

Out of the fog as fast as possible: flight speed of migrating birds increases under foggy conditions

Paolo Becciu^{1,2}, Michele Panuccio^{2,3}, Giacomo Dell'Omo² and Nir Sapir¹

¹Animal Flight Laboratory, Department of Evolutionary and Environmental Biology, University of Haifa, Haifa, Israel.

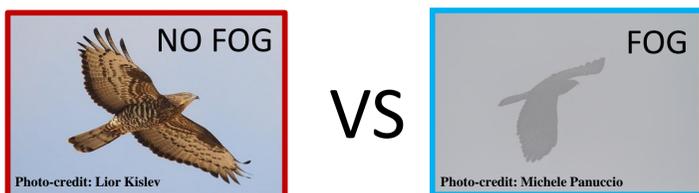
²Ornis italica, Rome, Italy.

³MEDRAPTORS (Mediterranean Raptor Migration Network), Rome, Italy.

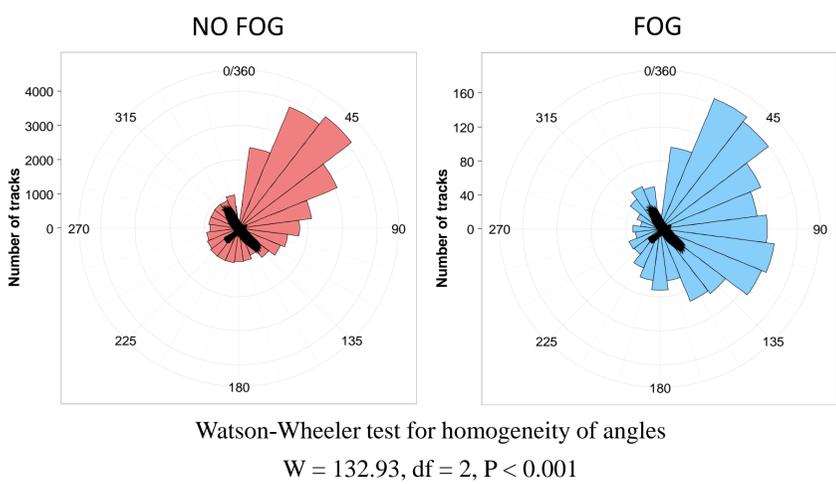
INTRODUCTION

Weather conditions may influence the movement of birds and migrating birds show a high selectivity of weather conditions during their journeys. As a general pattern, migration is facilitated by clear skies and tailwind assistance, while it is hampered by precipitation and opposing winds. **Fog** and low clouds reduce the visibility during flight and thus **can negatively affect the orientation of birds**. Studies that tried to quantify the effect of fog on active bird migration are rare.

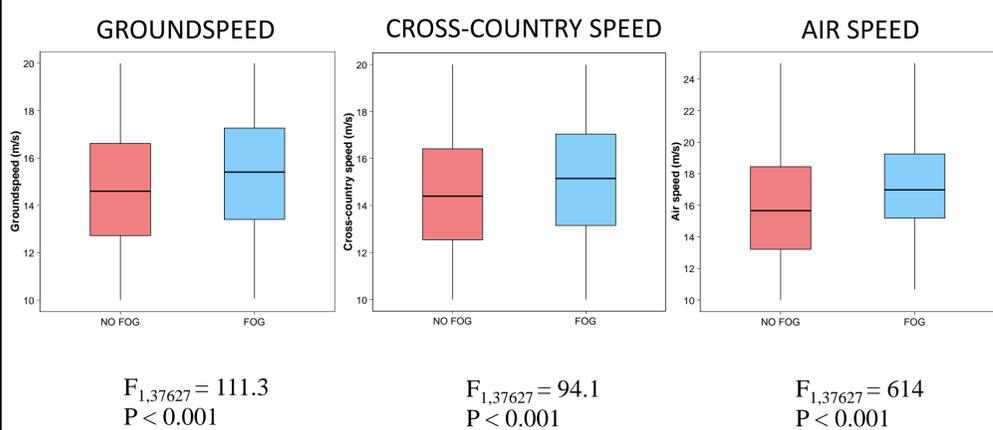
RESULTS



1. EFFECTS OF FOG ON BIRD ORIENTATION

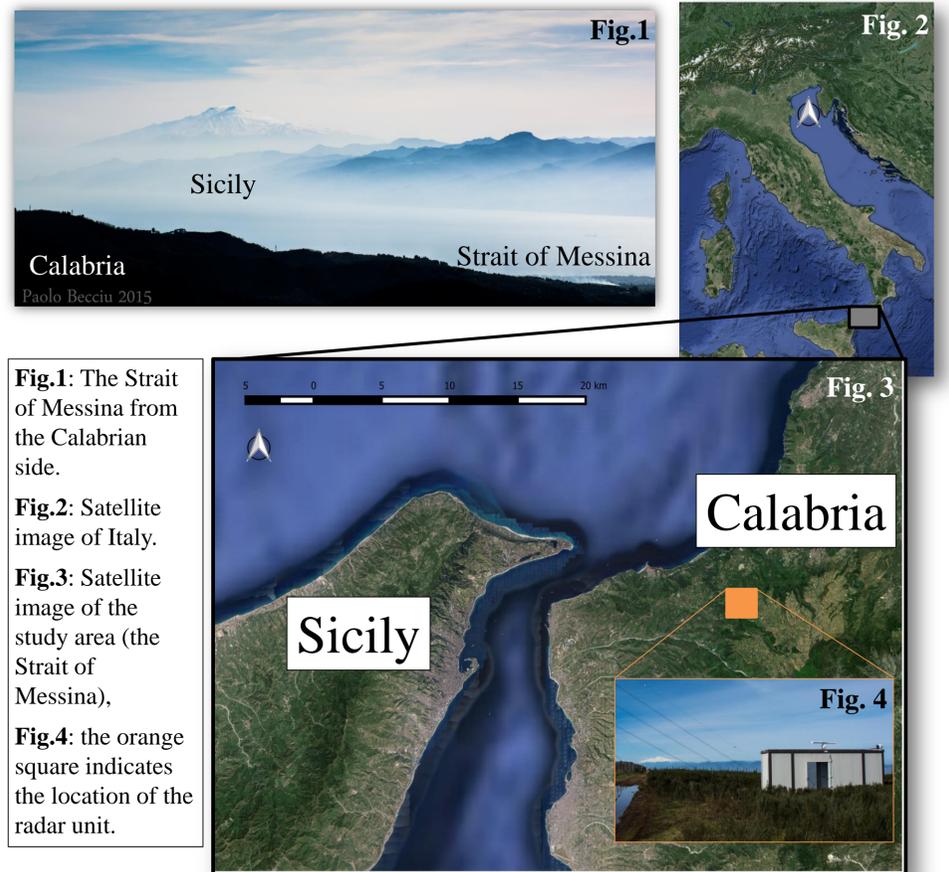


2. EFFECTS OF FOG ON BIRD SPEEDS



ACKNOWLEDGEMENTS

This work was carried out in the context of a study for monitoring raptor migration near a new electric power line, commissioned by Terna Rete Italia S.r.l. *Ornis italica* supported part of the fieldwork. P. B. and M.P. was partially funded by ENRAM (European Network for the Radar surveillance of Animal Movement).



DISCUSSION & CONCLUSIONS

- Flight directions** are more **scattered under foggy conditions** than under clear skies: this is probably due to a lower visibility and it may cause more drifting as well.
 - Birds fly at faster speeds** when flying **under foggy conditions**: probably they go faster to get out of the fog quickly in order to escape these unfavourable and unsafely conditions.
- Soaring birds can avoid flying through fog probably because **fog and low clouds prevent the formation of convective updrafts** necessary for migration using soaring flight.
 - This study highlight the importance of using radars to study bird migration. Since **under bad visibility conditions the use of radar may allow measuring the intensity of bird migration** as well as calculating **different flight parameters**.

METHODS

- **Fieldwork** → mid-March and mid-May 2016
- **Radar** → 24 kW X-band radar with a horizontally rotating antenna
- **Species** → European honey buzzard and other raptors
- **Tracks** → 37,629 (1,868 collected during foggy time)
- **Data treatment** → 1 Hz frame-captured videos processed with radR package in R software and then imported in a GIS software for filtering
- **Fog detection** → visual detection by radar operator
- **Statistics** → ANOVA and Watson-Wheeler test (R software)