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Press release

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Space radio environment forecasting is now possible.

3-day forecasting officially launched for predicting solar activities
Will invite 100 interested citizens to a special presentation on March 29

The National Radio Research Agency (Director general Dong-Hyung Lee) announced that it is now posting a daily 3-day sunspot activity forecast at the website of the Korean Space Weather Center.

※ Korean Space Weather Center homepage: http://www.spaceweather.go.kr

Until now the alert service has been provided almost exclusively to industries vulnerable to sunspot damage such as airliners, the military and organizations managing satellites, but now all interested citizens can simply visit the website of the Korean Space Weather Center to view the solar activity forecast and even apply to receive the alert service via e-mail or SMS.

The Korean Space Weather Center of the National Radio Research Agency had previously been providing the 3-day forecast three times a week since last October as a pilot test, but now the service is

being made public on a daily basis.

For the 3-day forecast, the Korean Space Weather Center utilizes the sunspot analysis data it has been receiving from the SWPC since 1996, and independently developed a program for predicting the probability of the sunspot eruptions based on their shape and location on the sun.

※ SWPC (Space Weather Prediction Center) : The Space Weather Prediction Center of the National Oceanic and Atmospheric Administration (USA), which has the most advanced technical expertise among the 14 such organizations of the world.

The KSWC also provides a 27-day forecast, which is the solar rotation period once a week.

The Korean Space Weather Center will hold a special Space Radio Environment Presentation in Jeju on March 29. One hundred citizens interested in solar observation activities, sunspot forecasting and the Center's alert service, as well as government officials will attend the presentation.

If you wish to attend, you can apply at the website of the Korean Space Weather Center.

At this event, the Korean Space Weather Center, the agency in Jeju exclusively responsible for solar activities, will be introduced, and eruptions of sunspots, space radio forecasting techniques, the situation room, and solar observation equipment will be explained.

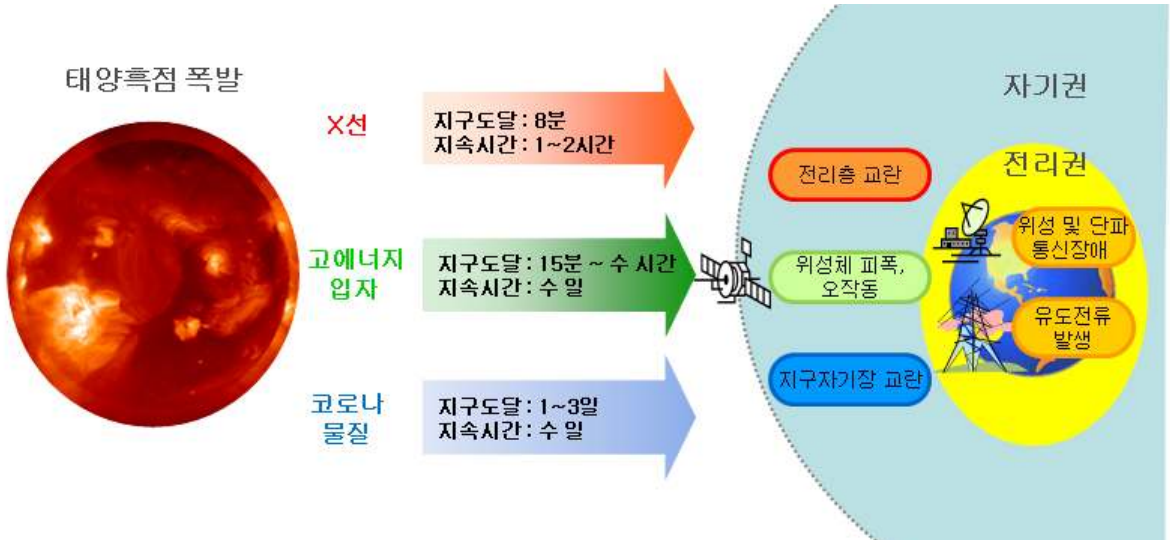
"As a maximum of solar activities is predicted for 2013, the general public is becoming more interested in the space weather

environment," said Jae-Hyung Lee, Director of the Korean Space Weather Center.

"We are planning to hold a special space weather environment presentation tailored for the general public every quarter."

[Cf.] Eruption of sunspots

□ Overview



Eruption of sunspots	X-ray High-energy particles Coronal mass	Time to Earth: 8 minutes Duration: 1~2 hours Time to Earth: 15 minutes ~ a few hours Duration: a few days Time to Earth: 1~3 days Duration: a few days	Ionospheric storm Satellites exposed to radiation and malfunctioning Geomagnetic disturbance	Magnetosphere Ionosphere Communication problems of satellites and short wave electronic equipment Induced current

o When sunspots erupt, **X-rays, high-energy particles** (protons) and coronal mass particles (protons, electrons, helium, etc.) are emitted into space.

o After eruption it ordinarily takes X-rays 8 minutes, high-energy particles a few hours, and coronal mass particles 1~3 days to

reach the earth, disturbing **the ionosphere** and **geomagnetic field**.

□ Types of damage caused by sunspots

o **(X-rays)** These disturb the ionosphere during **daytime** causing **short wave communication failures**, satellite-to-satellite communication failures, and errors in receiving GPS signals.

o **(High-energy particles)** These affect the solar panels of satellites, cause **short wave communication failure of airplanes** flying over the North Pole, and expose astronauts to radiation sickness.

o **(Coronal mass)** These cause short wave communication failure due to the disturbance of the ionosphere, and can severely **damage electric power facilities due to induced current** caused by the disturbance of the geomagnetic field.

□ Sunspot alert issuance procedure

o When a sunspot erupts an alert will be issued automatically based on detection data from a NASA satellite and observation centers located around the world.

o The data is classified into 5 levels (minor [1], moderate [2], strong [3], severe [4], extreme [5]) according to international standards for the intensity of the solar flare, the quantity of high-energy particles, and the degree of disturbance of the geomagnetic field.

□ Statistics about alerts related to sunspot eruptions

o Solar activities occur in cycles that peak (rise to a maximum) and trough (fall to a minimum) over an approximate **11-year cycle**,

and,

- as **a solar peak** is predicted for **May 2013**, the number of alerts related to sunspot eruptions is increasing.

<Issuance of level-3 or higher alerts>

2010	2011	2012 (as of the end of February)
level 3: twice	level 3: 10 times level 4: twice	level 3: twice (1.23, 1.28)

□ The role of the Korean Space Weather Center of the National Radio Research Agency

o The KCC established the Korean Space Weather Center in August 2011 on the Jeju island as **an organization specializing in the space radio environment** to help minimize damages caused by sunspot eruptions.

o The Korean Space Weather Center provides the **forecast service** i.e. predicting solar activities and the **alert service** which propagates sunspot eruptions pursuant to **the Radio Waves Act**.

o The Korean Space Weather Center is a member of the **International Space Environment Service** (ISES), an international organization sharing solar activity observation data and analysis information.

- As a Regional Warning Center (RWC) representing Korea, it is working closely with the 14 member countries under the umbrella of the International Space Environment Service to actively respond to solar activities.

※ ISES: International Space Environment Service, RWC : Regional Warning Center