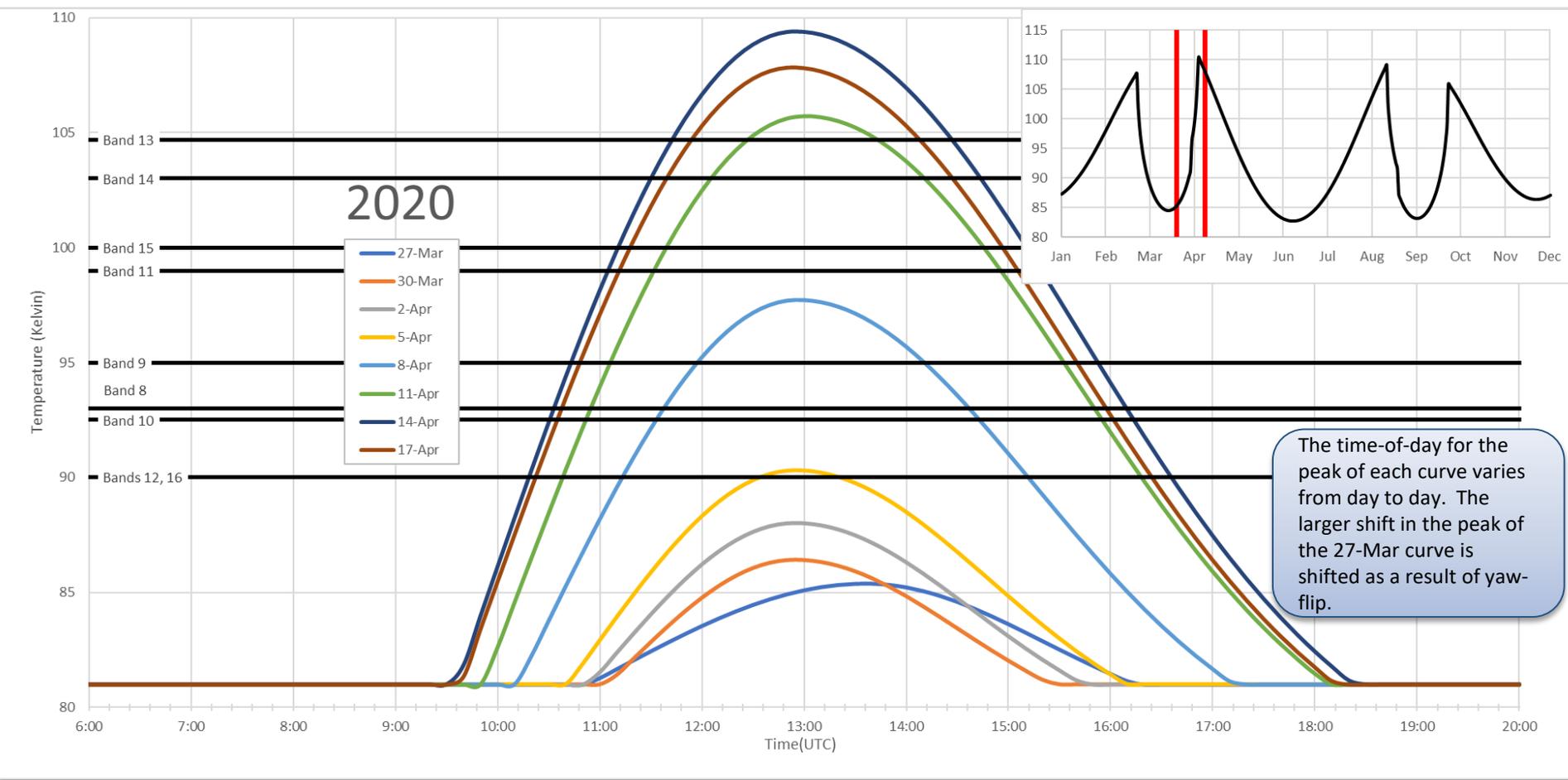
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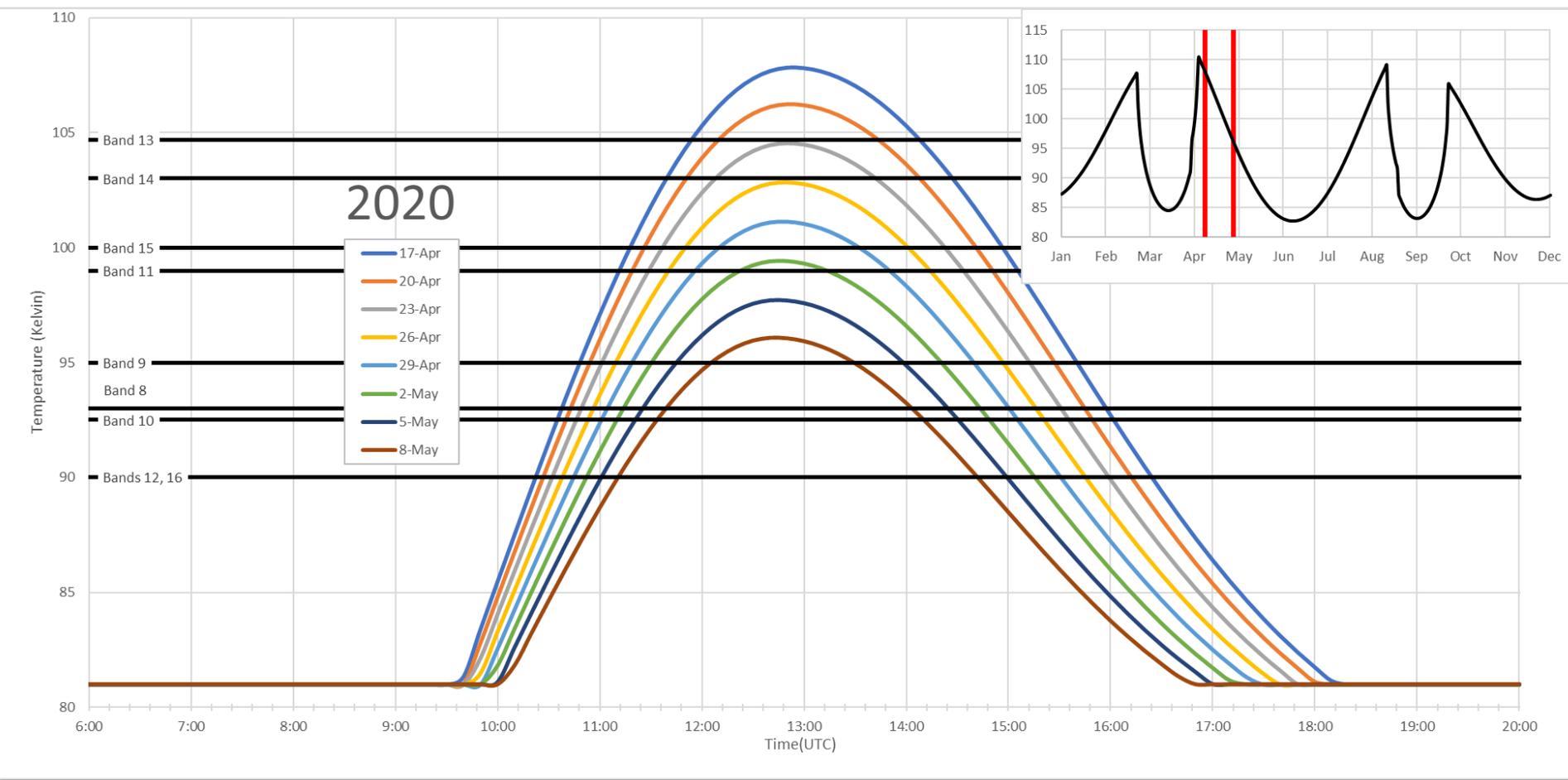


The time-of-day for the peak of each curve varies from day to day. The larger shift in the peak of the 27-Mar curve is shifted as a result of yaw-flip.

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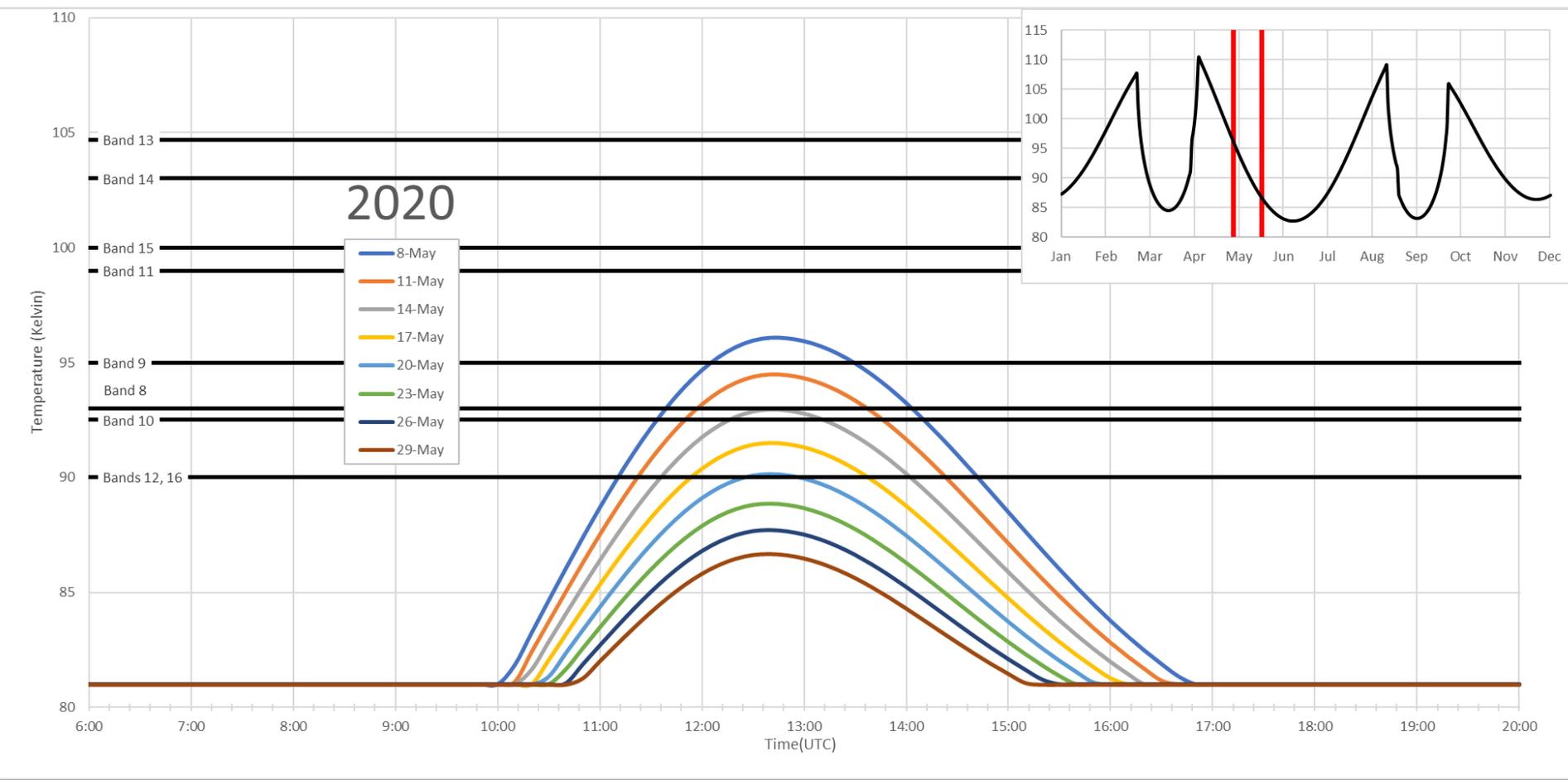
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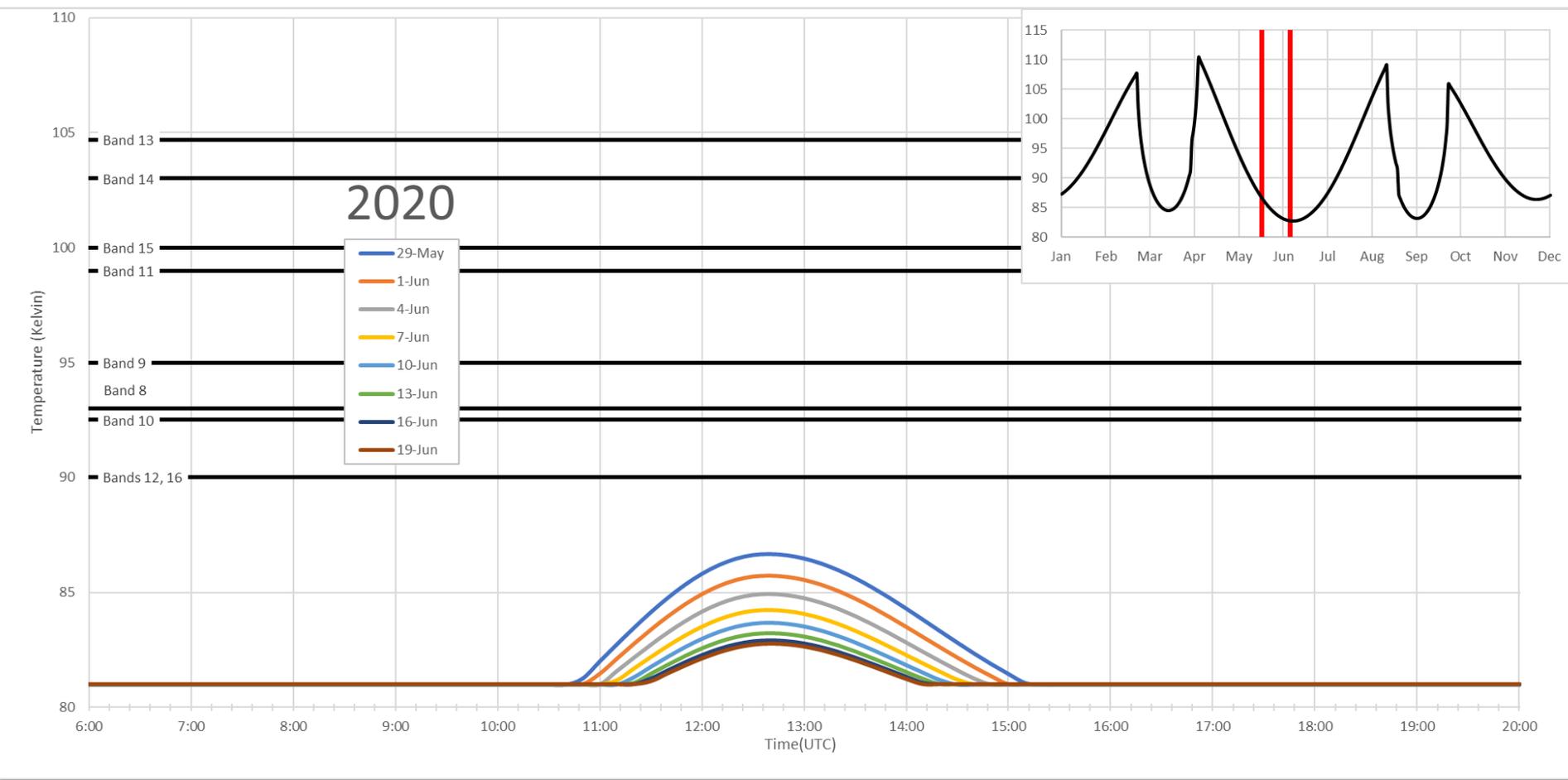
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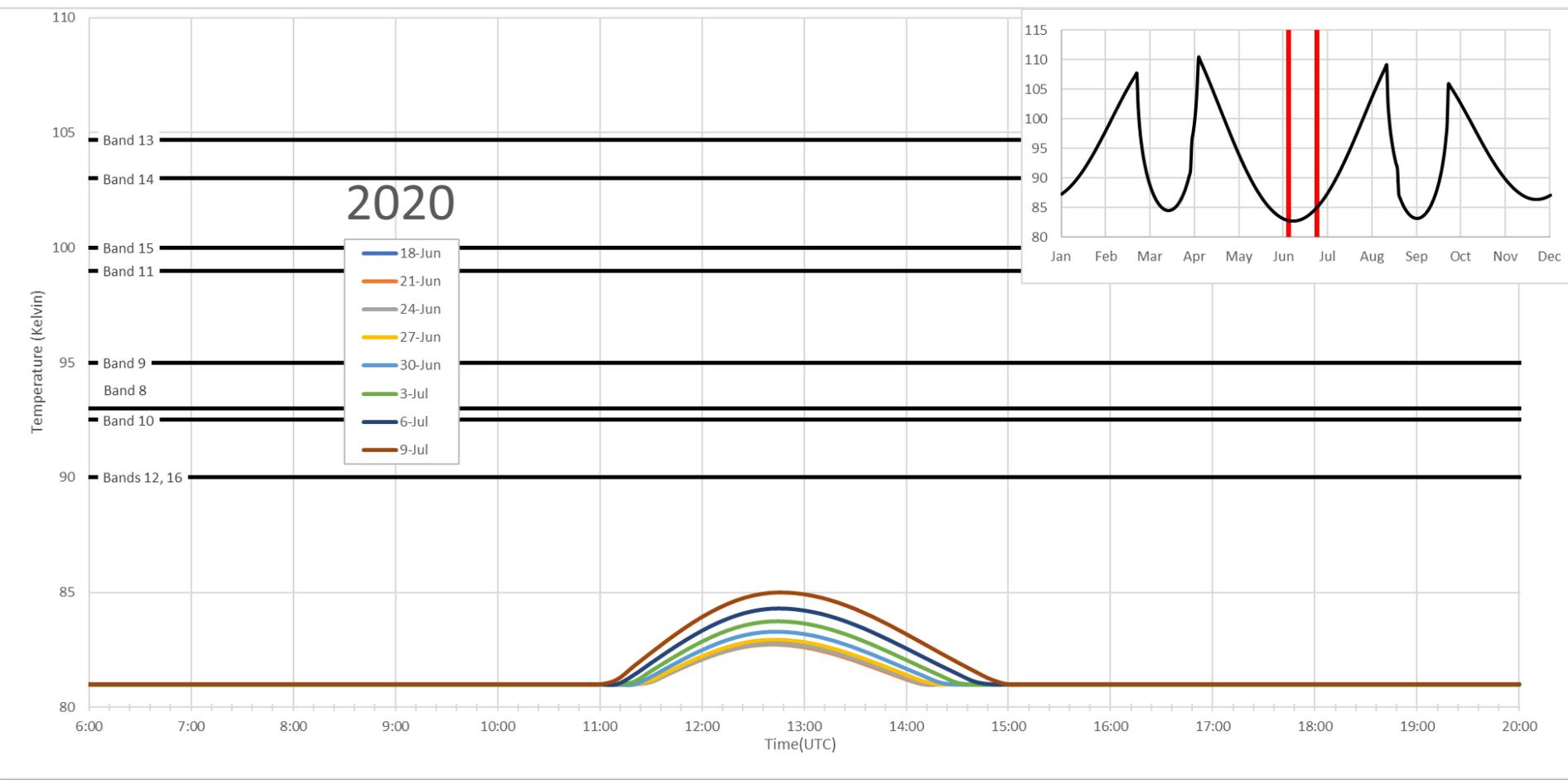
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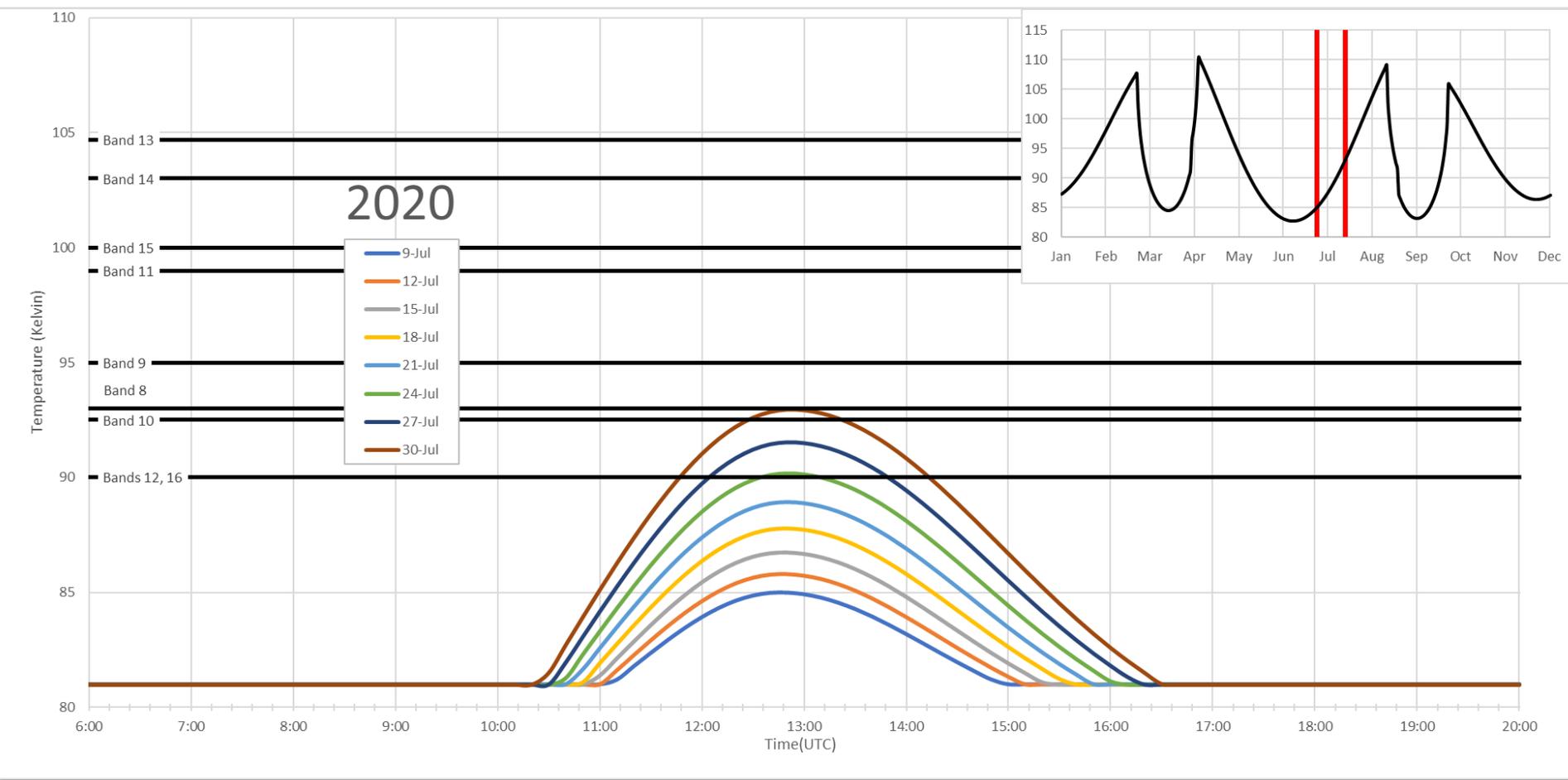
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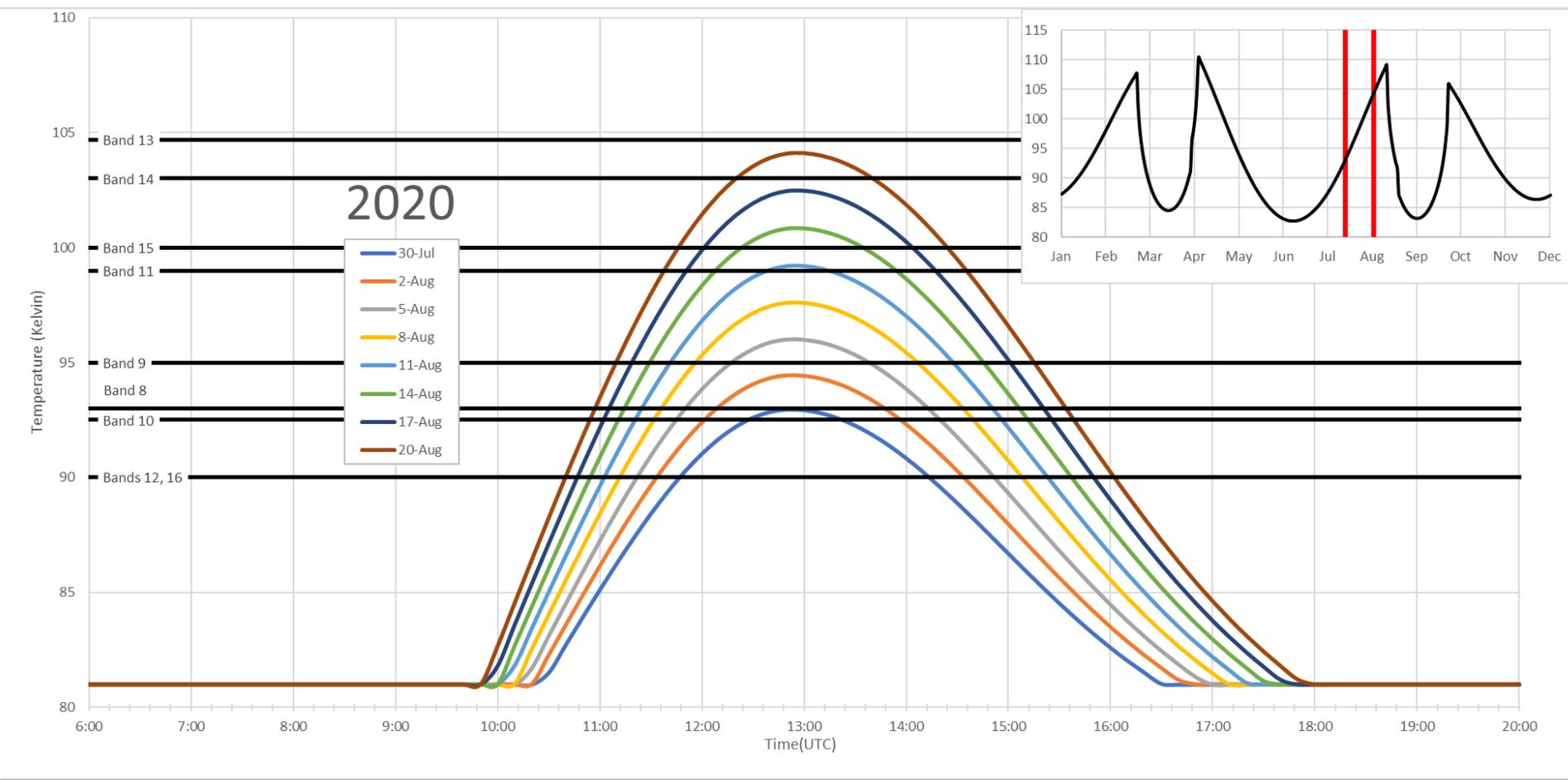
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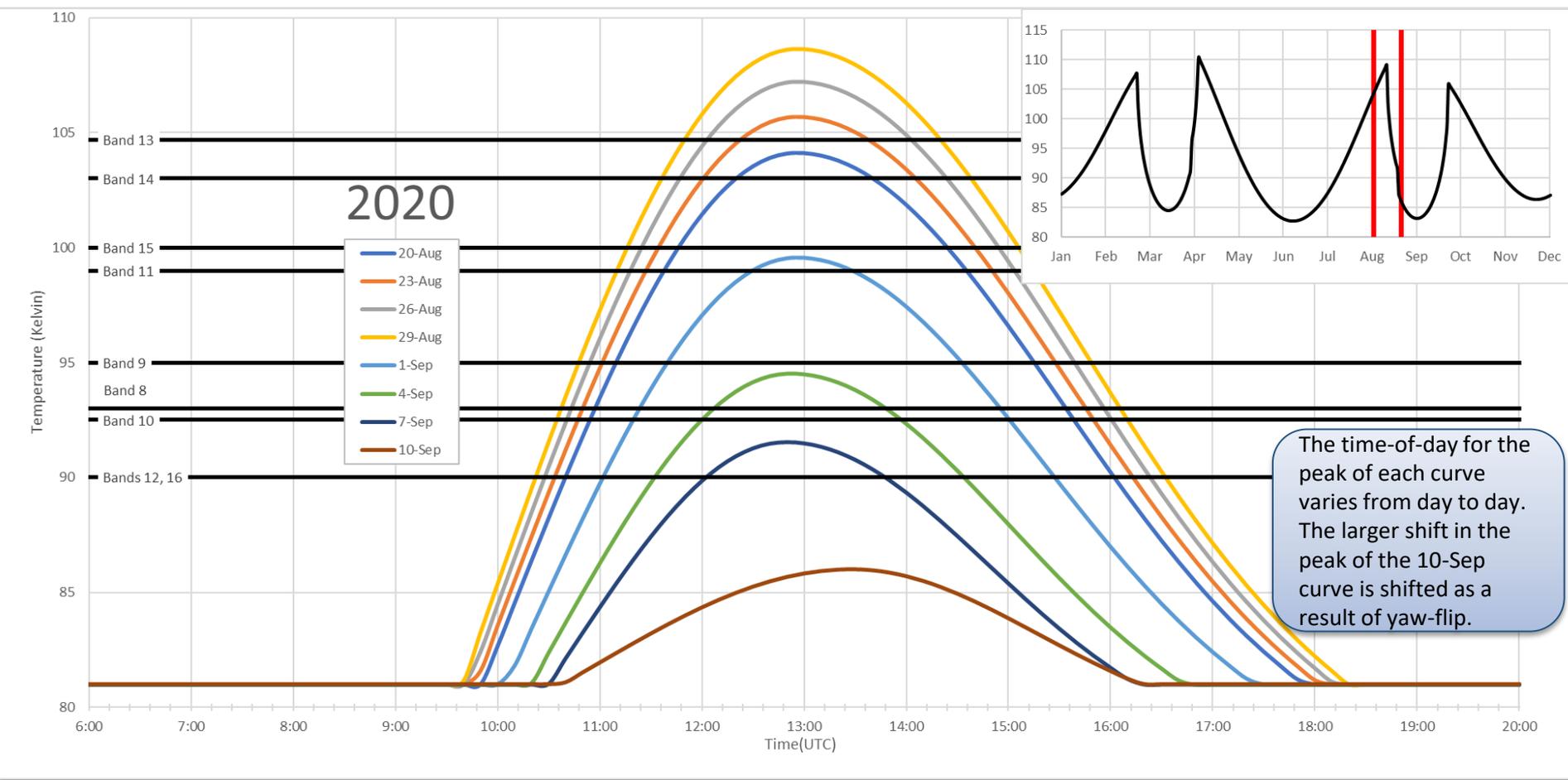
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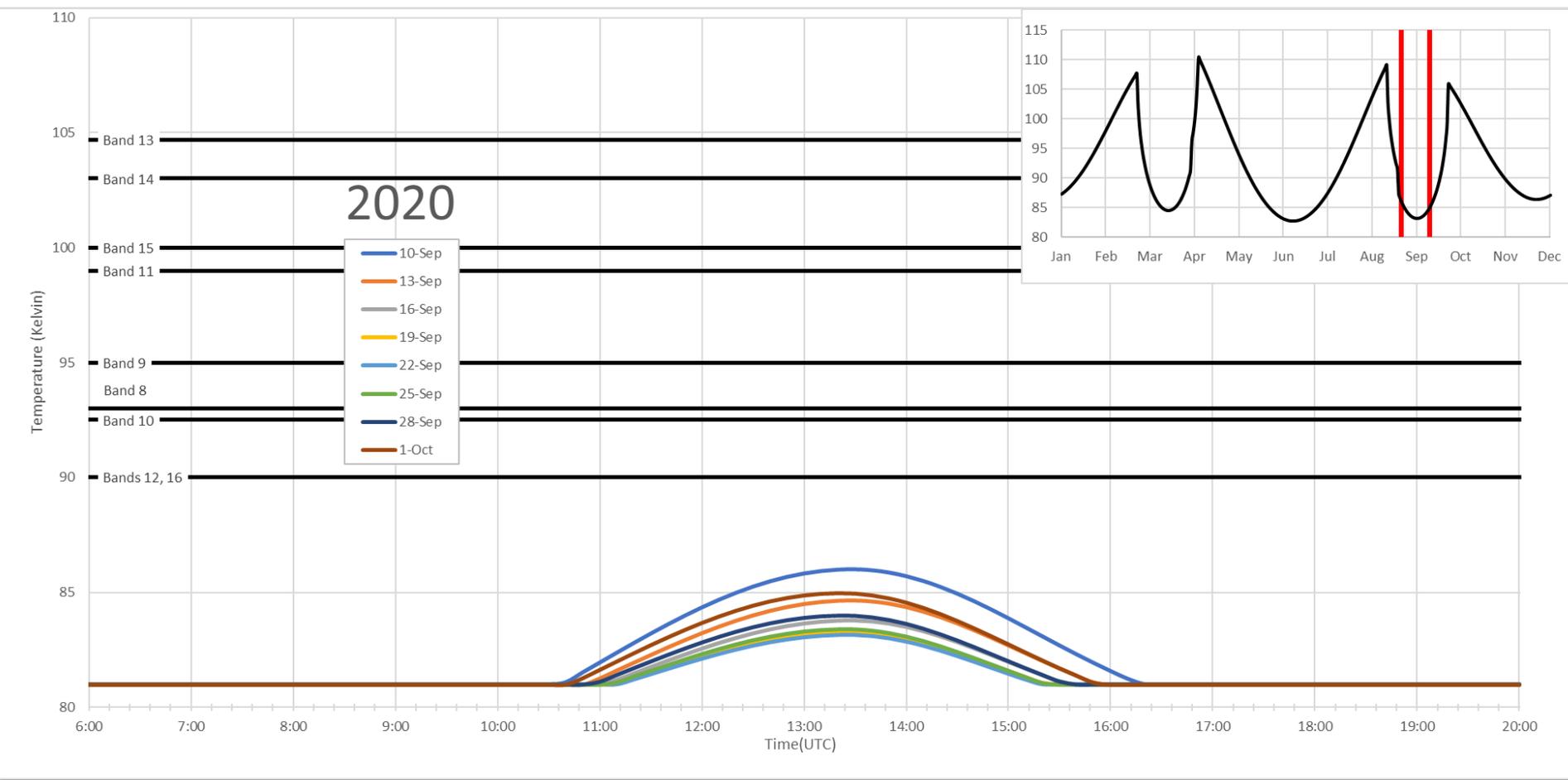
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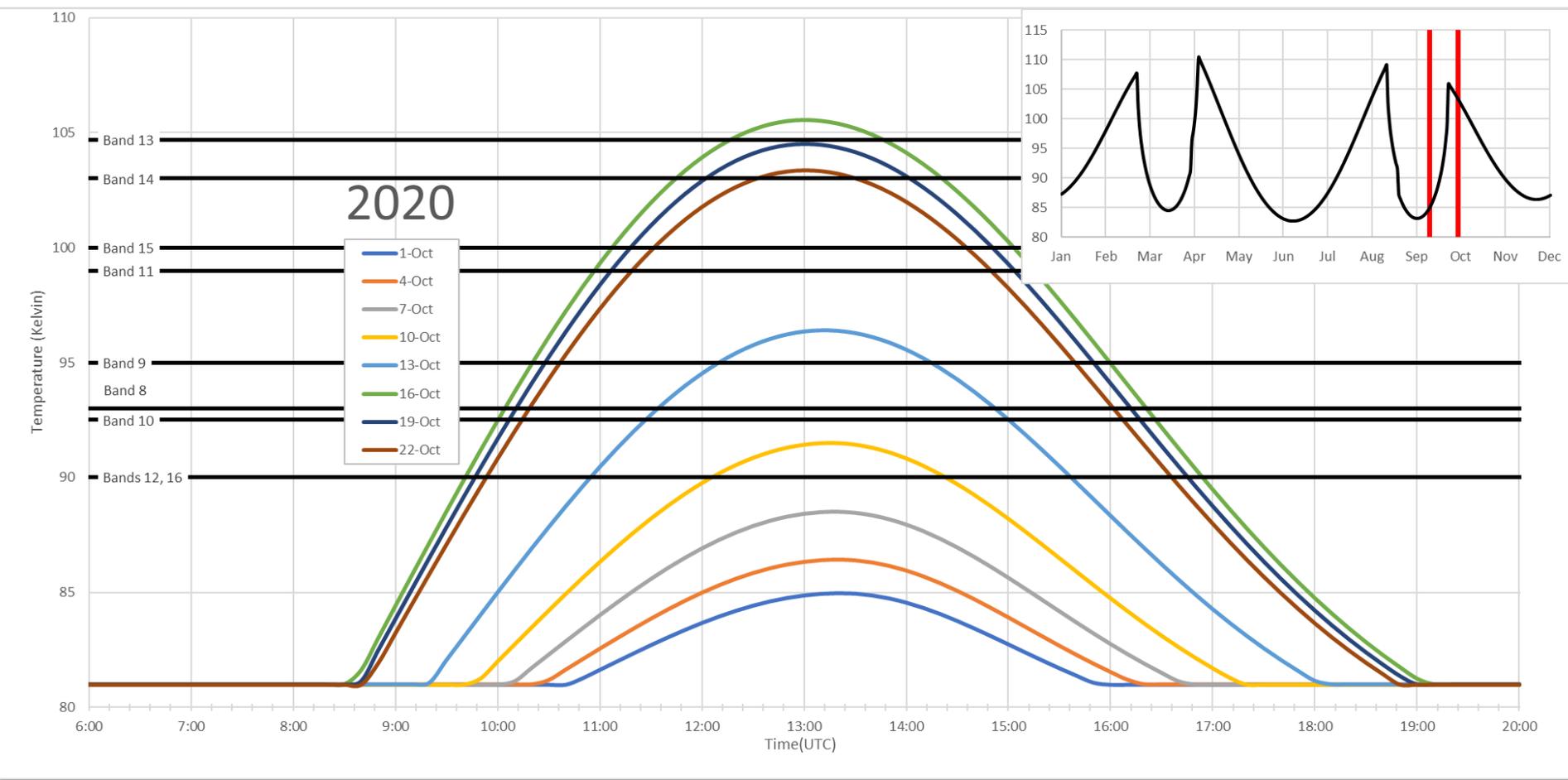
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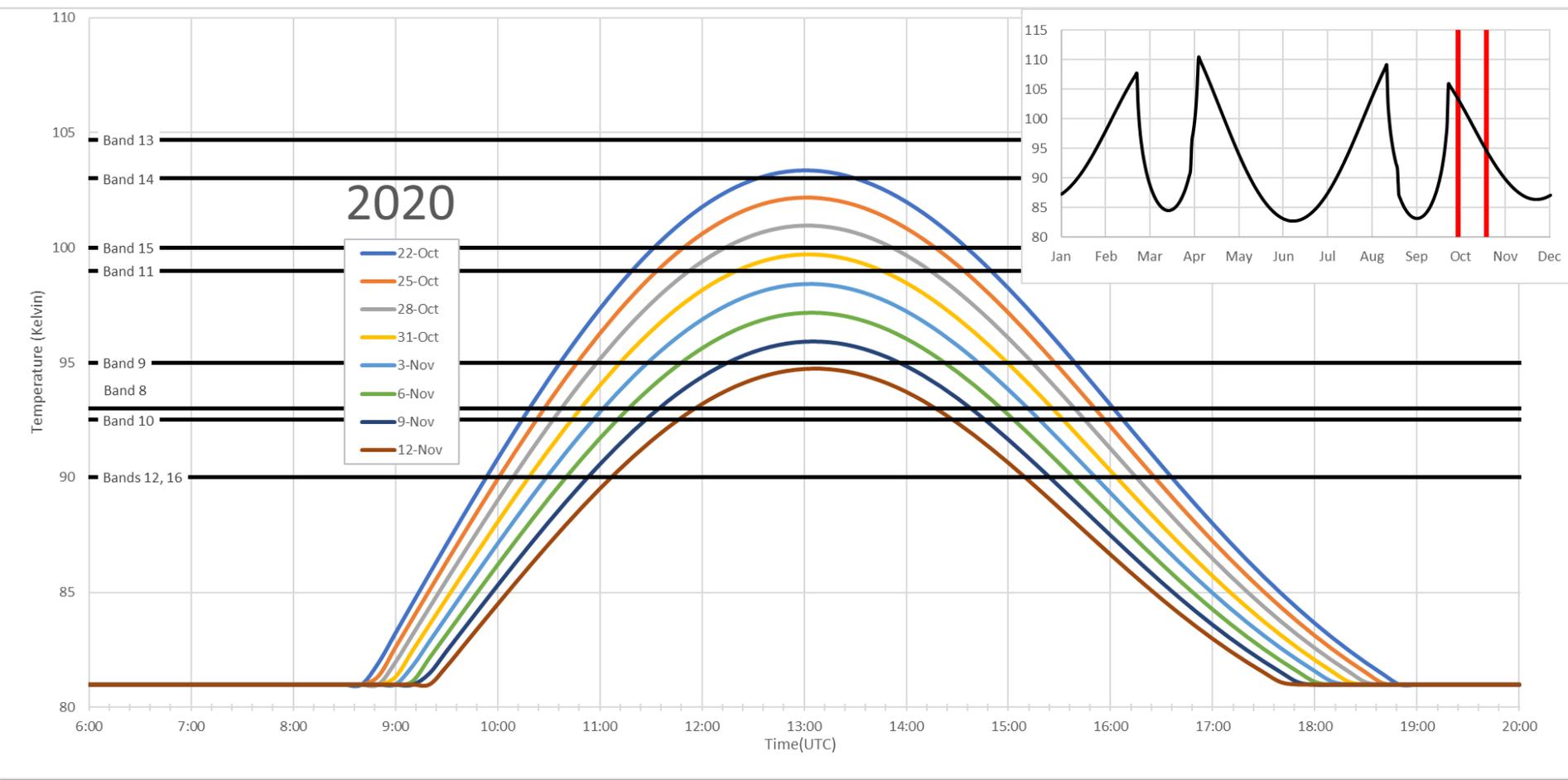
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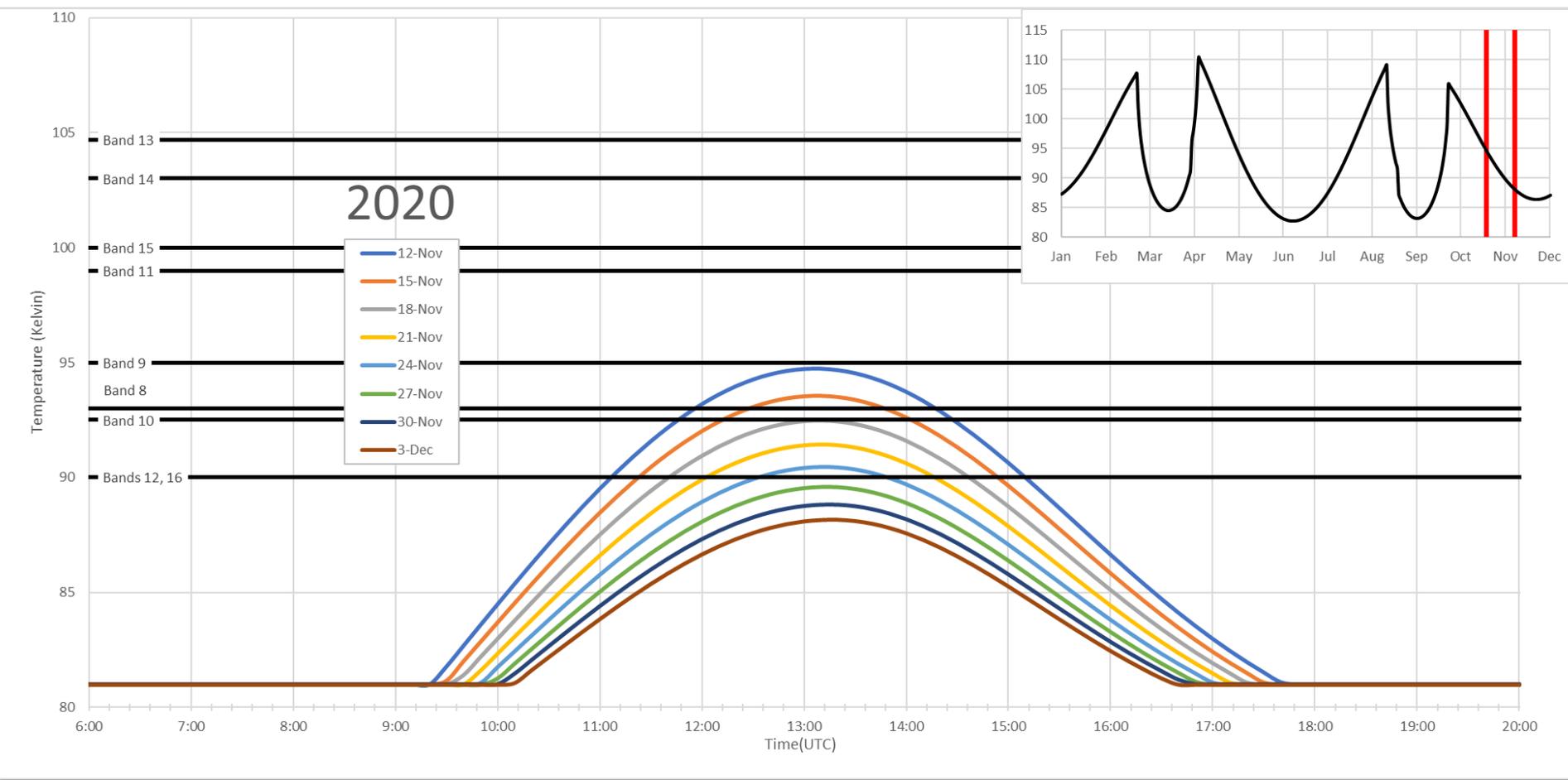
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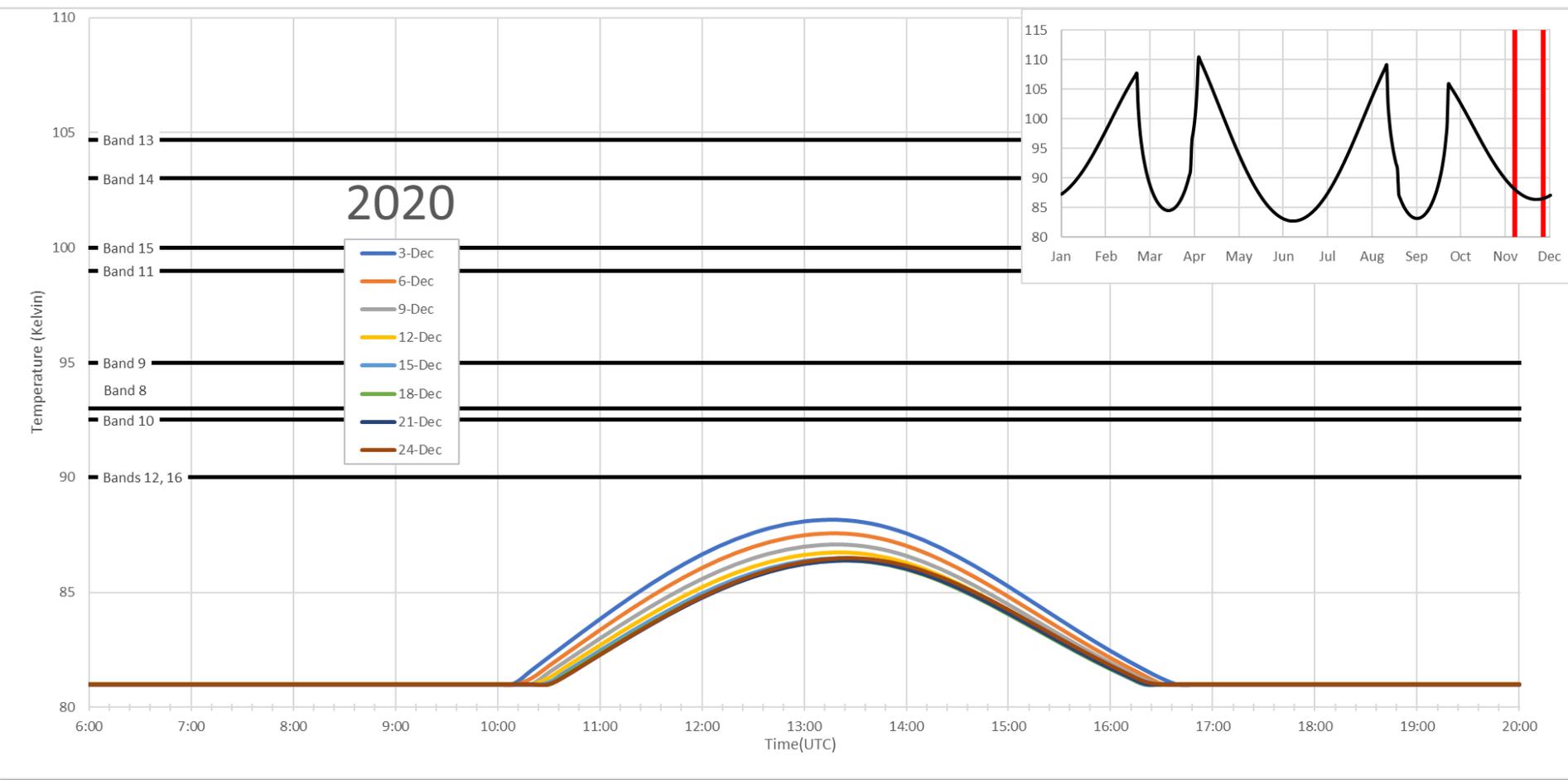
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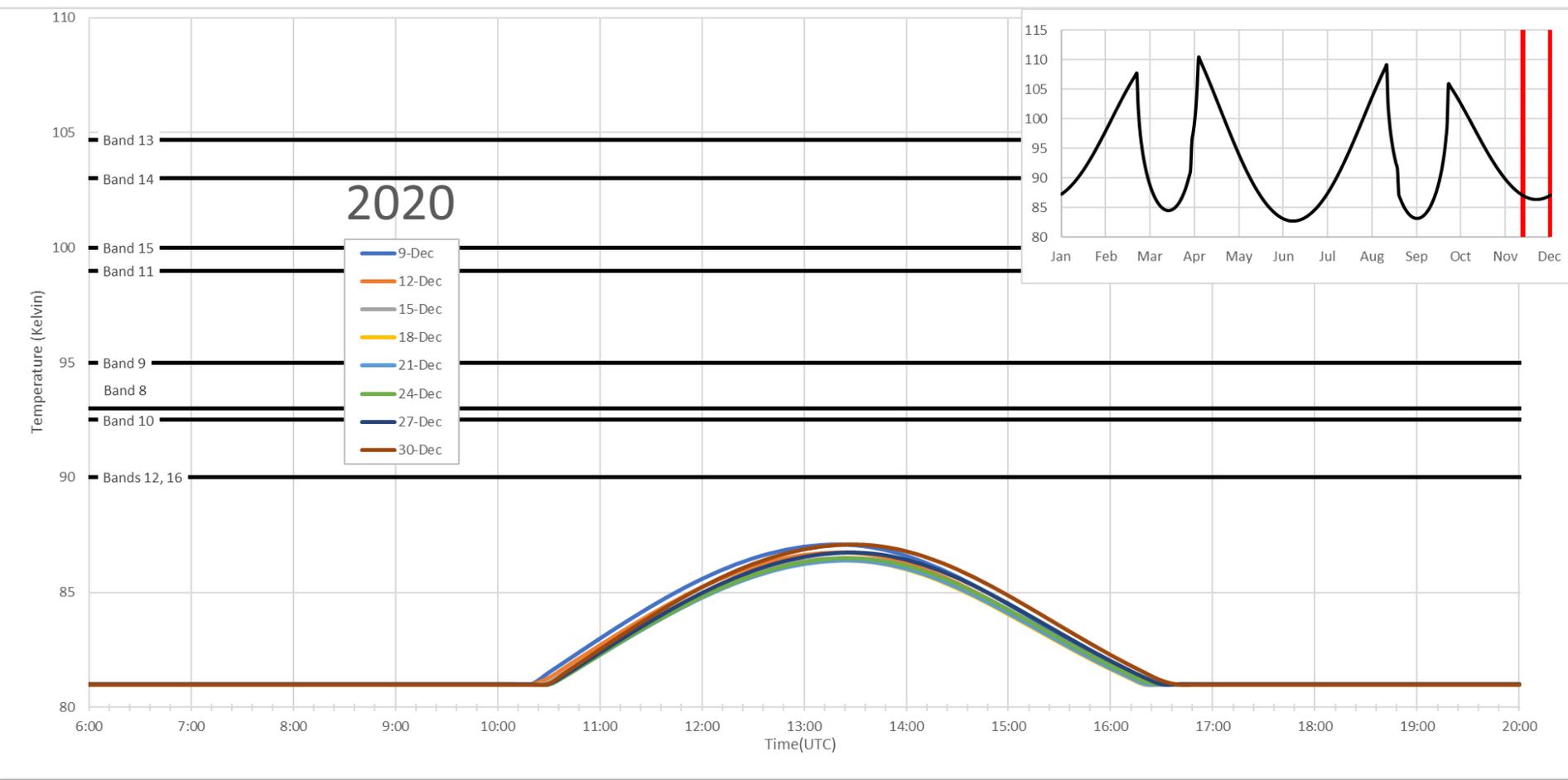
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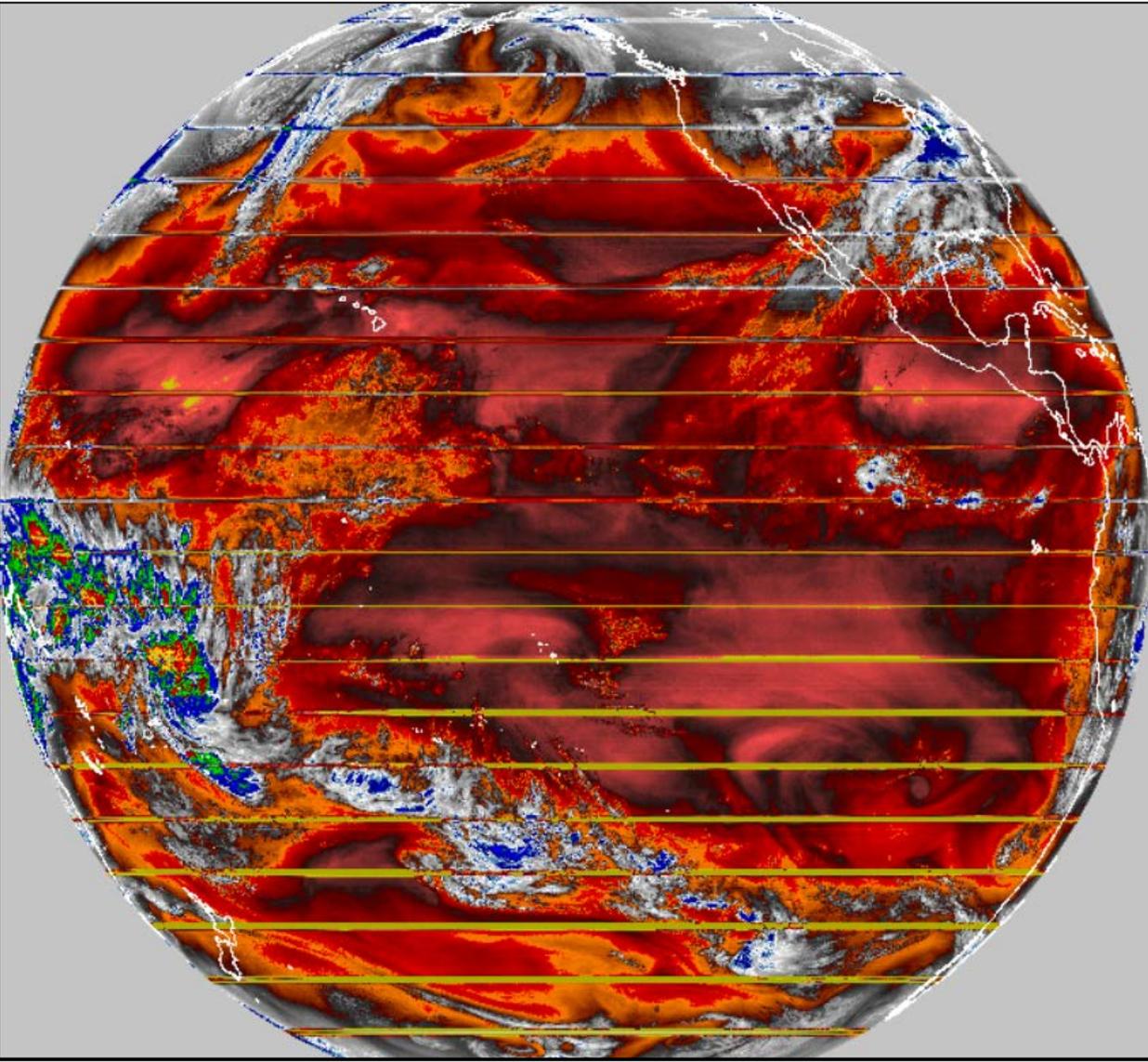
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Characterization of Marginal and Unusable Hours

2020 Predictions	Characterization of Daily Maximum Values	Characterization of Diurnal Values
1 January - 26 February	Channel saturation begins starting with bands in this order: 12, 16, 10, 8, 9, 11, 15, 14, 13 from marginal to unusable by the end of the time period	Saturation can occur between approximately 1000-1730 UTC. Peak saturation occurs at the end of the time period at approximately 1300 UTC.
26 February - 19 March	Channel saturation improves starting with bands in this order: 13, 14, 15, 11, 9, 8, 10, 16, 12 from unusable to marginal by the end of the time period	Saturation can occur between approximately 1000-1730 UTC. Peak saturation occurs at the beginning of the time period at approximately 1300 UTC.
19 March	Spring Equinox	
19 March - 12 April	Channel saturation begins starting with bands in this order: 12, 16, 10, 8, 9, 11, 15, 14, 13 from marginal to unusable by the end of the time period	Saturation can occur between approximately 1030-1630 UTC. Peak saturation occurs at the end of the time period at approximately 1300 UTC.
12 April - 20 June	Channel saturation improves starting with bands in this order: 13, 14, 15, 11, 9, 8, 10, 16, 12 from unusable to marginal by the end of the time period	Saturation can occur between approximately 1030-1630 UTC. Peak saturation occurs at the beginning of the time period at approximately 1300 UTC.
20 June	Summer Solstice	
20 June - 30 August	Channel saturation begins starting with bands in this order: 12, 16, 10, 8, 9, 11, 15, 14, 13 from marginal to unusable by the end of the time period	Saturation can occur between approximately 1000-1730 UTC. Peak saturation occurs at the end of the time period at approximately 1300 UTC.
30 August - 22 September	Channel saturation improves starting with bands in this order: 13, 14, 15, 11, 9, 8, 10, 16, 12 from unusable to marginal by the end of the time period	Saturation can occur between approximately 1000-1730 UTC. Peak saturation occurs at the beginning of the time period at approximately 1300 UTC.
22 September	Fall Equinox	
22 September - 15 October	Channel saturation begins starting with bands in this order: 12, 16, 10, 8, 9, 11, 15, 14, 13 from marginal to unusable by the end of the time period	Saturation can occur between approximately 1030-1630 UTC. Peak saturation occurs at the end of the time period at approximately 1300 UTC.
15 October - 19 December	Channel saturation improves starting with bands in this order: 13, 14, 15, 11, 9, 8, 10, 16, 12 from unusable to marginal by the end of the time period	Saturation can occur between approximately 1030-1630 UTC. Peak saturation occurs at the beginning of the time period at approximately 1300 UTC.

Example of Marginally Saturated Image



Example of Unusable Saturated Image

