A Bispectral Composite Threshold Approach
for Automatic Cloud Detection in VIIRS Imagery

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The detection of clouds in satellite imagery has a number of important applications in weather and climate studies. The presence of clouds can alter the energy budget of the Earth-atmosphere system through scattering and absorption of shortwave radiation and the absorption and re-emission of infrared radiation at longer wavelengths. The scattering and absorption characteristics of clouds vary with the microphysical properties of clouds, hence the cloud type. Thus, detecting the presence of clouds over a region in satellite imagery is important in order to derive atmospheric or surface parameters that give insight into weather and climate processes. For many applications however, clouds are a contaminant whose presence interferes with retrieving atmosphere or surface information. In these cases, is important to isolate cloud-free pixels, used to retrieve atmospheric thermodynamic information or surface geophysical parameters, from cloudy ones. This abstract describes an application of a two-channel bispectral composite threshold (BCT) approach applied to VIIRS imagery. The simplified BCT approach uses only the 10.76 and 3.75 micrometer spectral channels from VIIRS in two spectral tests; a straight-forward infrared threshold test with the longwave channel and a shortwave – longwave channel difference test. The key to the success of this approach as demonstrated in past applications to GOES and MODIS data is the generation of temporally and spatially dependent thresholds used in the tests from a previous number of days at similar observations to the current data. The paper and subsequent presentation will present an overview of the approach and intercomparison results with other satellites, methods, and against verification data.