# Destriping CMODIS Data by Power filtering

Jin-song CHEN, SHAO Yun, Bo-Qin ZHU
Institute of Remote Sensing Applications, Chinese Academy of Science
Chao Yang District Da Tun Road
Beijing 100101 China

Successfully launched on Match 25 2002, the first Chinese moderate resolution spectrometer (CMODIS) aboard the SZ-3 spacecraft has 34 bands of 20nm width in the range from 403 to 1250nm. It is designed to provide visible and infrared image of high temporal and ground resolution for surveying land cover change, monitoring of water pollution and natural disaster, estimate of crops yield and weather forecast. CMODIS data received have been proved applicable in the fields above mentioned. Because of detector-to-detector variation within instruments and imperfect calibration , sharp and repetitive stripes exist in many bands of CMODIS image which can distractingly and obstructively affect the interpretation and application of CMODIS data and lead to failure in data classification and wrong retrievals of useful information and geo-physical data (e.g., surface albedo, solar irradiance).. This paper briefly discusses the causes of striping in CMODIS data and review some conventional destriping methods, and then a method based on a finite impulse response filter (FIR) in frequency domain, developed specifically to remove the stripes in CMODIS image of inhomogeneous targets, is presented. The method removes the striping in CMODIS data by defining the frequency components caused by striping and cutting them off while preserving frequency components produced by the natural variability. The destriping result achieved by the method is displayed and the destriping effectiveness of the method is evaluated in the paper by means of some appropriate indexes of quality which include ratio of noise reduction and image distortion, the mean value and standard deviation of the image data, the mean radiance of the each line of the image data , the improvement factor of radiometric quality of the data after destriping and histogram analyses. The experimental results show that the destriping method presented by this paper can effectively remove striping in CMODIS data with minimum distortion into the image, improve the radiometric accuracy and quality of the image data greatly. Comparison between the results produced by the method and those produced by other algorithms(e.g., low pass filtering, moment matching ) is also made on the experimental CMODIS images of heterogeneous targets. The comparison results indicate the method is superior to the methods above mentioned in removing striping of

CMODIS data on the assumption that the detector to detector variation changes with time and targets in the image area are inhomogeneous. The method can also be used in other multidetector sensors.