1 Definitions

Our computed radiance, R_c is given by

$$R_c = \epsilon B(T_s)\tau_{atm} + \int B d\tau,$$

where T_s is the NCEP sea surface temperature, and τ_{atm} is the atmospheric transmittance computed with the forward model using the NCEP model fields for temperature and water vapor.

$$R_s^C = \epsilon B(T_s)$$

is the radiance if the atmospheric transmittance was zero, and

$$R_{obs} = R_c = \epsilon B(T_s^t)\tau_{atm}^t + \int B^t d\tau^t,$$

is the observed radiance, where the superscripts denote "true" quantities. $R_c - R_s^c$ is our estimate of the "atmospheric" part of R_{obs}, which we subtract from R_{obs} in order to estimate just the sea surface emission part of R_{obs}, or $\epsilon B(T_s^t)$. T_s^t denotes our estimate of the true sea surface temperature. Therefore, our final estimate of the sea surface temperature from an observed radiance is

$$BT\left[\frac{R_{obs} - (R_c - R_s^c)}{\epsilon}\right] = T_s^t - est$$

Where $BT[]$ turns radiance into brightness temperature.

2 Clear Flag

I compute $T_s^t - est$ for the 900 and 2616 cm^{-1} channels. The clear flag is derived from FOVS that return true for the following three tests:

1. Is Mitch Goldberg's L2 flag (fov_clear_flag) set?
2. $|T_s^t(2616cm^{-1}) - est - T_s| < 1K$
3. $|T_s^t(2616cm^{-1}) - est - T_s^t(900cm^{-1}) - est| < 0.5K$

Since we know the true sea surface temperature Test-#2 above is quite good. However, in practice T_s will have 0.5 - 1K errors, and Test-#3 might be quite important, although it is less sensitive. Test-#2 will help get rid of outliers that could make it through Test-#3.