Subject: Re: ENVI: AVHRR Calibration for Old NOAA Platforms
Posted by Paul van Delst on Wed, 22 Nov 2000 08:00:00 GMT
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wcapehar@my-deja.com wrote:
>
> Has anyone figured out a way to get ENVI (3.4 or previous releases) to
> calibrate the older NOAA plaform's AVHRR data? I am assuming that the
> thermal data ramp calibrations (DN -> Radiance) is taken from the scene
> but the wave-number insertion to get it into Tempreratures requires the
> Plaform-specific values.

I would argue that the former quantity also must be (satellite/instrument) platform specific also. Each instrument channel's spectral response functions are slightly different thus the radiometric calibration and polychromaticity correction coefficients are instrument/channel specific. My experience is with NOAA HIRS and GOES IR instruments but if you're talking about thermal AVHRR channels, then what I said applies (I have no idea how to calibrate visible channel data).

The calibration and polychromaticity correction coefficients as well as the channel central frequencies for just about every satellite that's flown are available from NOAA....somewhere....I know there is a NOAA website with all this info somewhere. I have the latter numbers from NOAA-5 (TIROS-N!) to NOAA-15 (minus NOAA-13 which futzed out in orbit I believe) but it's not officially sanctioned data.

e.g.: Note the difference between NOAA-5, NOAA-14, and NOAA-15 AVHRR. These differences are significant when it comes to calculating temperatures from measured radiances:

AVHRR PLANCK-FUNCTION CONSTANTS FOR TIROS-N ("NOAA-05")

| CHANNEL | CENT-WN | FK1 | FK2 | BC1 | BC2 |
|---|---|---|---|---|---|
| 3 | 2651.105 | .22193E+06 | .38144E+04 | 1.81578 | .99757 |
| 4 | 920.615 | .92933E+04 | .13246E+04 | .46051 | .99841 |
| 5 | 920.615 | .92933E+04 | .13246E+04 | .46051 | .99841 |

AVHRR PLANCK-FUNCTION CONSTANTS FOR NOAA-14

| CHANNEL | CENT-WN | FK1 | FK2 | BC1 | BC2 |
|---|---|---|---|---|---|
| 3 | 2659.515 | .22405E+06 | .38265E+04 | 1.98132 | .99734 |
| 4 | 929.383 | .95613E+04 | .13372E+04 | .43272 | .99852 |
| 5 | 834.606 | .69244E+04 | .12008E+04 | .24104 | .99909 |

AVHRR PLANCK-FUNCTION CONSTANTS FOR NOAA-15

| CHANNEL | CENT-WN | FK1 | FK2 | BC1 | BC2 |
|---|---|---|---|---|---|
| 3 | 2694.853 | .23310E+06 | .38773E+04 | 1.58348 | .99781 |
| 4 | 925.715 | .94486E+04 | .13319E+04 | .36698 | .99874 |
| 5 | 839.502 | .70469E+04 | .12079E+04 | .21465 | .99919 |

As for the calibration coefficients, depending on the calibration scheme, some are calculated pre-launch and others calculated in-flight. In some cases time-averaged

coefficients are used. I, personally, would not rely on a commercial package to calibrate correctly since calibration schemes have improved over time and are still being worked on to get the most out of satellite data. The NOAA NESDIS research and operational folks that do this stuff day-in/day-out are a bunch of smart cookies.

Have a lookee at:
http://www2.ncdc.noaa.gov/docs/klm/html/d/app-d.htm
for some of the later NOAA satellite numbers. Maybe it will lead you to the older instruments' data.

Anyway, sorry for the brain-dump, but satellite radiance calibration is a subtle business.

cheers,

paulv

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