

# NUMA01: Computational Programming with Python

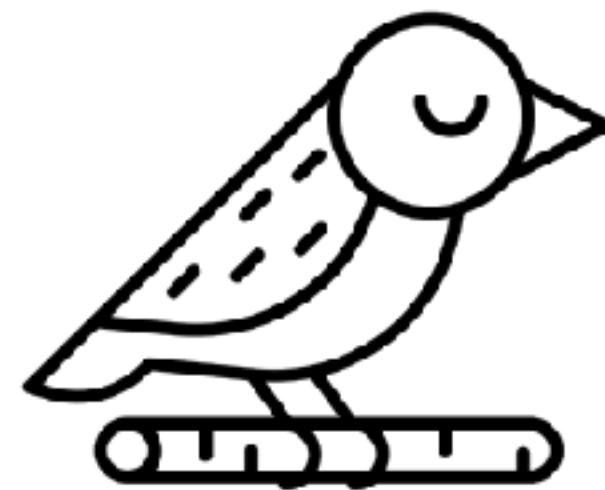
## Final Project // 2019.06.26



# Project Birds

In this project we process a **bigger** amount of **data**.

In an ongoing **experiment**, which started in **mid January 2015**  
the **in- and out-movements** of a bird at a nesting box were observed and **counted**.



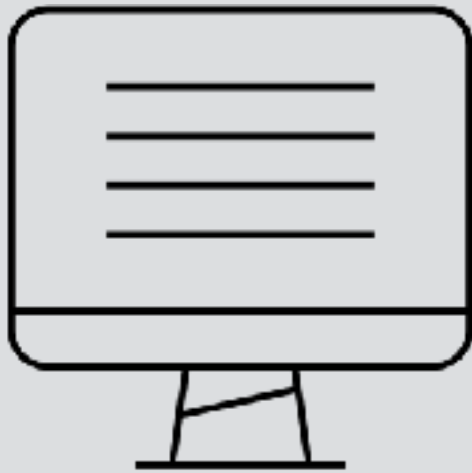


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2015-01-25	14:12:05.142511	70	2015-01-25	15:32:05.739886	70
2015-01-25	14:14:05.045367	70	2015-01-25	15:34:04.749130	70
2015-01-25	14:16:05.005320	70	2015-01-25	15:36:04.777022	70
2015-01-25	14:18:06.639303	70	2015-01-25	15:38:05.768101	74
2015-01-25	14:20:04.753845	70	2015-01-25	15:40:05.969609	74
2015-01-25	14:22:05.549372	70	2015-01-25	15:42:05.575432	74
2015-01-25	14:24:04.558621	70	2015-01-25	15:44:06.074641	74
2015-01-25	14:26:04.477710	70	2015-01-25	15:46:05.412341	74
2015-01-25	14:28:05.258913	70	2015-01-25	15:48:05.350484	74
2015-01-25	14:30:05.293665	70	2015-01-25	15:50:06.534232	74
2015-01-25	14:32:05.660442	70	2015-01-25	15:52:05.386500	74
2015-01-25	14:34:05.566237	70	2015-01-25	15:54:06.184306	74
2015-01-25	14:36:04.613010	70	2015-01-25	15:56:05.496602	75
2015-01-25	14:38:05.071092	70	2015-01-25	15:58:05.397928	75
2015-01-25	14:40:05.570470	70	2015-01-25	16:00:05.897354	75
2015-01-25	14:42:05.177669	70	2015-01-25	16:02:05.500175	75
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2015-01-25	14:46:05.401841	70	2015-01-25	16:06:05.008453	75
2015-01-25	14:48:06.385270	70	2015-01-25	16:08:05.208770	75
2015-01-25	14:50:06.885364	70	2015-01-25	16:10:05.708145	75
2015-01-25	14:52:05.595971	70	2015-01-25	16:12:05.609773	75
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2015-01-25	15:02:05.706856	70	2015-01-25	16:22:06.616131	75
2015-01-25	15:04:04.715008	70	2015-01-25	16:24:04.728852	75
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# The Data

The data was obtained in a **.txt** file with the **date & time** in **UTC** and the **total** number of **registered** **movement** so far.

An **Arduino** mounted to the nest box **reports** the observations every **two minutes / 24h**.





# The questions to answer

How does the total number of registered **movements** per **day** change over the **year**?

Can we observe the start of the **breeding** period? Can we observe the start and end of the **feeding** period?

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Is the **first** and **last motion** per day somehow **related** to **sunrise** and **sunset**?

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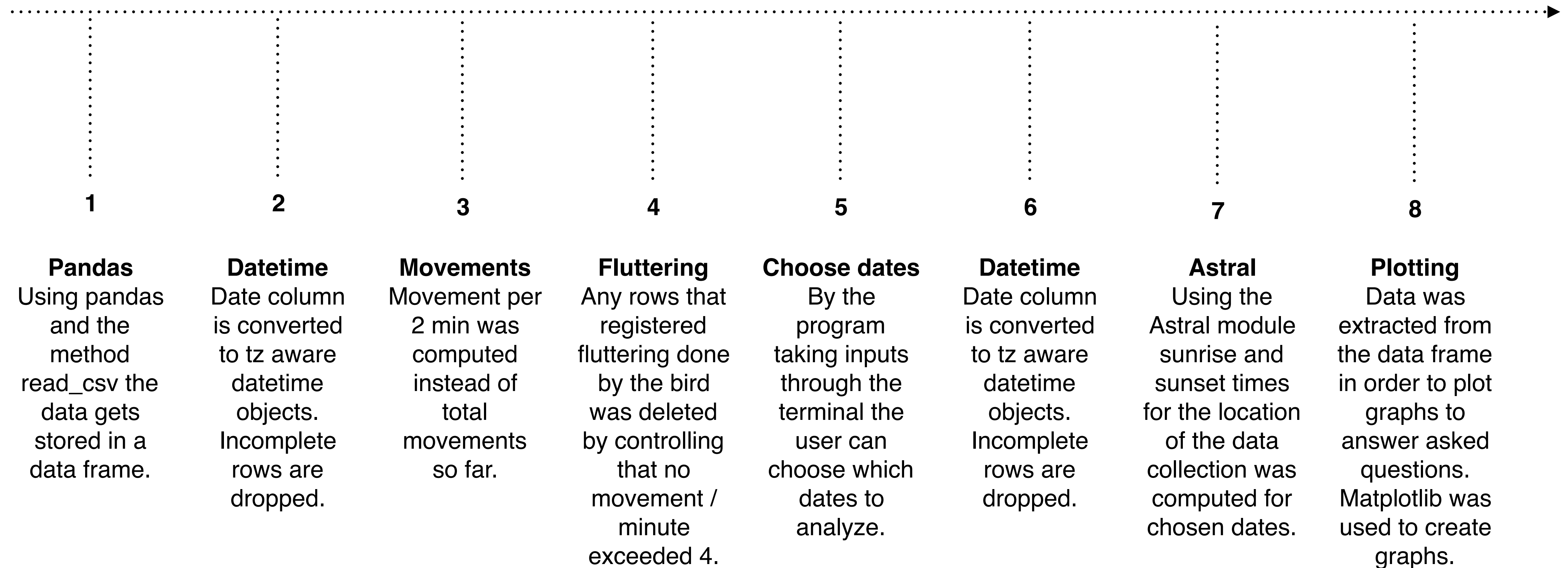
Are there **motions** when it is **dark**?

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Can we be given an **analysis** on an **hourly** basis for a **given day** or dates?

# To solve this

## Data cleaning and processing algorithm



# The Results

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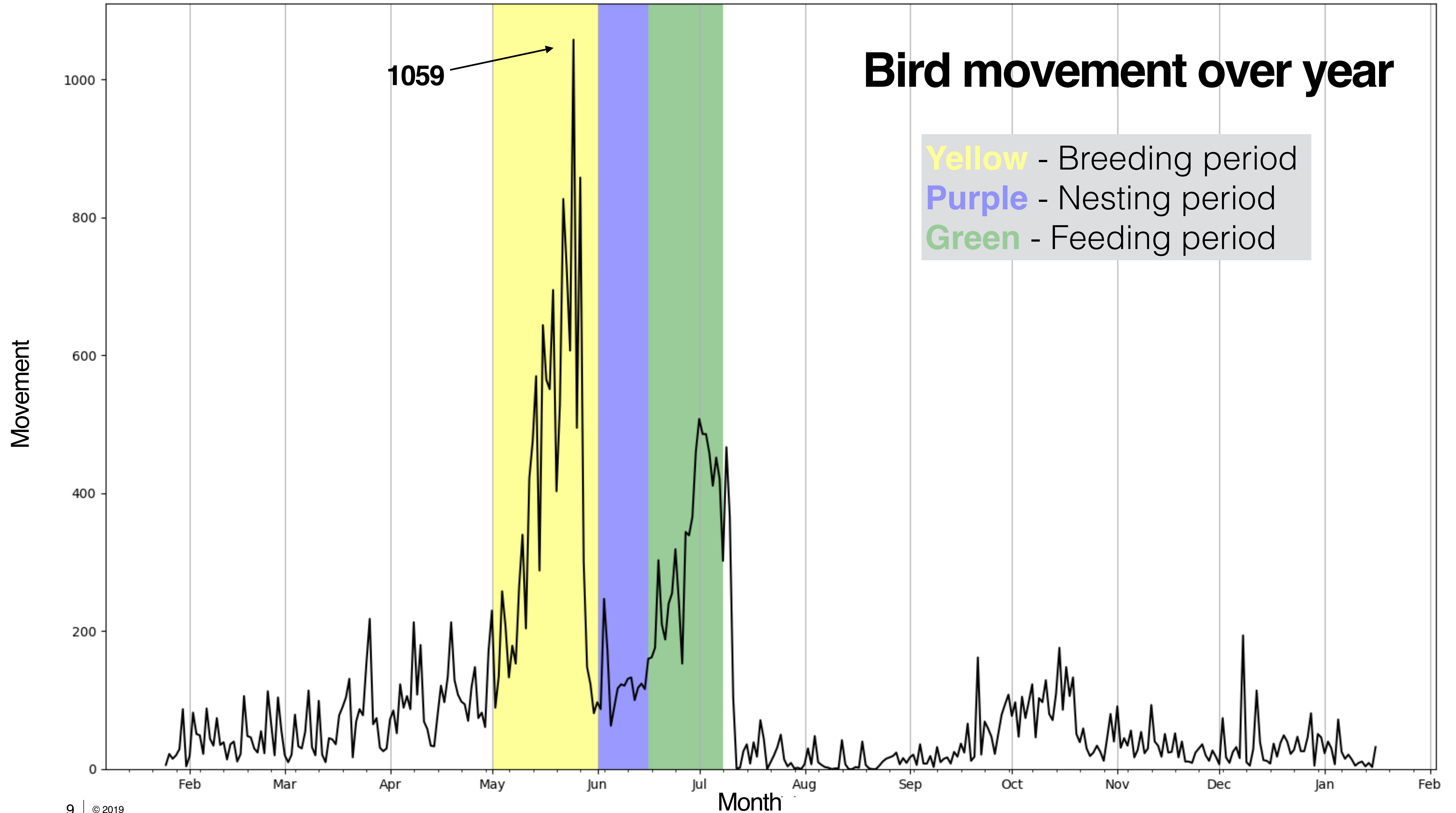
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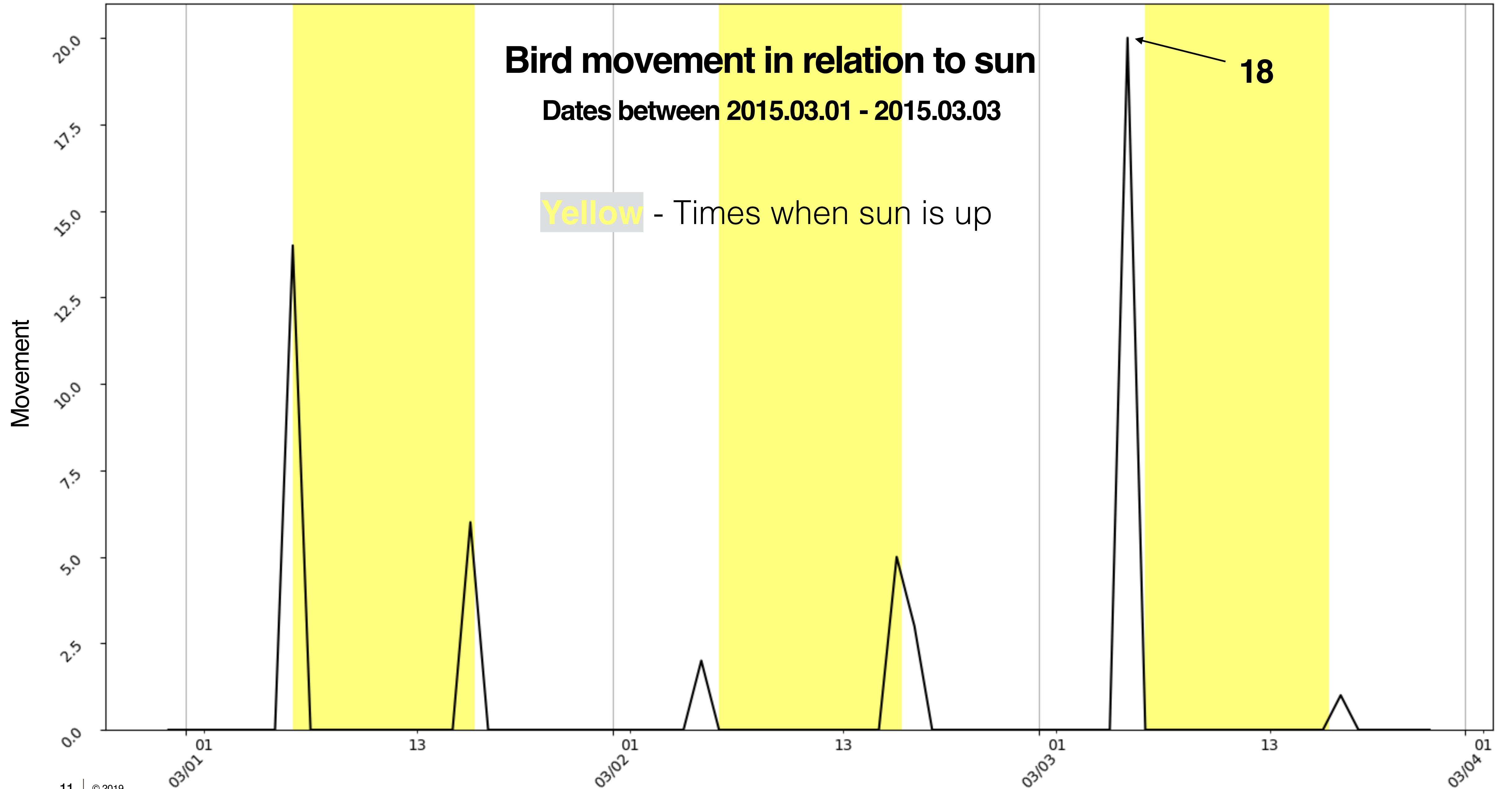
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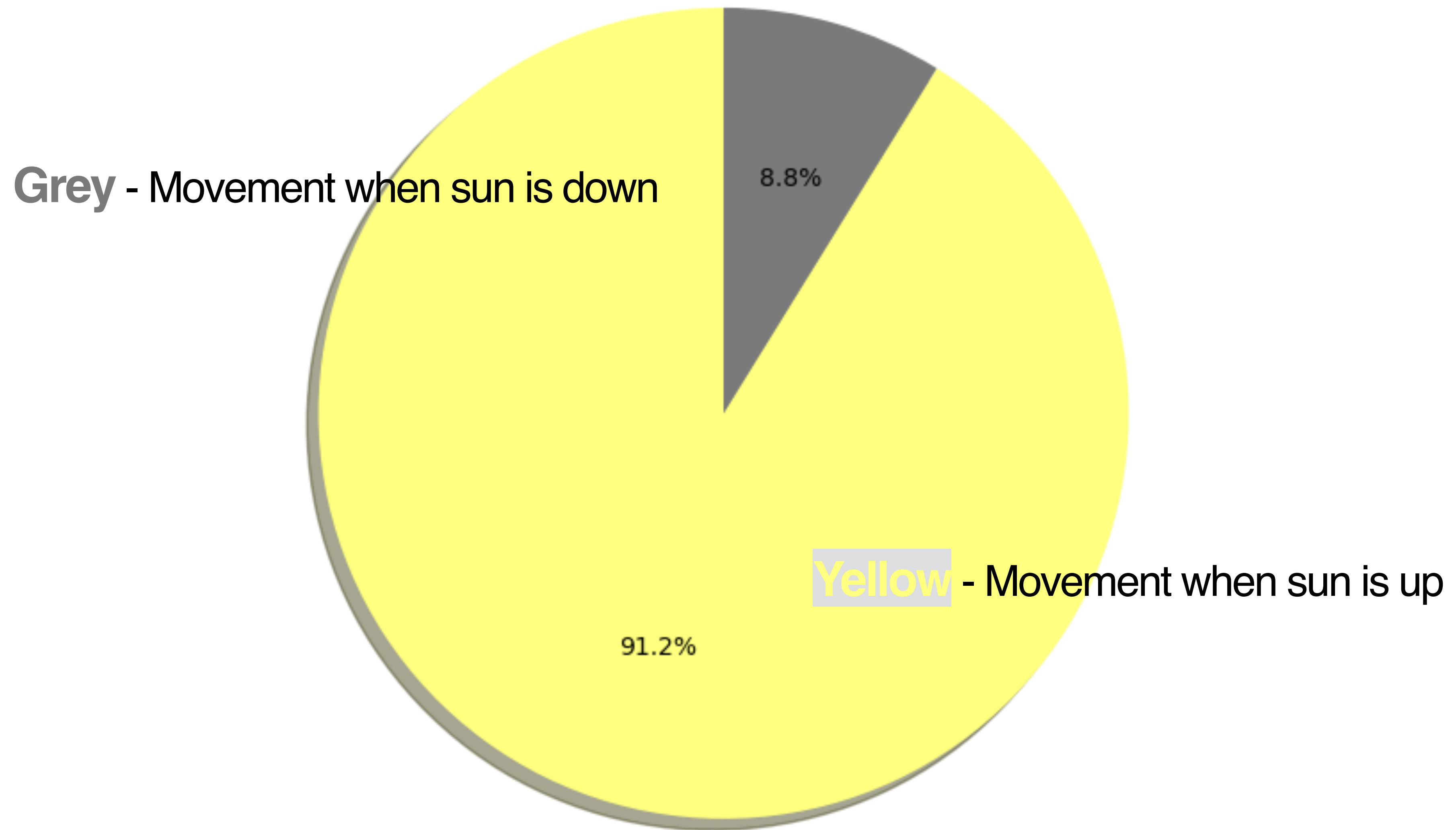
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# Bird movement during year

## sun up vs sun down



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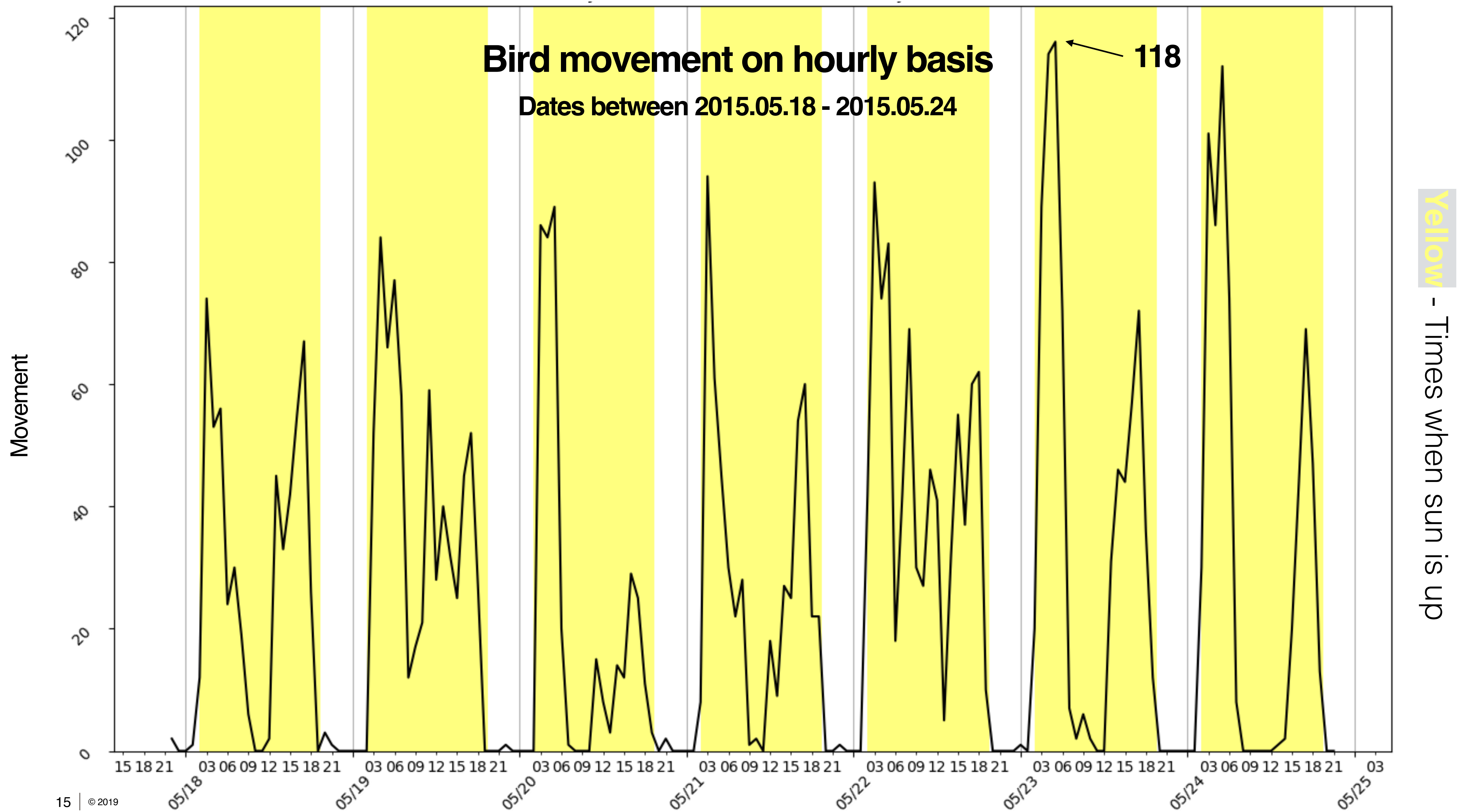
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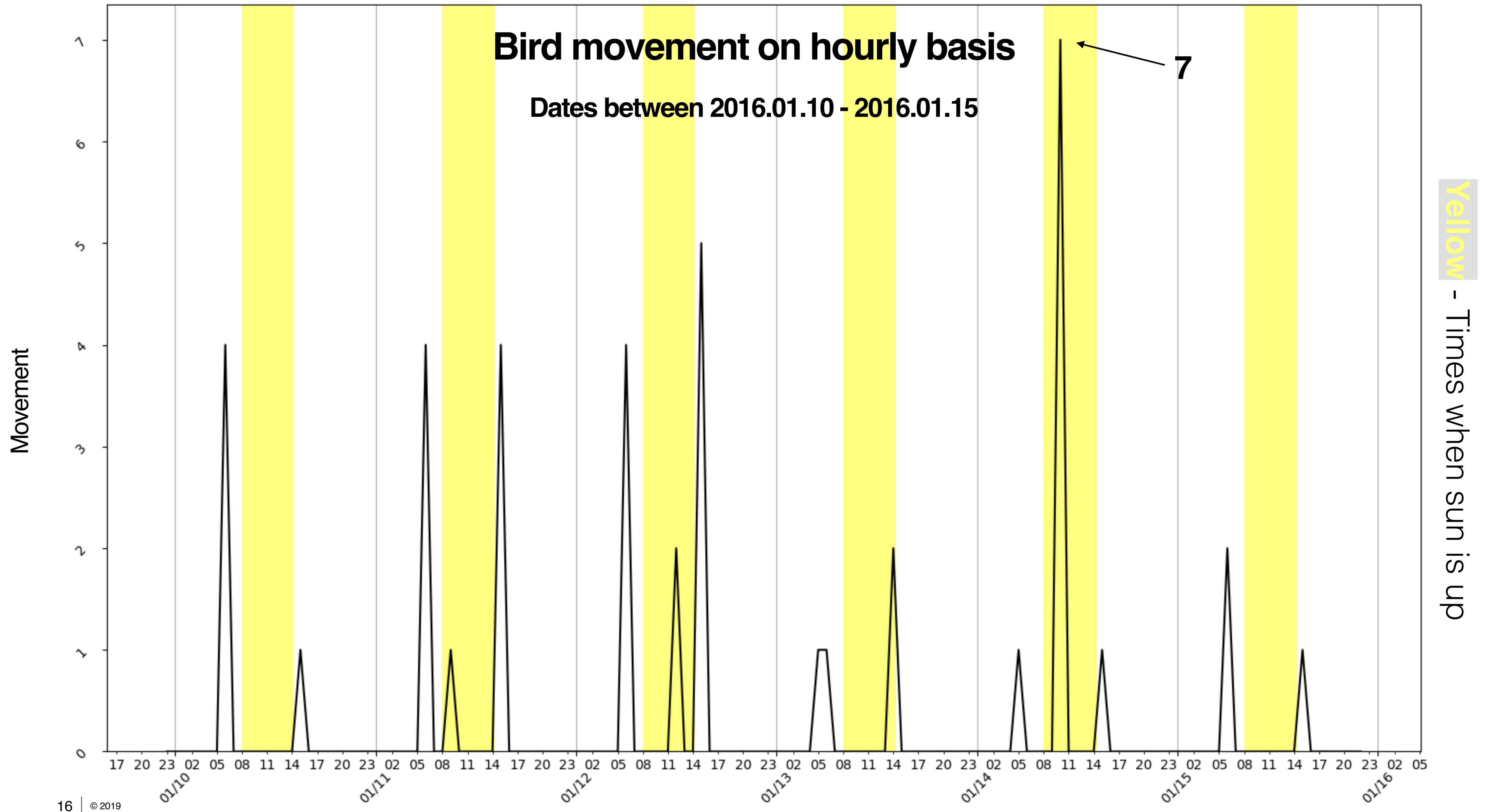
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# Thanks



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