



# Nighttime from Space

Observations by Suomi NPP satellite, VIIRS instrument

You get very different results depending on whether you make remote sensing observations during daytime or nighttime. In this article, we share some satellite observations that were taken during cloudless nights. These observations come from an instrument on the "Suomi NPP" satellite, which is owned and operated by the National Oceanic and Atmospheric Administration from the USA. The instrument that collects the information has a

measurement channel that collects the electromagnetic radiation made by most street, bridge, building, and airport lights during nights. We can use this kind of observation to infer where human activity occurs.

Many countries in the world don't have their society's information organized as well as in Finland. For these countries, nighttime lights have been used to better understand the actual population size, where electricity

exists and to estimate economic activity. These kinds of socio-economic activities can be monitored from space every cloud-free night over many years.

We perform image arithmetic (subtraction) to learn how much change has happened in the socio-economic activity for our area. In the figure A above, we

can see where and how much activity occurred during winter 2014, when the instruments on the Suomi NPP satellite started working. Figure B shows the night-light data summary from more recent time, winter 2020. In figure C, we calculated the difference between figures A and B and we expect this difference to

represent the change in the human activities during this time period. We don't estimate actual euros of economic activity but spatial-economists can do this, for us it is only which area is more and which is less.

Can you guess what is causing the change seen in figure C? You can get a hint from the

magnified area around Seinäjoki where local changes are more visible, with some of the intensity changes removed. Please send your ideas to us via E-mail. You can also visit our site for more in-depth discussion in several languages, other examples and a free to use nighttime lights exploration tool.