# Investigating the Effects of Detector-Averaged SRFs

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The spectral response of an instrument varies from detector to detector. A long-standing assumption in GOES product generation has been that these individual detector SRFs can be averaged for ease of use. This assumption works if the detectors are very similar such that their differences are smaller than the measurement noise. Using detector-averaged SRFs in forward model applications has been standard practice for the current GOES series. In contrast, McIDAS-X uses individual detector SRFs for brightness temperature calculations for the current Sounder when detector information is available; these individual detector level brightness temperatures are then used in the display of imagery. In the GOES-R era for the Advanced Baseline Imager (ABI), it is expected that an averaged SRF will be used for all applications, from imagery to product generation and in forward model calculations. Due to the remapping of individual detectors to the ABI Fixed Grid Format (FGF), the use of averaged SRFs may be unavoidable.

The current GOES Imager has 2 detectors per band and the Sounder has 4 detectors per band. This is far fewer than what will be on ABI, but the techniques used to study today's instrument will be applicable to GOES-R. The individual detector SRFs for the current GOES series (8-15) will be convolved with high spectral resolution calculated atmospheres to provide information on how the detector differences vary by atmosphere type and how those differences compare to noise. In addition, high spectral resolution measurements from a high spectral resolution polar orbiter can be used for the same purpose and will add the element of various types of clouds and other real atmospheric features that aren't available in the calculated atmospheres.