

"Red, Green, Blue" - RGB satellite data activity

The Advanced Baseline Imager (ABI) on GOES satellites measures 16 bands (wavelengths) of the electromagnetic spectrum! Once the data is here on Earth, scientists must combine a minimum of 3 bands to make a 'True Color' image: red, green and blue. However, ABI does not measure energy in the green portion of the electromagnetic spectrum so we use near-infrared data at the wavelength of .86 μm (micrometers) which is invisible to the naked eye but very sensitive to vegetation. (Note: our eyes are incredible remote sensing instruments able to measure and send all wavelengths in visible light to our brain.)

GOES-R ABI Band	Central Wavelength (μm)	Wavelength Range (μm)
1 (blue)	0.47	0.45 - 0.49
2 (red)	0.64	0.59 - 0.69
3	0.86	0.846 - 0.885
4	1.38	1.371 - 1.386
5	1.61	1.58 - 1.64
6	2.26	2.225 - 2.275
7	3.9	3.80 - 4.00
8	6.185	5.77 - 6.6
9	6.95	6.75 - 7.15
10	7.34	7.24 - 7.44
11	8.5	8.3 - 8.7
12	9.61	9.42 - 9.8
13	10.35	10.1 - 10.6
14	11.2	10.8 - 11.6
15	12.3	11.8 - 12.8
16	13.3	13.0 - 13.6

This exercise approximates the process scientists follow to convert GOES single wavelength data into 'true color' imagery similar to what we see with our eyes.

Step 1: Go to <http://cimss.ssec.wisc.edu/education/apps/satrgb/>

Step 2: Take a few minutes to interact with the Concept App (flowers). Change the "select images" values and combine channels.

Step 3: Pick any Real-time Geostationary Satellite image and try to make a 'True Color Image'.

Fill in the wavelength values (images) you applied:

Red _____ Blue _____ Green _____

Questions:

- 1) What parts of the electromagnetic spectrum are measured by the **Advanced Baseline Imager**?
Check all that apply:
Ultraviolet rays _____ Visible light _____ Infrared radiation _____ Radio waves _____
- 2) Why are so many satellite images monochromatic?

References:

ABI Bands Quick Information Guides: <https://www.goes-r.gov/education/ABI-bands-quick-info.html>
GOES-R Education Proving Ground: <http://cimss.ssec.wisc.edu/education/goesr/>

