

# VIIRS Imager Characteristics

|                                   | Band No. | Wave-length (μm) | Horiz Sample Interval (km Downtrack x Crosstrack) |               | Driving EDRs            | Radiance Range | Ltyp or Ttyp   | Signal to Noise Ratio (dimensionless) or NEΔT (Kelvins) |                |             |
|-----------------------------------|----------|------------------|---|---------------|-------------------------|----------------|----------------|---|----------------|-------------|
|                                   |          |                  | Nadir   | End of Scan   |                         |                |                | Required  | Predicted      | Margin      |
|                                   |          |                  |   |               |                         |                |                |   |                |             |
| VIS/NIR FPA<br>Silicon PIN Diodes | M1       | 0.412            | 0.742 x 0.259                                     | 1.60 x 1.58   | Ocean Color<br>Aerosols | Low<br>High    | 44.9<br>155    | 352<br>316  | 441<br>807     | 25%<br>155% |
|                                   | M2       | 0.445            | 0.742 x 0.259                                     | 1.60 x 1.58   | Ocean Color<br>Aerosols | Low<br>High    | 40<br>146      | 380<br>409  | 524<br>926     | 38%<br>126% |
|                                   | M3       | 0.488            | 0.742 x 0.259                                     | 1.60 x 1.58   | Ocean Color<br>Aerosols | Low<br>High    | 32<br>123      | 416<br>414  | 542<br>730     | 30%<br>76%  |
|                                   | M4       | 0.555            | 0.742 x 0.259                                     | 1.60 x 1.58   | Ocean Color<br>Aerosols | Low<br>High    | 21<br>90       | 362<br>315  | 455<br>638     | 26%<br>102% |
|                                   | I1       | 0.640            | 0.371 x 0.387                                     | 0.80 x 0.789  | Imagery                 | Single         | 22             | 119   | 146            | 23%         |
|                                   | M5       | 0.672            | 0.742 x 0.259                                     | 1.60 x 1.58   | Ocean Color<br>Aerosols | Low<br>High    | 10<br>68       | 242<br>360  | 298<br>522     | 23%<br>45%  |
|                                   | M6       | 0.746            | 0.742 x 0.776                                     | 1.60 x 1.58   | Atmospheric Corr'n      | Single         | 9.6            | 199   | 239            | 20%         |
|                                   | I2       | 0.865            | 0.371 x 0.387                                     | 0.80 x 0.789  | NDVI                    | Single         | 25             | 150   | 225            | 50%         |
|                                   | M7       | 0.865            | 0.742 x 0.259                                     | 1.60 x 1.58   | Ocean Color<br>Aerosols | Low<br>High    | 6.4<br>33.4    | 215<br>340  | 388<br>494     | 81%<br>45%  |
| CCD                               | DNB      | 0.7              | 0.742 x 0.742                                     | 0.742 x 0.742 | Imagery                 | Var.           | 6.70E-05       | 6   | 5.7            | -5%         |
| S/MWIR<br>PV HgCdTe (HCT)         | M8       | 1.24             | 0.742 x 0.776                                     | 1.60 x 1.58   | Cloud Particle Size     | Single         | 5.4            | 74  | 98             | 32%         |
|                                   | M9       | 1.378            | 0.742 x 0.776                                     | 1.60 x 1.58   | Cirrus/Cloud Cover      | Single         | 6              | 83  | 155            | 88%         |
|                                   | I3       | 1.61             | 0.371 x 0.387                                     | 0.80 x 0.789  | Binary Snow Map         | Single         | 7.3            | 6.0   | 97             | 1523%       |
|                                   | M10      | 1.61             | 0.742 x 0.776                                     | 1.60 x 1.58   | Snow Fraction           | Single         | 7.3            | 342   | 439            | 28%         |
|                                   | M11      | 2.25             | 0.742 x 0.776                                     | 1.60 x 1.58   | Clouds                  | Single         | 0.12           | 10  | 17             | 66%         |
|                                   | I4       | 3.74             | 0.371 x 0.387                                     | 0.80 x 0.789  | Imagery Clouds          | Single         | 270 K          | 2.500   | 0.486          | 415%        |
|                                   | M12      | 3.70             | 0.742 x 0.776                                     | 1.60 x 1.58   | SST                     | Single         | 270 K          | 0.396   | 0.218          | 82%         |
|                                   | M13      | 4.05             | 0.742 x 0.259                                     | 1.60 x 1.58   | SST<br>Fires            | Low<br>High    | 300 K<br>380 K | 0.107<br>0.423  | 0.063<br>0.334 | 69%<br>27%  |
| LWIR<br>PV HCT                    | M14      | 8.55             | 0.742 x 0.776                                     | 1.60 x 1.58   | Cloud Top Properties    | Single         | 270 K          | 0.091   | 0.075          | 22%         |
|                                   | M15      | 10.763           | 0.742 x 0.776                                     | 1.60 x 1.58   | SST                     | Single         | 300 K          | 0.070   | 0.038          | 85%         |
|                                   | I5       | 11.450           | 0.371 x 0.387                                     | 0.80 x 0.789  | Cloud Imagery           | Single         | 210 K          | 1.500   | 0.789          | 90%         |
|                                   | M16      | 12.013           | 0.742 x 0.776                                     | 1.60 x 1.58   | SST                     | Single         | 300 K          | 0.072   | 0.051          | 42%         |

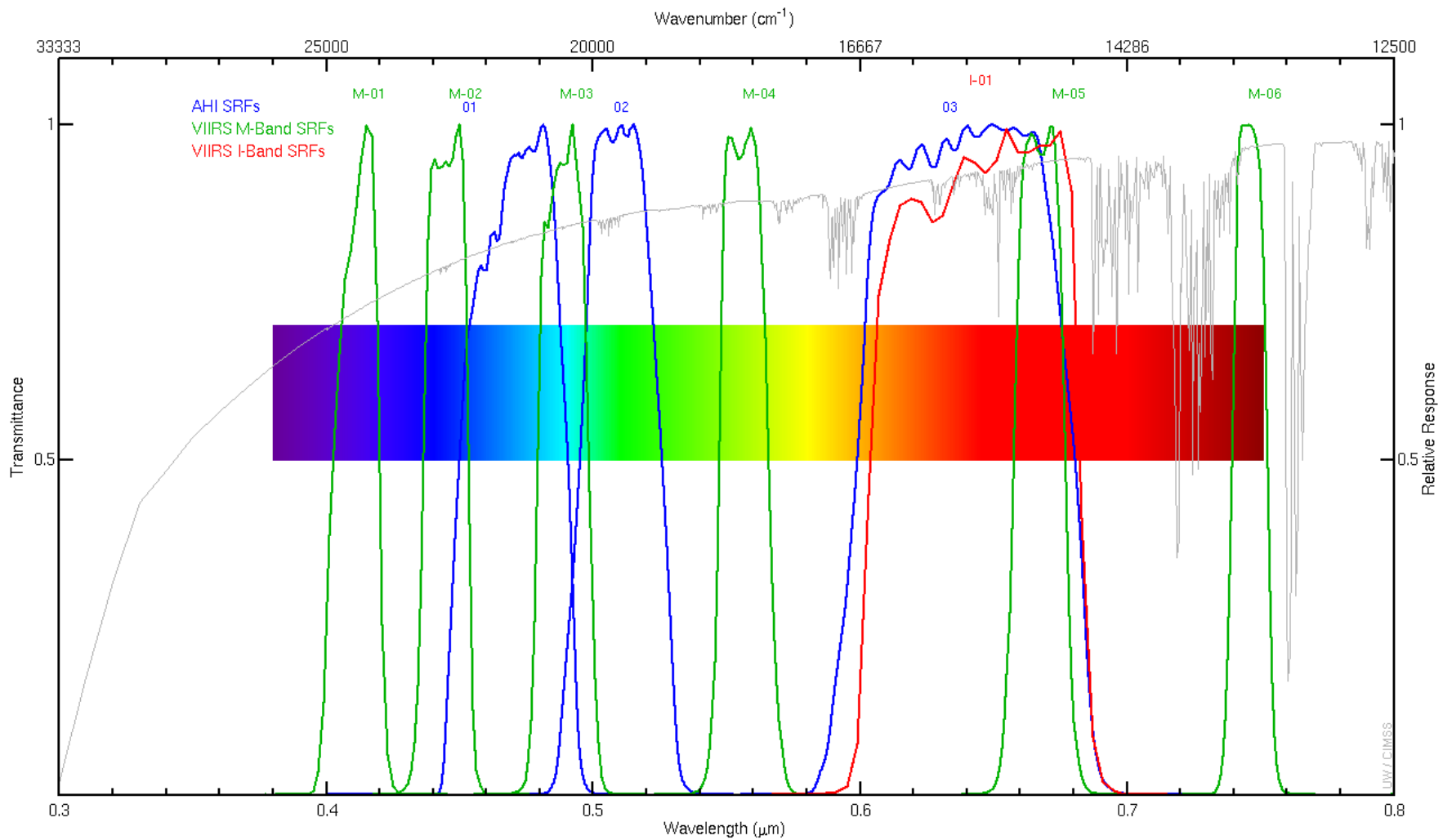
## MODIS Imager Characteristics

| Band | Wavelength (nm) | Resolution (m) | Primary Use                                 |
|------|-----------------|----------------|---|
| 1    | 620–670         | 250            | Land/Cloud/Aerosols Boundaries              |
| 2    | 841–876         | 250            |   |
| 3    | 459–479         | 500            | Land/Cloud/Aerosols Properties              |
| 4    | 545–565         | 500            |   |
| 5    | 1230–1250       | 500            |   |
| 6    | 1628–1652       | 500            |   |
| 7    | 2105–2155       | 500            |   |
| 8    | 405–420         | 1000           | Ocean Color/ Phytoplankton/ Biogeochemistry |
| 9    | 438–448         | 1000           |   |
| 10   | 483–493         | 1000           |   |
| 11   | 526–536         | 1000           |   |
| 12   | 546–556         | 1000           |   |
| 13   | 662–672         | 1000           |   |
| 14   | 673–683         | 1000           |   |
| 15   | 743–753         | 1000           |   |
| 16   | 862–877         | 1000           |   |
| 17   | 890–920         | 1000           |   |
| 18   | 931–941         | 1000           |   |
| 19   | 915–965         | 1000           |   |
| 20   | 3.660–3.840     | 1000           | Surface/Cloud Temperature                   |
| 21   | 3.929–3.989     | 1000           |   |
| 22   | 3.929–3.989     | 1000           |   |
| 23   | 4.020–4.080     | 1000           |   |
| 24   | 4.433–4.498     | 1000           | Atmospheric Temperature                     |
| 25   | 4.482–4.549     | 1000           |   |
| 26   | 1.360–1.390     | 1000           | Cirrus Clouds Water Vapor                   |
| 27   | 6.535–6.895     | 1000           |   |
| 28   | 7.175–7.475     | 1000           |   |
| 29   | 8.400–8.700     | 1000           | Cloud Properties                            |
| 30   | 9.580–9.880     | 1000           | Ozone                                       |
| 31   | 10.780–11.280   | 1000           | Surface/Cloud Temperature                   |
| 32   | 11.770–12.270   | 1000           |   |
| 33   | 13.185–13.485   | 1000           | Cloud Top Altitude                          |
| 34   | 13.485–13.785   | 1000           |   |
| 35   | 13.785–14.085   | 1000           |   |
| 36   | 14.085–14.385   | 1000           |   |

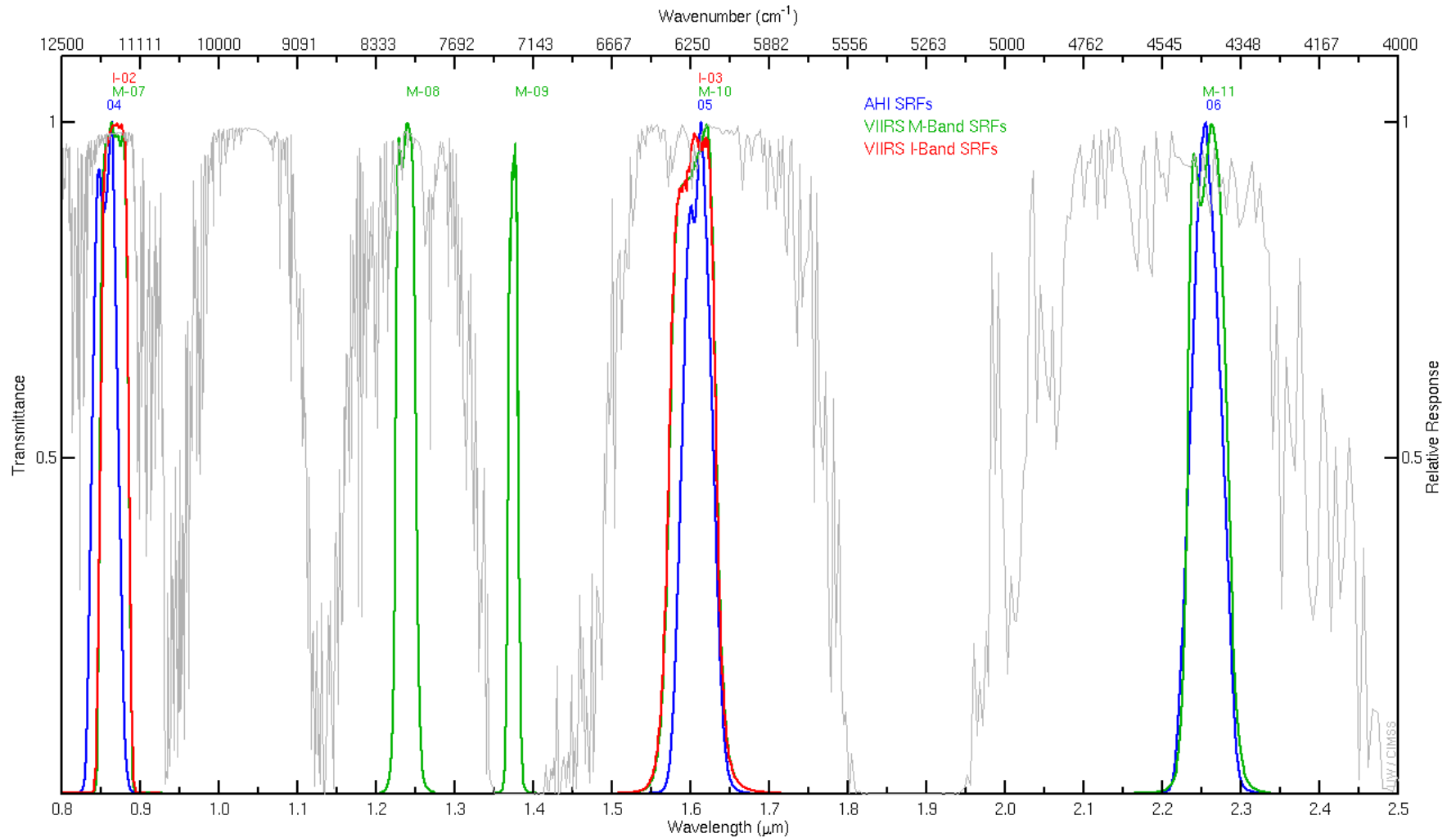
## Advanced Himawari Imager Spectral Bands

| AHI Band | AHI Approximate Central Wavelength (μm) | Approximate sub-point resolution (km) | Type          | Nickname                 |
|----------|---|---------------------------------------|---------------|--------------------------|
| 1        | 0.47                                    | 1                                     | Visible       | Blue                     |
| 2        | 0.51                                    | 1                                     | Visible       | Green                    |
| 3        | 0.64                                    | 0.5                                   | Visible       | Red                      |
| 4        | 0.86                                    | 1                                     | Near-Infrared | Veggie                   |
| 5        | 1.6                                     | 2                                     | Near-Infrared | Snow/Ice                 |
| 6        | 2.3                                     | 2                                     | Near-Infrared | Cloud Particle Size      |
| 7        | 3.9                                     | 2                                     | Infrared      | Shortwave Window         |
| 8        | 6.2                                     | 2                                     | Infrared      | Upper-level Water Vapor  |
| 9        | 6.9                                     | 2                                     | Infrared      | Mid-level Water Vapor    |
| 10       | 7.3                                     | 2                                     | Infrared      | Lower-level Water Vapor  |
| 11       | 8.6                                     | 2                                     | Infrared      | Cloud-Top Phase          |
| 12       | 9.6                                     | 2                                     | Infrared      | Ozone                    |
| 13       | 10.4                                    | 2                                     | Infrared      | “Clean” Longwave Window  |
| 14       | 11.2                                    | 2                                     | Infrared      | Longwave Window          |
| 15       | 12.4                                    | 2                                     | Infrared      | “Dirty” Longwave Window  |
| 16       | 13.3                                    | 2                                     | Infrared      | CO <sub>2</sub> Longwave |

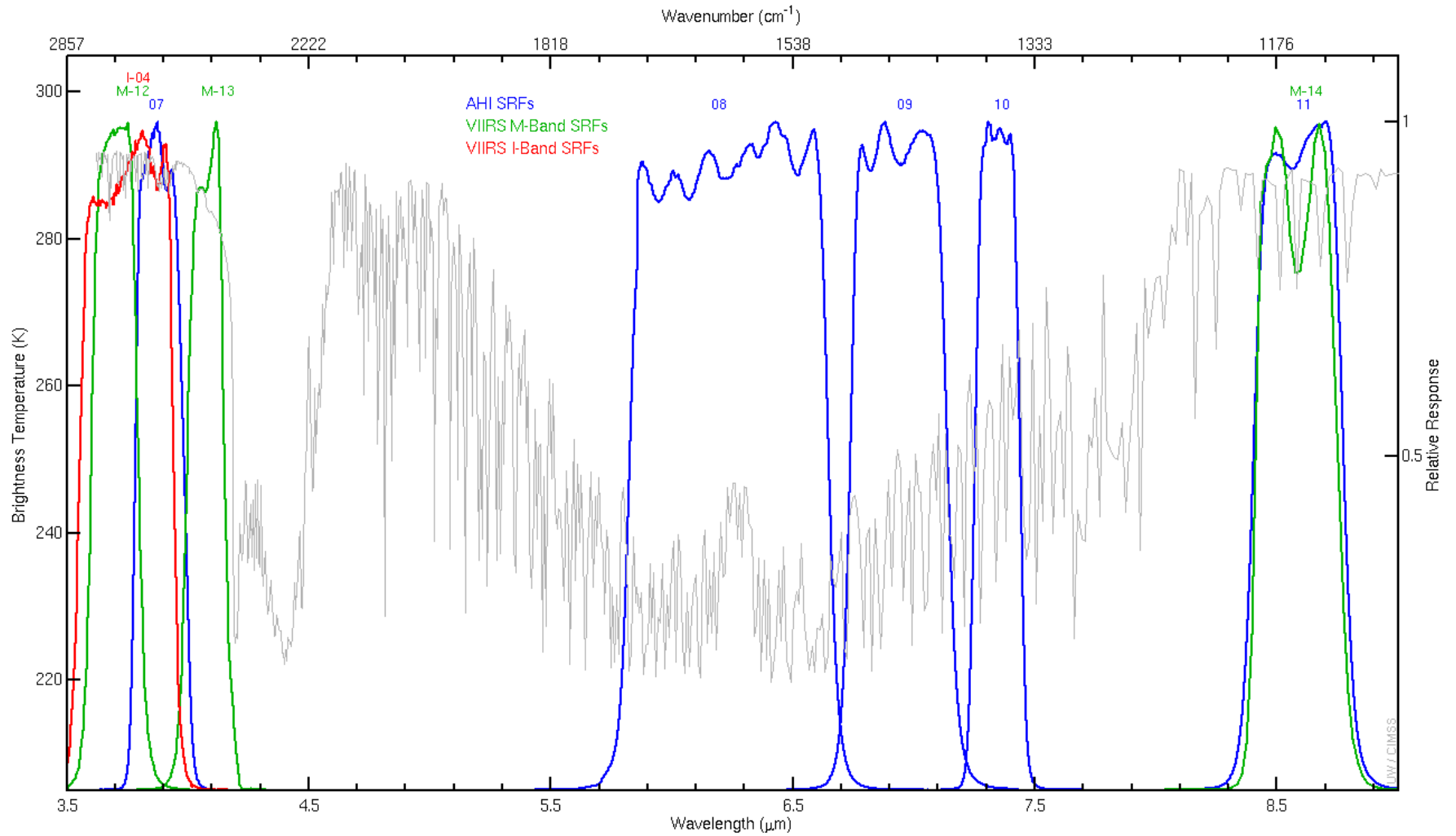
# Visible bands on the AHI and S-NPP VIIRS



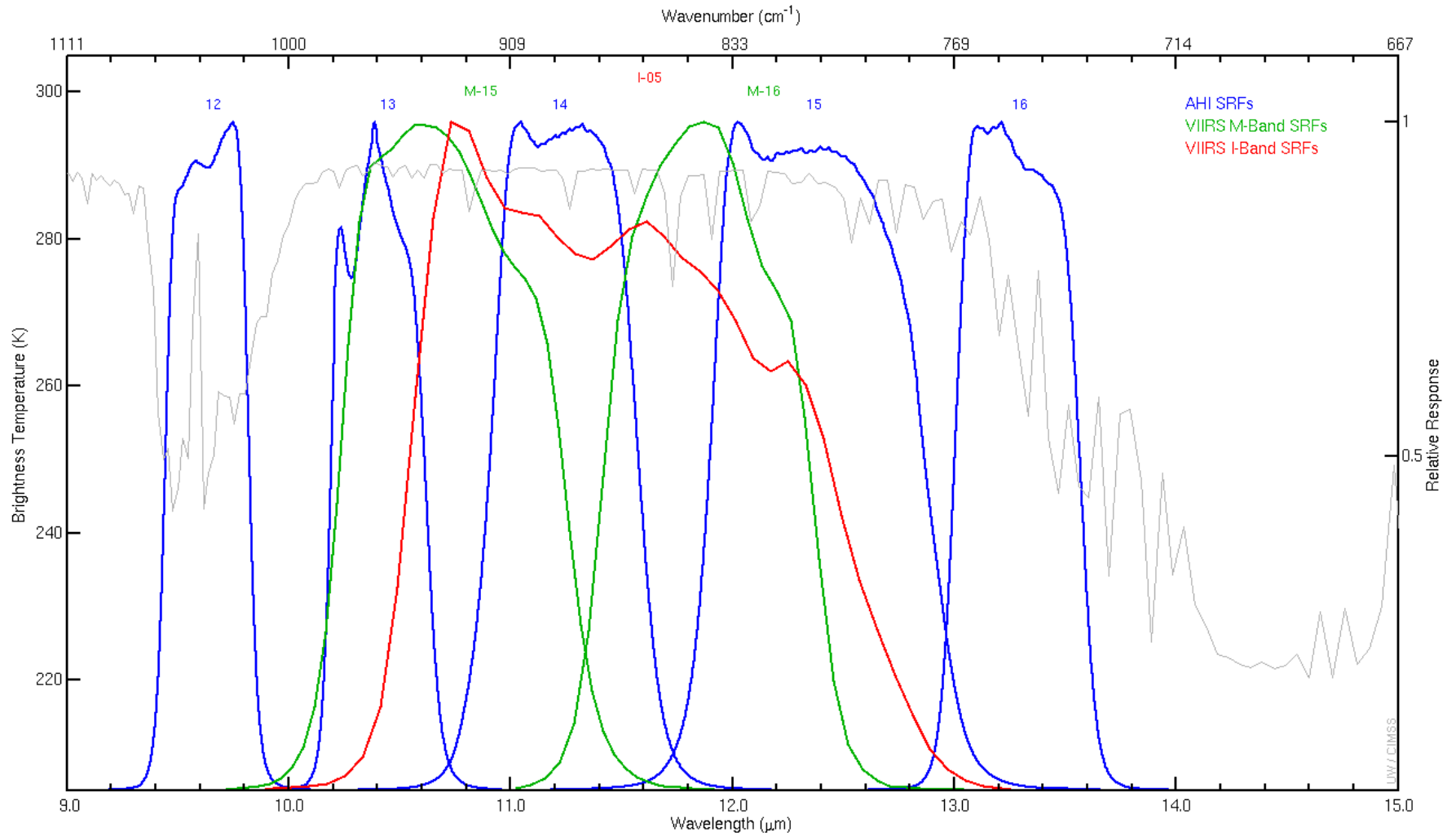
# Near-IR bands on the AHI and S-NPP VIIRS



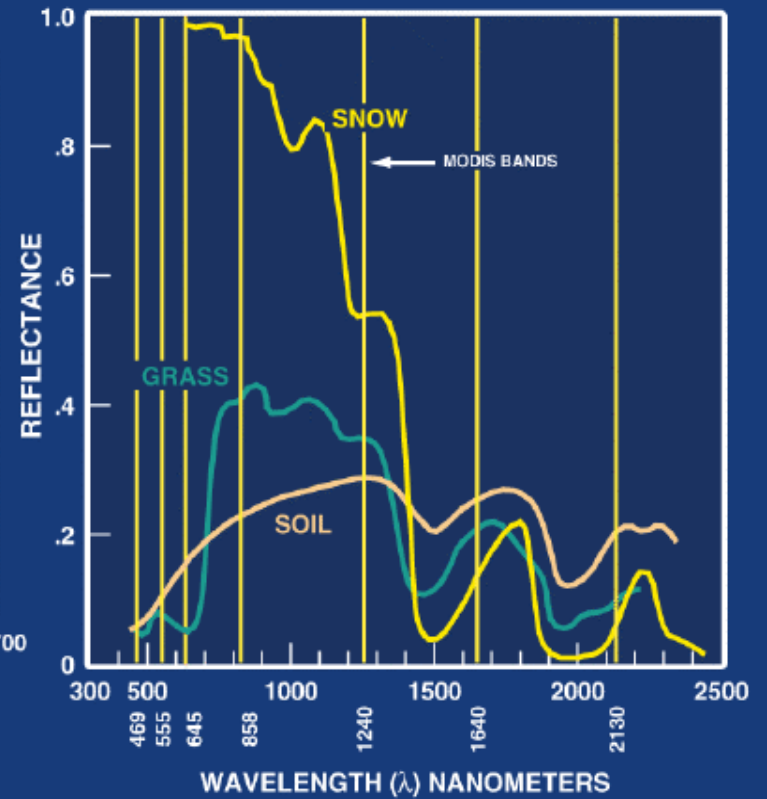
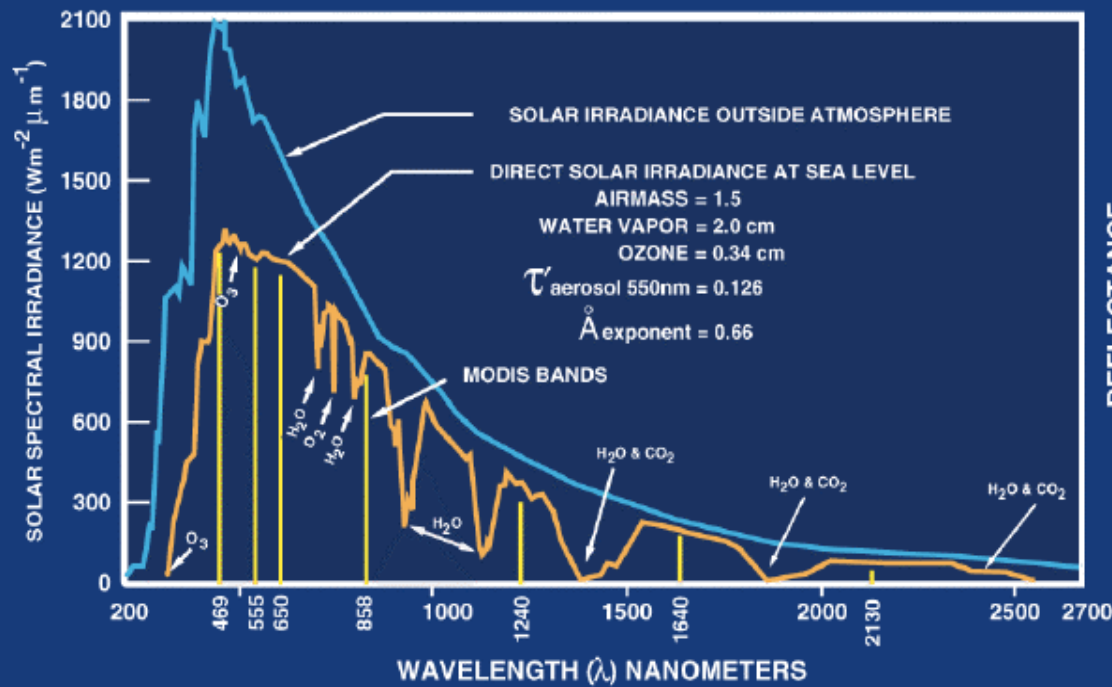
# Infrared Bands on the AHI and S-NPP VIIRS



# Infrared Bands on the AHI and S-NPP VIIRS (continued)

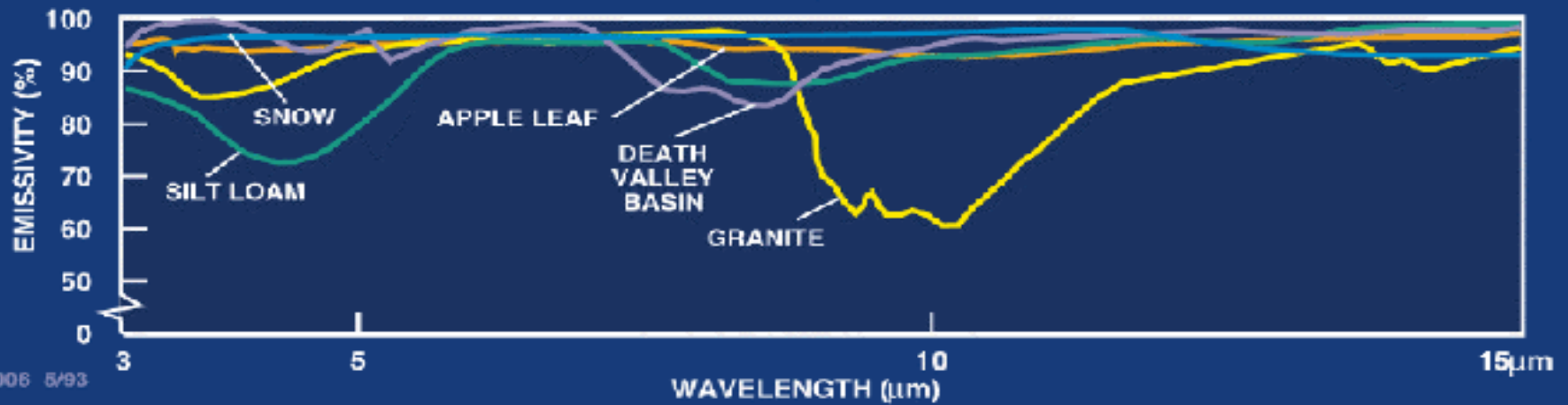
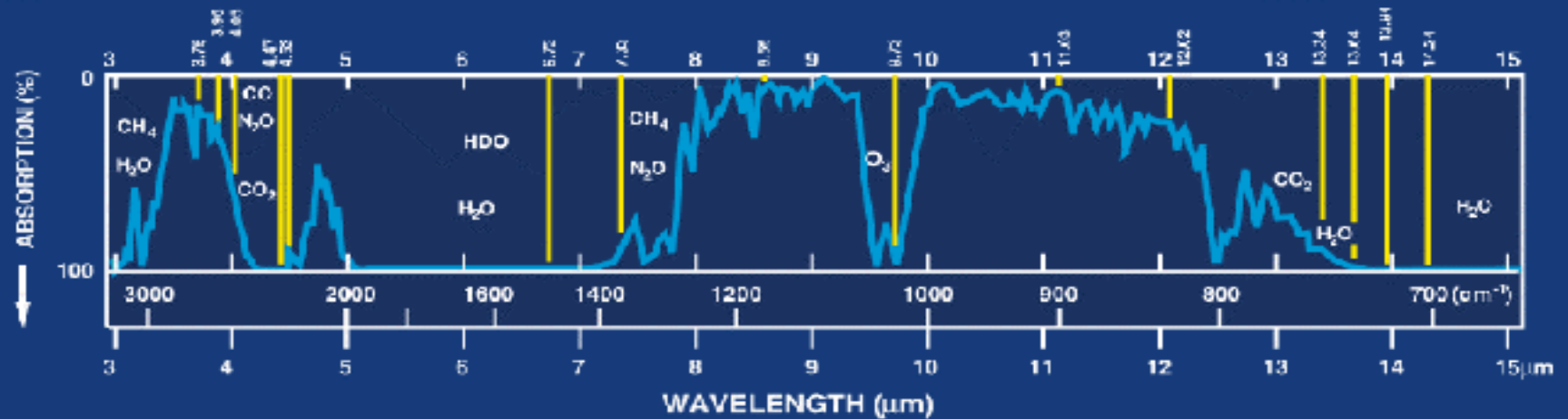


# LAND-SOLAR RADIATION



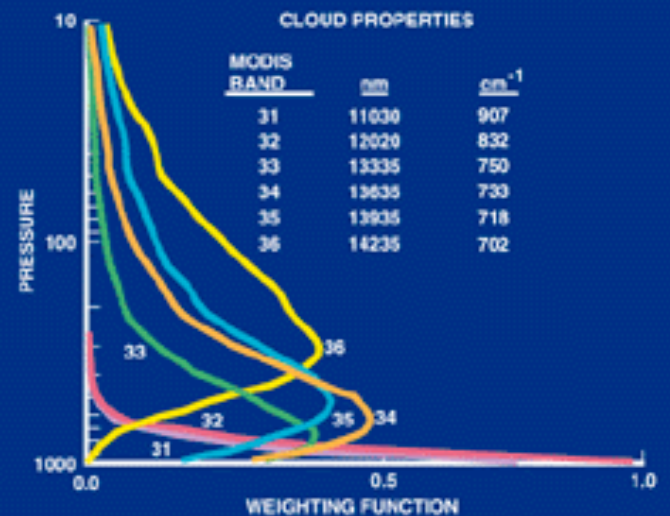
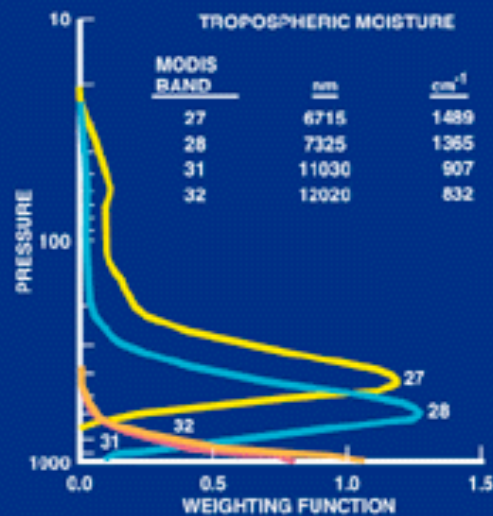
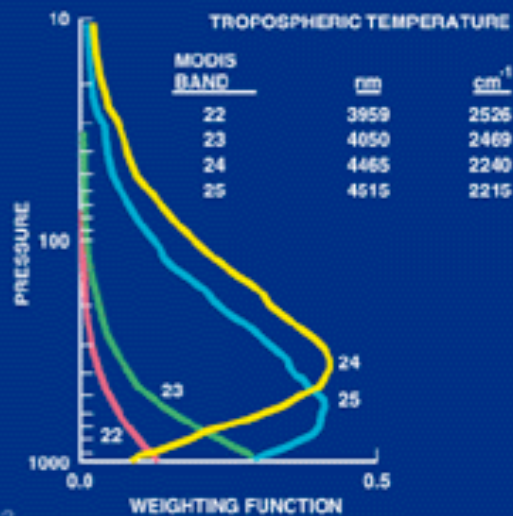
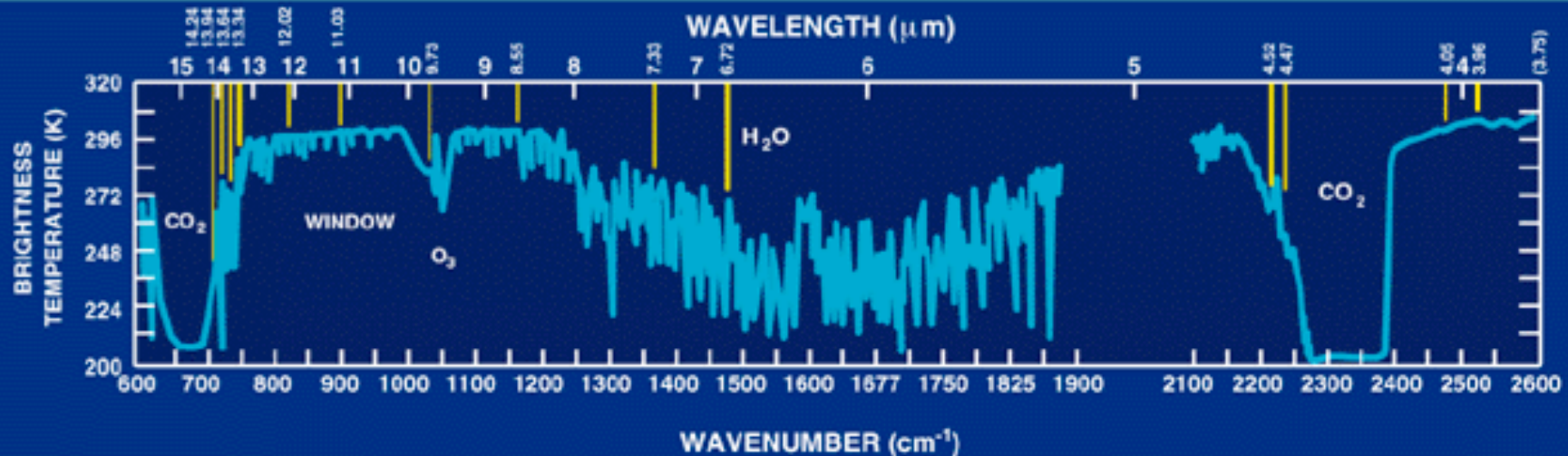


# LAND - THERMAL RADIATION



C351.006 5/93

# ATMOSPHERE - THERMAL RADIATION



## ATMS Instrument Characteristics

| Channel | Center frequency (GHz)    | Max. bandwidth (GHz) | Center frequency stability (MHz) | Temp. sensitivity NEΔT (K) | Calibration accuracy (K) | Static beamwidth (°) | Quasi polarization | Characterization at nadir (reference only) |
|---------|---------------------------|----------------------|----------------------------------|----------------------------|--------------------------|----------------------|--------------------|--|
| 1       | 23.8                      | 0.27                 | 10                               | 0.9                        | 2.0                      | 5.2                  | QV                 | Window-water Vapor 100 mm                  |
| 2       | 31.4                      | 0.18                 | 10                               | 0.9                        | 2.0                      | 5.2                  | QV                 | Window-water Vapor 500 mm                  |
| 3       | 50.3                      | 0.18                 | 10                               | 1.20                       | 1.5                      | 2.2                  | QH                 | Window-surface Emissivity                  |
| 4       | 51.76                     | 0.40                 | 5                                | 0.75                       | 1.5                      | 2.2                  | QH                 | Window-surface Emissivity                  |
| 5       | 52.8                      | 0.40                 | 5                                | 0.75                       | 1.5                      | 2.2                  | QH                 | Surface air                                |
| 6       | 53.596 ±0.115             | 0.17                 | 5                                | 0.75                       | 1.5                      | 2.2                  | QH                 | 4 km ~700 mb                               |
| 7       | 54.40                     | 0.40                 | 5                                | 0.75                       | 1.5                      | 2.2                  | QH                 | 9 km ~ 400 mb                              |
| 8       | 54.94                     | 0.40                 | 10                               | 0.75                       | 1.5                      | 2.2                  | QH                 | 11 km ~ 250 mb                             |
| 9       | 55.50                     | 0.33                 | 10                               | 0.75                       | 1.5                      | 2.2                  | QH                 | 13 km ~ 180 mb                             |
| 10      | 57.290344                 | 0.33                 | 0.5                              | 0.75                       | 1.5                      | 2.2                  | QH                 | 17 km ~ 90 mb                              |
| 11      | 57.290344 ±0.217          | 0.078                | 0.5                              | 1.20                       | 1.5                      | 2.2                  | QH                 | 19 km ~ 50 mb                              |
| 12      | 57.290344 ±0.3222 ±0.048  | 0.036                | 1.2                              | 1.20                       | 1.5                      | 2.2                  | QH                 | 25 km ~ 25 mb                              |
| 13      | 57.290344 ±0.3222 ±0.022  | 0.016                | 1.6                              | 1.50                       | 1.5                      | 2.2                  | QH                 | 29 km ~ 10 mb                              |
| 14      | 57.290344 ±0.3222 ±0.010  | 0.008                | 0.5                              | 2.40                       | 1.5                      | 2.2                  | QH                 | 32 km ~ 6 mb                               |
| 15      | 57.290344 ±0.3222 ±0.0045 | 0.003                | 0.5                              | 3.60                       | 1.5                      | 2.2                  | QH                 | 37 km ~ 3 mb                               |
| 16      | 87-91                     | 2.0                  | 200                              | 0.5                        | 2.0                      | 2.2                  | QV                 | Window H <sub>2</sub> O 150 mm             |
| 17      | 166.31                    | 2.0                  | 200                              | 0.6                        | 2.0                      | 1.1                  | QH                 | H <sub>2</sub> O 18 mm                     |
| 18      | 183.31±7.0                | 2.0                  | 100                              | 0.8                        | 2.0                      | 1.1                  | QH                 | H <sub>2</sub> O 8 mm                      |
| 19      | 183.31±4.5                | 2.0                  | 100                              | 0.8                        | 2.0                      | 1.1                  | QH                 | H <sub>2</sub> O 4.5 mm                    |
| 20      | 183.31±3.0                | 1.0                  | 50                               | 0.8                        | 2.0                      | 1.1                  | QH                 | H <sub>2</sub> O 2.5 mm                    |
| 21      | 183.31±1.8                | 1.0                  | 50                               | 0.8                        | 2.0                      | 1.1                  | QH                 | H <sub>2</sub> O 1.2 mm                    |
| 22      | 183.31±1.0                | 0.5                  | 30                               | 0.9                        | 2.0                      | 1.1                  | QH                 | H <sub>2</sub> O 0.5 mm                    |

# ATMS Weighting Functions

(U.S. Standard Atmosphere)

