



From large scale movements to local food caches - Variation in space use of non-breeding ravens

Matthias-Claudio Loretto^{1,2}, Kristina Beck³, Richard Schuster⁴ & Thomas Bugnyar^{1,2}

¹Department of Cognitive Biology, University of Vienna, Austria

²Core Facility Konrad Lorenz Research Station for Behaviour and Cognition, University of Vienna, Austria

³Department of Behavioural Ecology and Evolutionary Genetics, Max Planck Institute for Ornithology, Seewiesen, Germany

⁴Department of Biology, 1125 Colonel By Drive, Carleton University, Ottawa, Canada

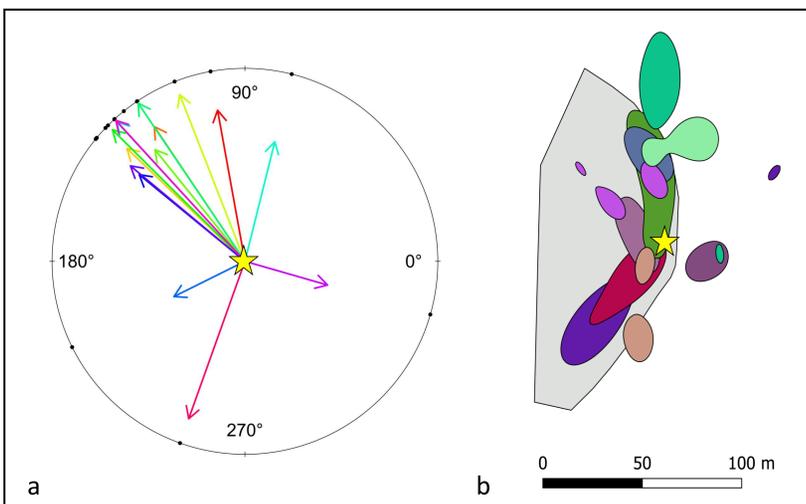
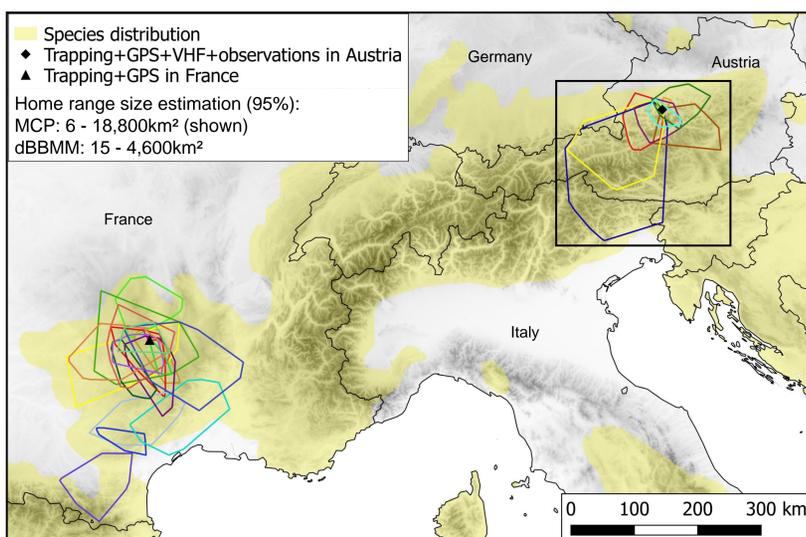


Background and Aim

- Little is known about the behaviour of most species' non-breeders, although they can strongly influence population dynamics
- Common ravens (*Corvus corax*) live as non-breeders for their first 3 years; sometimes up to 10 years or more
- We studied individual variation of behavioural strategies in non-breeding ravens across different spatial scales.

Large variation in home range size (HR)

GPS-tracking: n=26 non-breeders, during up to 44 months
Colours of polygons represent space use of different individuals.
Movement strategies: 9 nomadic, 9 resident, 8 no clear pattern



Individual site preferences for food caching

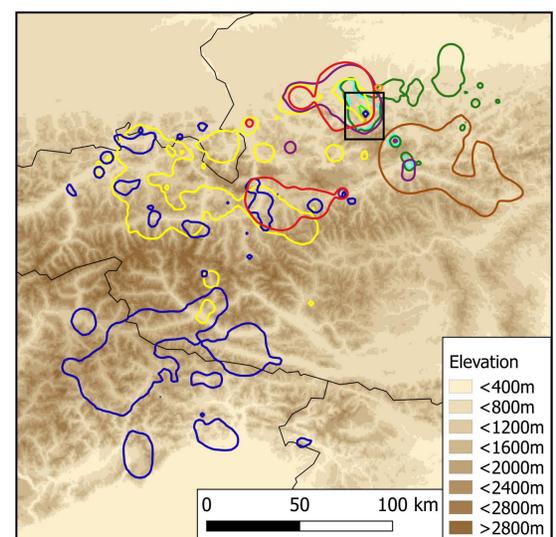
We observed ravens at a food source ★ (feeding of wild boars in a zoo) when flying away with food or during food caching.

- a) Mean flight direction shows individual preferences; shorter arrows indicate higher individual variation (15-99 observations/individual)
b) Locations of food caches of 10 ravens show individual site preferences (18-59 caches/individual; grey area=wild boar enclosure)

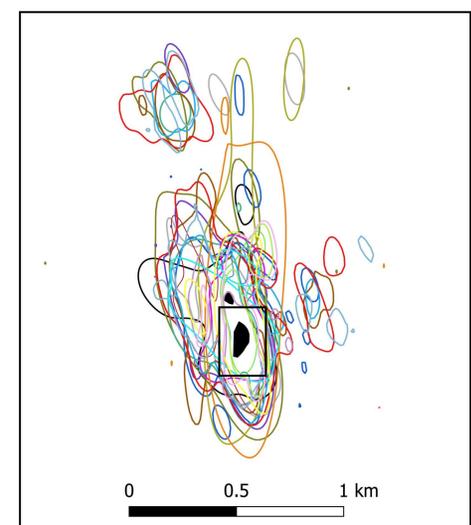
Ravens use a single, several or many resources

Every polygon represents (part of) an individual's home range and contains one or several resources: zoos, compost stations, garbage dumps, ski huts...+ night roosts

Zoom 🔍



Zoom 🔍



Zoom 🔍



At food source: space use highly overlaps

VHF-tracking: n=21 during up to 30 months
Black areas show main food sources in a zoo, i.e. enclosures of wild boars, bears and wolves

Conclusion:

- All ravens relied on anthropogenic food sources
- Large individual differences in movement behaviour and use of these resources
- Individual site preferences for food caching can be consistent over months

Our results uncover different behavioural strategies on different spatial scales in non-breeding ravens, however, the costs and benefits of each strategy still remain unclear.

Acknowledgements:

We are grateful to Christian Itty and his colleagues at the ONCFS for their technical support in trapping and tagging ravens in France. We acknowledge our long-term cooperation with the Naturtierpark Grünau GmbH and permanent support by the "Verein der Förderer KLF".