

A large flock of birds, likely geese, is flying in a V-formation against a clear blue sky. The birds are small, dark silhouettes, and their path curves from the upper left towards the lower right of the frame. The text is overlaid on the top half of the image.

Moving targets: Methods for wildlife remote sensing

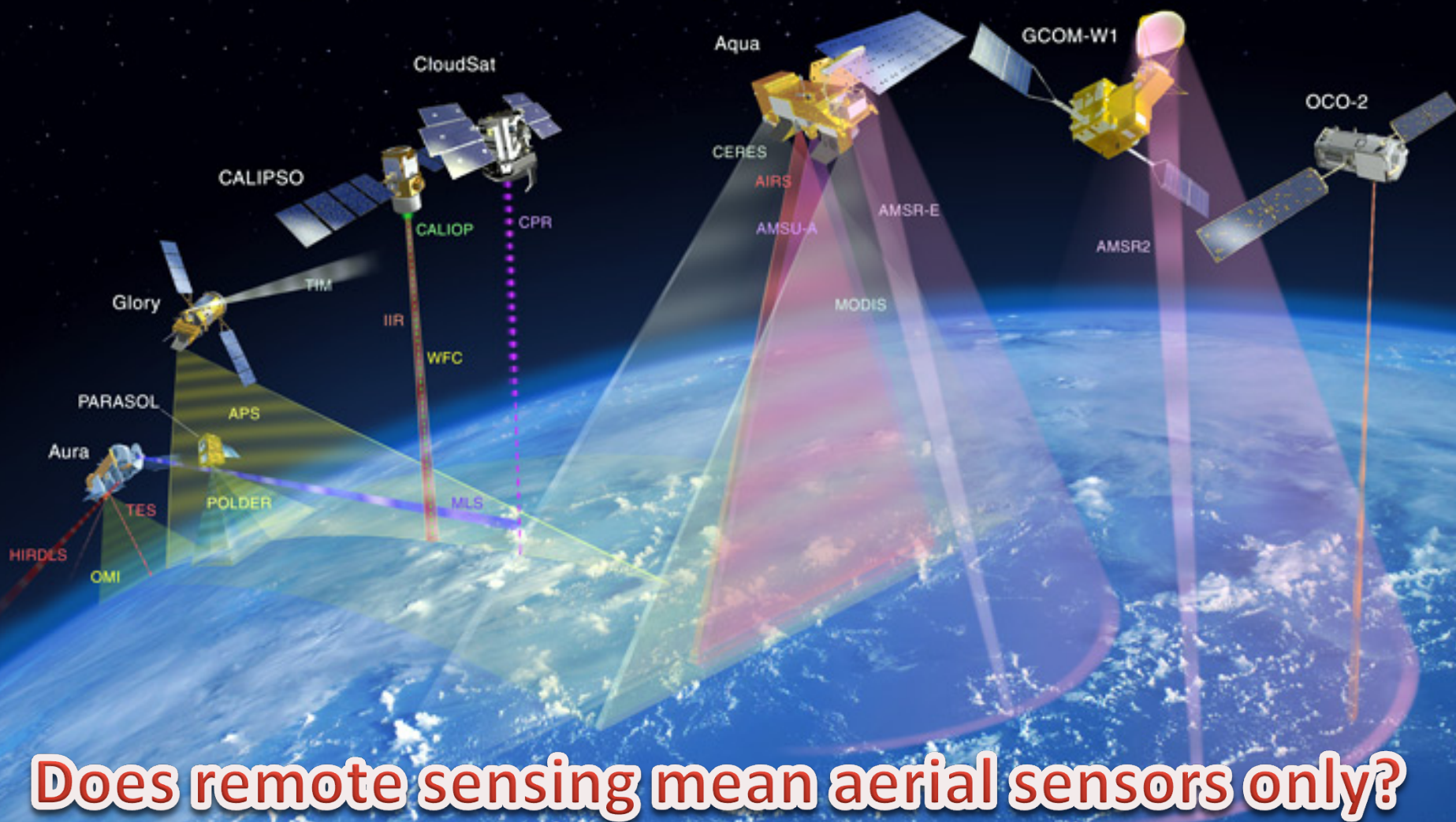
Eli S. Bridge

University of Oklahoma

Oklahoma Biological Survey

ebridge@ou.edu

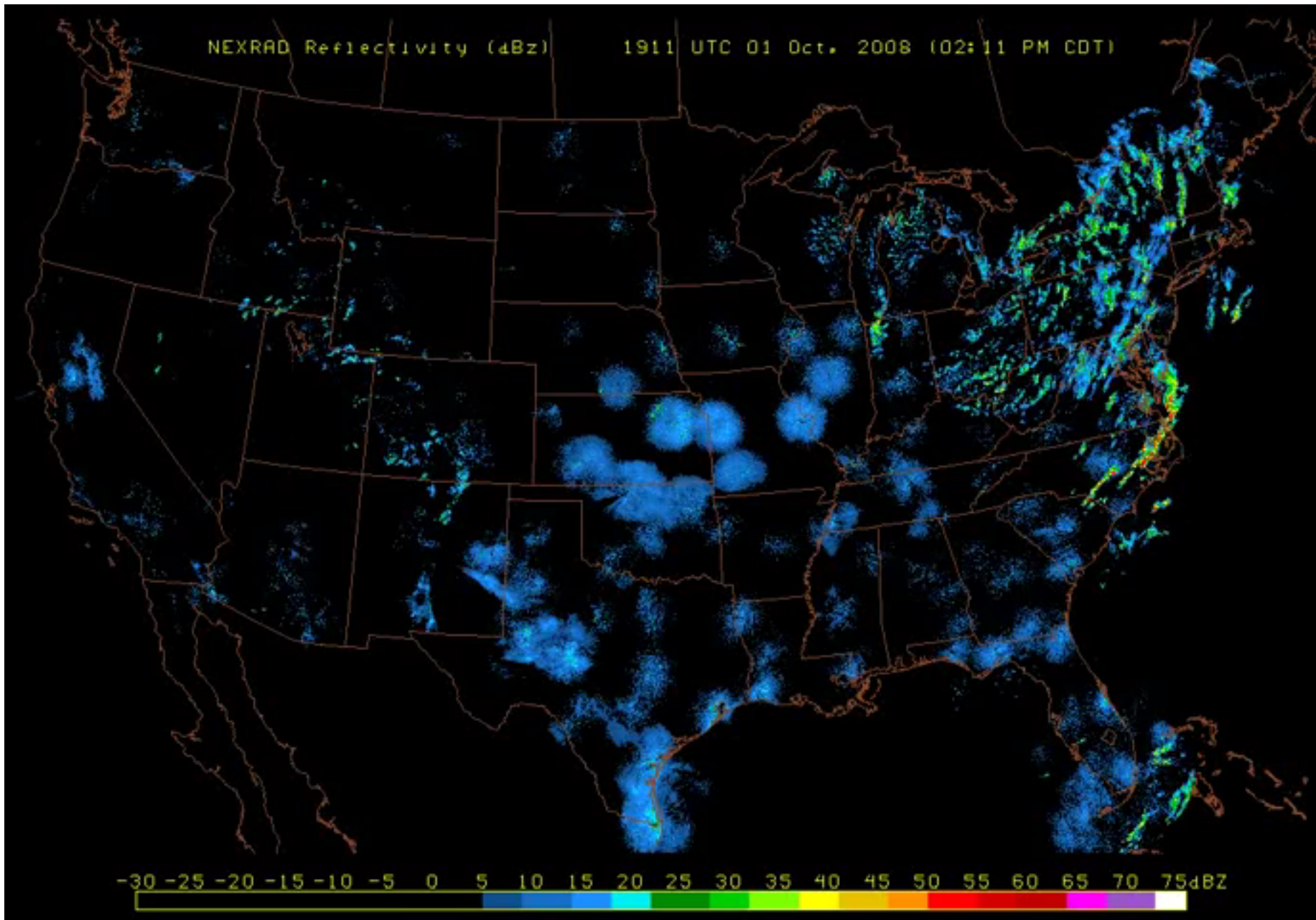
Remote sensing is the acquisition of information about an object or phenomenon without making physical contact with the object and thus in contrast to in situ observation.

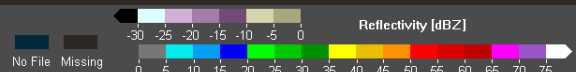
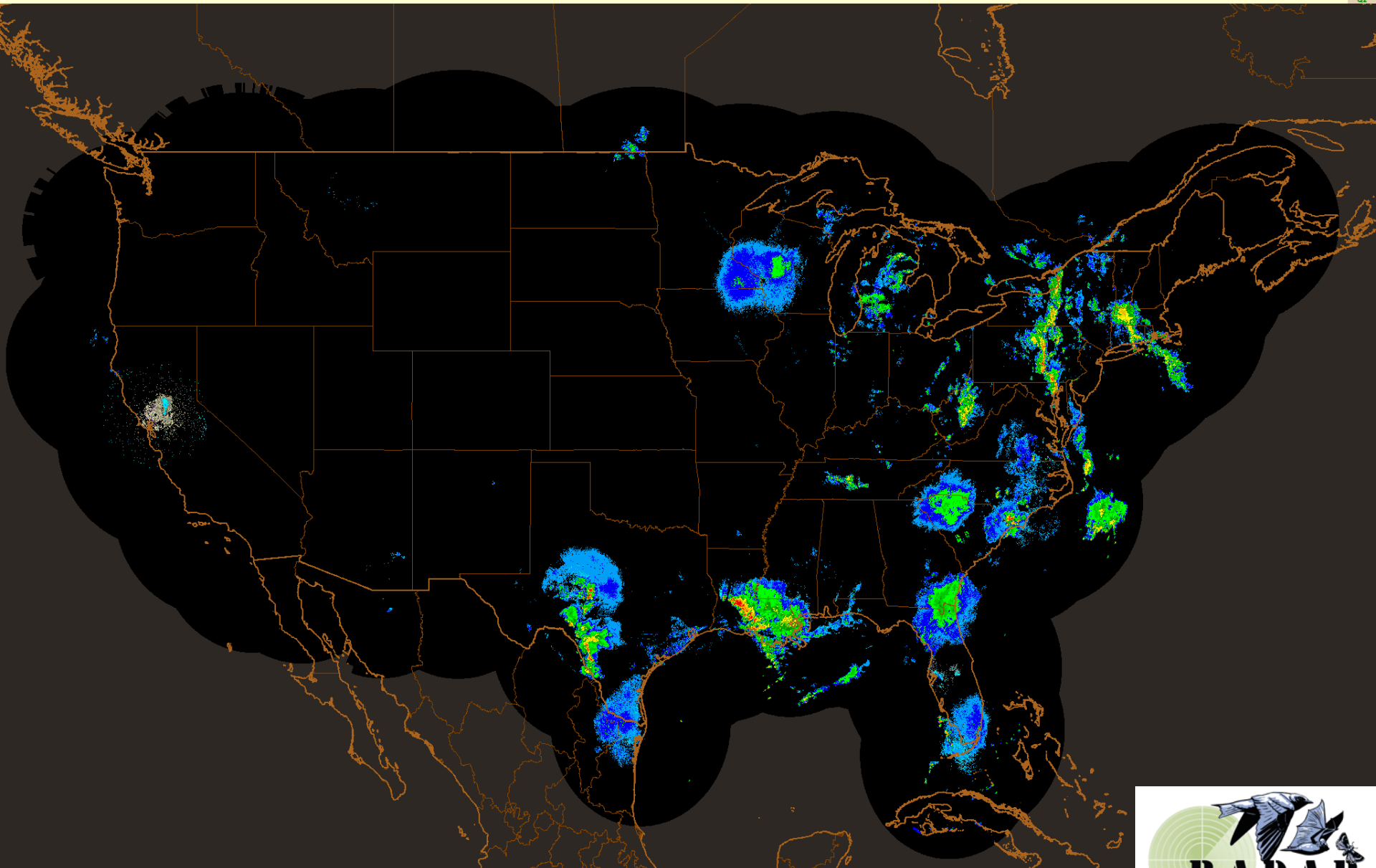


Does remote sensing mean aerial sensors only?

NEXRAD Reflectivity (dBz)

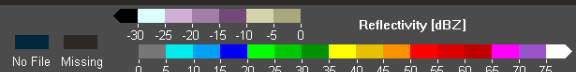
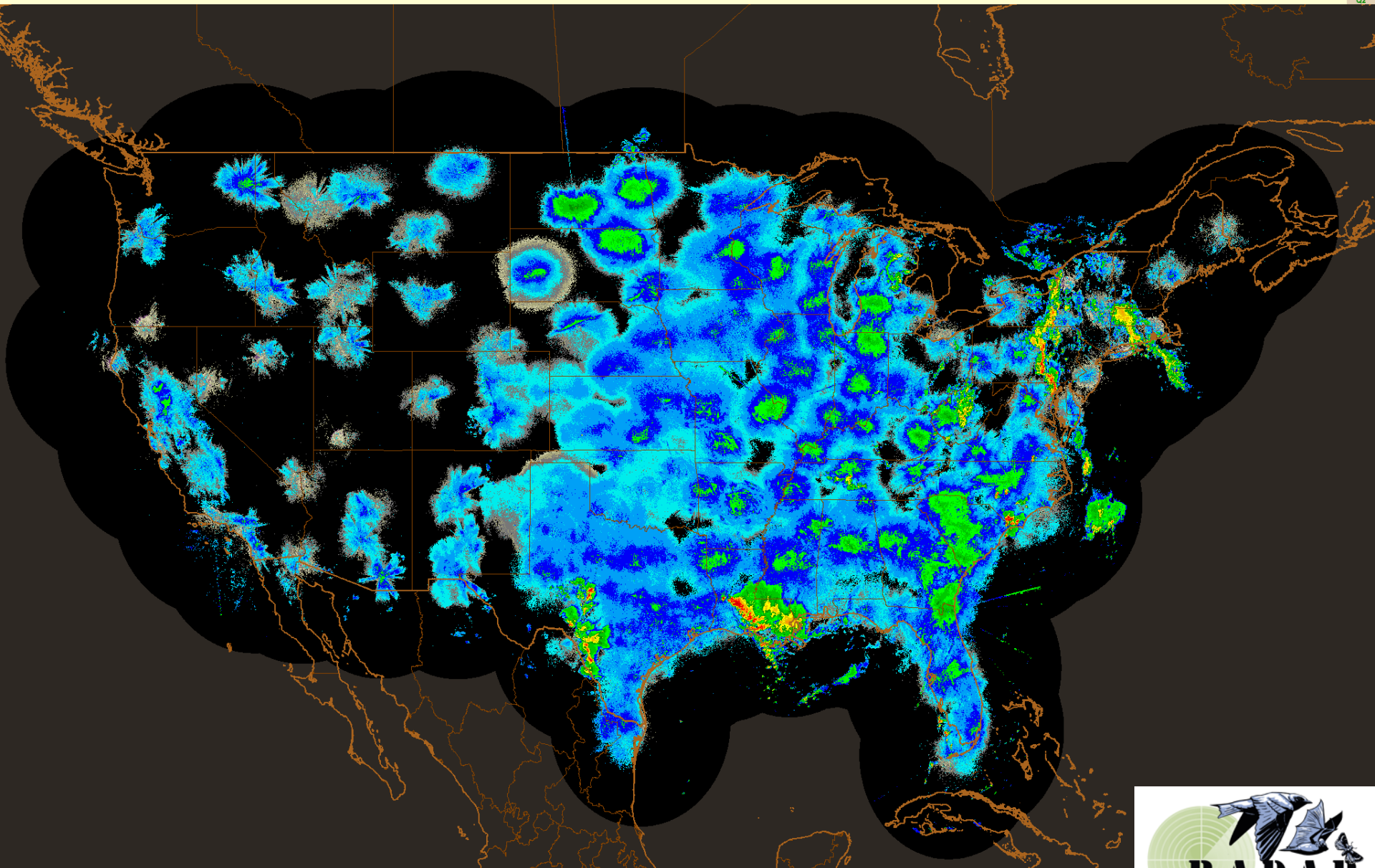
1911 UTC 01 Oct. 2008 (02:11 PM CDT)





Composite Reflectivity [Before QC]
Derived From Mosaic3D

Valid At:
09/29/2011 03:00:00 UTC



Mos

Sub

Gener

Region

Not

36.7

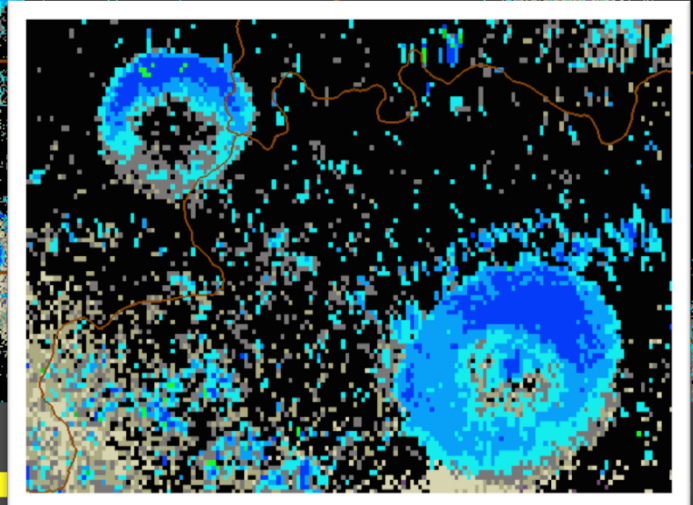
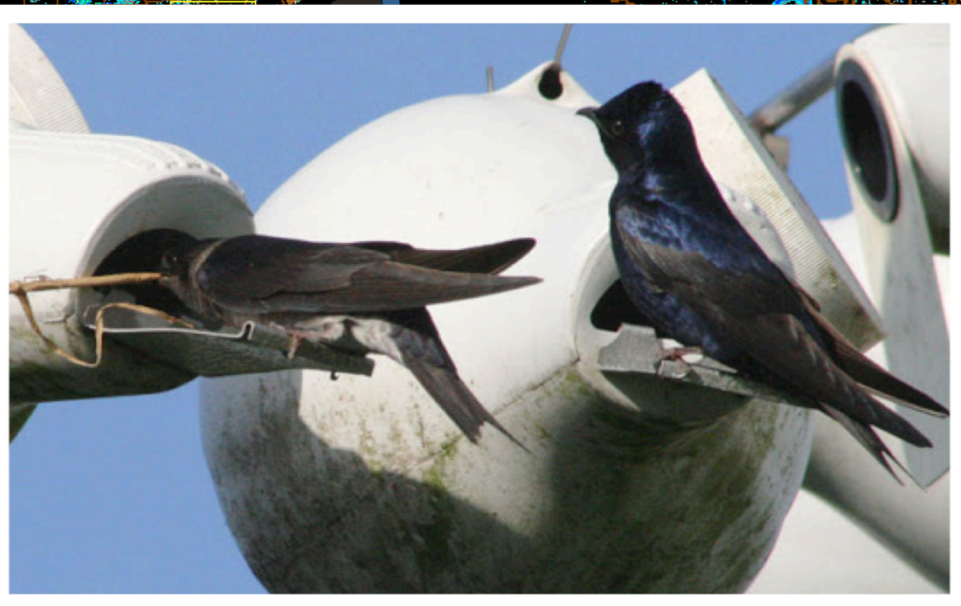
Produ

CR

Time N



Mouse Mode

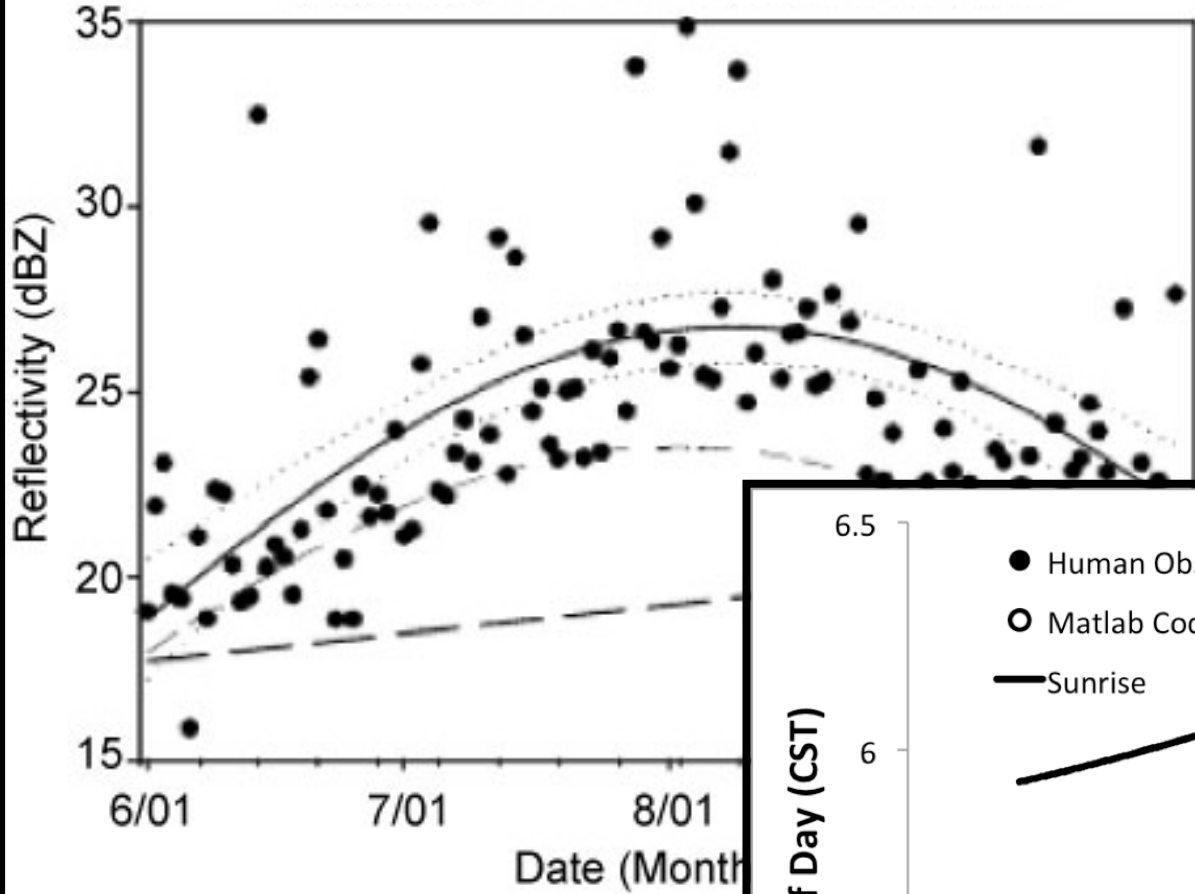


0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 33.98

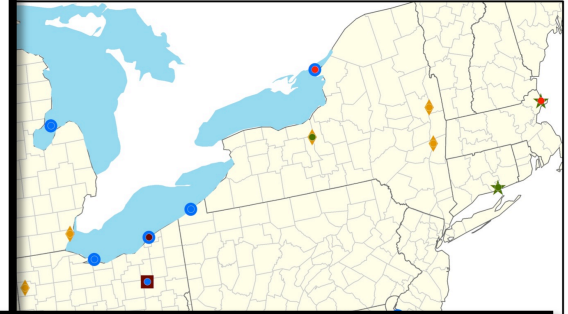
Garland, TX, 30 July 2011



Roosts within 50km of a NEXRAD Station

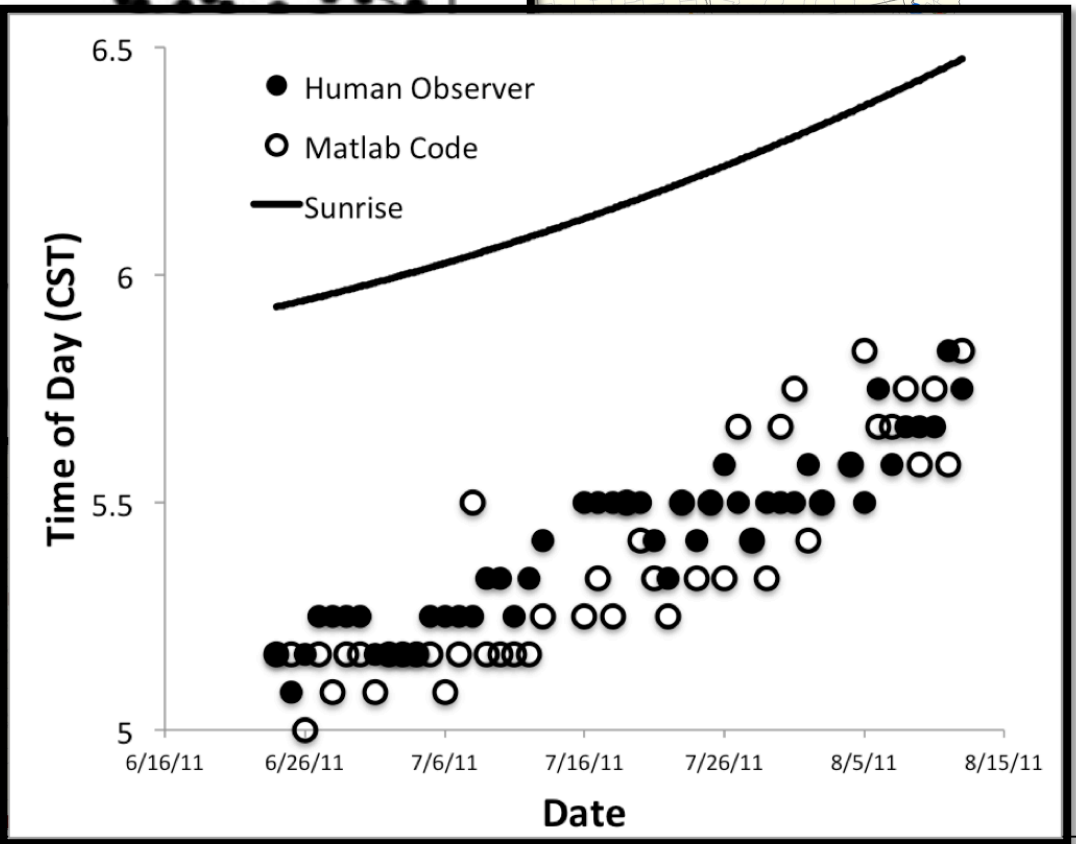


5km radius)

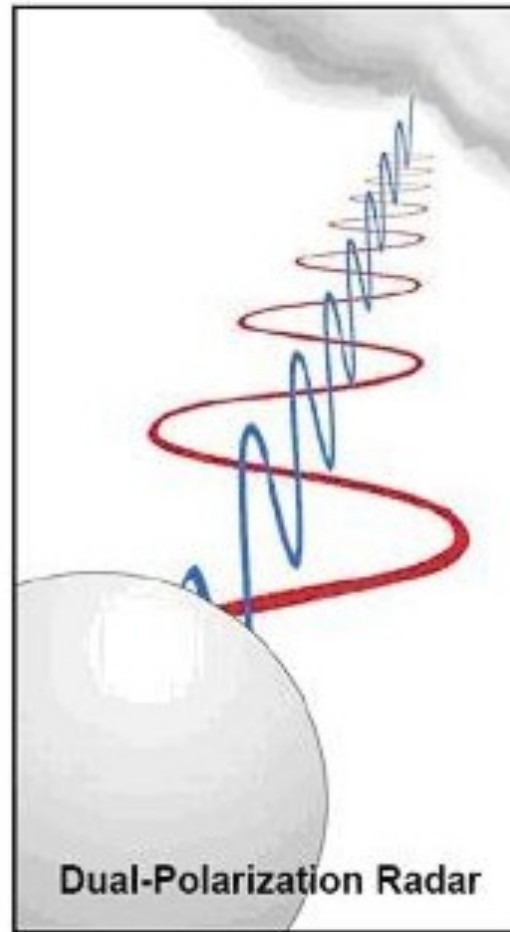
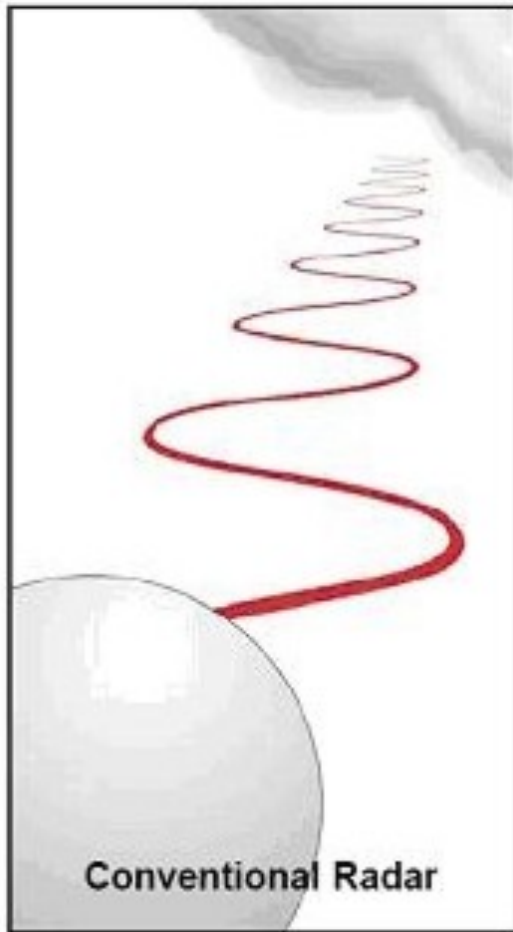


▲ 2% other

Kelly et al (in prep).



Dual-pol radar



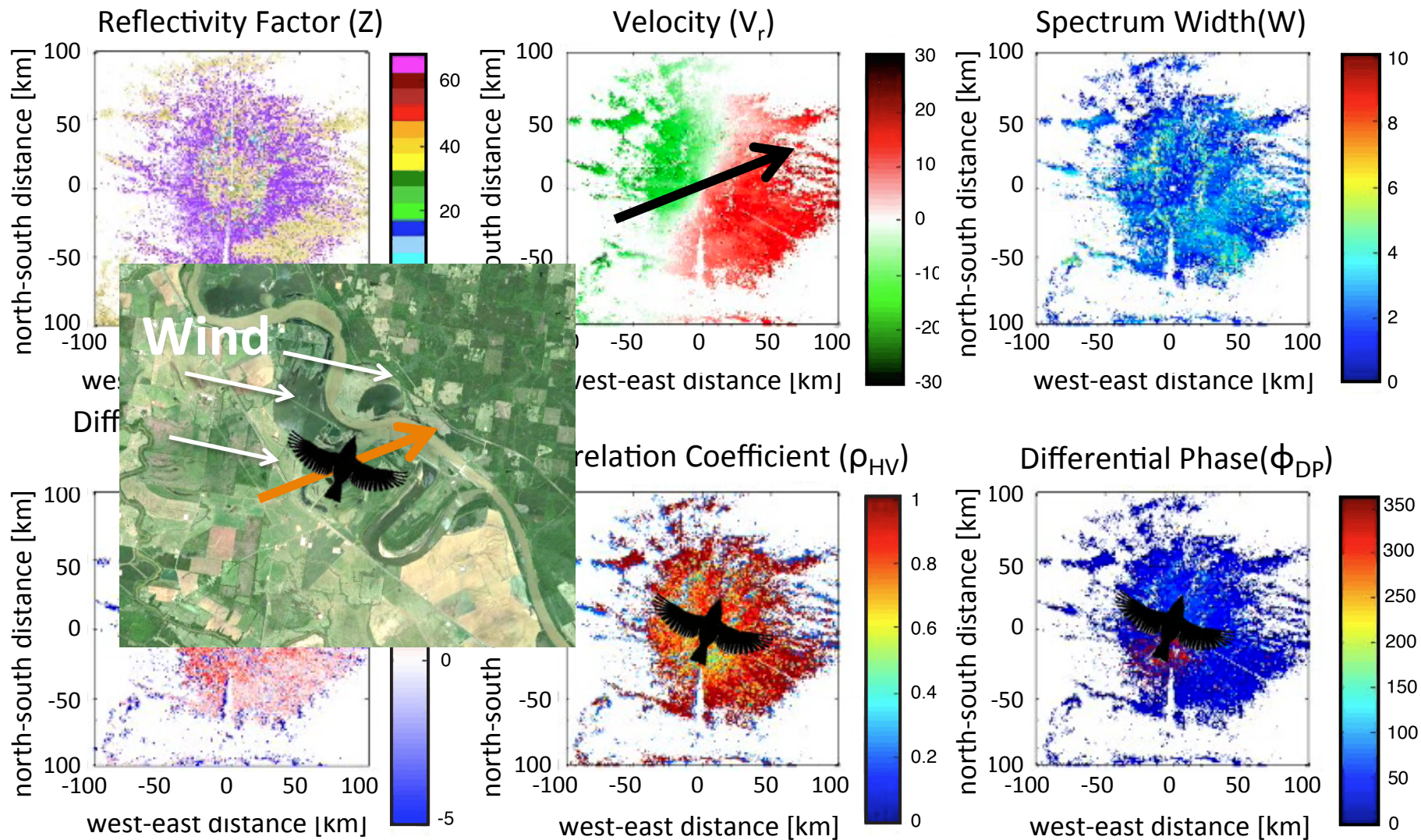
Horizontal and vertical polarized beams.

What does this mean for radar ornithology?

Dual-pol radar and orientation

Horton et al. (in prep)

Binghamton, NY (KBGM) Night of May 15th, 2013,



Animal tracking toolbox

- Intrinsic markers
 - Stable isotopes
 - DNA
- RADAR
- Observer networks
- Extrinsic markers
 - Leg bands
 - Radio tags
 - Satellite tags
 - Cell phone tags
 - Archival tags



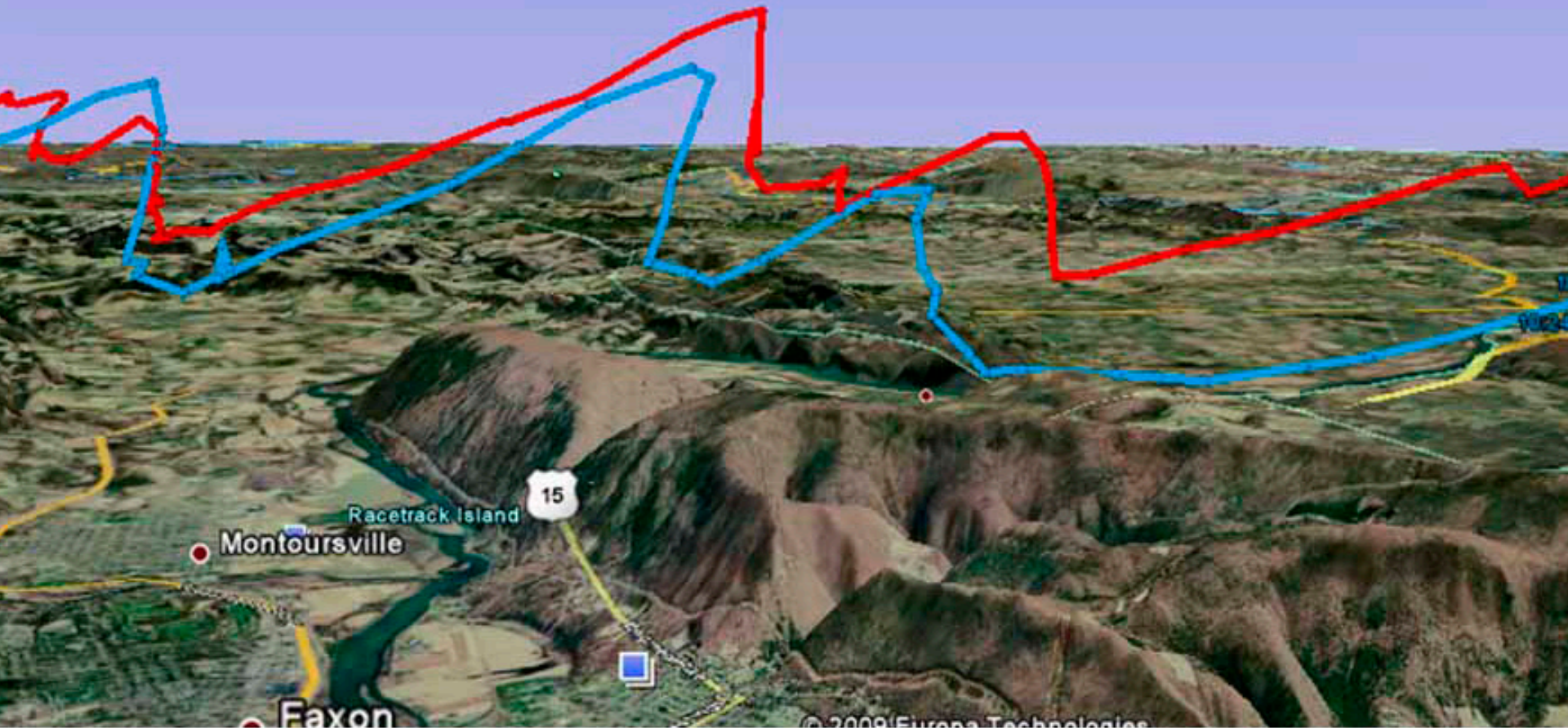
Observation networks - Ebird



Weekly estimates of Indigo Bunting density

GSM (cellular) tags

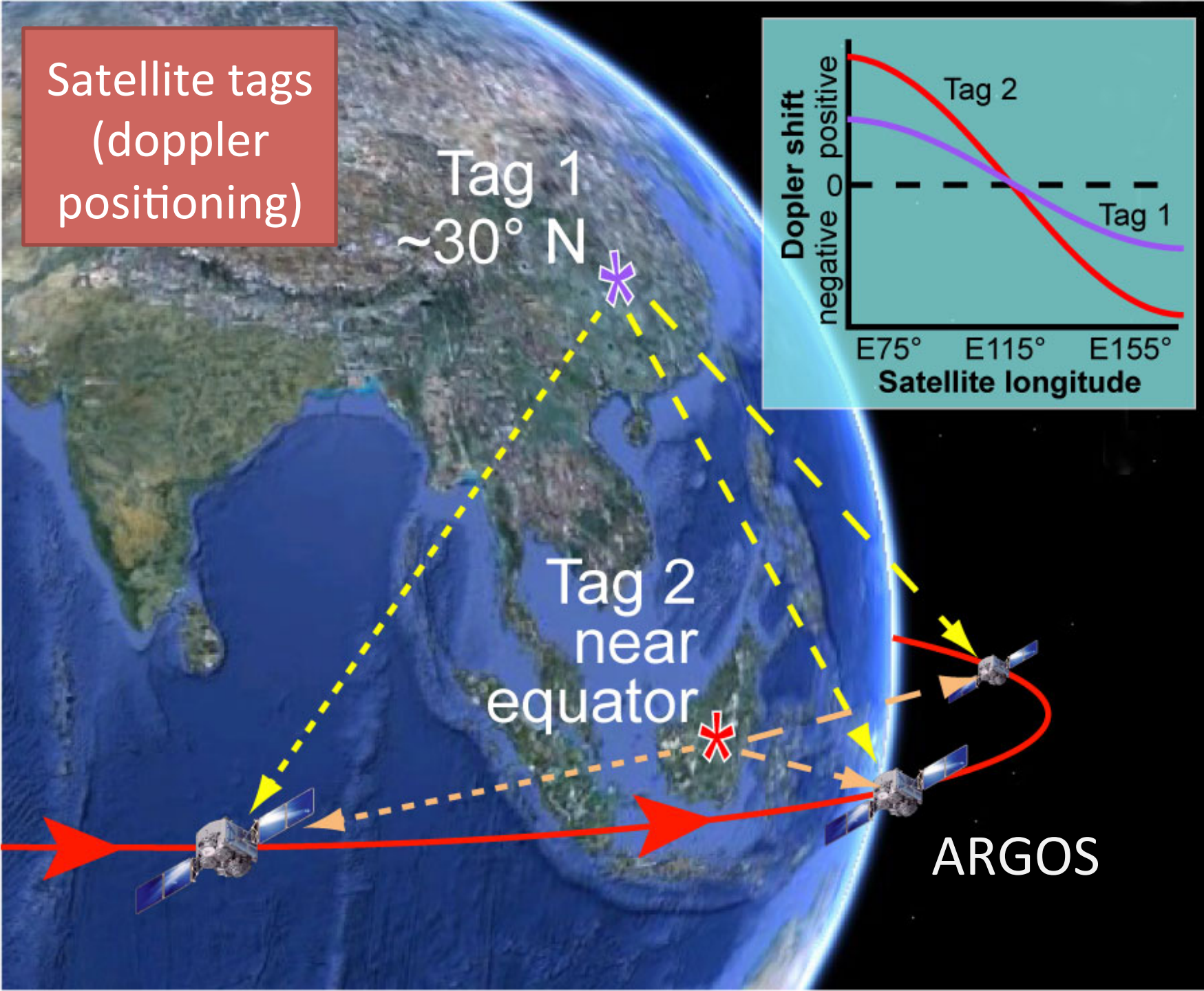
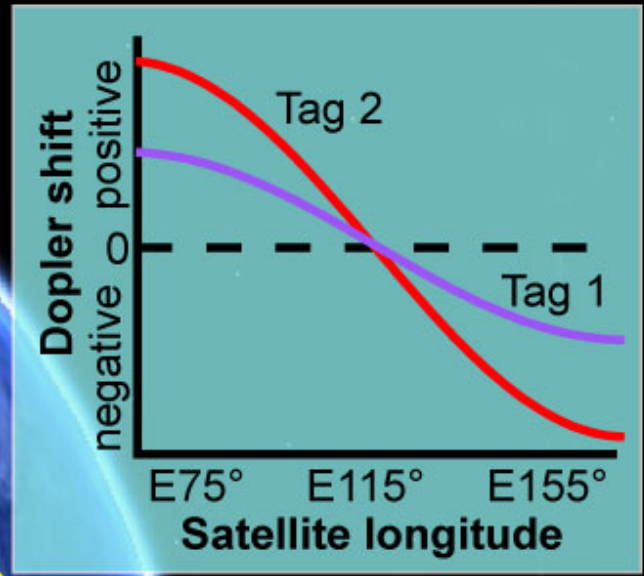
Tracks from two Golden Eagles, 8 days apart



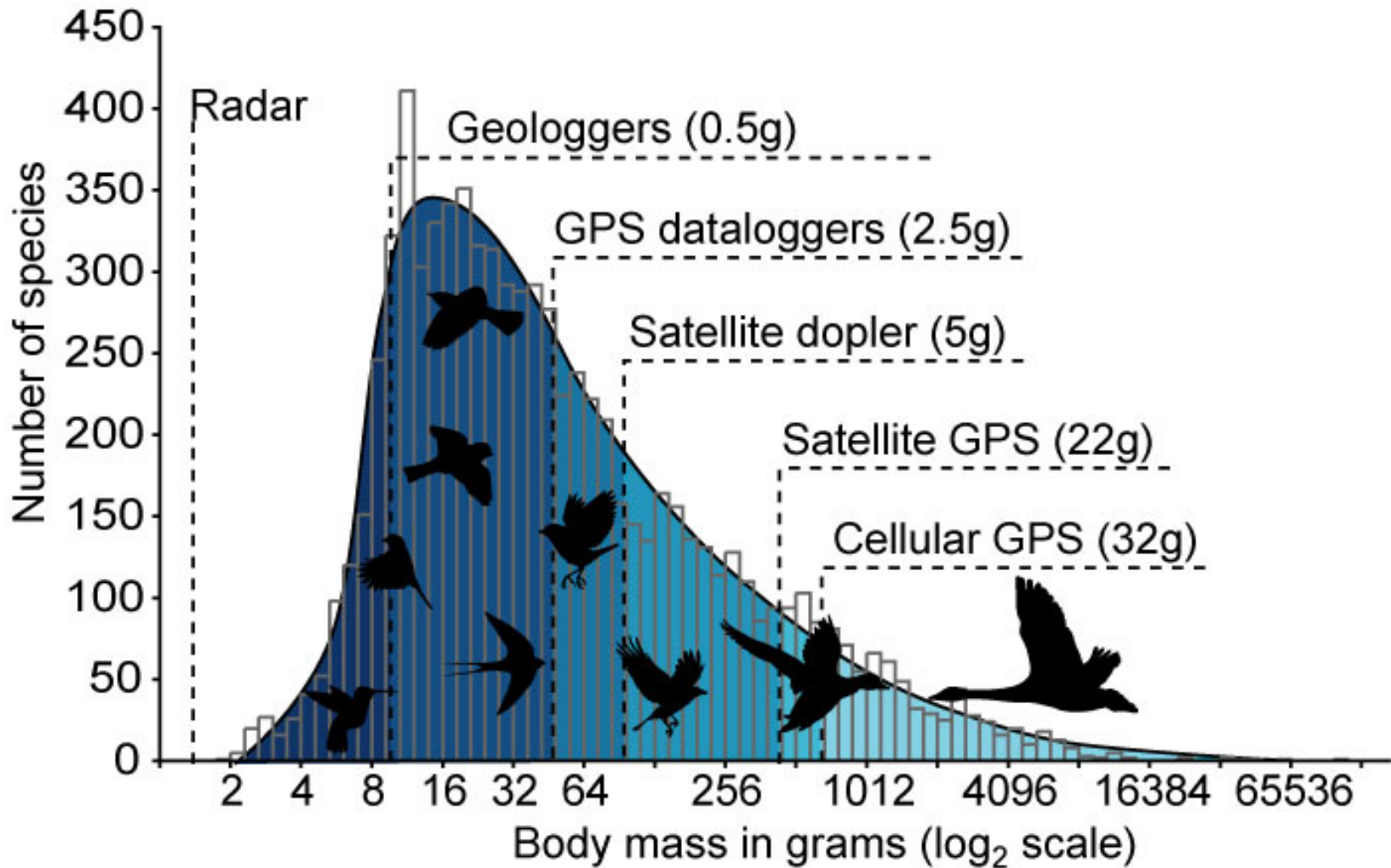
Satellite tags
(doppler
positioning)

Tag 1
~30° N

Tag 2
near
equator



Extrensic markers and bird size



Archival devices (dataloggers)

What can we archive?

Light-levels (geolocators)

Temperature

Pressure (altitude)

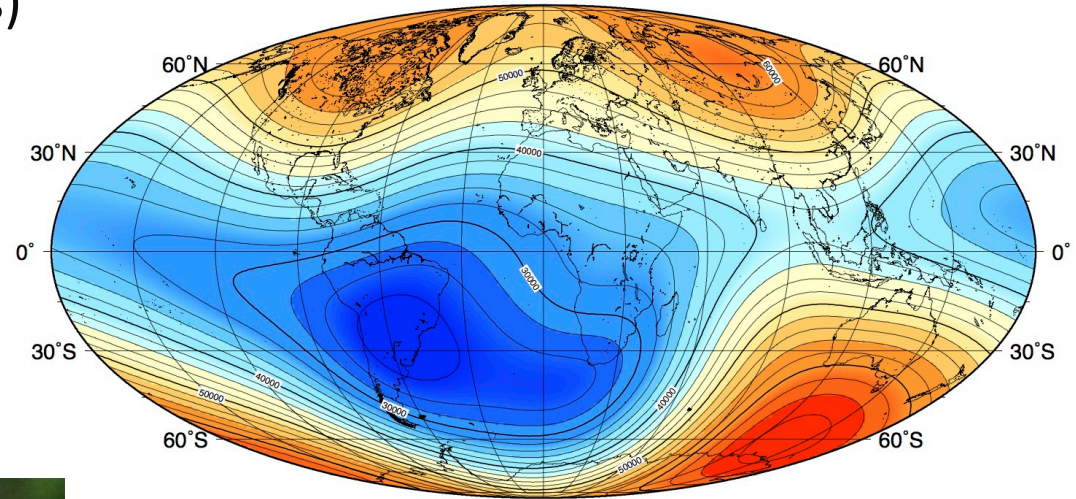
Activity/movement

magnetic field

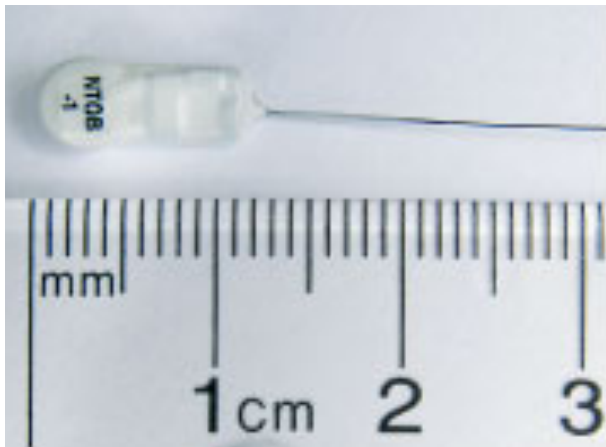
GPS locations

Encounters

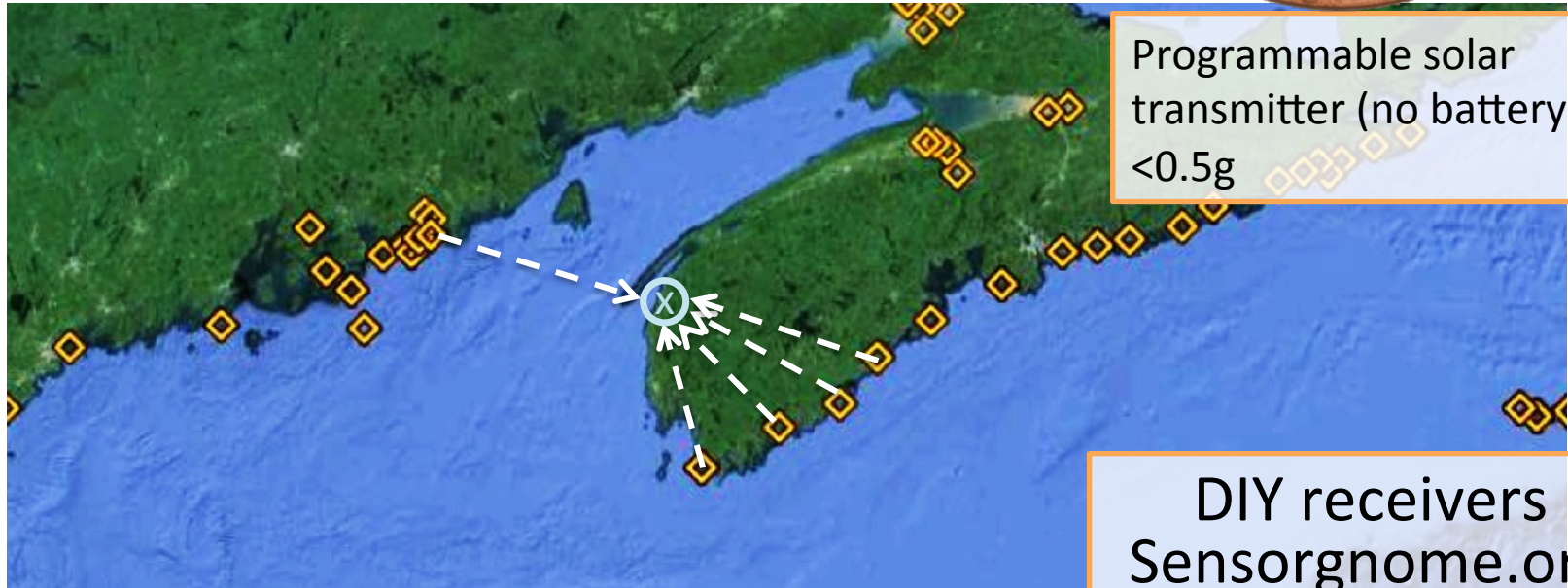
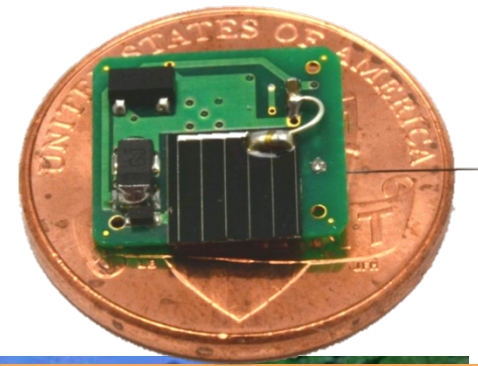
Magnetic field intensity (2005)



Radio telemetry



Coded transmitters and receiver networks

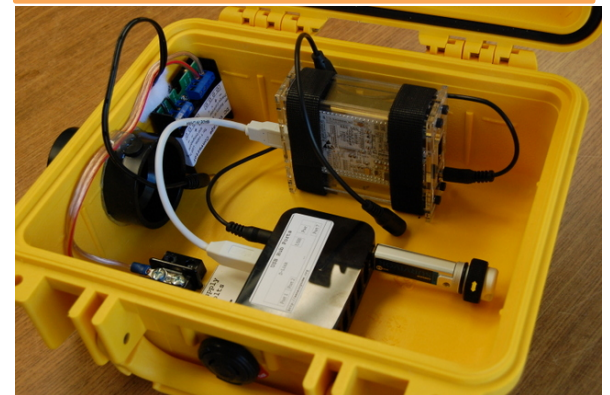


Programmable solar transmitter (no battery).
<0.5g

DIY receivers
Sensorgnome.org

Relative timing of signal arrival at different receiver locations can be used to automatically triangulate tag position with accuracy within a few meters.

MacCurdy et al. 2011. Chapter 33: *Handbook of Position Location*



Ready made telemetry towers
(with built-in power supply)



Search Upload Edit Studies Weather

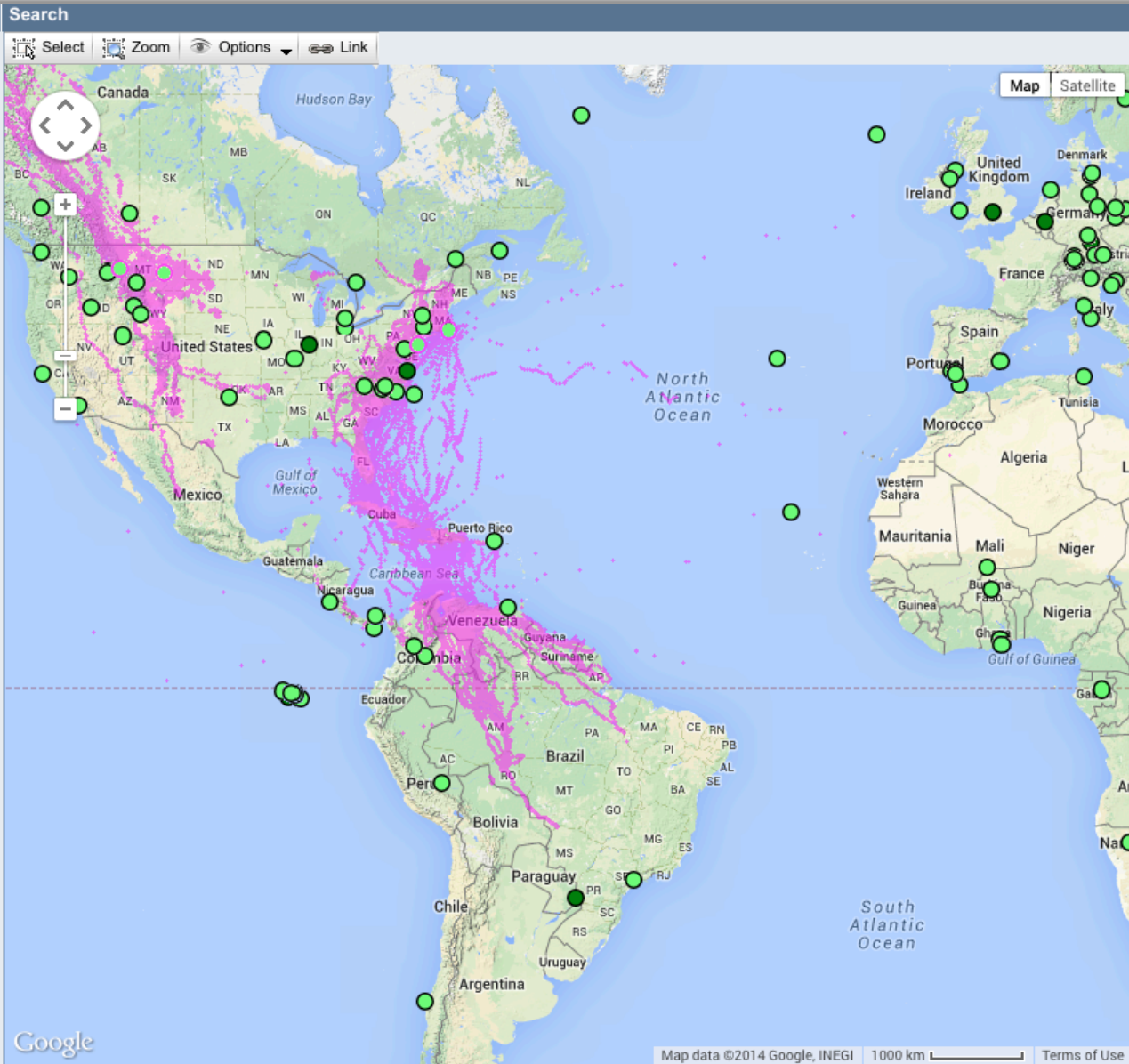
Search **Advanced Search**

All Sensor Types

Only studies where I can see data

Search result

- Sort by Animal Identifier
- Cheetah kills South Africa Luke Hunter Panthera
 - Cheetahs, Acinonyx jubatus, balance turn capacity w
 - Ciconia nigra - Black stork - Bavaria/Germany
 - Collared Peccary on BCI
 - Costa Lab Northern Elephant Seals
 - Cuvier's beaked whale CRC NW Atlantic
 - Dunn Ranch Bison Tracking Project
 - e-Obs GPRS Himalayan Griffon, Sherub, Bhutan
 - E-obs GSM Cranes Bhutan
 - E-obs GSM Dalmatian pelicans SPP Greece
 - Eastern Box Turtle Tracking, NC Wildlife
 - Eastern Montana Golden Eagles [n=33]
 - Eastern Washington Lesser Canada Goose - Delinez
 - Egyptian vulture Pascual Lopez Spain
 - Eidolon (straw-coloured fruit bats), Cumming, Zambi



Wind, chlorophyll, and albatrosses around the Galapagos

2008-05-31 (Day 1)

Search Upload

Search

All Sensor

Only stud

Search resu

Sort by Anima

- Cheetah
- Cheetah
- Ciconia r
- Collared
- Costa La
- Cuvier's
- Dunn Ra
- e-Obs G
- E-obs G
- E-obs G
- Eastern
- Eastern
- Eastern
- Egyptian
- Eidolon

Map Satellite



Thanks!

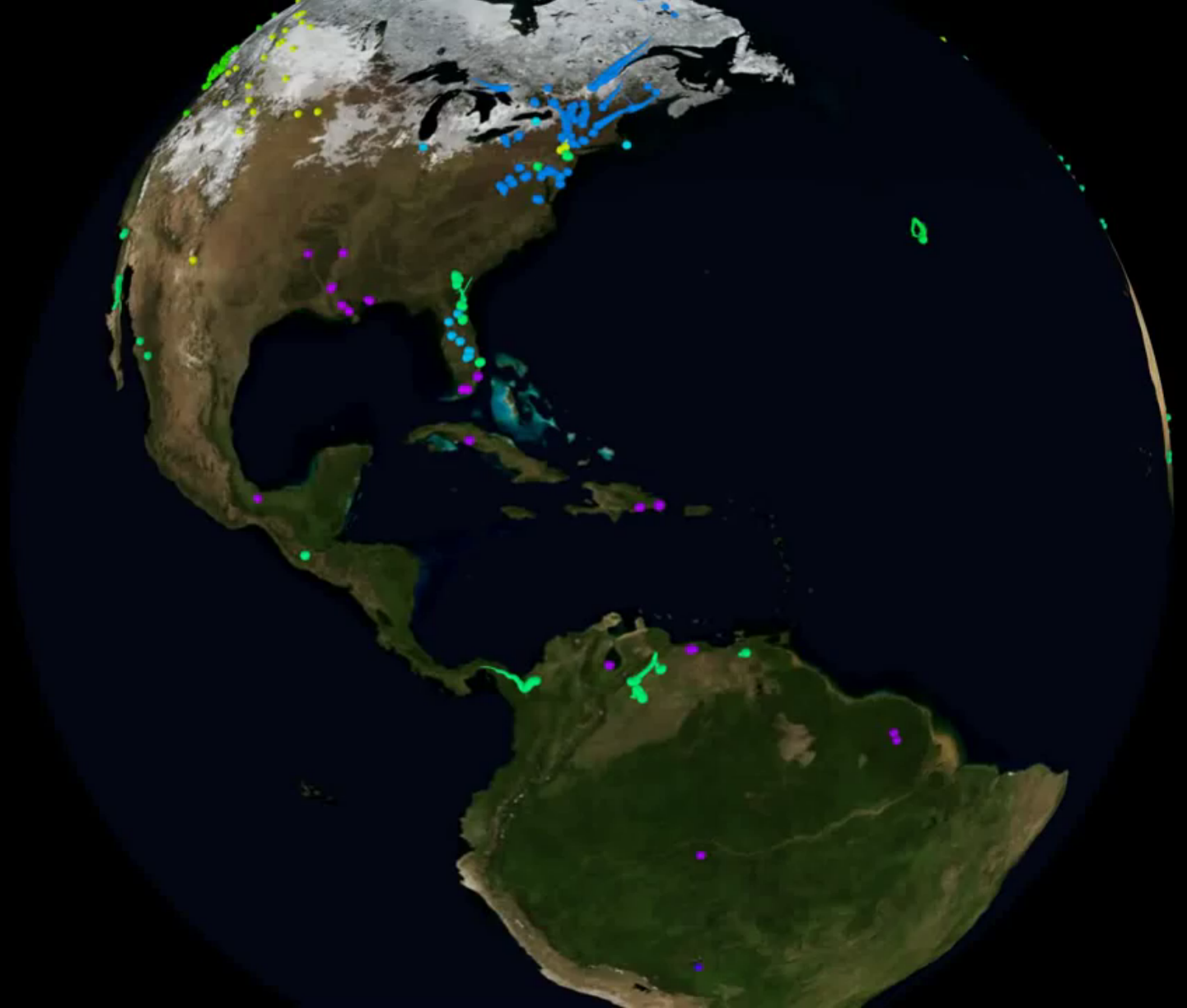
Jeff Kelly
Andrea Contina
Jeremy Ross
Phil Chilson
Sandra Plechet
Kyle Horton
Todd Fagin

David Winkler
Rob MacCurdy
Phil Taylor

Purple Martin
Conservation
Association

Ebird

Movebank



01-01

