**Identification of Urban Zones Related to Carbon Emission Levels Using Moderate Resolution Nighttime Satellite Imagery From the International Space Station: Preliminary Results**

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Fossil fuel $CO_2$ emission sources can be broadly divided into point sources (e.g. power plants) and distributed sources (vehicles, hot water heaters, furnaces, cooking, etc.). The spatial and temporal patterns of distributed carbon emissions cannot be measured from space due to atmospheric transport and the coarse spatial resolution at which atmospheric $CO_2$ can be measured from space. We are investigating the use of moderate resolution satellite observed nighttime lights as a proxy for the distributed component of fossil fuel $CO_2$ emissions. We analyzed 25 meter resolution nighttime color camera imagery that was acquired at Los Angeles, California from the International Space Station relative to county zoning maps. The preliminary results indicate that building in commercial and industrial zones have substantially brighter lighting than residential zones. The results indicate that it would be feasible to make high spatial resolution models of distributed $CO_2$ emissions within urban centers based on brightness levels of nocturnal lighting observed at moderate spatial resolution.

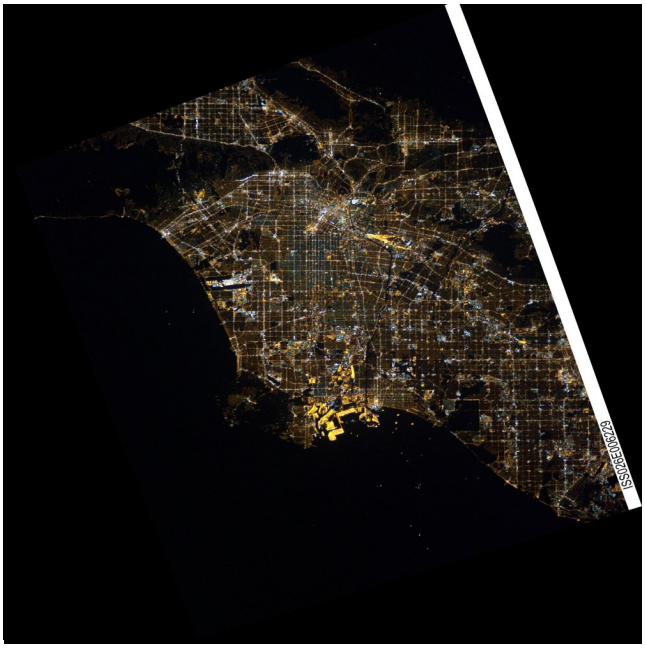

**Figure 1.** Twenty-five meter resolution color camera image of Los Angeles collected from the International Space Station on November 30, 2010.

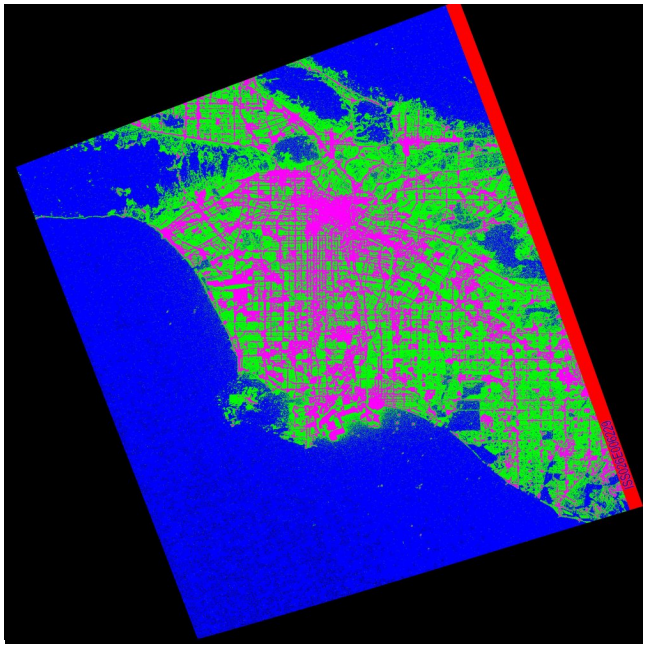

**Figure 2.** Figure 1 image classified into four zones related to fossil fuel carbon emission levels: red = image margin, blue = no lights detection (very low carbon emissions), green = residential areas = low carbon emissions, magenta = commercial, industrial, and major streets/roads (high carbon emissions).