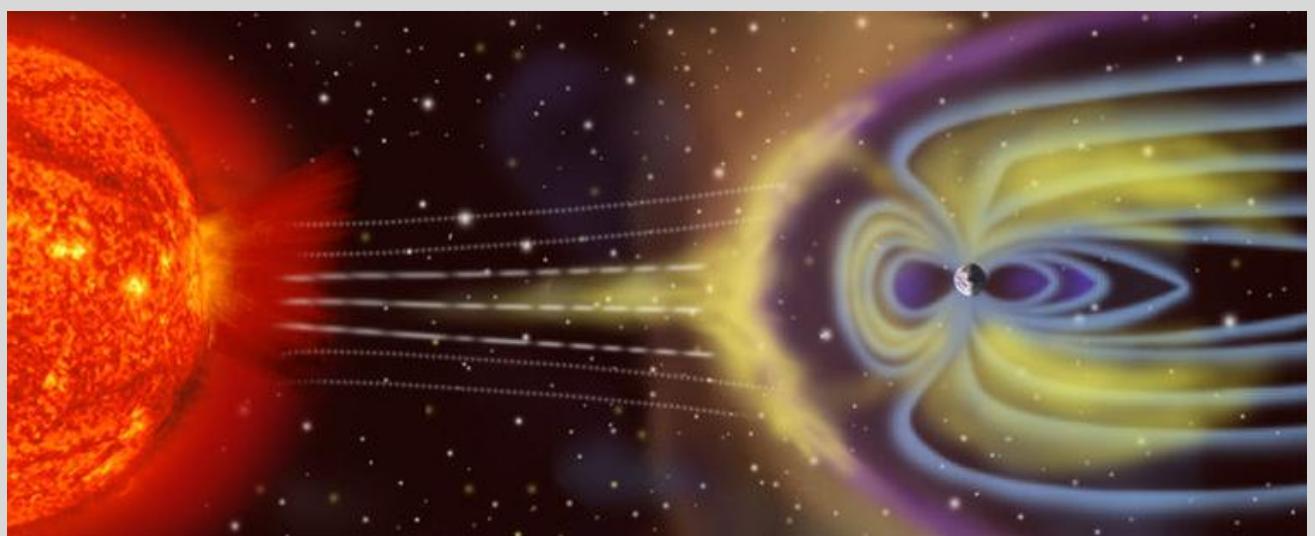
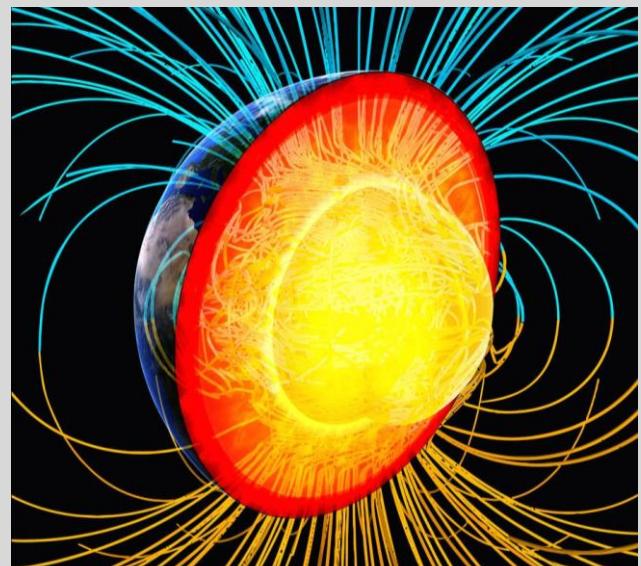
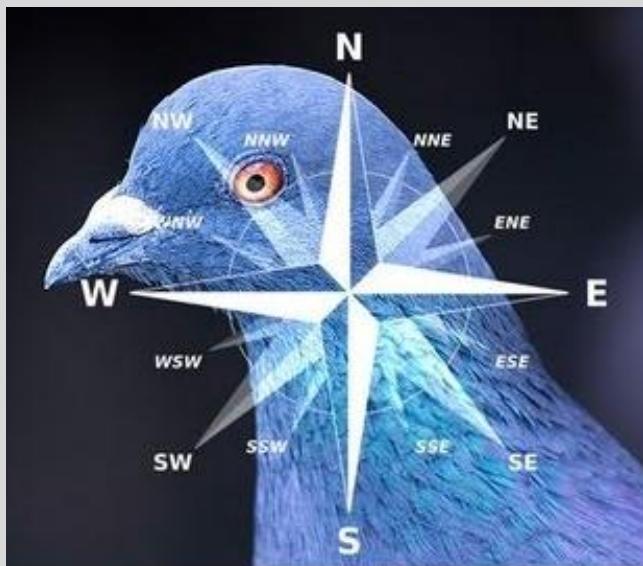


Racing Pigeon and the sun

Ove Fuglsang Jensen ©



Why article in English?

I have had this website for some years, and I have followed the statistics on the website, and lately it has changed to show where in the world the visitors are stationed. I found out, that 40% were Danish and just as many were from USA, and the rest from Europe and Asia. In the States it is Washington, Virginia, California, Texas and Illinois with most visitors.

Most of the articles in BrevdueNord (RacingPigeonNorth), are translated articles from PIPA and Dr vet. Colin Walker's book The Pigeon. Now, you can read articles in PIPA and the book of Colin Walker, and here I cannot help you. But two of my pages are about the weather (Vejret) and the sun (Solen), and these subjects I know a lot about.

Therefore I will write articles of the sun and the weather, and the effect it has on the Racing Pigeons.

To understand fully why the sun can disturb the Pigeons navigation, I will make some sections on Pigeon navigation, but make this very short, because you can Google information on Racing Pigeon navigation.



Racing Pigeon navigation

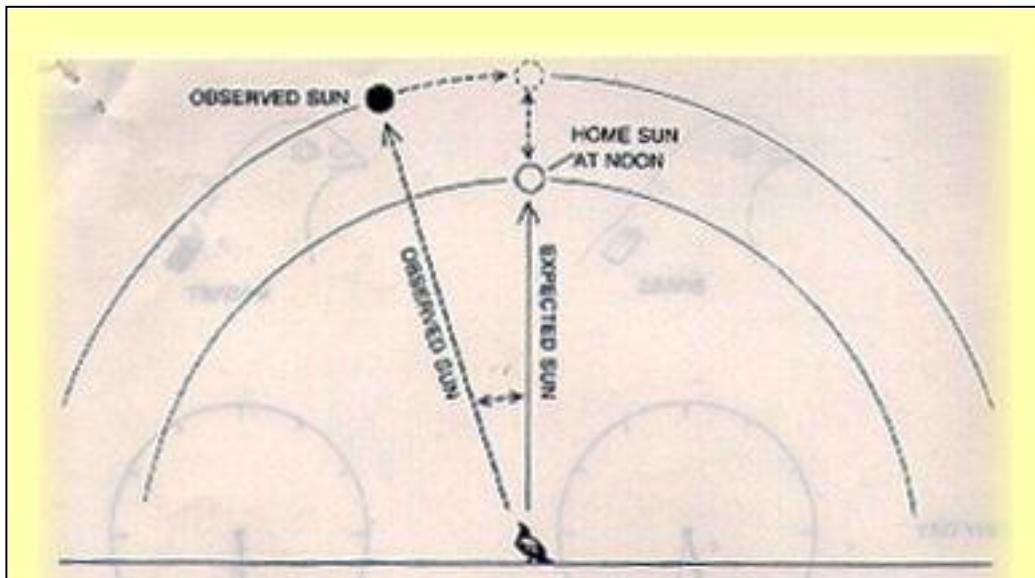
Scientist found the secret

Way back in scientific research, it was obvious that birds navigate after the sun and landmarks, but in 1970's something new happens in this fields of research. The Cornell University, New York, began to investigate the effect the Earth magnetic field had on Racing Pigeons. It was clearly proved, that the earth magnetic field had a big influence in navigation of birds and other animals. After this there was a lot of experimenting, mainly with the Racing Pigeon, trying to find what the pigeons were able to manage, and most important: **What could disturb the pigeons in doing a proper navigating.**

The aim of this article, is to bring scientific facts and describe the problems in navigating of the pigeon, and here we only discuss the effects of the sun.

Racing Pigeon 3 forms of navigation

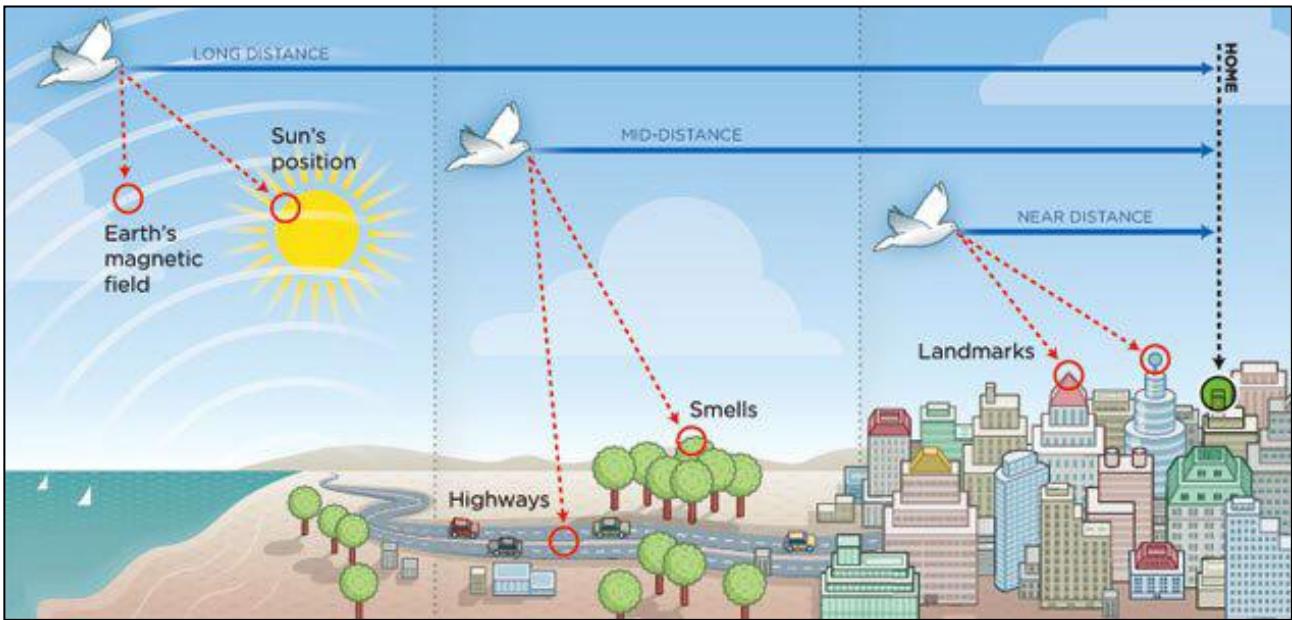
The sun



The Racing Pigeon and other birds can navigate after the sun. The pigeon has a built-in clock, and this enables them away from home, to read the position of the sun compared to the same time at the loft.

This is a very important fact that the scientist have proved: **A young pigeon cannot navigate after the sun before it is over 3 months old!**

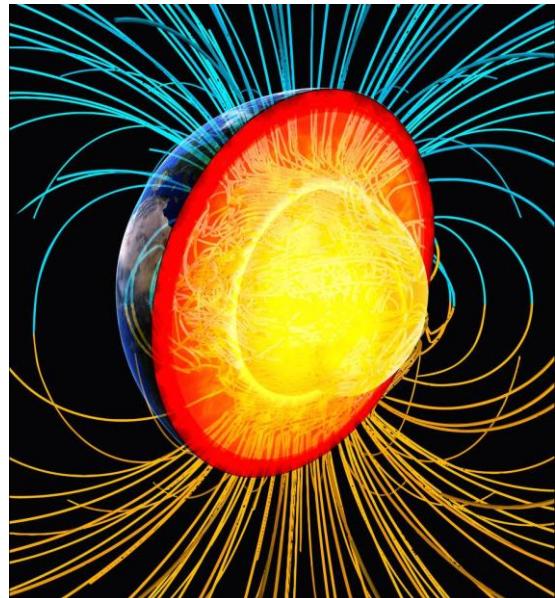
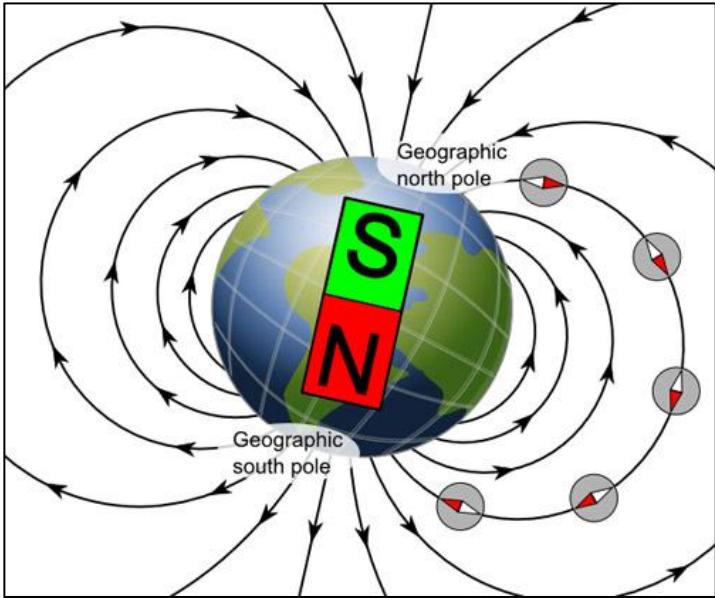
The map or landmarks



In this simple drawing, the 3 ways of navigating are mentioned. It has been known for many years, that pigeons take bearings after the landscape: They can follow mountain or hill ridge, rivers, edge of big forest and even highways. A pigeon knows the landscape in all detail in a radius of 10-15 km, but elderly pigeons know the way home visually perhaps for 50 km. Scientific experiments have shown, that the pigeon sees the landscape in another dimension that we humans do. In other words, the pigeon has a very advanced way of "reading" the landscape. In the drawing smells are put on as an option, but I personally do not believe in that theory that pigeon can "sniff" their way home like a dog! My advice is, that you put a GPS tracker on a pigeon in a tossing and you can make your own deduction.



The earth magnetic field



The earth has an magnetic field with a north/south pole, like a gigantic magnet. From inside the earth the magnetic lines goes out into space. On the picture where the earth are cut in half, you see the magnetic lines from the core of the earth, and that is these magnetic lines from inside earth which are used for navigating by the birds and other animals. These lines are called **inclination lines**, and racing pigeons can "read" these lines and sense how long they are south or north of the loft. In the race the pigeon keeps flying until it can sense they are near the loft, and then rest of the route are taken on landmarks.

The Racing Pigeon and magnetic

The Racing Pigeon are born with the ability to sense the earth magnetic field. When the chick hatch, they will be "plotted" on the location of the loft, and one can say that the youngster have an GPS location. Where is this organ to navigate magnetic? Some mean that it is tiny metallic in the brain, but others mean it is in the beak. The pigeons can find their way home only by the magnetic ability, except for the last 10-15 km. In the 1970es the Cornell University made some test with pigeons, where the pigeons were mounted frosted lenses in the eyes, and then released. They were followed by an aero plane and the result were that all pigeons landed around 10 km from the loft. By this simple test we can see that the inclination lines have a distance of 10-20 km coming from inside earth.



Disturbance of the magnetic navigation

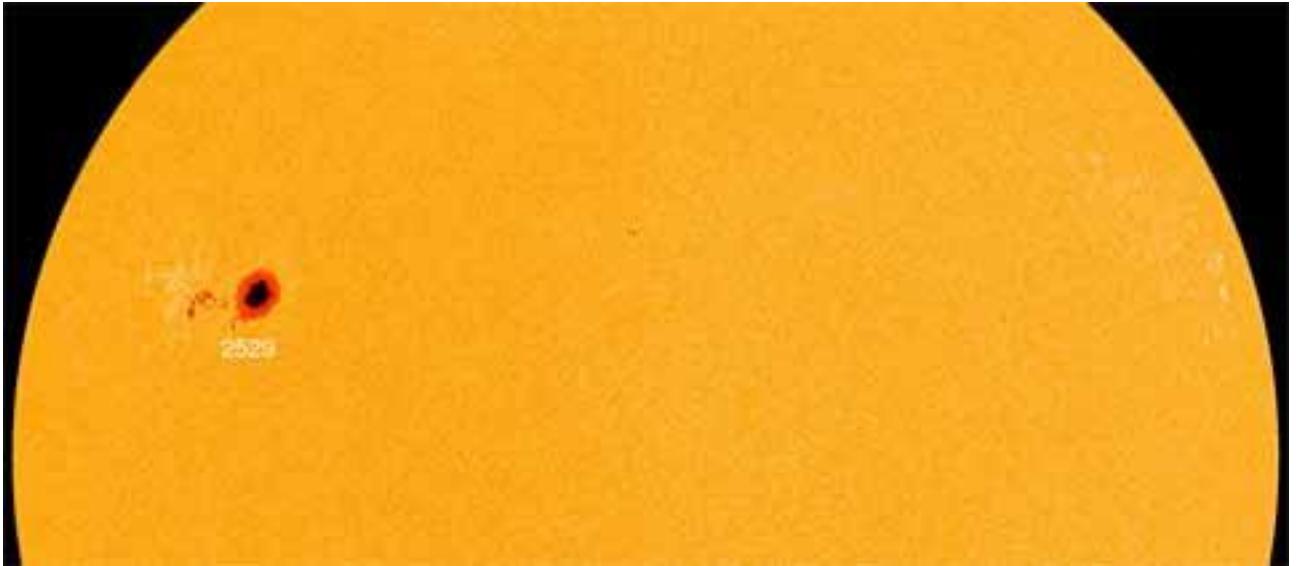
When we go through the different way of the Racing Pigeons navigating, one could think that nothing can go wrong! The problems disturbing the pigeons in the race are the weather and disturbance of the earth magnetic field. Here we only discuss the so-called Space weather and the problem here. There are 3 different problems from the sun:

1 Solar flare 2 Magnetic storms 3 Solar wind

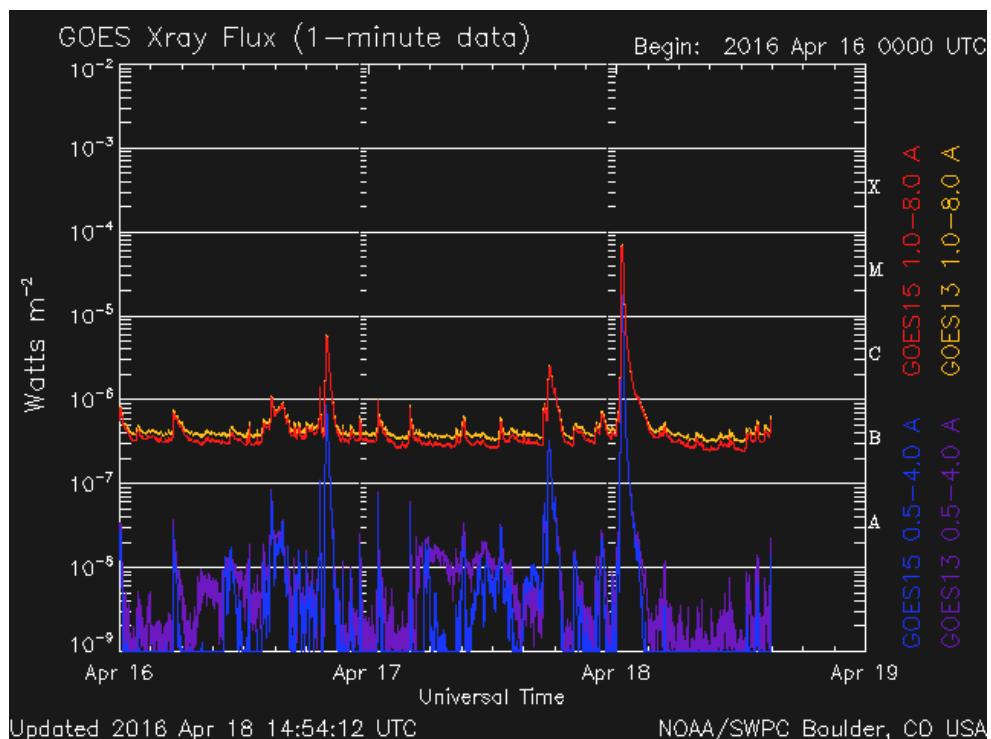
Solar flare



A solar flare is the most powerful event in our solar system. Is it directed against the earth it will send shockwave into the earth magnetic field. Notice how small the earth is"!



The solar flare erupts from the sunspots on the surface of the sun. There can be many of these in periods, and they move from the left to the right which takes 14 days. The sun do like the earth turn around itself.



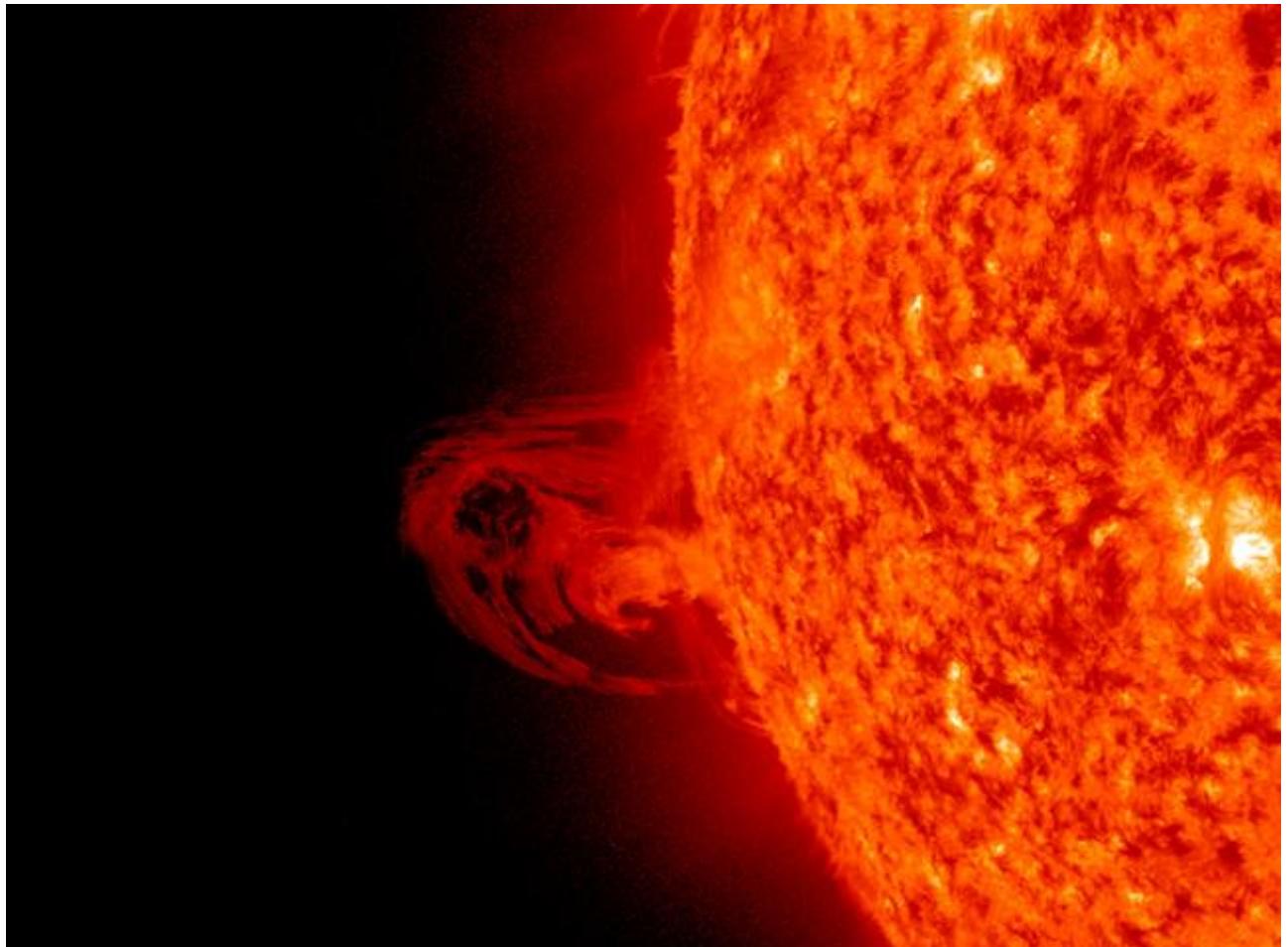
The sun flare are powerful Xray. They are measured in a satellite orbiting the earth. The flares are measured in M and X flares, where X are the strongest and M flare are more medium. This picture is from 16-18. april 2016, and there is a X1 at midnight 18. april, and it can be dangerous if shooting just before releasing the pigeons!

Youtube video about the sun

<https://www.youtube.com/watch?v=lpzCSZ7Eerc>

<https://www.youtube.com/watch?v=2U3ucaVzRqQ>

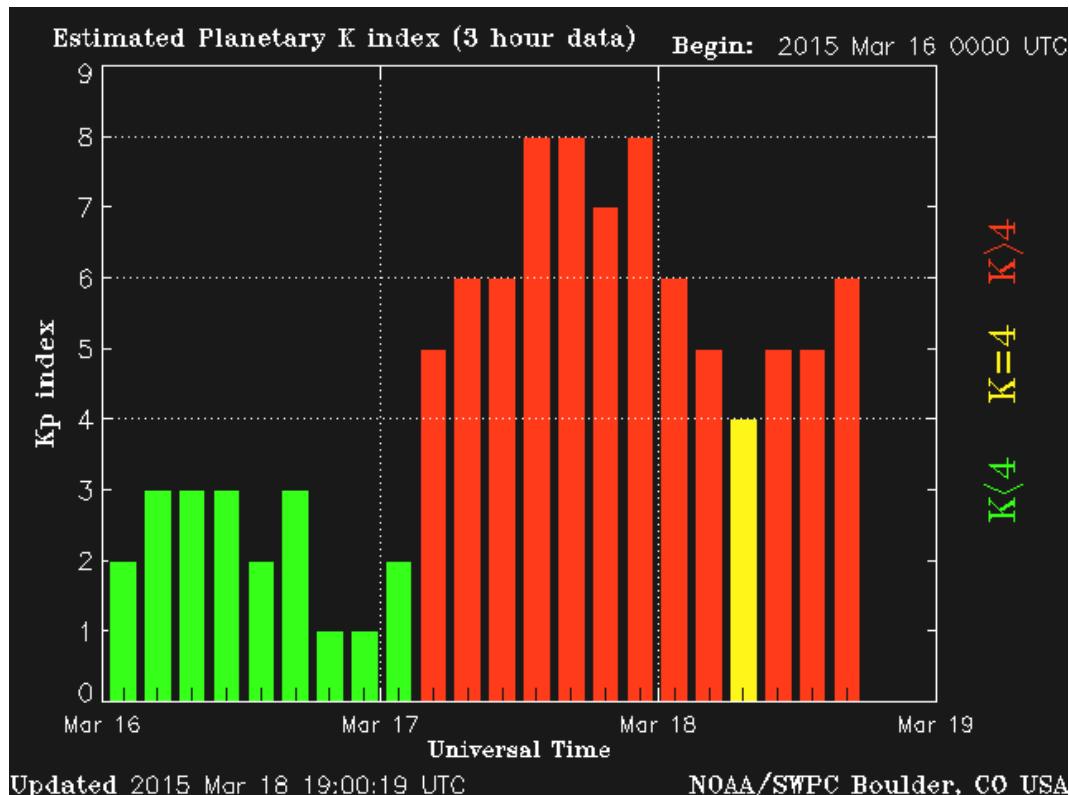
Magnetic storms



Another form of ejection from the sun are the so-called Coronalmass ejection, where some of the surface of the sun slips out in space. There is a good video explaining everything of these ejection.

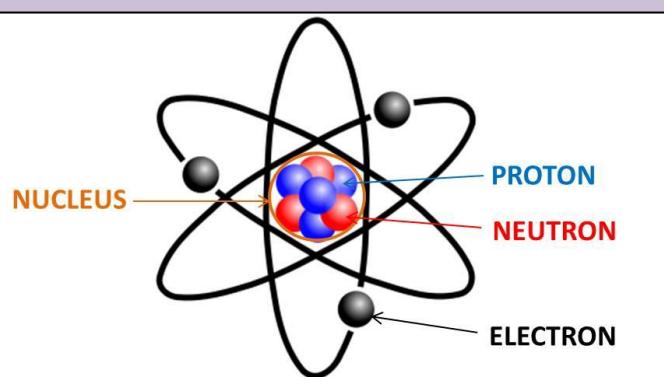
See the video in this address:

<https://www.youtube.com/watch?v=N5utQxtma2U>



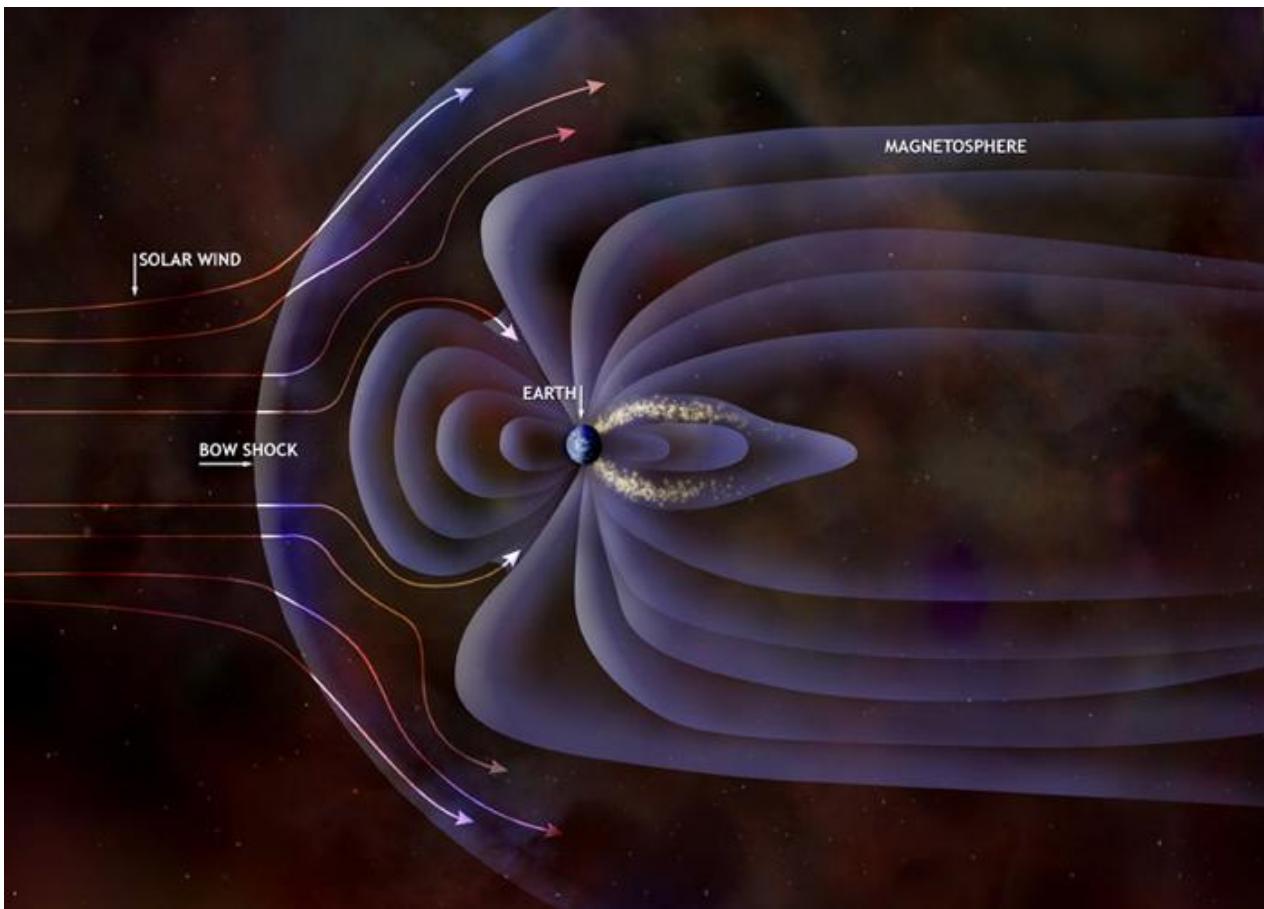
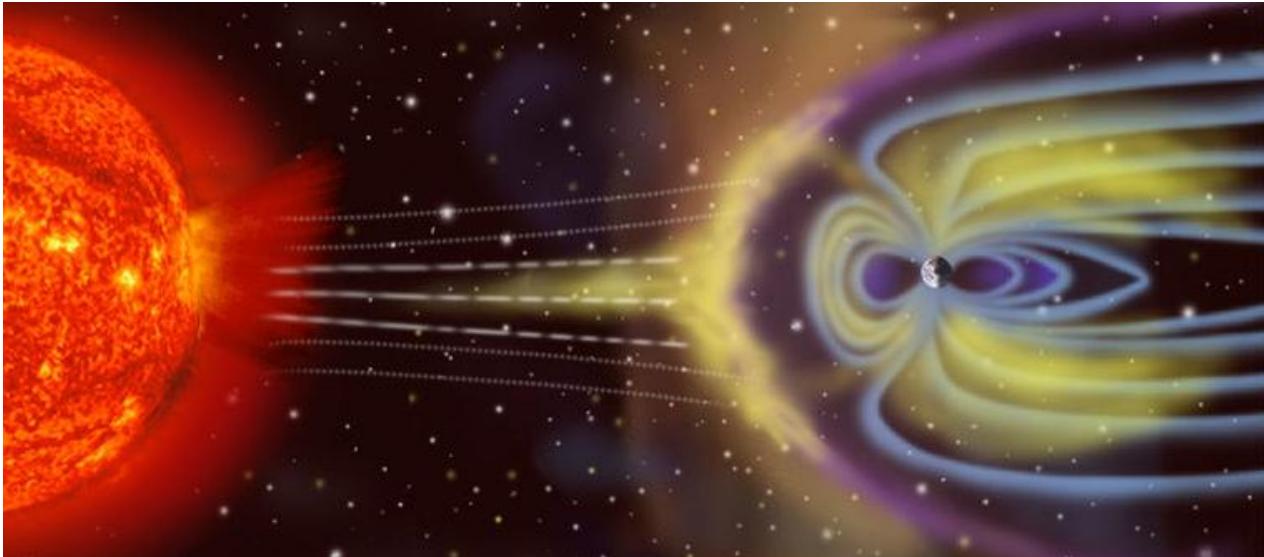
As shown in the video the coronal mass ejection will disturb the magnetic field of the earth, and it is measured on the earth surface and from a satellite. Above is an example of these readings set up in graphic columns. When the magnetic storm reaches Kp5 it will have an effect on the pigeons.

Why do this coronal mass ejection make trouble for the magnetic field? The answer is simple: The sun is a gigantic fusion reactor containing atomic particles, and when the "cloud" are leaving the corona of the sun, it contains particles of protons and electrons. These particles are electric charged with a lot of minus/plus, and in contact with earth magnetic field it makes a lot of disturbance on the magnetic field.

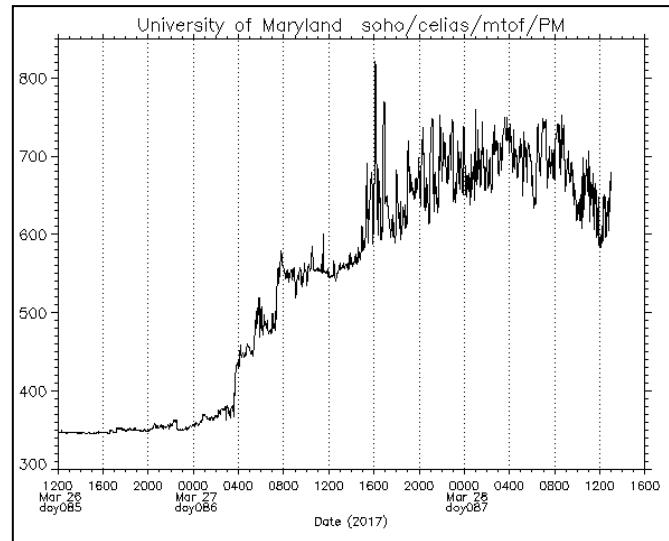
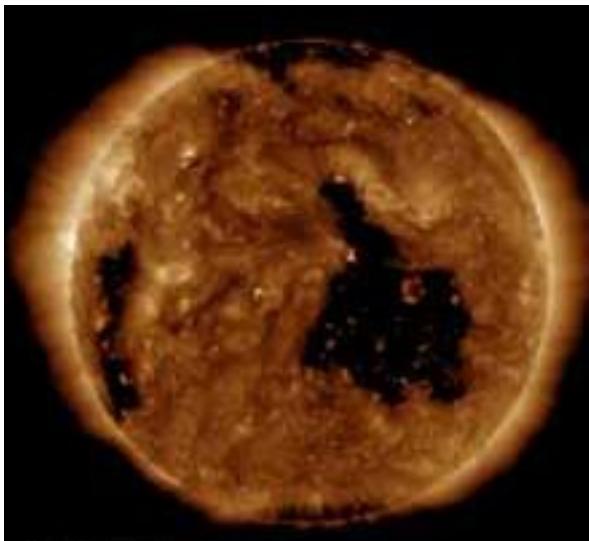


These protons and electrons can make a lot of trouble, not only on the magnetic field, but also on the many satellites in orbit. Specially proton can be nasty to cover the satellite and perhaps make shortcut in the electric circuits.

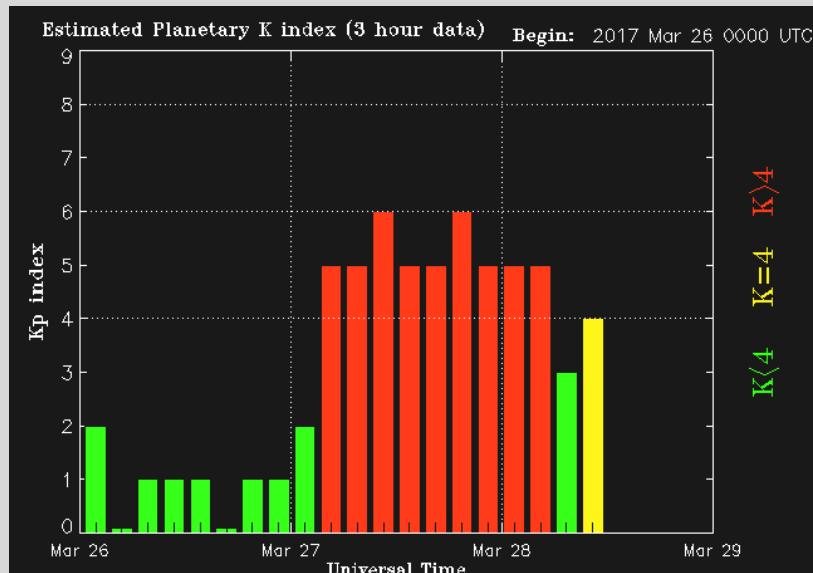
Solar wind



All the planets in our solar system are exposed by the so-called solar wind, and it is a "wind" at the speed of around 400km/sec. As you can see on the pictures, the solar wind "bends" the magnetic field.



Sometimes the corona of the sun opens in large areas, and they are called coronal holes. The normal speed of the solar wind then speeds up to 600-800 km/sec, and that means trouble for earth magnetic field. The speed of solar wind are constantly measured by a satellite.



The 27-28 march 2017 there was an event where a hole in the corona emerged. The hole is black in the picture and you can see the wind speed are very high. That the effect are present on the earth, is clearly shown by the red graphic columns.

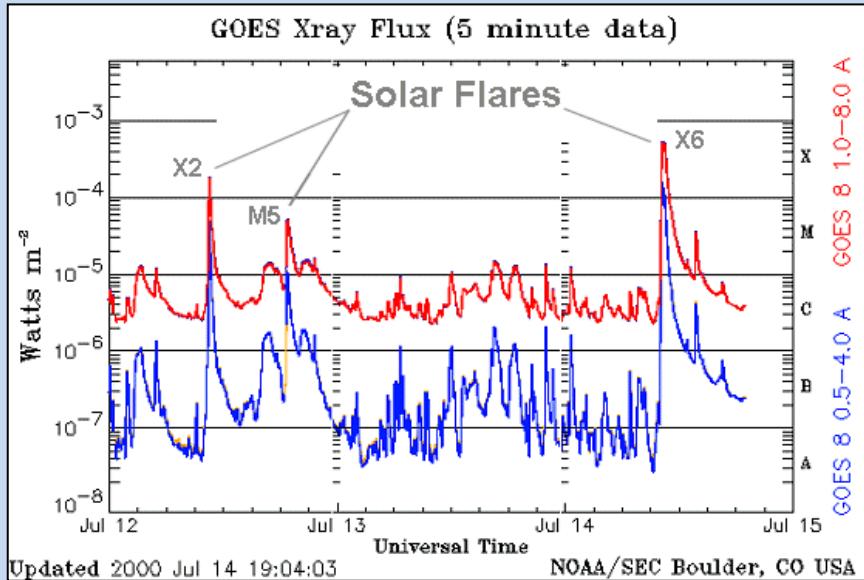
See videos of the sun - Sun Series

https://www.youtube.com/watch?v=_kZ6HSPkf8U

Effect on navigation for Racing Pigeon

It is a scientific fact, that migrating birds - and the Racing Pigeon, use the earth magnetic field to navigate. In the above text and pictures, we can see a lot of incidents from the sun which can affect the magnetic field and in this way it will make the pigeons navigation more difficult. In the following we shall take the 3 different obstacles from the sun, and look on the data and evaluate if there is reason for trouble in the pigeonrace.

Solar flare



There are two sort of flares we shall be worried of in the pigeon race. The small in C do not matter, but when it is reaching the middle of M there can be trouble. When we are "hitting the roof" in M and the flare reaches the scale of X you should be alarmed! Are the pigeons released 1 hour or so after a powerful sun flare, there will be an shock effect on the magnetic field. A release after 4-5 hours a flare shoots, will not give problems. If the weather are cloudy on the release site, the pigeons cannot use the sun for navigating, and in an powerful flare there will be trouble. If the sun can be seen the race will go better, but not all pigeons have a lot of experience and some pigeons are not good navigators. A solar flare in the power of M6 or X2, will give some effect on the race whatever the weather. There are no scientific investigations in this subject, but I have since 2001 made observations on pigeon race and solar flare.

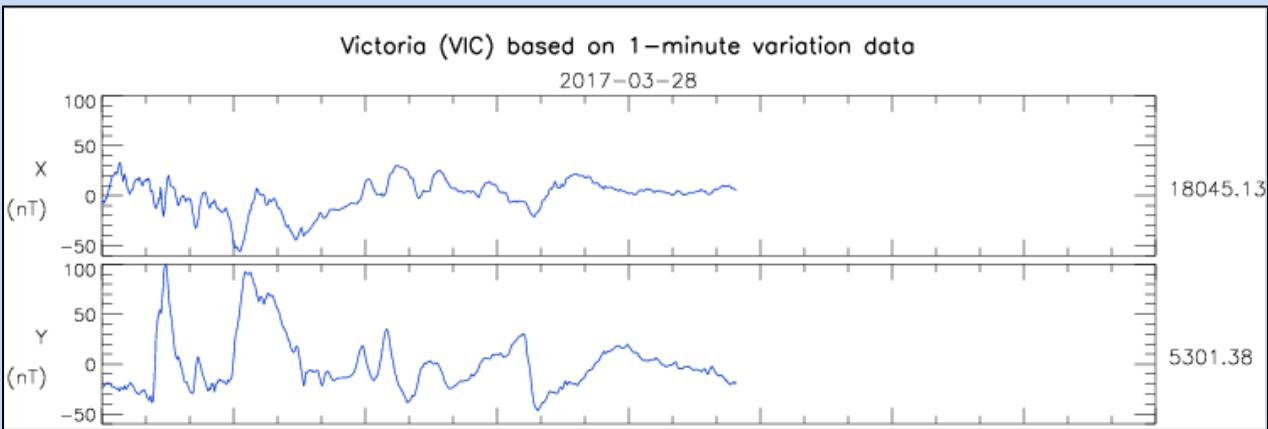
Magnetic storms

The magnetic field of the earth are measured online and it is done in two ways: In a satellite and in ground stations all over the world. Our pigeons fly near the surface so we must use two option: Estimated Kp Index or Intermagnet. The Kp value shows an estimate of many stations and Intermagnet show a single station. The Kp Index you have already seen, therefore there is only shown the Intermagnet.

The screenshot shows a user interface for selecting a magnetic station. At the top, there are dropdown menus for the year (2017), month (04), and day (06). Below these are two more dropdown menus for hour (00) and minute (24). To the right of these is a link labeled "Latitudes". Under the heading "Regions", there is a checked checkbox for "South/North America" and several other regions listed with unchecked checkboxes: Asia/Japan, Europe, Pacific Ocean/Australia/Antarctica, and Africa/Indian Ocean. Below this is a dropdown menu set to "IAGA code". A scrollable list of stations follows, starting with SHU, Shumagin, 55.35/199.54, and ending with YKC, Yellowknife, 62.480/245.518. The list includes SIT, Sitka, 57.06/224.67; SJG, San Juan, 18.11/293.85; STJ, St John's, 47.595/307.323; TEO, Teoloyucan, 19.75/260.81; THL, Qaanaaq (Thule), 77.47/290.773; TUC, Tucson, 32.18/249.27; VIC, Victoria, 48.520/236.580; VSS, Vassouras, -22.4/316.35; and YKC, Yellowknife, 62.480/245.518.

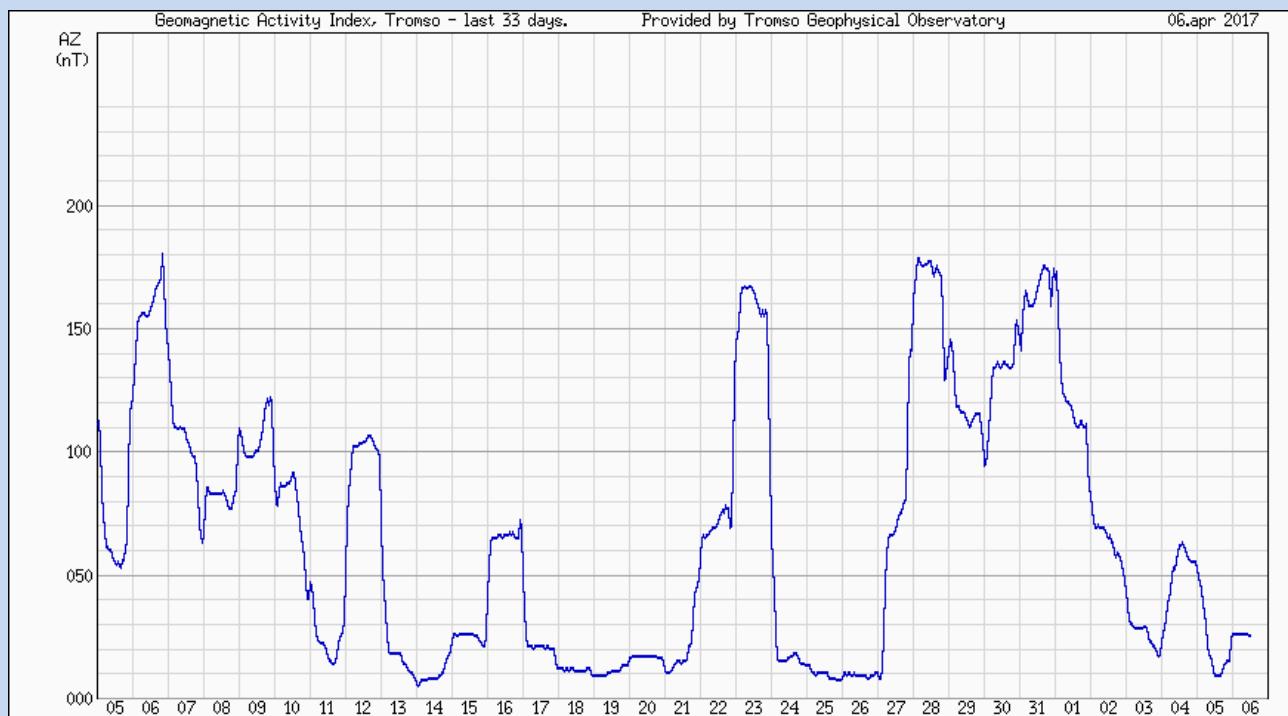


Intermagnet is making you able to see the magnetic measure near your home locality. First you choose South/north America and then choose a station near your home - the stations in north are in bottom. When I choose a station here in Denmark, I choose a station in Hamburg as it is online. When you open a station it is the X and Y which shows what we need. When lines goes up and down or looks like a saw blade, it is magnetic disturbance. You can see the same day 28. march in Kp index on page 11.



Magnetic storms effect on pigeons

Geomagnetic Activity Index, Tromsø



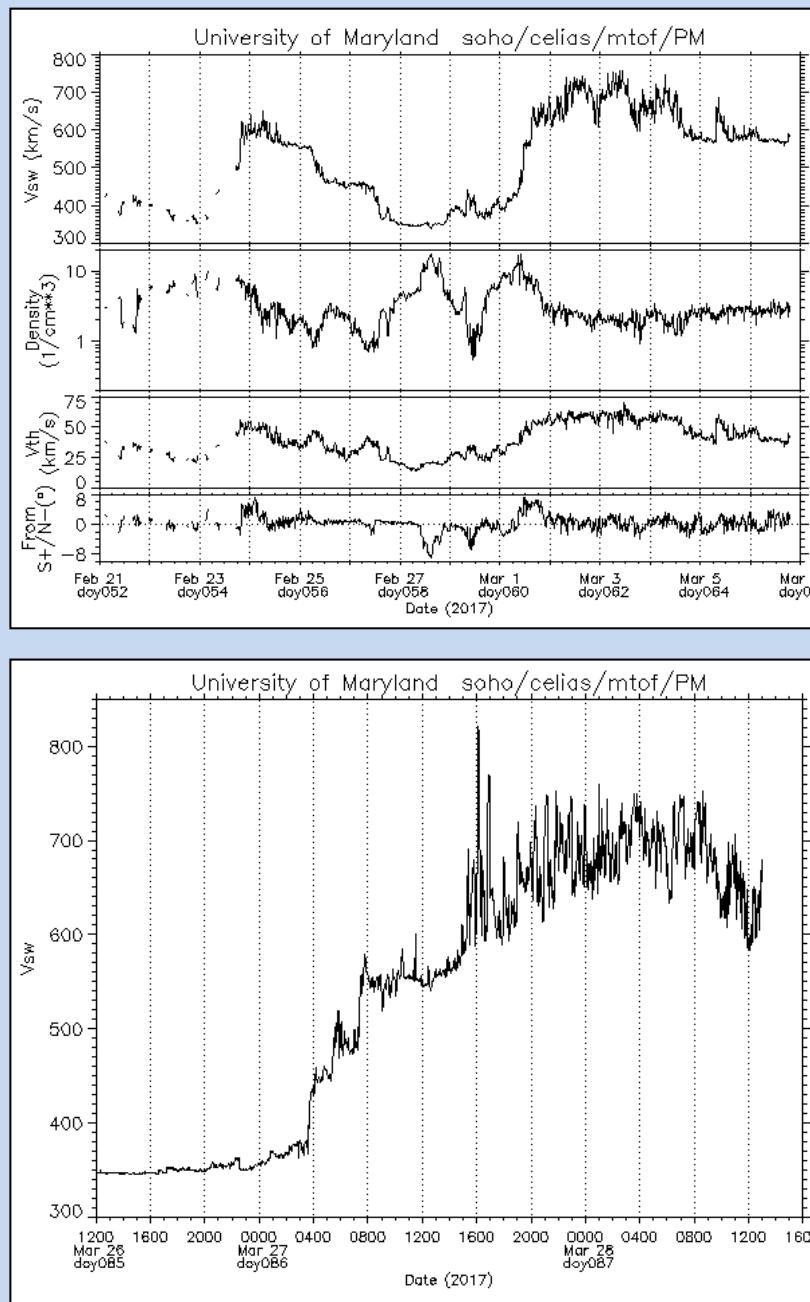
In comparison with the solar flare there are greater numbers of magnetic storms as you can see on the geomagnetic storms just for 1 month. To be dangerous for the pigeon the values shall be near the 150 to annoy our pigeons

Scientific experiment since 1970, has shown that the animals using the magnetic as navigating, will have problems navigating when a magnetic storm reaches Kp 5 - the red column. In these experiment the scientist used the Racing Pigeon because they were easy to handle and of course returned to the loft. If the storm escalates to Kp 6-7 it will be more difficult for the pigeons.

As mentioned in solar flare the weather also has a role to play. Are the sky on the release site total covered with clouds, the pigeons cannot use the sun to navigate. Elderly pigeons have in time learned to manage troubles in the navigating - in general we fanciers call that "experience". Pigeons 1 year old and pigeons with bad ability to navigate, will be in trouble.

Fanciers remember this: A young pigeon under 3-4 month cannot navigate after the sun! They will be very vulnerable if a storm are ongoing.

Solar wind



Detail on solar wind can be seen in MTOF Proton monitor where you can see two types of data: One in top for two days and one below for 14 days. You can also take the solar wind km/sec as seen in bottom. Notice how the solar wind speeds up in few hours! The effect from a solar wind over 650km/sec are the same as an geomagnetic storm.

Websites with data from the sun

[SpaceWeather.com](#)

[Todays Spaceweather](#)

[MTOF Proton monitor](#)

[Intermagnet.org](#)

[Solar Dynamics Obs](#)

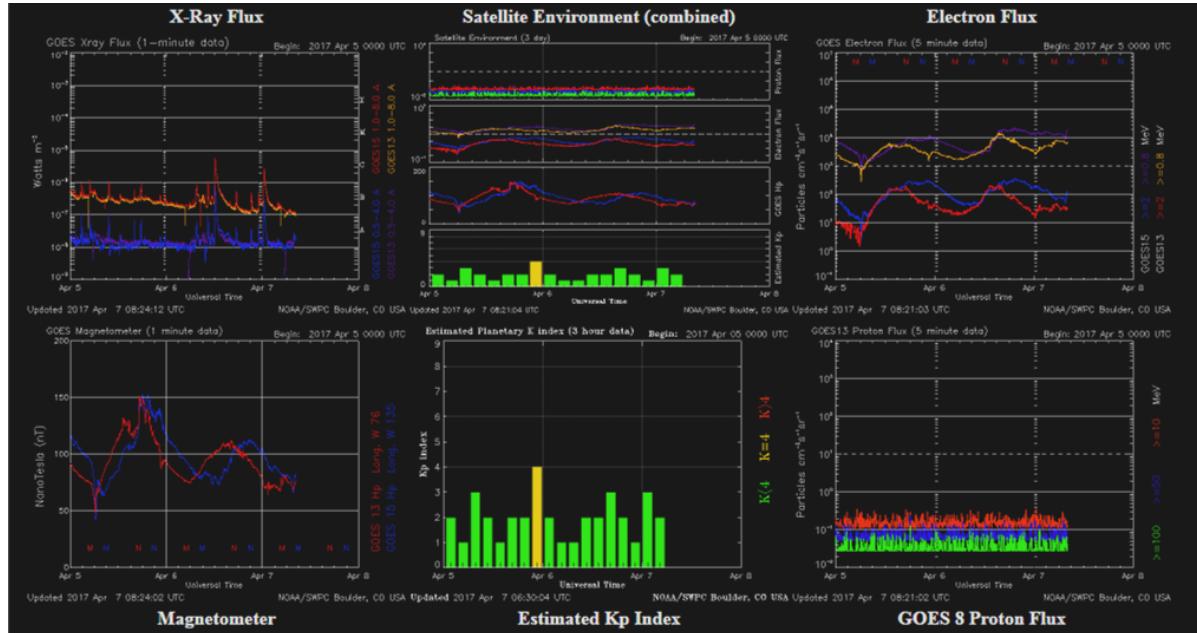
[Forecast rumvejr](#)

Space weather.com: This page is like reading a newspaper with the latest news from the sun and space. Are there an event on the sun you can read detail in the middle, but what have interest for us fanciers are in the left side column: From top to bottom are **Solar wind - Daily sun - Current Aurora Oval - Coronal holes**. When opening this website you can under 30 seconds see if anything are ongoing from the sun.

Todays' Spaceweather: Here you can in few seconds run through the data. Some of the 6 have been shown already and there are 3 more of interest: **Magnetometer - Electron flux - Goes 8 Proton flux** are all from satellites. Looking on data from the satellites you can see if something are on the way. This website are the most important source of information about the sun - just a glance and you can see how things are going on the sun.

MTOF Proton monitor: This site shows details of the solar wind - easy to see the detail on speed and how fast the deveolment are..

Intermagnet: This site are for the smart fanciers who want the detail.



Remember: The time in these graphics are **Universal time!** You have to make minus or plus to find the time in your area. In Denmark it is plus 2 hours.

To analyze a race

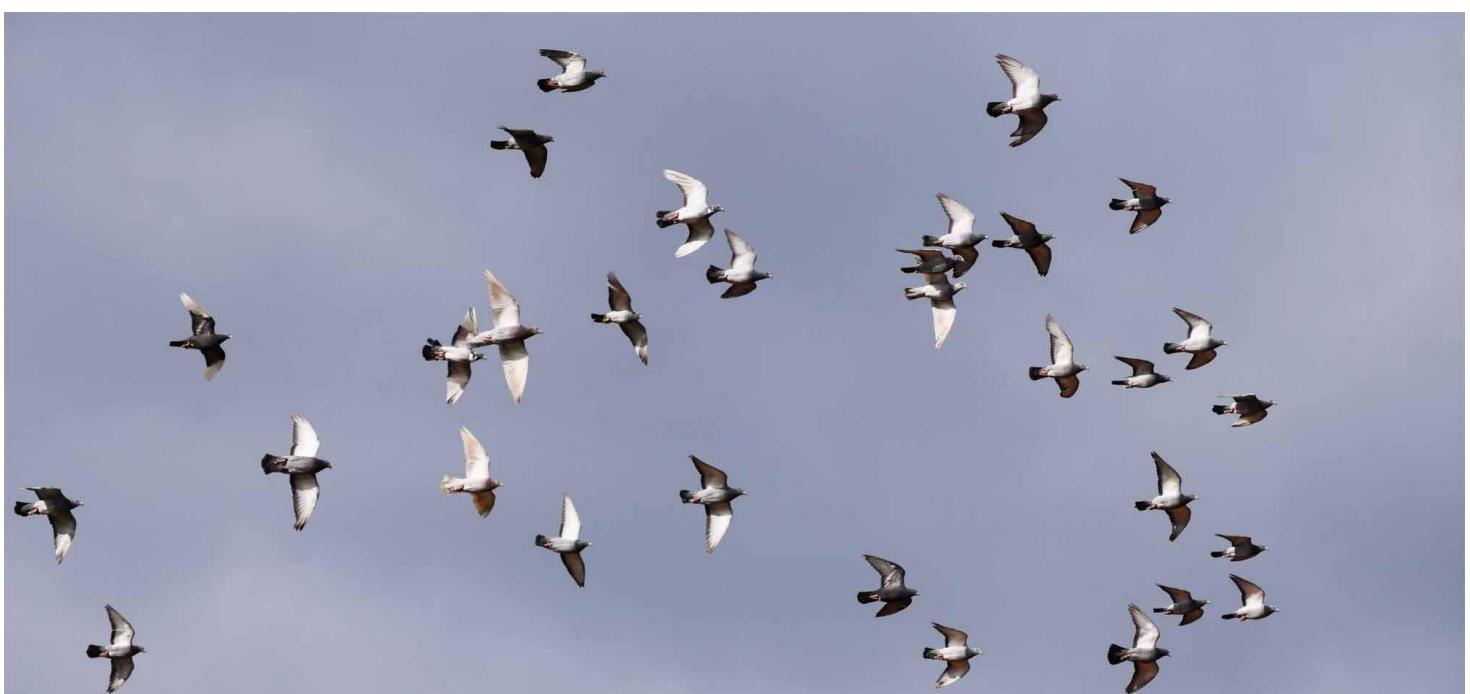
The aim of this article is to urge the fanciers to take an interest into how the sun can affect our pigeons in a race. Maybe some of you reading this already knows a lot about trouble with the sun. The most difficult part is to make a connection to what could be the course of the difficulties. It could be the sun or it could be the weather - there are many options.

Secrets of navigation



Let us imagine that the secrets of Racing Pigeon navigation are under a carpet, and we at one time liftet the carpet and found out of a lot in this subject. That was what happened in 1970és when Cornell University starts their invistigations with the racing pigeon to reveale the secrets of bird navigation . Many scientific exsperiments have been made since then and not only the Cornell University but many others all over the world. A lot of these exsperiment have been done with the Racing pigeon because it is easy to handle, are well trained and return to the loft. In that way we know a lot of yhe ability of the Racing pigeon to navigate also in magnetic storms and other magnetic anormality. Strange enough there are no investigating of the effect of an solar flare, but that I have made some of!

Looking at the physiologically effect from the weather there are simply no scientific investigations - strange enough! If we take a look on where most of the dificulties in racing the pigeons are, the result are that around 80-90% of all troubles in racing are from the meteorologic events. The worst of all are coldfronts, occlusions and inversions.

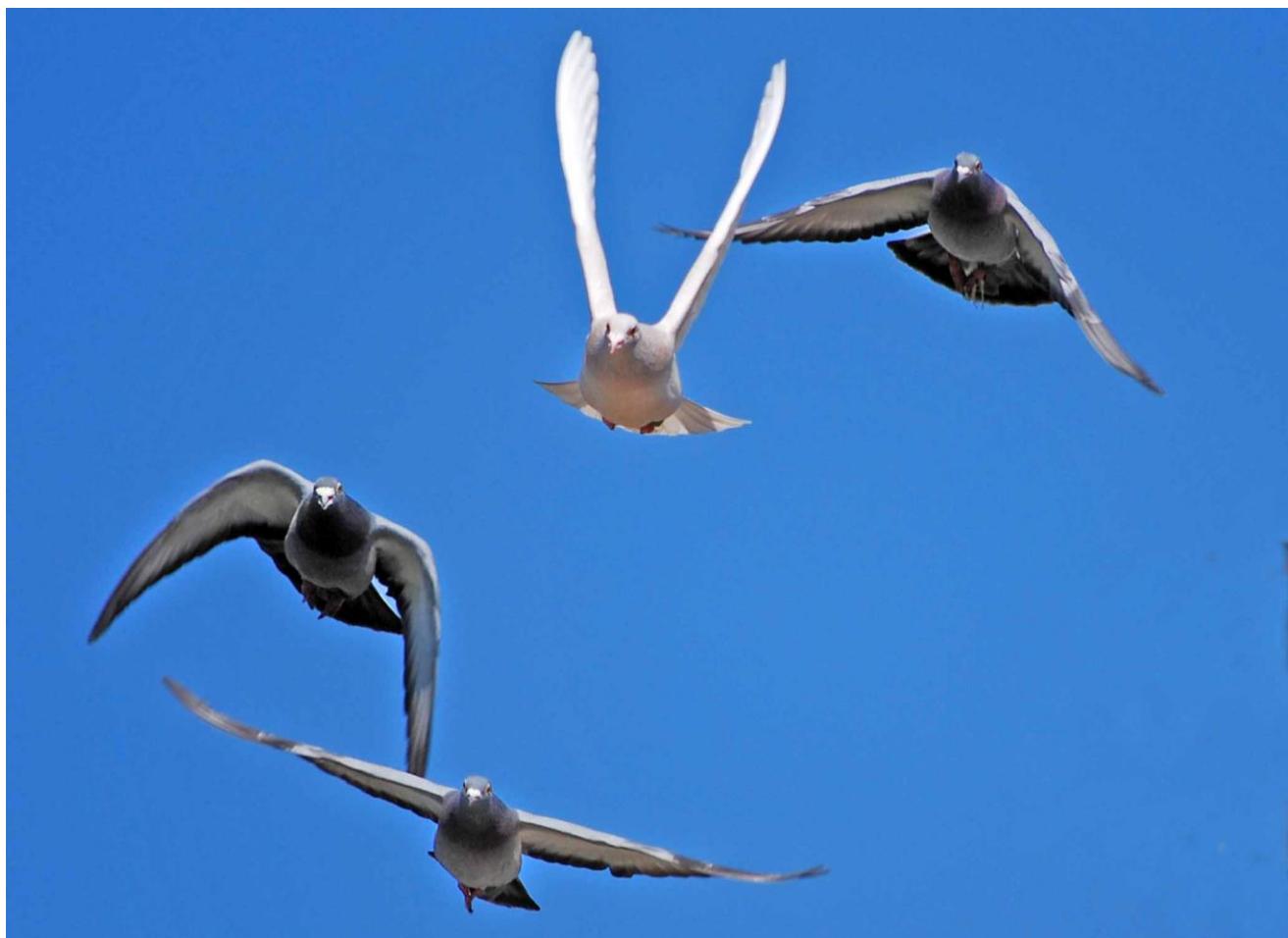


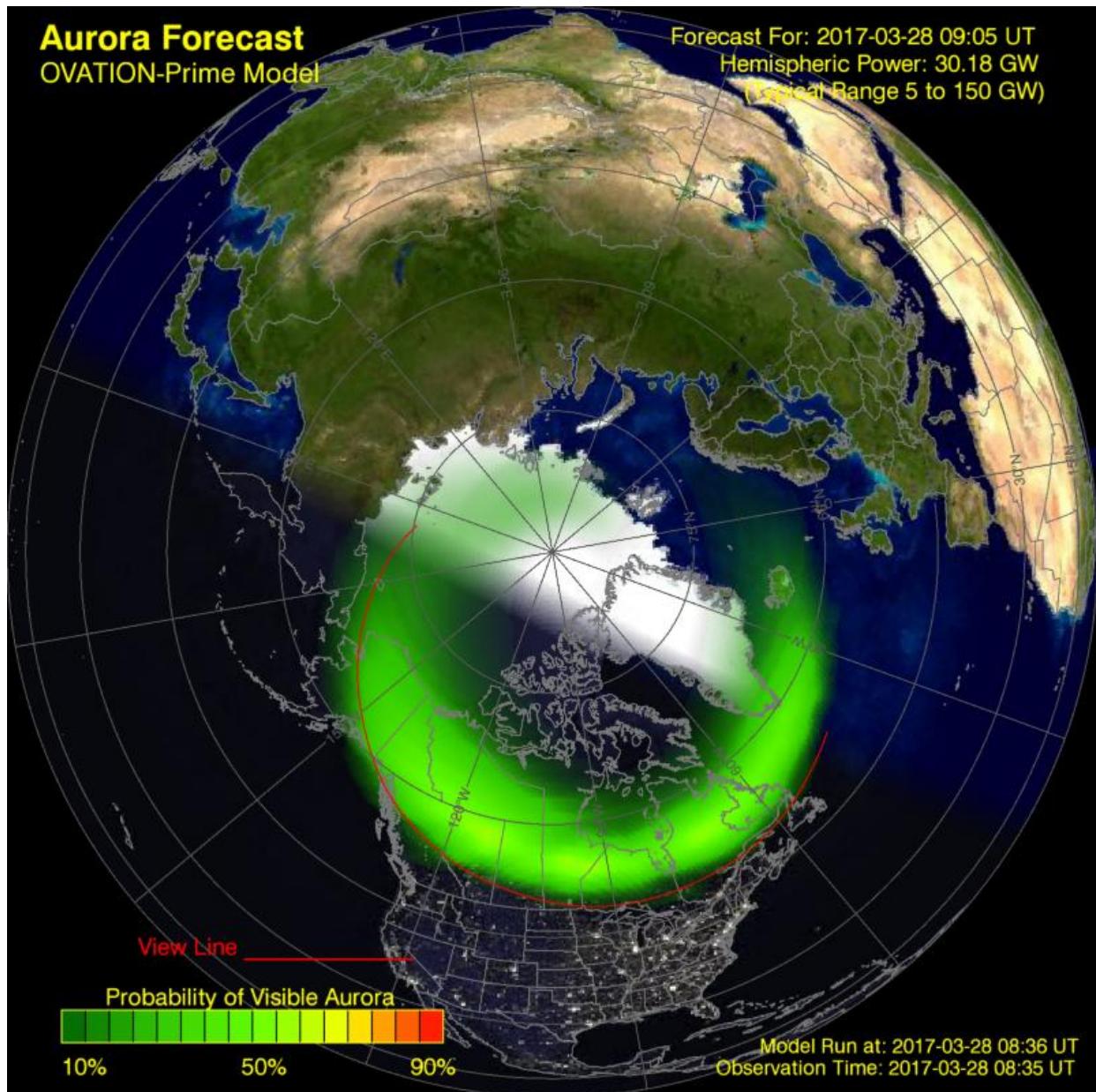
Try to analyze yourself!

During the season you shoud make a little effort and see for yout self the effect of the sun. I remember in 2001 when I started to watch the sun and there was this grapic with Kp index and I thought: I want to see if this really are the trufth, and I must say after 16 years that it is true. I have a good friend to whom I told about the sun and he promissed to use Todays'spaceweather where he only looked on the Kp index "went into red". One day he had the pigeons on a tossing for 100 km, and it went wrong as the pigeons came home during the hole day. That was a magnetic storm on or over Kp5, and he realized that all that talk about the sun was true. I hope that you amrican fanciers will keep an eye ot the sun. In the Staes you are all big users of computers an IPad.

The sun and the weather

When I over the years have tne nose in this analysing the races, it occours that some races goes wrong because of a mix in weather and the sun. I remener a race from Antwerpen in 2004 where there was an **Inversion** and a geomagnetic storm at the same time - holy shit it went wrong and there were reports of pigeons sitting on boats in the English Channel. In this article **I concentrate on the sun, but in some weeks I will make an article about the worst meteologic phenomena to make trouble for our pigeons.**





Aurora forecast 28 march 2017. The same day look at page 11 for Kp index and page 13 for Intermagnet, magnetic station Victia. You can here see the same magnetic storm in 3 different ways.

You can see Aurora Forecast in the left side of Spaceweather.com. Why is this only for the Americans, what about Scandinavia.





The black Megens are a long distance pigeon

