OTES Earth Gravity Assist (EGA) Data Caveats V1.0 (05/21/2018)

The primary caveat associated with EGA data is the “ringing” that occurs as the Earth (or Moon) comes into or leaves our field of view. This is a known and expected effect; the transition from a very hot target (e.g., Earth) to a cold one (space) or vice versa produces a slope in the OTES interferogram that cannot be instantaneously accommodated by the DC-correction electronics. The transform of the interferogram results in high-frequency “ringing” in the spectrum that usually appears in a few sequential observations. A correction algorithm has been written and refined by the OTES team using the EGA data and will be implemented in a future update.

Update: 2019-04-27

EGA and Approach calibrated radiance spectra were observed to exhibit “ringing” that occurs as the target (Earth, Moon, Bennu) comes into or leaves the OTES field of view (FOV). This is a known and expected effect; the transition from a very hot target (e.g., Earth) to a cold one (space) or vice versa produces a slope in the OTES interferogram that cannot be instantaneously accommodated by the DC-correction electronics. The transform of the interferogram results in high-frequency “ringing” in the spectrum that usually appears in a few sequential observations. A correction algorithm has been written and implemented by the OTES team to equalize the ends of each interferogram in which this occurs, thus removing any ringing from the data.

An important caveat accompanying EGA and Approach data is associated with observing sequences in which the OTES field of view (FOV) was not filled. The standard calibration of OTES data uses views of space and an internal calibration target that fill the FOV; when the target does not fill the FOV, wavelength-dependent, off-axis modulation of energy through the interferometer results in an apparent low signal at short wavelengths. Correcting this effect requires a substantially more complex calibration approach, which is under consideration. These data may be used for relative comparisons of, for example, one channel’s radiance throughout the sequence, but the spectral data should not be used for absolute radiance or emissivity science.