

Earthquakes, geomagnetism and the reversed sense of direction of woodpigeons (*Columba palumbus*) during their 2016 October migration in Central Italy.

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ABSTRACT

During the recent strong earthquake sequence in Central Italy a "reversed migration" of woodpigeons was observed by members of the Club Italiano del Colombaccio. The phenomenon could be related to new temporary electro-magnetic local sources due to on earth fracture movements influencing the migratory senses of the birds.

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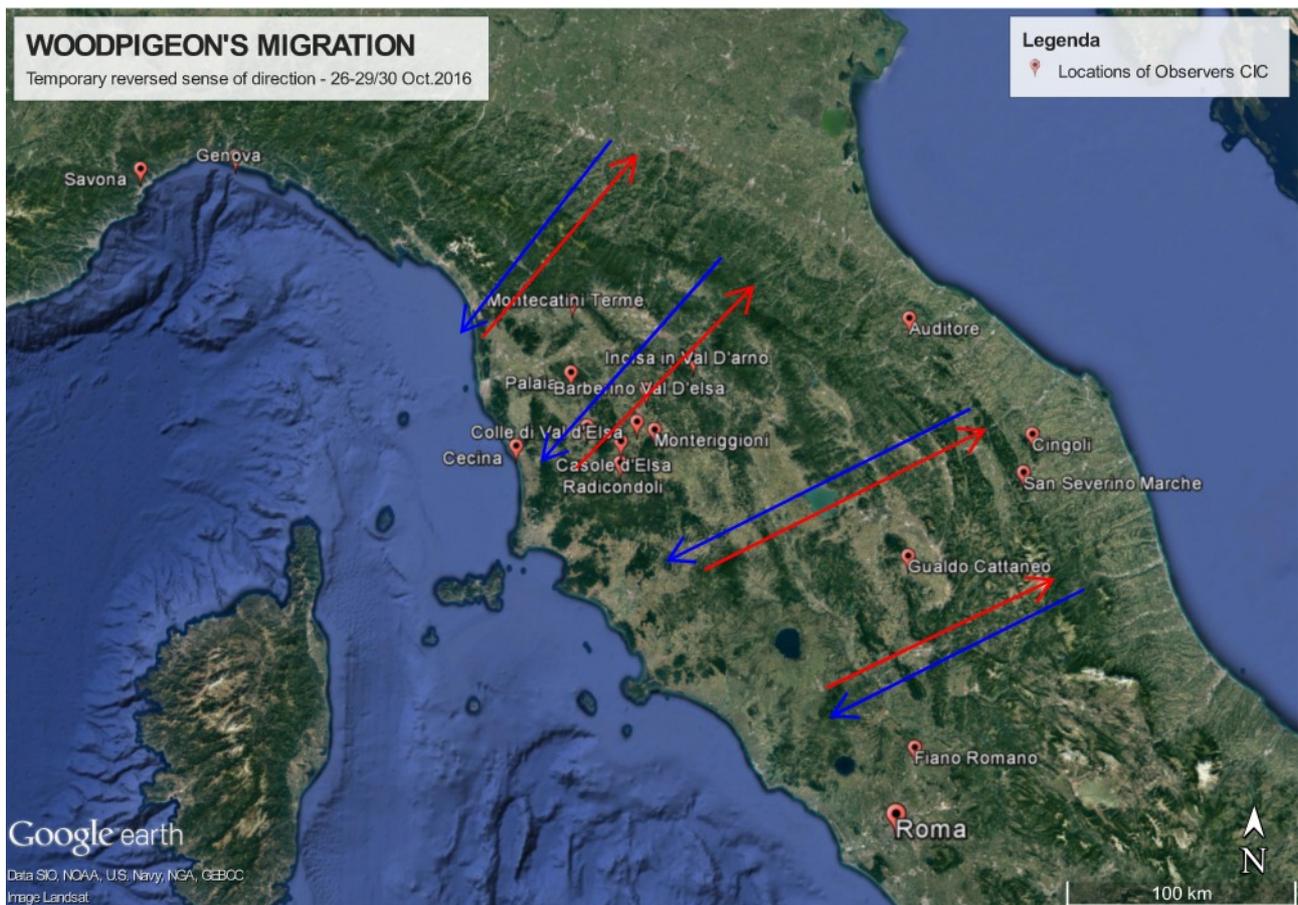


Figure 1: Map of normal (blue) and reversed (red) migration directions over Central Italy and locations of the Club Italiano del Colombaccio hunter-observers (design by Federico Gili).

INTRODUCTION

Before, during and after the seismic events occurred of 26th to 30th Oct 2016 in Central Italy with epicentres in the area of Norcia (42°47'27"N, 13°05'45" E) and with maximum of strength of 6.5 on the Richter scale, many experienced hunters, official Observers of Club Italiano del Colombaccio CIC reported anomalous behaviour of the migration of flocks of woodpigeons . Flocks 10-500 birds) were observed over the valleys, passes and mountains of Appennine Mountains for about 500 km in Central Italy near Abruzzo, Marche, Umbria, Tuscany and Emilia regions as well as the Tirrenian coasts of Lazio, Tuscany, Liguria regions as far north as the border with France. The anomaly was characterized by a reversed direction of flight; the birds were observed flying in unusual directions, from South to North and from West to East. The typology of flights were similar to "migration flights" and not to "erratism" or "seasonal reversed movements". The latter are quite usual during the Pyrenees migration in France depending on weather, wind or food availability.

The flights were not greatly influenced by local weather conditions and occurred at normal and/or high altitudes. Depending on various hunting bags, shot birds were mostly young. The phenomenon - with a peak in Saturday 29 and Sunday 30 morning (maximum earthquake shock at 7:40 am) - was observed on 22 hunting-observatories-stations located along the Appennine Mountains and related territories mostly from Abruzzo to North Tuscany. On Monday 31 Oct. the migration

continued by normal way N-S // NE-SW as it began on 5th October. A part the official real data collected, the phenomenon has been described as a "very impressive and strange phenomenon" by all the observers, and appeared related to the seismic events occurring at the time. Many requests for explanation were received by the author via e-mail in his role as Editor of Colombaccio Scientifico CIC. (The author thanks the Observers very much for their cooperation.)

DISCUSSION

Considering the phenomenon as an anomaly of sense of direction, it was intuitive to consider the complex mechanism of the sense-ecology, its complex anatomic-physiologic basis, and the complex decision-making of directions for the incoming migratory flight. The focus is obviously on the sense of electro-geomagnetism for which there are many references in the literature and on the Web.

However according to one reference: " ... the magnetic parameters can be largely distorted ... for migratory birds the bi-coordinate map could be difficult to use ... the magnetic field is also prone to natural disturbance such as solar flares " (Newton, 2007)

Exploring the literature in depth and receiving qualified comments and suggestions by the courtesy of some researchers in the field of electro-magnetism, it seems that a distortions of geomagnetic fields by earthquake local energy would not radically change the geomagnetic field. It seems, on the other hand, that the fractures of the earth (faults), before and during earthquakes - as happened on Monte Vettore, Norcia, can generate "electromagnetic local sources." It was calculated that an earthquake of middle intensity(M5) can generate an electromagnetic dipole of 50 kV and it certainly can influence the electromagnetical sense mechanism of migrant birds" (personal communication by Dr.Gabriele Cataldi -Radio Emission Project - LTPA Observer Project -5 Nov.2016 - The Author thanks Dr Cataldi for his fundamental suggestion)

The temporary electromagnetic actions of these sources related to earthquakes can be well considered connected with the temporary effects and anomalies of the migration behaviour of the woodpigeons migrating in Central Italy during the last week of October 2016. These items seem open new perspectives in a new unexplored field of Research concerning the Migration Ecology of the Birds. It seems also to us that the contribution of the Club of Hunters (CIC) and its observers could be quite important in opening a new field of research in Ornithology as a new challenge in migration ecology research. At present (5 days after the seismic events) we are awaiting better details, comments, data and suggestions to conclude and update the target of this present short paper. .

LOCATIONS OF OBSERVERS

CIC Radicondoli, Casole d'Elsa Siena, Colle val d'Elsa, Monteroggioni, Barberinovald'Elsa, Palaia Pisa, CecinaLivirno, Incisa val d'Arno Firenze, Gualdo Cattaneo Umbria, Savona Liguria, Fiano Romano Lazio, Volterra , Montecatini, Cingoli Ancona, San Severino, Auditore Pesaro Urbino , Genova, Appennino Bolognese, Appennino Toscoumbro. See Figure 1.

EDITOR'S NOTE

People have long suspected that the response of birds has something to do with geomagnetism but personally I doubt it. The magnetic field variations from an earthquake would be very small compared to other natural variations such as those from geomagnetic storms. Another possibility is that infrasound, sound below the threshold of human hearing, plays a role. Earthquake infrasound might be detected by the Para-Tympanic Organ of Vitali thus giving a confusing migratory trigger for the birds. See <http://www.livescience>. for information about earthquakes and infrasound.

J.R.

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