Light-level geolocation analyses

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Contents

Preface

Note: The Manual is currently under development and content may not show up (ask Simeon if you need immediate access)!*

This manual is part of the following publication and has been written by the same group of authors:

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Geolocation by light is a method of animal tracking that uses small, light-detecting data loggers (referred to as geolocators) to determine the locations of animals based on the light environment they move through.

Technological and fieldwork issues aside, effective use of light level geolocation requires translation of a time series of light levels into geographical locations. Geographical locations that are derived from light-level data are subject to error which directly arises from noise in the light-level data, i.e. unpredictable shading of the light sensor due to weather or the habitat (Lisovski et al., 2012). Although light-level geolocation has provided a wealth of new insights into the annual movements of hundreds of bird species and other taxa, researchers struggle with the analytical steps that are needed to obtain location estimates, interpret them, present their results, and document what they have done.

This manual has been written by some of the leading experts in geolocator analysis and is based on material created for several international training workshops. It offers code and experience that we have accumulated over the last decade, and we hope that this collection of analysis using different open source software tools (R packages) helps both newcomers and experienced users of light-level geolocation.

Acknowledgements

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Structure of the manual

This manual should allow users with limited knowledge in R coding to perform a state-of-the-art analysis of geolocator data. Thus, we start with the very basics of loading packages and data 2 Starting with the initial data editing steps, which we call twilight annotation 8, we provide instructions on how to use several prominent analysis packages, illustrate the general analysis workflow using example data, and provide some recommendations for how to visualize and present results. We do not cover every available analysis package but focus on what we percieve to be the most frequently used tools, which are GeoLight 3, probGLS 4, SGAT 5 and FLightR 6. The manual concludes with a recommendation for using Movebank as a data repository for geolocator tracks **??**.

The datasets

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Chapter 1

Getting started

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Chapter 2

Loading data

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Chapter 3

GeoLight

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Chapter 4

probGLS

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Chapter 5

SGAT

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Chapter 6

FLightR

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Chapter 7

Data repositories

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Chapter 8

Twilight Annotation

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References

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