



# Solar Activity Effects on Pigeons

## How do pigeons navigate?

Racing homing pigeons navigate incredible distances with apparent ease. A champion racing pigeon can be released 400 miles from its home loft, in a place it has never been before, and return within 1 day. The last 40 miles of its journey, the bird navigates by sight. But over the other 360 miles, the pigeon determines its way home by "sensing" the Earth's magnetic fields. We are not yet sure exactly how this mechanism works, but it does work -- extremely well.

## How can the Sun affect racing pigeons?

When there is especially strong activity on the Sun, such as a Coronal Mass Ejection (CME), unusually strong surges of solar wind (charged particles from the Sun) can create a geomagnetic storm which distorts the Earth's normal magnetic field. The pigeons can no longer rely on their normal guidance system and may become lost. Thus wise pigeon racers, especially those in very northern areas, keep track of solar activity and do not fly their birds under certain geomagnetic conditions.

## How do we measure geomagnetic activity?

Geomagnetic activity is measured by what we call the 'A' Index, which ranges from 0 to 400 Nanoteslas (nT), a measurement of the strength of a magnetic field. 0 indicates virtually no geomagnetic disturbance, while 400 is the maximum disturbance. Another useful number is the "K" index, which tracks changes in the radio atmosphere and can affect pigeon navigation. The K index ranges from zero (no disturbance) to 9 in a maximum disturbance.

## What levels of geomagnetic activity are dangerous for pigeons?

Any current reading of local figures over 150 nT in the A index of geomagnetic activity, or 4 or higher in 'K' index, is considered unsafe for training or racing pigeons.

## Where can pigeon racers and fliers get solar activity data?

[Geomagnetic stations](#) track geomagnetic activity around the Earth. Their readings are freely available. The center of these activities in the USA is the Space Environment Center at Boulder, Colorado. There are other data centers in various parts of the world. Because the Earth's geomagnetic field emanates from the poles, the affects are more dramatic in the far north and far south. Thus pigeon racers need to rely on local data, that is, data that accurately represents the state of the geomagnetic field in their particular geographical location.

Pigeon fanciers can pick up either "a" index (equivalent amplitude index of local geomagnetic activity) or "K" index (quasi-logarithmic local index of geomagnetic activity relative to an assumed quiet-day curve for the recording site). Because the indices are related, one can be computed from the other; see <http://www.swpc.noaa.gov/info/Kindex.html>.

Any current reading of local figures over 150 nT in the A index of geomagnetic activity, or 4 or higher in 'K' index, is considered unsafe for training or racing pigeons.

- [a-index data](#) (Boulder & several other sites)
- [K-indices](#) (Boulder)

Both indices are necessarily tied to a specific geomagnetic observatory. The above data represent collections and averages. For other regions, you can obtain data from [SIDC](#) (click on the "Latest Space Weather data) or directly from [your nearest site](#).

## **Where can I get more information?**

[Geomagnetic Activity and its Effect on Racing Pigeons](#)

---