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Data Article

Data set for French historical light aids to navigation (F-LAN) covering the period 1775–1929

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ABSTRACT

F-LAN is a geospatial data set that documents hundreds of coastal lights that guided ships around France from medieval times to 1929. F-LAN provides visibility range for individual lights. The authors collected all data from scholarly literature, historical coastal navigational charts, and official lighthouse surveys. F-LAN allows users to track the provision of coastal lighting over time. It complements the existing LAN dataset for England and Wales. Thanks to F-LAN it is now possible to map and analyse light coverage for France over two centuries. It can be used to analyse coastal routing, infrastructure investment and the relationship between accidents and the provision of light in any given area.

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Specifications Table

Subject	Human Geography
Specific subject area	Economic History, Transport Infrastructure, Historical Geography, Maritime History
Type of data	Table
How data were acquired	We acquired and transcribed the data from archived records and published secondary sources. All primary sources used are available using the follow link to access the Bibliothèque des Phares The sources used are: • Ministère de l'Intérieur. Direction générale des Ponts et Chaussées et des Mines, Rapport contenant l'exposition du système, adopté par la Commission des phares, pour éclairer les côtes de France, (Paris, 1825) • Direction générale des Ponts et Chaussées et des Mines, Description sommaire des phares et fanaux allumés sur les côtes de France au 1er août 1837, (Paris, 1837) • Direction générale des Ponts et Chaussées et des Mines, Description sommaire des phares et fanaux allumés sur les côtes de France au 1er juillet 1846 (Paris, 1846) • Reynaud, Léonce, Mémoire sur l'éclairage et le balisage des côtes de France publié par ordre de son Excellence M. Armand Béhic, ministre de l'Agriculture, du Commerce et des Travaux publics, (Paris, 1864) [4] • Ministère des travaux publics. Ponts et Chaussées. Phares et Balises, État de l'éclairage et du balisage des côtes de France au 1er janvier 1872, (Paris, 1872) • Ministère des travaux publics. Ponts et Chaussées. Phares et Balises, État de l'éclairage et du balisage des côtes de France au 1er janvier 1882, (Paris, 1882) • Ministère des travaux publics. Ponts et Chaussées. Phares et Balises, État de l'éclairage des côtes de France au 1er janvier 1930, (Paris, 1929)
Data format	Raw
Parameters for data collection	A primary consideration for the data collection was to maximise geographical and temporal coverage. Another was source reliability and detail. We drew on historical records with maximum coverage of coastal lighting to fulfil these considerations.
Description of data collection	The data was inputted, and all lights were georeferenced manually. Individual lighthouse locations were copied from official publication lists from 1863, 1872 and 1929. We compared the charts with modern geographical information systems to get coordinate positions for some lights.
Data source location	France
Data accessibility	Repository name: UK Data Service Reshare/Zenodo Data identification number: 854,607 https://doi.org/10.5255/UKDA-SN-854607 (permanent identifier) Litvine, Alexis D. and Dunn, Oliver (2021). French Historical Light Aids to Navigation. [Data Collection]. Colchester, Essex

Value of the Data

- F-LAN allows all researcher to identify the growth in numbers of light aids to navigation and light coverage at sea and compare it with British light provision described in the equivalent data for England and Wales (LAN). [1]
- The data will be useful for historians, geographers, and economists interested in coastal navigation in France. Combined with data on port locations and trade flows it will enable new geospatial analysis of coastal routing.
- The data can cast light on the development of coastal infrastructure, the maritime economy, safety at sea, and transport costs.
- F-LAN is fully compatible with the equivalent data for England and Wales (LAN) [1]

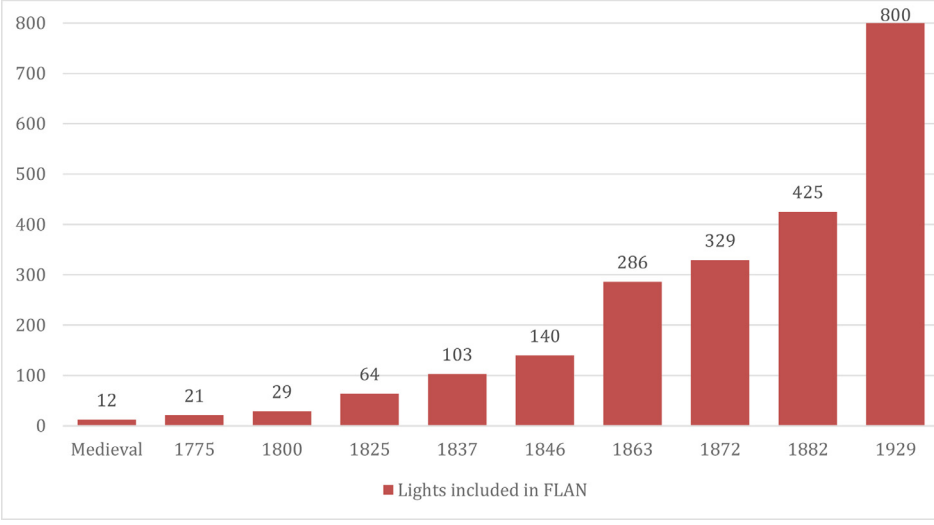

Fig. 1. Number of lights (all types) reported by benchmark year in F-LAN. (Establishments fitted with multiple lights are counted as one observation).

1. Data Description

Fig. 1 summarises by benchmark period the number of light establishments of all kinds included in F-LAN. Table 1 lists all F-LAN variables. This is followed by a description in the next section of the methods used to generate each variable. Fig. 2 is a cartographic representation of the data including maximum potential visibility ranges for different benchmark dates.

The data available on UK-DS/Zenodo (10.5255/UKDA-SN-854,607) include:

- F-LAN_DATASET.csv containing all the variables described in Table 1 below
- readme_F-LAN.rtf containing data citation
- F-LAN_Codebook.rtf containing a description of all variables

2. Experimental Design, Materials and Methods

F-LAN draws mainly on sources created by the *Commission des Phares* since 1811 to plan and document France's lightning coverage. We have used the following official publication available at the Bibliothèque des Phares to create F-LAN:

- Ministère de l'Intérieur. Direction générale des Ponts et Chaussées et des Mines, Rapport contenant l'exposition du système, adopté par la Commission des phares, pour éclairer les côtes de France, (Paris, 1825)
- Direction générale des Ponts et Chaussées et des Mines, Description sommaire des phares et fanaux allumés sur les côtes de France au 1er août 1837, (Paris, 1837)
- Direction générale des Ponts et Chaussées et des Mines, Description sommaire des phares et fanaux allumés sur les côtes de France au 1er juillet 1846 (Paris, 1846)
- Reynaud, Léonce, Mémoire sur l'éclairage et le balisage des côtes de France publié par ordre de son Excellence M. Armand Béhic, ministre de l'Agriculture, du Commerce et des Travaux publics, (Paris, 1864) [4]
- Ministère des travaux publics. Ponts et Chaussées. Phares et Balises, État de l'éclairage et du balisage des côtes de France au 1er janvier 1872, (Paris, 1872)

Table 1
F-LAN variables types.

Field	Description
ID_F-LAN	Unique ID for each light
JOIN_ID_1863_1929	Spatial Joint ID to join 1863 and 1929 lighthouses
LATITUDE	Latitude for the location of the lighthouse
LONGITUDE	Longitude for the location of the lighthouse
NAME	Name of each lighthouse as reported in 1863
VISIBILITY_MA_KM	Night-time visibility range of lights for the medieval period in kilometres
VISIBILITY_MA_50PC_M	Night-time visibility range of lights for the medieval period in metres, with light visible 50 per cent of the time
VISIBILITY_MA_90PC_M	Night-time visibility range of lights for the medieval period in metres, with light visible 90 per cent of the time
VISIBILITY_1775_KM	Night-time visibility range of lights for 1775 in kilometres
VISIBILITY_1775_50PC_M	Night-time visibility range of lights for 1775 in metres, with light visible 50 per cent of the time
VISIBILITY_1775_90PC_M	Night-time visibility range of lights for 1775 in metres, with light visible 90 per cent of the time
VISIBILITY_1800_KM	Night-time visibility range of lights for 1800 in kilometres
VISIBILITY_1800_50PC_M	Night-time visibility range of lights for 1800 in metres, with light visible 50 per cent of the time
VISIBILITY_1800_90PC_M	Night-time visibility range of lights for 1800 in metres, with light visible 90 per cent of the time
VISIBILITY_1825_KM	Night-time visibility range of lights for 1825 in kilometres
VISIBILITY_1825_50PC_M	Night-time visibility range of lights for 1825 in metres, with light visible 50 per cent of the time
VISIBILITY_1825_90PC_M	Night-time visibility range of lights for 1825 in metres, with light visible 90 per cent of the time
VISIBILITY_1837_KM	Night-time visibility range of lights for 1837 in kilometres
VISIBILITY_1837_50PC_M	Night-time visibility range of lights for 1837 in metres, with light visible 50 per cent of the time
VISIBILITY_1837_90PC_M	Night-time visibility range of lights for 1837 in metres, with light visible 90 per cent of the time
VISIBILITY_1846_KM	Night-time visibility range of lights for 1846 in kilometres
VISIBILITY_1846_50PC_M	Night-time visibility range of lights for 1846 in metres, with light visible 50 per cent of the time
VISIBILITY_1846_90PC_M	Night-time visibility range of lights for 1846 in metres, with light visible 90 per cent of the time
VISIBILITY_1863_KM	Night-time visibility range of lights for 1863 in kilometres
VISIBILITY_1863_50PC_M	Night-time visibility range of lights for 1863 in metres, with light visible 50 per cent of the time
VISIBILITY_1863_90PC_M	Night-time visibility range of lights for 1863 in metres, with light visible 90 per cent of the time
VISIBILITY_1872_KM	Night-time visibility range of lights for 1872 in kilometres
VISIBILITY_1872_50PC_M	Night-time visibility range of lights for 1872 in metres, with light visible 50 per cent of the time
VISIBILITY_1872_90PC_M	Night-time visibility range of lights for 1872 in metres, with light visible 90 per cent of the time
VISIBILITY_1929_50PC_M	Night-time visibility range of lights for 1929 in metres, with light visible 50 per cent of the time
VISIBILITY_1929_90PC_M	Night-time visibility range of lights for 1929 in metres, with light visible 90 per cent of the time
TYPE_1775	Optics used (Reflective, Lenticular, None) in 1775
TYPE_1800	Optics used (Reflective, Lenticular, None) in 1800
TYPE_1825	Optics used (Reflective, Lenticular, None) in 1825
TYPE_1837	Optics used (Reflective, Lenticular, None) in 1837
TYPE_1846	Optics used (Reflective, Lenticular, None) in 1846
TYPE_1863	Optics used (Reflective, Lenticular, None) in 1863
TYPE_1872	Optics used (Reflective, Lenticular, None) in 1872
TYPE_1929	Optics used (Reflective, Lenticular, None) in 1929
FUEL_1775	Fuel used in 1775
FUEL_1800	Fuel used in 1800

(*continued on next page*)

Table 1 (*continued*)

Field	Description
FUEL_1825	Fuel used in 1825
FUEL_1846	Fuel used in 1846
FUEL_1863	Fuel used in 1863
FUEL_1872	Fuel used in 1872
FUEL_1929	Fuel used in 1929
HEIGHT_FROM_HIGH_SEA_LEVEL_M_1837	Height of lighthouse lantern above sea level (in metres) in 1837
HEIGHT_FROM_HIGH_SEA_LEVEL_M_1846	Height of lighthouse lantern above sea level (in metres) in 1846
HEIGHT_FROM_HIGH_SEA_LEVEL_M_1863	Height of lighthouse lantern above sea level (in metres) in 1863
HEIGHT_FROM_HIGH_SEA_LEVEL_M_1872	Height of lighthouse lantern above sea level (in metres) in 1872
HEIGHT_FROM_HIGH_SEA_LEVEL_M_1929	Height of lighthouse lantern above sea level (in metres) in 1929

- Ministère des travaux publics. Ponts et Chaussées. Phares et Balises, État de l'éclairage et du balisage des côtes de France au 1er janvier 1882, (Paris, 1882)
- Ministère des travaux publics. Ponts et Chaussées. Phares et Balises, État de l'éclairage des côtes de France au 1er janvier 1930, (Paris, 1929)

F-LAN is divided into seven key benchmark years that follow the publication dates for the sources listed above (1825, 1837, 1846, 1863, 1872, 1882 and 1929). Data for previous benchmark years (1700, 1775, and 1800) were derived from the 1825 and 1837 listings that give earlier opening dates. The Medieval data was taken from secondary sources. Dates of origin of medieval lights are rarely available, so a broad periodization was employed.

F-LAN tracks all *active* lights listed in sources, including lighthouses, leading-lights, lightships, light beacons, harbour lights and buoys.

2.1. Lighthouse coordinates

The Variable JOIN_ID_1863_1929 makes it possible to express geographic coordinates of all lighthouses using the geolocated 1929 points. First, original coordinates given in the sources were imported to plot data for all lighthouses. Second, it was then necessary to convert from the original source X/Y coordinate type based on the Paris meridian system used in the source, to the modern Greenwich meridian latitude and longitude coordinates we provide. This was done so the coordinate data can be read by modern GIS. These coordinates were manually checked for accuracy. Smaller harbour lights were not given original coordinate values in the original sources, and so we geolocated these manually. Some small surviving harbour light locations were found in port satellite imagery and by the original source textual description of their location. Otherwise, historical maps and imagery were used to find less obvious light locations. Once geolocated using these methods, all lighthouses were given accurate coordinate values in the dataset.

2.2. Visibility range

The visibility reported in official publications between 1837 and 1929 correspond to ideal visibility conditions on dry land. [4] From 1929, visibility was measured from actual observations taking into account local meteorological variations throughout the year. It provides formulae to degrade ideal visibility from previous dates to measure the area where any given light is visible 50 per cent of the time, and 90 per cent of the time. Both metrics are provided for each benchmark date using the formula derived from the 1929 data, adjusted for fuel and optic type. This is very likely to overestimate the actual range of medieval non-directional lights but given that ranges were already very small, this has no impact on the overall representation of the light coverage.

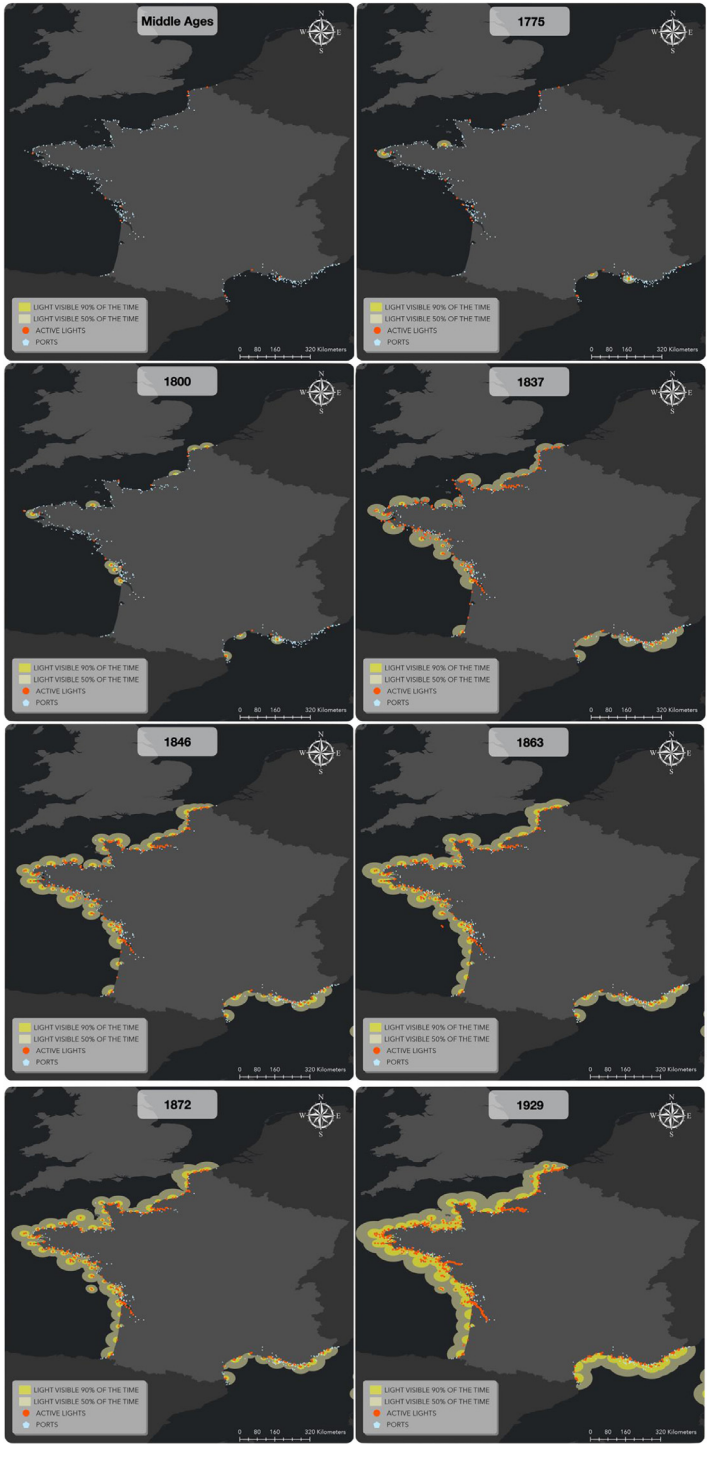

Fig. 2. Evolution of lighthouses and visibility ranges over time.

2.3. Medieval benchmark-specific variables

Lights in this benchmark possess fewer attributes compared with other lights in the data set because of a general lack of evidence dating from the period. Fichou, Le Hénaf, Mével [2] provide a map indicating existing lighthouses in the ancient and medieval periods based on historical and archaeological research. All medieval lights were small in scale and mostly candle or oil powered with some larger lights using straw or firewood for intermittent signals. The available sources do not give range data for the medieval benchmark period. Buxton-Dunn and Alvarez-Palau [1] uses Naish's [3] estimates for medieval lights' visibility, with a range between 1.6 and 5.3 standard miles for candles and coal-powered fires. We adopted the same convention to maintain compatibility with the two datasets.

2.4. 1775 and 1800 benchmark variables

We used Fichou's [2] map showing existing lights in the eighteenth century, lighthouse opening dates recorded in 1825 and 1837 and Tévenard's mémoire [5] to compile a list of active lights at each benchmark year. The range for each light is assumed by fuel, optic type and height. The new reflectors installed from 1770 by the Tourville-Sangrain company contributed to a significant increase of the lighting range of a dozen lighthouses, and we adopted contemporary description of a visibility of 'up to seven nautical leagues' for the Phare du Plannier (1774) in Marseilles as the absolute maximum.

CRediT Author Statement

Alexis Litvine and **Oliver Dunn:** jointly for all roles.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

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References

[1] 0. Buxton-Dunn, E. Alvarez-Paul, Dataset for historical lighthouses and light aids to navigation (LAN), Data Br. 31 (2020) 1514–1911, doi:10.1016/j.dib.2020.105991.
[2] J.-C. Fichou, N. Le Hénaf, X. Mével, Phares. Histoire du Balisage et éclairage des Côtes De France, Le Châsse-Marée, Douarnenez, 1999.
[3] J. Naish, Seamarks: Their History and Development, Stanford Maritime, London, 1985.
[4] L. Reynaud, Mémoire Sur L'éclairage Et Le Balisage Des Côtes De France publié Par Ordre De Son Excellence M. Armand Béhic, Ministre de l'Agriculture, du Commerce et des Travaux publics, Paris, 1864.
[5] A. Thévenard, Mémoires Relatifs à La Marine, 3, Laurens, Paris, 1799.