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Statistical Correlation between DMSP-OLS Night Light Images and Economic Activity at the MSA Level in Florida

Delores J. Forbes and Charles Roberts

Department of Geosciences, Charles E. Schmidt College of Science, Florida Atlantic University, Boca Raton, FL

The Defense Meteorological Satellite Program (DMSP) Optical Line Scan (OLS) instruments collect data from an altitude of approximately 830km above the surface of the Earth. The OLS sensor is typically operated at a high gain setting for the detection of clouds at night. During 2006, the National Geophysical Data Center (NGDC) requested data collected at various gain settings to limit saturation in the brightest areas while still detecting dimmer lights. The resulting composite image is a radiance calibrated (RC) image of lights at night. The night light data from these instruments have been shown to correlate by lit area with national level Gross Domestic Product (GDP), and to correlate with GDP at the State level by total radiance value. In this study, the 2006 RC image is examined at a new, larger scale, the Metropolitan Statistical Area (MSA), within the state of Florida. The RC night-lights image is subset to the MSA level and checked for correlation to 2006 MSA-level GDP figures from the United States Bureau of Economic Analysis (BEA). Preliminary results show that three different calculated correlation coefficients are significant at the 0.01 level (2-tailed). The results therefore suggest that correlation between radiance values and GDP at the MSA level is very strong. Based on these preliminary results, principal components analysis (PCA) using subdivisions of GDP by industry will be performed. Those results may then indicate which industries within each MSA explain the greatest amount of variance within the data.