Effects of the Energy Transition on Nature

Willem Bouten
Institute for Biodiversity and Ecosystem Dynamics

Future Energy @IAS
16 -01-2020

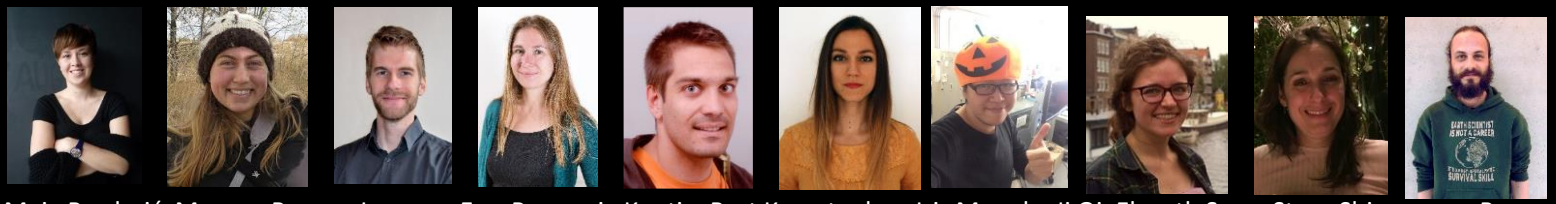


- Research Group
- Eemshaven project
- Researchers < > Policy makers
- Ideas for discussion

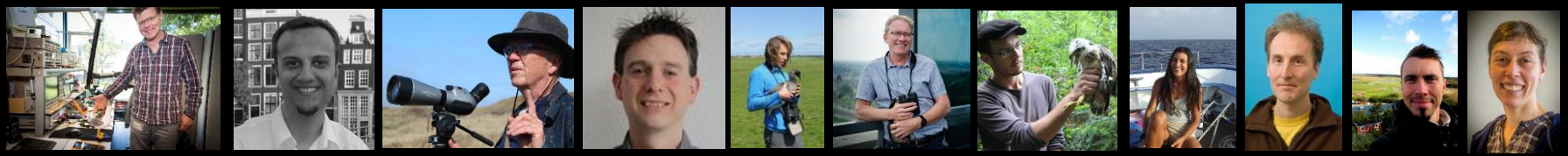
Animal Movement Ecology Team @ UvA



Judy Shamoun-Baranes, Willem Bouten, Emiel van Loon, Bart Nolet (NIOO)



Maja Bradarić, Morgan Brown, Jens van Erp, Rosmarie Kentie, Bart Kranstauber, Iris Manola, Ji Qi, Elspeth Sage, Stacy Shinneman, Berend Weijers



Close collaborators, guest researchers & past postdocs and PhDs :
Ander Astudillio (SURFSara), Edwin Baaij (UvA Technology Center), Kees Camphuysen (NIOZ), Hidde Leijnse (KNMI), Adriaan Dokter (Cornell lab of Ornithology), Hans van Gasteren (RNLAF), Wouter Vansteelant (EBD), Laura Gangosa (EBD), Jamie McLaren, Michael Kemp, Liesbeth Verlinden

AME Team @ wind energy

Funding:

NWO Applied and Engineering Sciences

Ministerie van Economische Zaken en Klimaat

Rijkswaterstaat Ministry of Infrastructure and the Environment

Ministerie van Landbouw, Natuur en Voedselkwaliteit

Gemini

provincie groningen

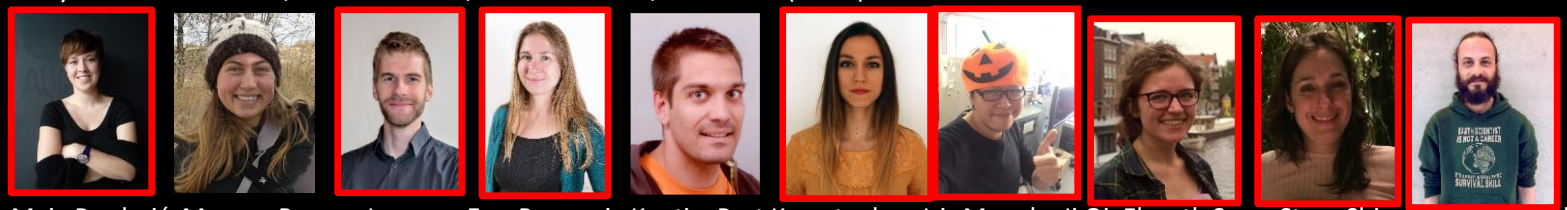
COST EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

esa

LIFEWATCH



Judy Shamoun-Baranes, Willem Bouten, Emiel van Loon, Bart Nolet (NIOO)

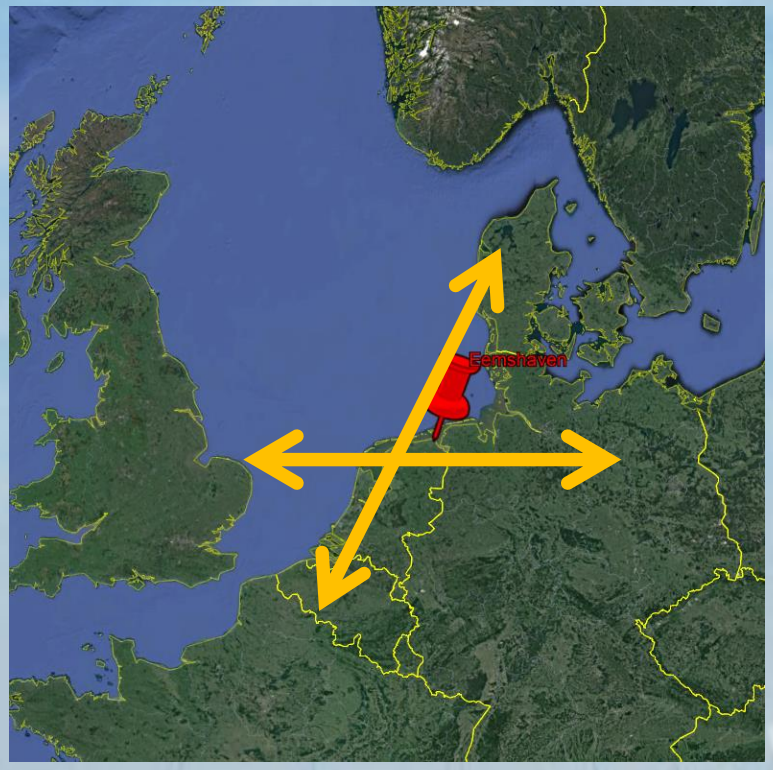


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Eemshaven



Bureau Waardenburg
Ecology & Landscape

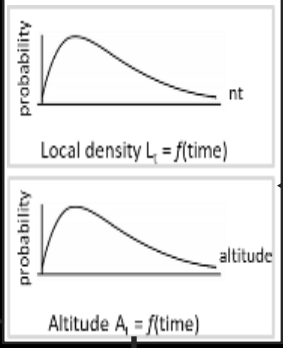
University of Amsterdam

Altenburg & Wymenga
ecologisch onderzoek
30 jaar

Research Design

Predictive model of migration patterns in Eemshaven

Migration intensity



Shutdown

Collision model

Weather radar

Field counts of casualties (FC)

Integrate and compare observations
- time series
- altitude profiles

Scale up & corrections:
- search area
- predation
- detection

Bird radar

Estimated casualties

Integrate and compare results

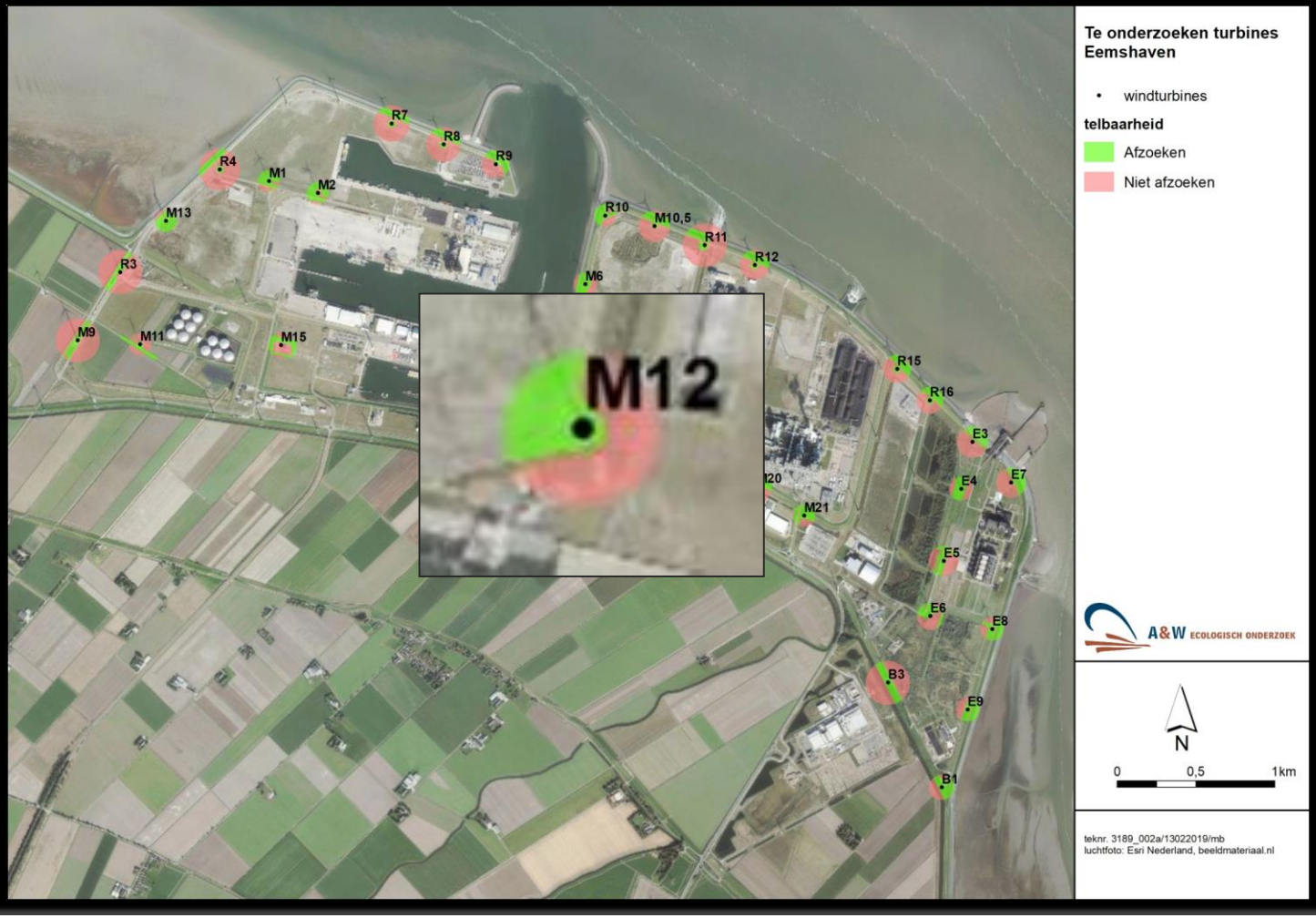
Estimated casualties

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Altenburg & Wymenga ecologisch onderzoek 30 jaar

33 Turbines (out of 90) for searching carcasses
1 ha per turbine (out of ~5ha)

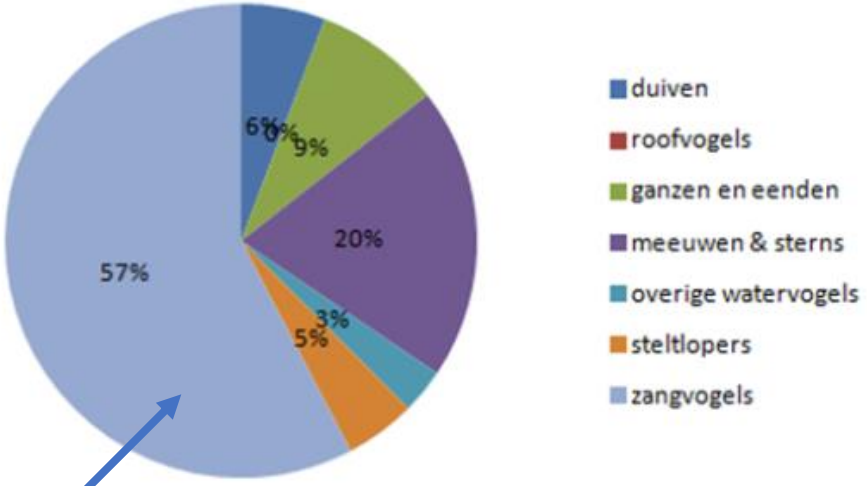


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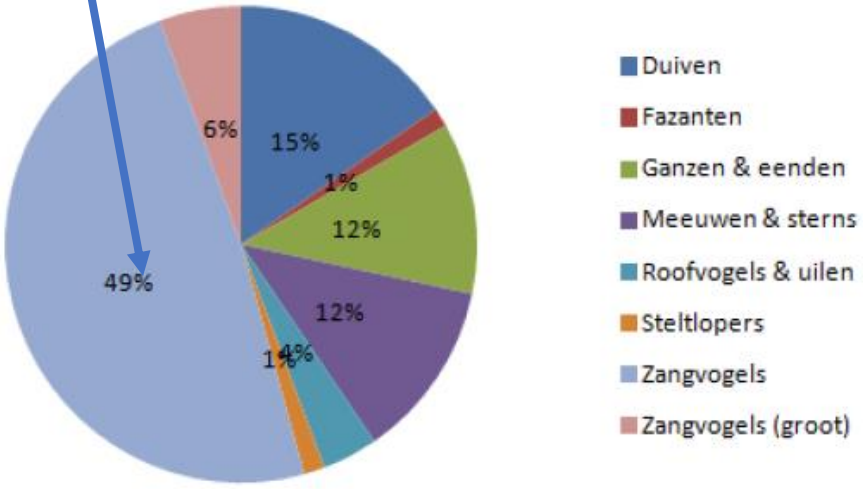
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Corrected numbers autumn 2018



Songbirds estimated: 1200 in autumn, 500 in spring

Corrected numbers spring 2019





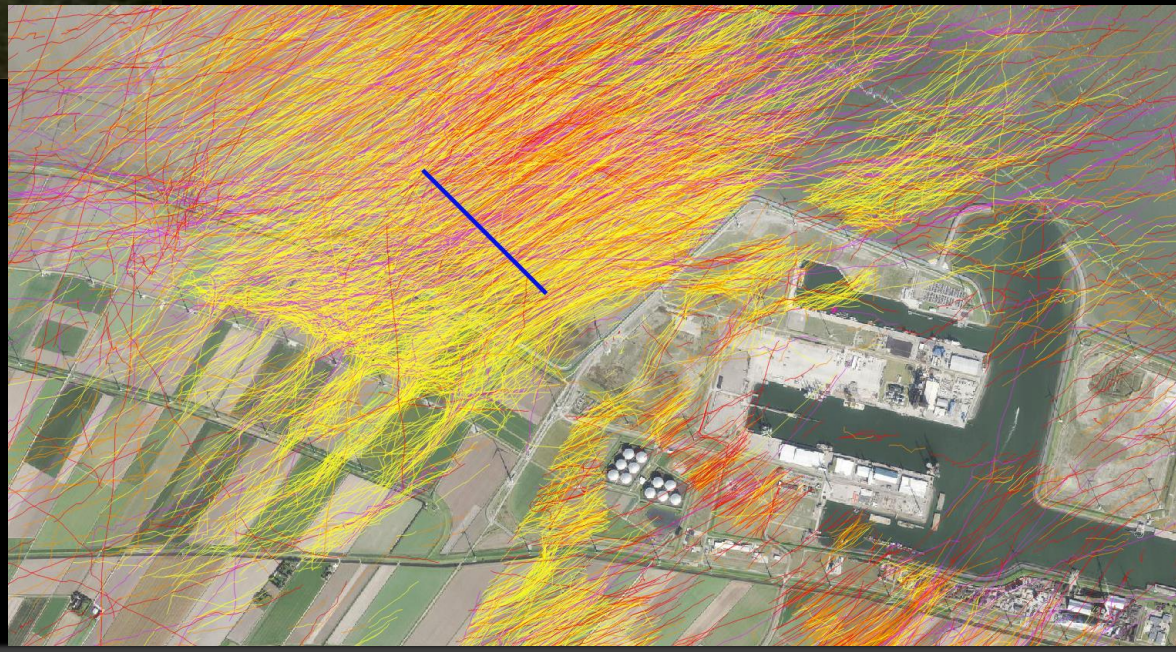
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Ecology & Landscape

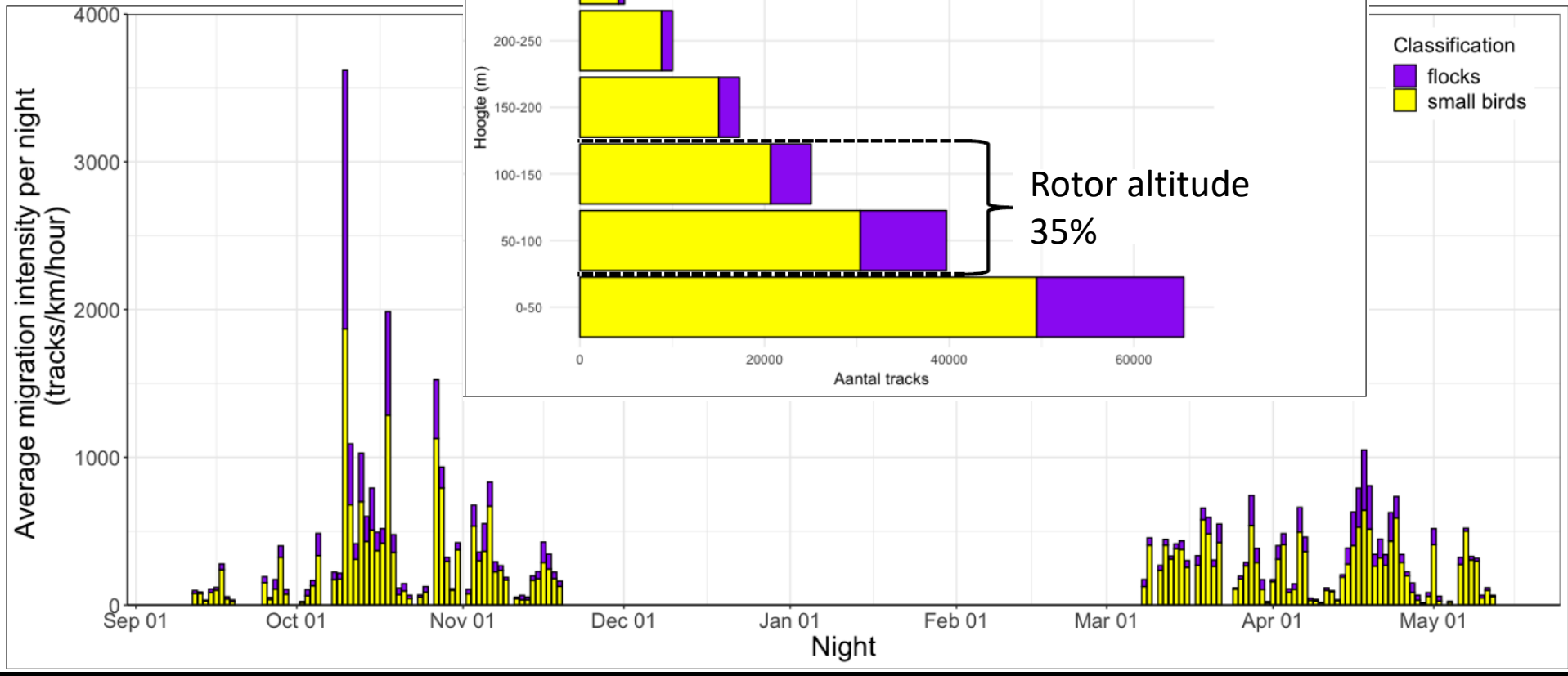
University of Amsterdam

Altenburg & Wymenga
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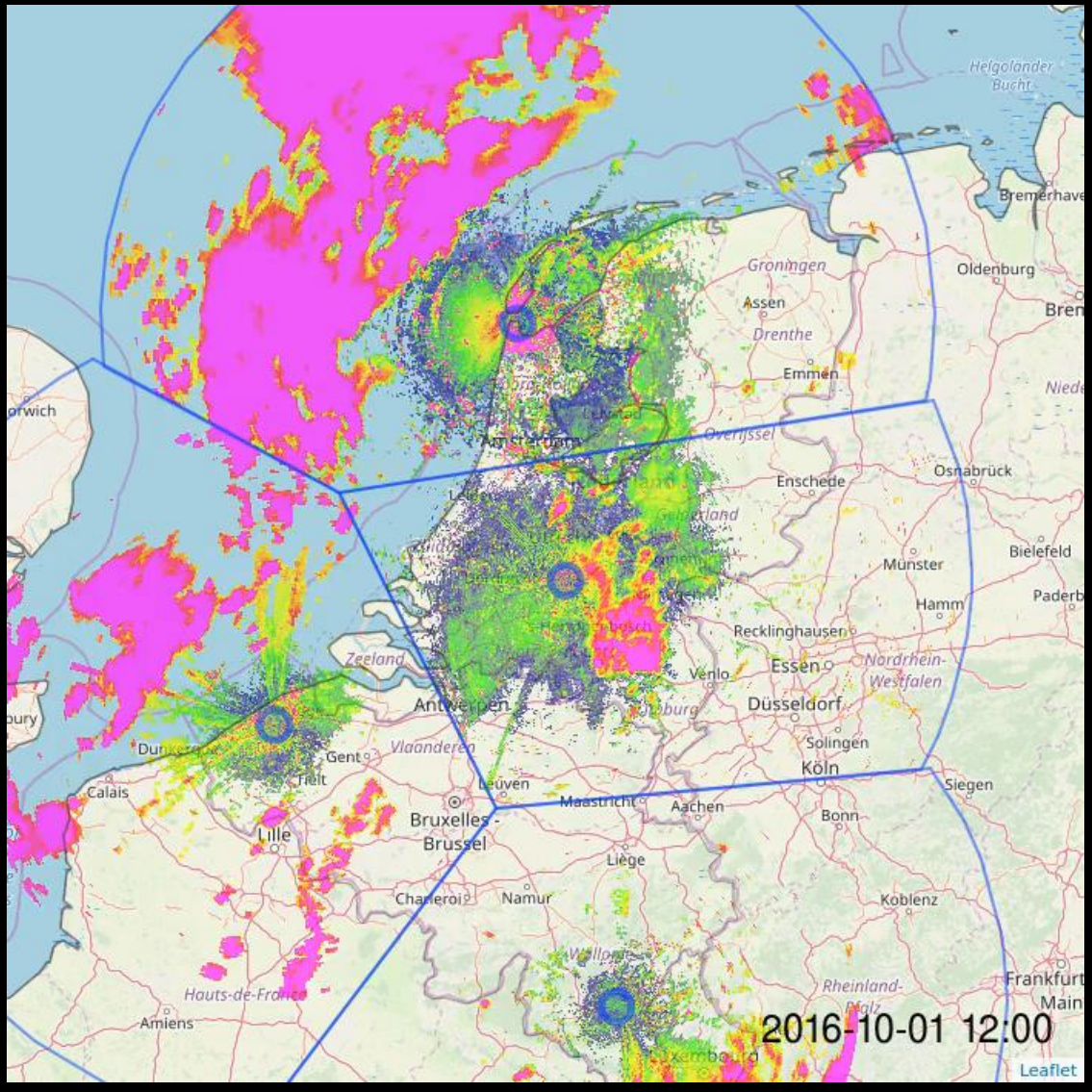
Robin 3D Max bird radar



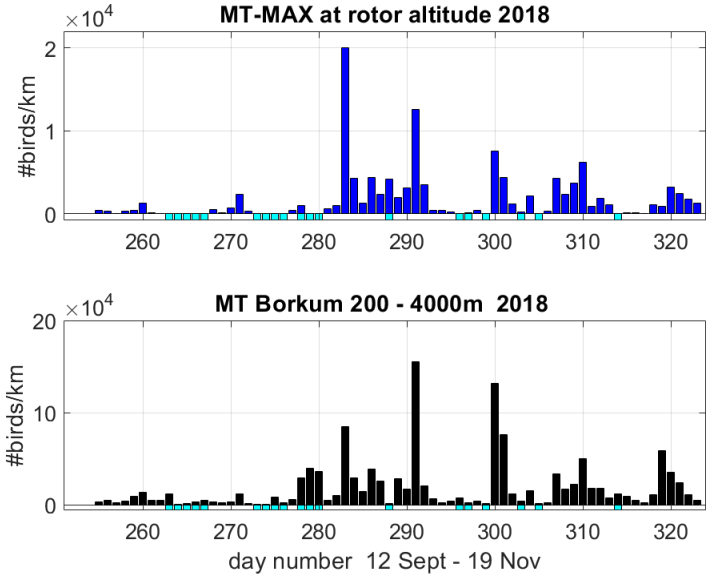


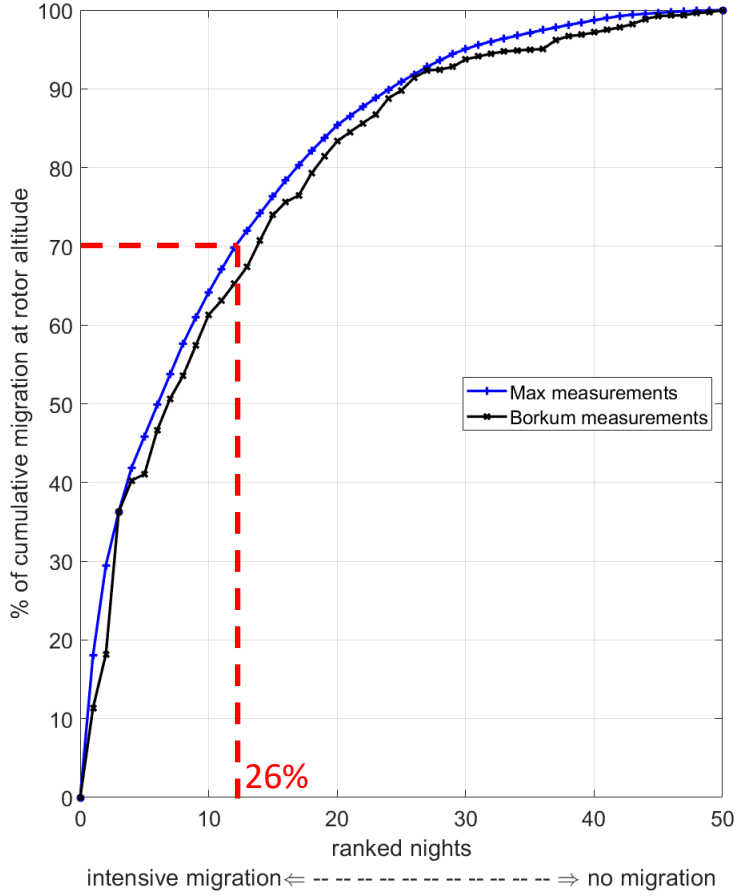

Average migration intensity per night
(tracks/km/hour)
4000
3000
2000
1000
0
Sep 01
Oct 01
Nov 01
Dec 01
Jan 01
Feb 01
Mar 01
Apr 01
May 01
Night
Classification
flocks
small birds
Altitude profile nocturnal passerines
Hoogte (m)
>300
250-300
200-250
150-200
100-150
50-100
0-50
0
20000
40000
60000
Aantal tracks
Rotor altitude
35%

Weather radars



Implications of shut down



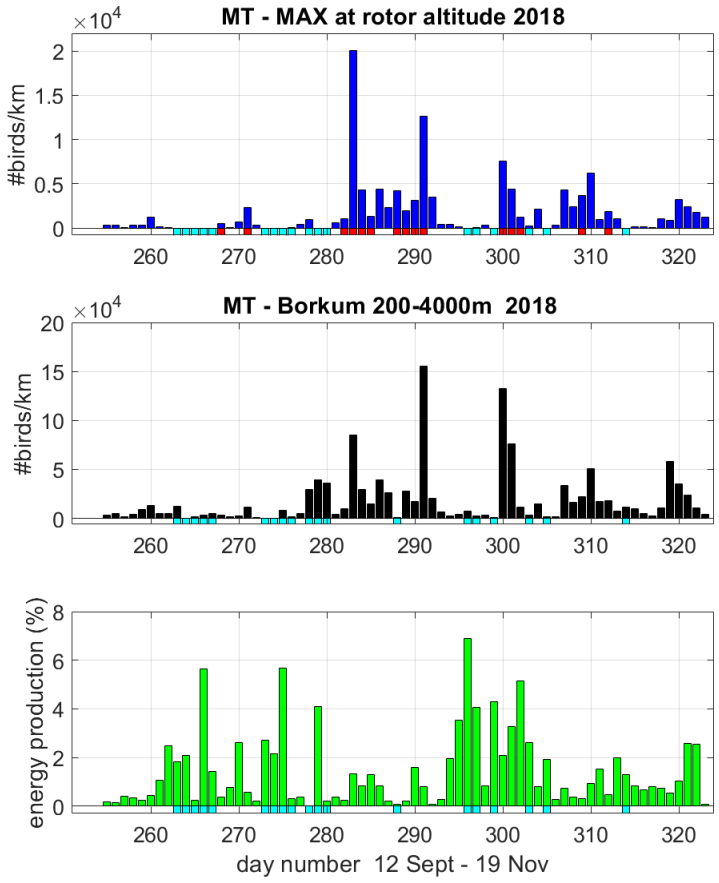


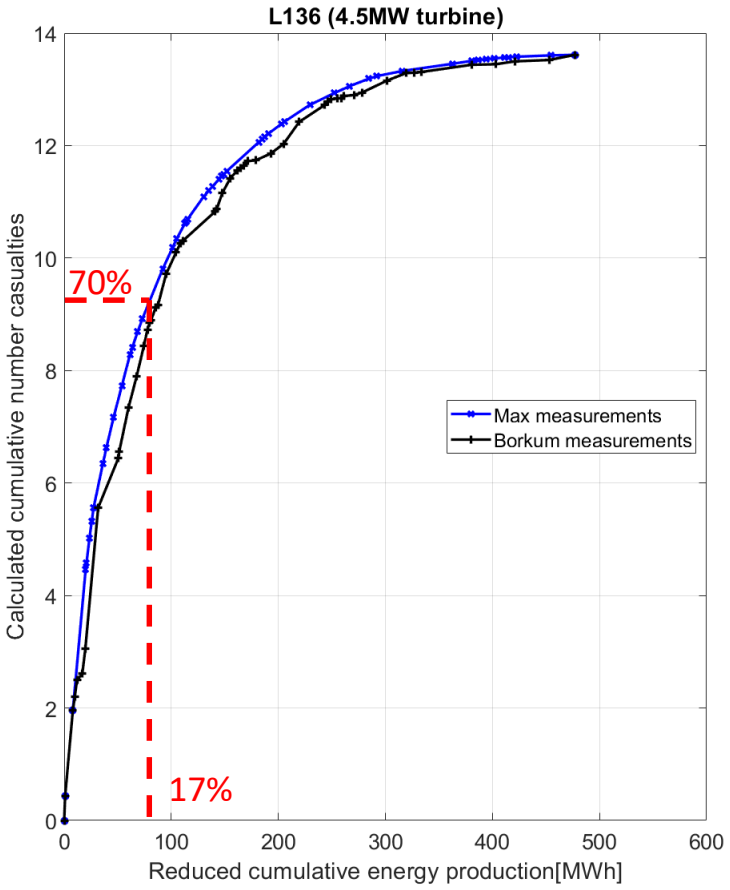
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Application of collision model



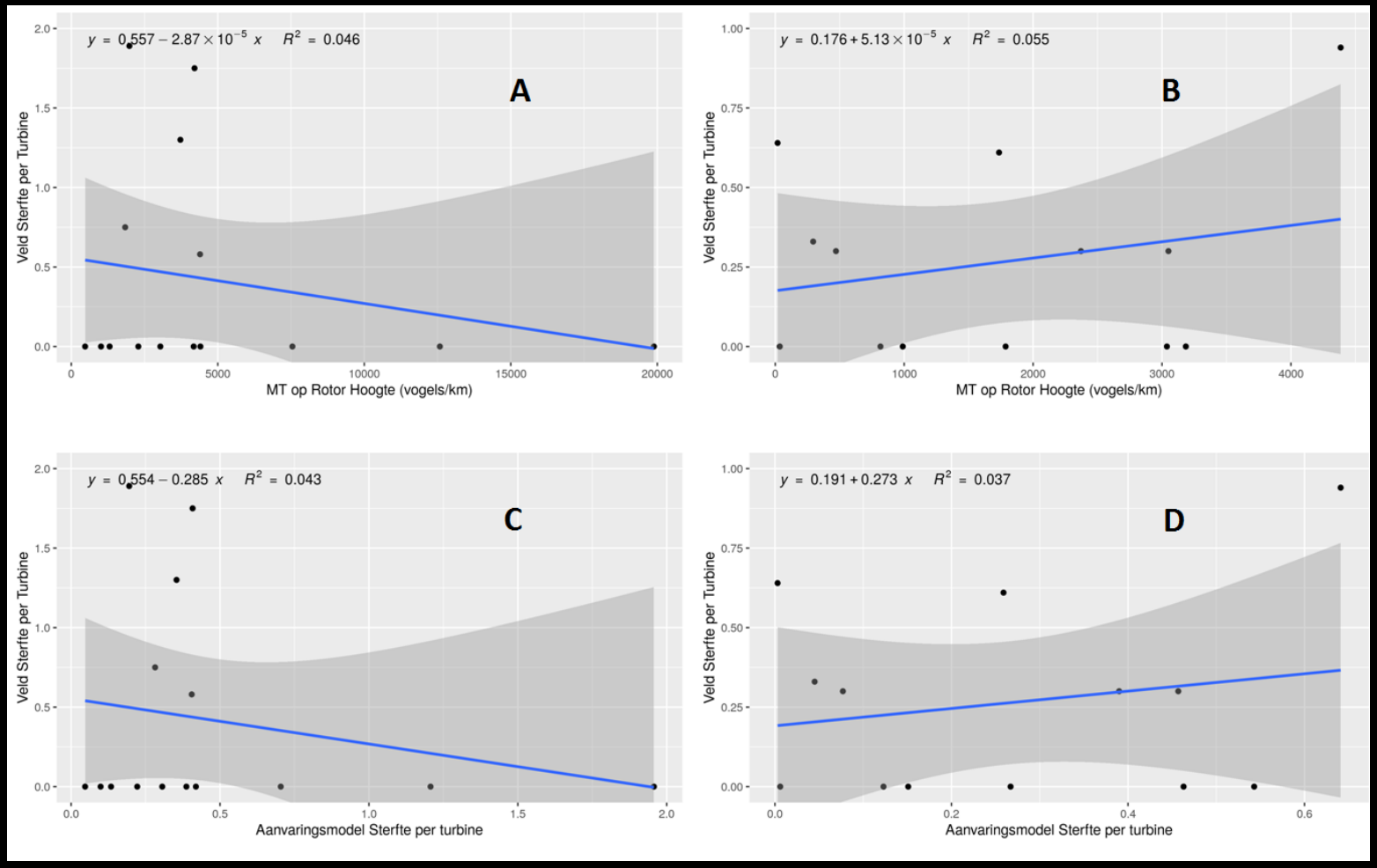


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However: No proven relation on daily basis



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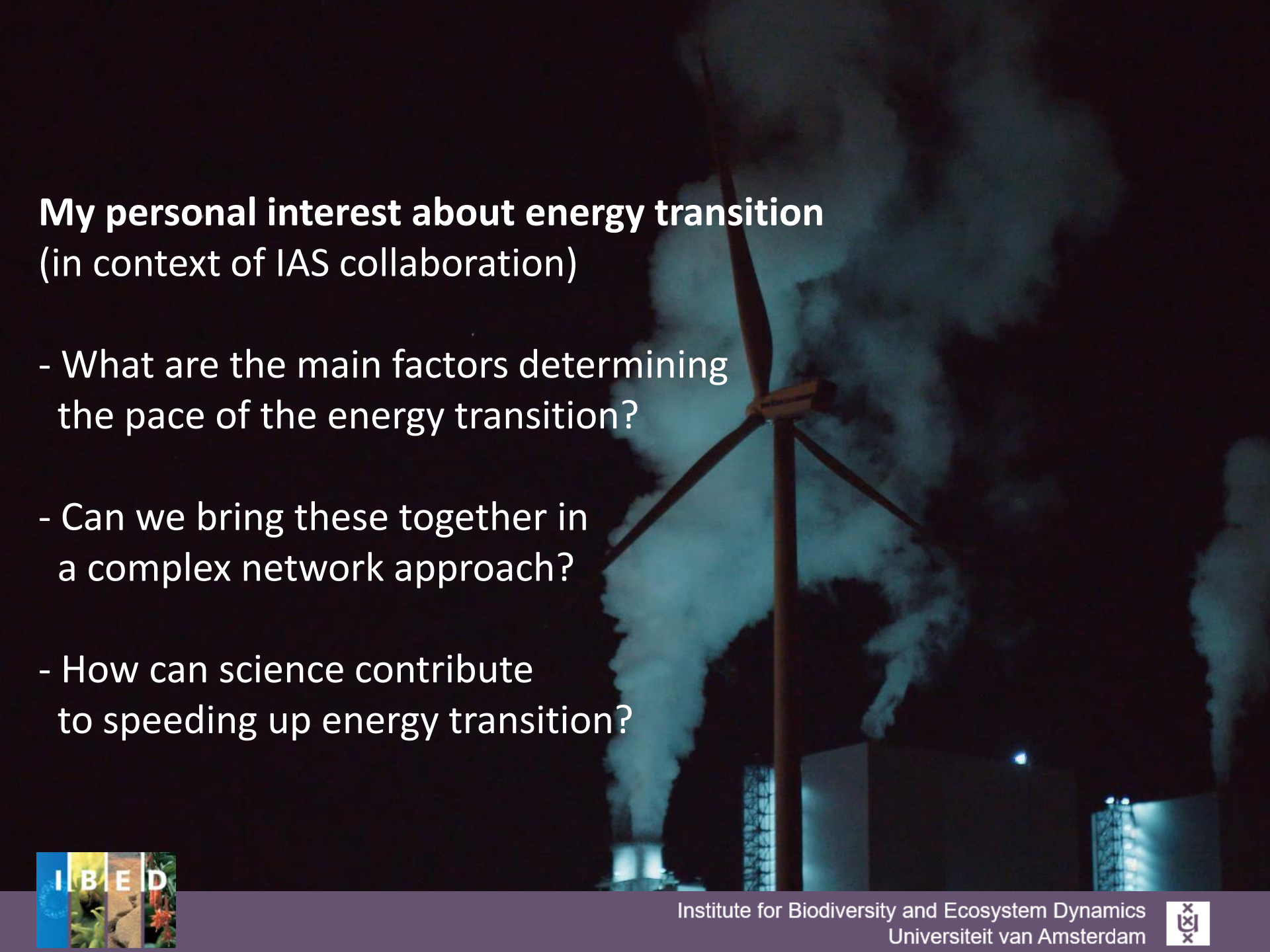
Conclusions

- Casualties (nocturnal passerine migration):
  1000-1225 in autumn, 500-950 in spring
- 2/3 of night time passerine migration in 25 nights,
  2.8% of yearly energy
- Optimised on migration and energy:
  2/3 of night time passerine migration in 33 nights,
  0,94% of yearly energy
- 100 hours = 10000 birds per rotor (4.5MW, R=68m)
  (11 nights, 9.1 hours, starting 1h after sun set)
  Peak: 460 birds per hour per rotor
- Weather radars can be used to develop the migration model
  but casualties are difficult to validate



Researchers aim at:
- The right data and models
- Evidence based decision making

Policy makers aim at:
- Decisions now
- Broad support for decisions
- Avoiding delay by court cases



My personal interest about energy transition
(in context of IAS collaboration)

- What are the main factors determining the pace of the energy transition?

- Can we bring these together in a complex network approach?

- How can science contribute to speeding up energy transition?