GOES-17 Saturation Prediction Reference Tools

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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)
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.
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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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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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## Characterization of Marginal and Unusable Hours

<table>
<thead>
<tr>
<th>2020 Predictions</th>
<th>Characterization of Daily Maximum Values</th>
<th>Characterization of Diurnal Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 January - 26 February</td>
<td>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</td>
<td>Saturation can occur between approximately 1000-1730 UTC. Peak saturation occurs at the end of the time period at approximately 1300 UTC.</td>
</tr>
<tr>
<td>26 February - 19 March</td>
<td>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</td>
<td>Saturation can occur between approximately 1000-1730 UTC. Peak saturation occurs at the beginning of the time period at approximately 1300 UTC.</td>
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<td>19 March</td>
<td>Spring Equinox</td>
<td></td>
</tr>
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<td>19 March - 12 April</td>
<td>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</td>
<td>Saturation can occur between approximately 1030-1630 UTC. Peak saturation occurs at the end of the time period at approximately 1300 UTC.</td>
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<td>12 April - 20 June</td>
<td>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</td>
<td>Saturation can occur between approximately 1030-1630 UTC. Peak saturation occurs at the beginning of the time period at approximately 1300 UTC.</td>
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<td>20 June</td>
<td>Summer Solstice</td>
<td></td>
</tr>
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<td>20 June - 30 August</td>
<td>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</td>
<td>Saturation can occur between approximately 1000-1730 UTC. Peak saturation occurs at the end of the time period at approximately 1300 UTC.</td>
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<td>30 August - 22 September</td>
<td>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</td>
<td>Saturation can occur between approximately 1000-1730 UTC. Peak saturation occurs at the beginning of the time period at approximately 1300 UTC.</td>
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<tr>
<td>22 September</td>
<td>Fall Equinox</td>
<td></td>
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<td>22 September - 15 October</td>
<td>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</td>
<td>Saturation can occur between approximately 1030-1630 UTC. Peak saturation occurs at the end of the time period at approximately 1300 UTC.</td>
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<td>15 October - 19 December</td>
<td>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</td>
<td>Saturation can occur between approximately 1030-1630 UTC. Peak saturation occurs at the beginning of the time period at approximately 1300 UTC.</td>
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Example of Marginally Saturated Image
Example of Unusable Saturated Image