

Global Nighttime Lights Trend

Measuring and tracking how much productivity is increasing can help us understand poverty and inequality. However, it is often harder than it seems to measure economic activity at regional levels, let alone comparing it on a global scale. Nighttime Lights data introduced in the field of economics reveals an opportunity to learn about economic activity and movements of people on our planet. Nighttime Lights data has proved to be a supplement measures of economic activity in countries where national statistics are poor (Henderson et al., 2012) and give insights on developments in GDP and population on subnational level (Chen and Nordhaus, 2011). Some recent studies have also shown that this data has the potential that reflects the economic impact of war (Li and Li, 2014) and predicts poverty (Jean et al., 2016).

My project, a visualization of nighttime lights trend worldwide, aims to use data to this end, reflecting the heterogeneity of economic development paths across global regions over the past decades.

The data utilized in this project is a global yearly nighttime lights satellite image from DMSP-OLS.

I employed a true color composites method and 3D visualization approaches to visualize the time series data of global nighttime lights. The first step is to load and manipulate the nighttime lights time series data in the GEE platform and perform true color composites. The resulting image is masked on the ocean and reduced to a lower resolution and exported as a jpg file to facilitate further visualization. Finally, I wrote in HTML (index.html) to create a WebGL globe that visualized my data, and the resulting image is used as a surface to cover the globe. The rotation and interaction of the globe are adjusted using OrbitControls.js. The interface was refined and uploaded on GitHub for release.

The change in lights at night can reflect the economic prosperity/recession and poverty of a region. In this project, we can see that developed countries such as the US and UK appear relatively green, Eastern Europe is blue, and economies that used to grow fast, such as China, are red. The urban expansion process can also be clearly observed by the change of color in this visualization project. Overall, our earth like a jeweled treasure incessantly spinning in an endless cosmos.

The live version is out here: <https://adamzhou3.github.io/NighttimeLightTrend/> . All code can be found at <https://github.com/AdamZhou3/NighttimeLightTrend> .

Chen, X., Nordhaus, W.D., 2011. Using luminosity data as a proxy for economic statistics. PNAS 108, 8589–8594.

Henderson, J.V., Storeygard, A., Weil, D.N., 2012. Measuring Economic Growth from Outer Space. American Economic Review 102, 994–1028.

Jean, N., Burke, M., Xie, M., Davis, W.M., Lobell, D.B., Ermon, S., 2016. Combining satellite imagery and machine learning to predict poverty. Science 353, 790–794.

Li, X., Li, D., 2014. Can night-time light images play a role in evaluating the Syrian Crisis? International Journal of Remote Sensing 35, 6648–6661.