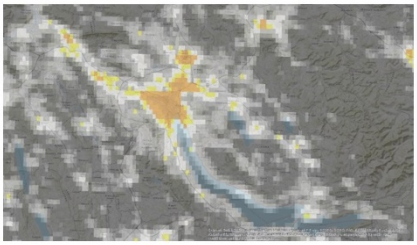
Artificial lighting and biodiversity – additional information

Lighting data availability in Switzerland



A variety of options exist for mapping outdoor artificial lighting at night, which differ in their spatial, temporal and spectral sensitivity. In addition, whilst some datasets cover large areas and are easy to access, others are much more restricted.

The following provides an overview of the key information types:

DMSP – Images of the earth at night collected by satellite at a global scale. http://ngdc.noaa.gov/eog/dmsp.html. Yearly summaries available from 1992 until 2013, but now discontinued. Collected at 5x5km resolution. A single band spanning the visible light spectrum, but excluding 0.4-0.5nm (blue light).

VIIRS – High-resolution images of the earth at night collected by satellite at a global scale. http://ngdc.noaa.gov/eog/viirs/download_monthly.html . Monthly summaries available from January 2014. Collected at 742m x 742m resolution. A single band spanning the visible light spectrum, but excluding 0.4-0.5nm (blue light).

ISS Photography – Photographs taken by astronauts from the international space station (ISS). These are stored in this database https://eol.jsc.nasa.gov/ , but identifying relevant images has been made easier here https://pmisson.cartodb.com/viz/281a7eb6-fa7a-11e4-8522-0e853d047bba/public_map. Once corrected and radiance calibrated, these images provide colour (RGB) information on lighting emissions. Resolution is 100x100m or better. Date and time of images depends on when astronauts decide to take photographs of the earth at night.

Aerial night photography – photographs taken by aeroplane, helicopter or drones. These are relatively uncommon, although Swiss examples include the canton of Geneva. More details can be found at http://ge.ch/mensuration-officielle/node/268 and the aerial photography can be downloaded from http://ge.ch/sitg/ . Colour images of 1x1m or better.

Sky Brightness Models - *The New World Atlas of Artificial Sky Brightness*. This is a model that has only recently been released http://cires.colorado.edu/Artificial-light following the first map released in 2001. It uses VIIRS data and ground-based measurements of sky brightness to create a prediction for artificial sky luminance at a global scale.

Lamp inventories - Databases held by street lighting managers are the primary tool used for the management of street lighting. In many cases, they provide the XY location each street lamp, along with information on lamp type. Data generally needs to be requested from the organisation managing the lighting infrastructure of that canton.

Links to other useful lighting resources

- A documentary on the broad impacts of light pollution, and related research https://www.youtube.com/watch?v=C8qvPTdC73s
- A short film comparing levels of astronomical light pollution https://vimeo.com/178841667
- Information on light pollution from the Swiss Federal Office for the Environment (FOEN) in German and French http://www.bafu.admin.ch/licht
- Dark Sky Switzerland http://www.darksky.ch
- An interdisciplinary network of European researchers studying artificial light at *night*. http://www.cost-lonne.eu/
- An app to help measure light pollution - Loss of Night App. http://scistarter.com/project/801