

#### Mapping Artificial Light At Night (ALAN) with night-time satellite imagery in order to help preserve biodiversity

Emma Bousquet, Aurélien Mure, Samuel Busson, Paul Verny, Florian Greffier,

Teodolina Lopez

#### ▶ To cite this version:

Emma Bousquet, Aurélien Mure, Samuel Busson, Paul Verny, Florian Greffier, et al.. Mapping Artificial Light At Night (ALAN) with night-time satellite imagery in order to help preserve biodiversity. URBIS24 | URBan Insights from Space, Sep 2024, Rome, Italy. hal-04707733

#### HAL Id: hal-04707733 https://hal.science/hal-04707733v1

Submitted on 24 Sep 2024

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers. L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Liberté Égalité Fraternité MINISTÈRE DE LA TRANSITION ÉCOLOGIQUE ET DE LA COHÉSION DES TERRITOIRES Liberté Égalité Fraternité





# Mapping Artificial Light At Night (ALAN) with night-time satellite imagery in order to help preserve biodiversity

Emma Bousquet<sup>1</sup>, Aurélien Mure<sup>1</sup>, Samuel Busson<sup>2</sup>, Paul Verny<sup>3</sup>, Florian Greffier<sup>4</sup>, and Teodolina Lopez<sup>1</sup>. Abstract ID : 109 (1) Cerema, Earth Observation group, Toulouse, France. (2) Cerema, Territory group, Aix-en-Provence, France. (3) Cerema, Urban Planning group, Aix-en-Provence, France. (4) Cerema, Lighting research group, Angers, France.

Artificial Light At Night (ALAN) network development is capital for security reasons, but it is also harmful for biodiversity as it can significantly modify its behaviour. Satellite data are an efficient tool to map and monitor ALAN, as they can detect both public and private light sources. Several optical satellite sensors are operating at night (VIIRS, Luojia 1-01, Jilin, SDGSAT-1, etc.).

In this study, Luojia 1-01 data were used to produce regional maps of night-time radiance over France, at medium resolution (130 m).

# Luojia 1-01 mission

- developed and operated by Wuhan University (China)
- 130 m spatial resolution
- 1 panchromatic spectral band (460 980 nm)
- 3 days temporal revisit
- Demonstrator for Jilin satellite
- Acquisition of night-time data across the globe, June-Nov. 2018 only





\*High Resolution Layer – Impervious Built-Up (Copernicus) Before registration

After registration



#### These data can be used to...

- Distinguishing private from public lighting, when a public light database is available
- Build a « black corridor » diagnosis of an area
- Identifying problematic areas, where a dense biodiversity coexists with a strong ALAN

### To go further...

For studies over smaller areas, high resolution and up-to-date night-time satellite data are also available (Jilin or SDGSAT-1), under conditions.

#### **And outside France ?**

Luojia 1-01 data are available all over the European continent, for 2018. The same work could be conducted over other regions outside France.

## Contacts

Emma Bousquet <u>emma.bousquet@cerema.fr</u>, Aurélien Mure <u>aurelien.mure@cerema.fr</u>



Brightest parcels over the biodiversity hot spot of Cap Roux (French Riviera). Private parcels are hatched. Biodiversity hot spots are in red.