**METADATA S1**. Shi Feng, Alice C. Hughes, Qinmin Yang, Leyi Li, Chao Li. Centroid-AME: an open-source software for estimating avian migration trajectories using population centroids movement in the annual cycle

**Metadata for Data S1**

Observation data of *Anthus spragueii* and *virtual species* for avian migration trajectory estimation with Centroid-AME software tool in the annual cycle

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**File list (flies found in DataS1.zip)**

Anthus\_spragueii.csv

Virtual\_species.csv

**Description**

**Anthus\_spragueii.csv** -.csv file with observation data of *Anthus spragueii* from eBird during Jan.1st to Dec. 31st in 2018.

COMMON\_NAME: The primary English common name of the taxon in the Clements taxonomy.

SCIENTIFIC\_NAME: The scientific name of the taxon in the Clements taxonomy.

OBSERVATION\_DATE: Date of the observations.

OBSERVATION\_COUNT: The count of individuals made at the time of observation. If no count was made, an 'X' is used to indicate presence.

APPROVED: The status of the record within the eBird data quality process. If "Accepted", the record is deemed acceptable. If "Not Confirmed" the record has been deemed unacceptable by review processes. 1 = yes, 0 = no.

COUNTRY: The country where the observation was made. Follows ISO 3166-2.

STATE: The state/province where the observation was made. Follows ISO 3166-2.

COUNTY: The county where the observation was made.

LATITUDE: Latitude of the observation in decimal degrees.

LONGITUDE: Longitude of the observation in decimal degrees.

OBS\_DATE: Date of the observations

YEAR: Year of the observations

**Virtual\_species.csv** -.csv file with observation data of virtual species from Jan.1st to Dec. 31st in 2018

COMMON\_NAME: The primary English common name of Virtual Species.

SCIENTIFIC\_NAME: The scientific name of the virtual species.

OBSERVATION\_DATE: Date of the observations.

OBSERVATION\_COUNT: The count of individuals made at the time of observation. If no count was made, an 'X' is used to indicate presence.

APPROVED: The status of the record after the data quality process. If "Accepted", the record is deemed acceptable. If "Not Confirmed" the record has been deemed unacceptable by review processes. 1 = yes, 0 = no.

COUNTRY: The country where the observation was made. Follows ISO 3166-2.

STATE: The state/province where the observation was made. Follows ISO 3166-2.

COUNTY: The county where the observation was made.

LATITUDE: Latitude of the observation in decimal degrees.

LONGITUDE: Longitude of the observation in decimal degrees.

OBS\_DATE: Date of the observations.

YEAR: Year of the observations.