Building a space weather facility at NOA

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Solar Telescope for imaging in Hα

- Manufactured by Lunt Solar Systems, it is a 100 mm refractor, 800 mm focal length. It has an in-built Hα etalon with <0.75 Å bandpass (<0.5 Å when doublestacked). A pressure tuner enables tuning along Hα for the imaging of Doppler-shifted features. It is equipped with a 1800 mm blocking filter. The camera is a DMK51AU02 CCD, (The Imaging Source) equipped with a Sony ICX274AL sensor, with 1600 x 1200 pixel resolution and 4.4 x 4.4 μm pixel dimension.

CCD

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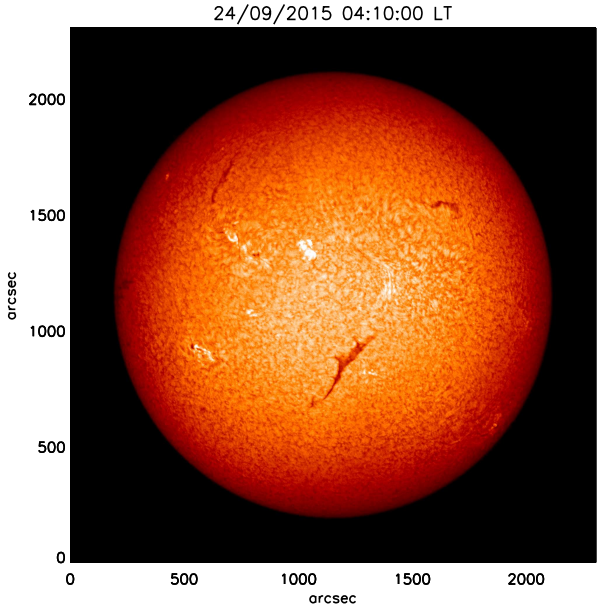
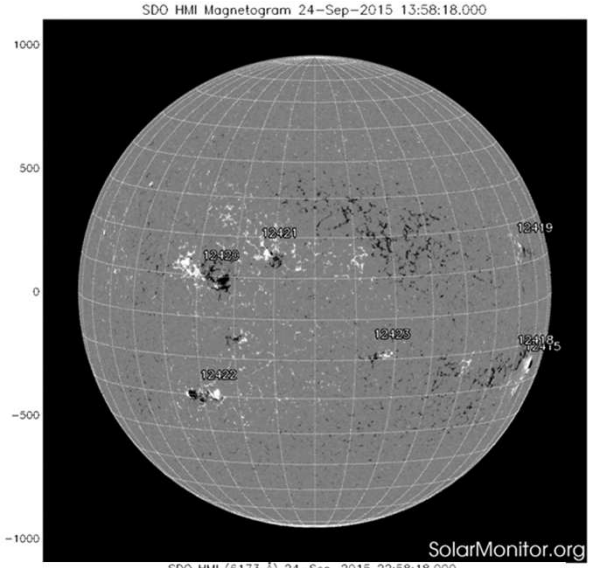
- The setup provides near-full-disk images of the sun with an estimated ~1.6’’/pixel resolution.

Goal:Provide solar Images (+ X-ray and particle fluxes from GOES and ACE)(through HELIOSERVER)

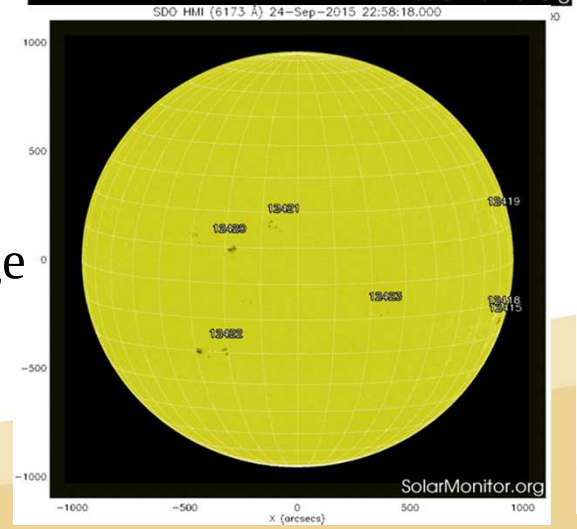




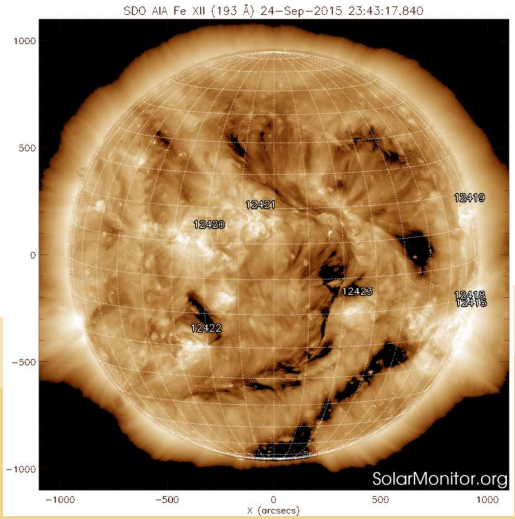
Full-disk image in Hα taken in September 24, 2015

HMI/SDO magnetogram

HMI/SDO continuum image



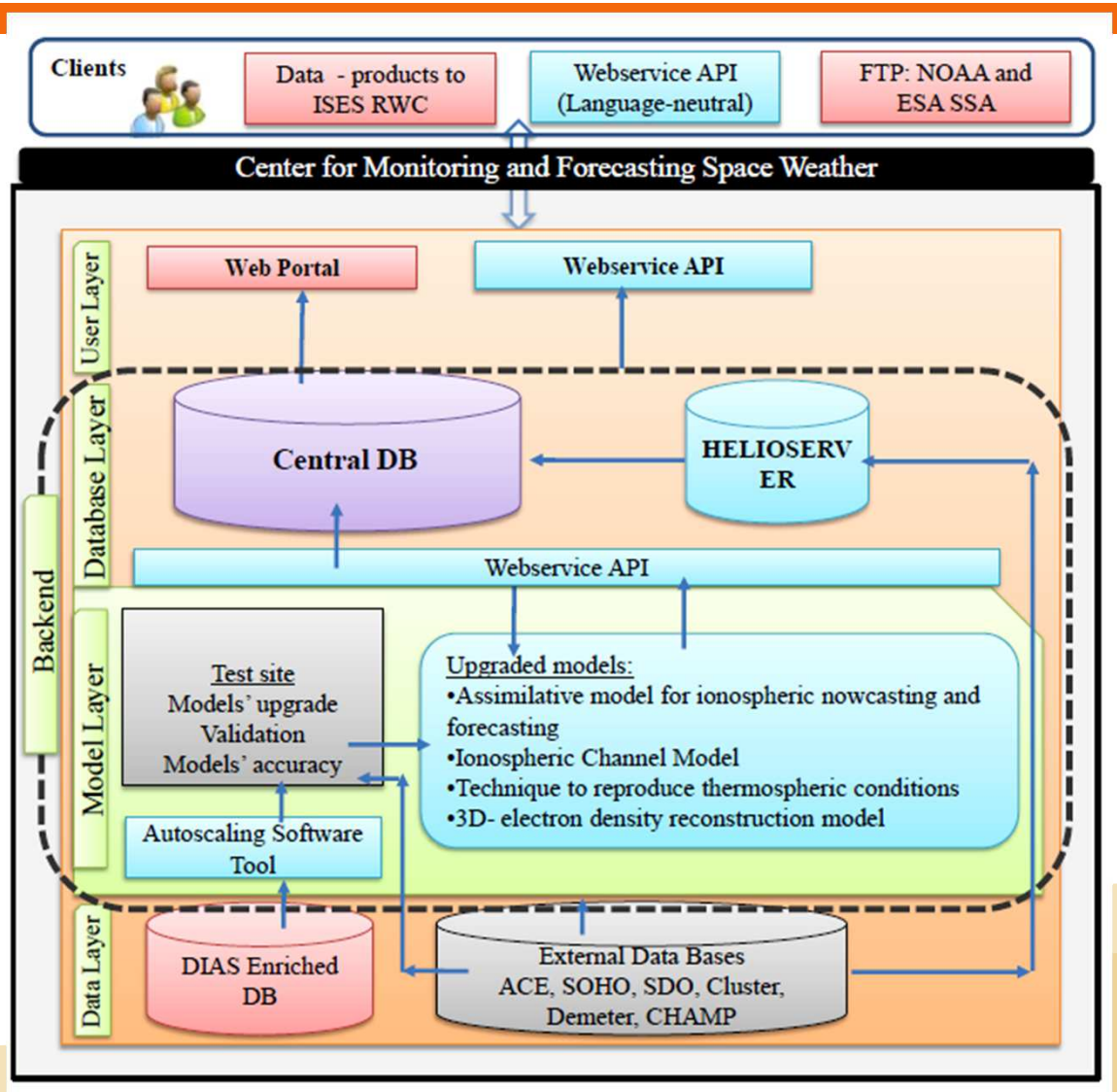
AIA/SDO 193Å filtergram



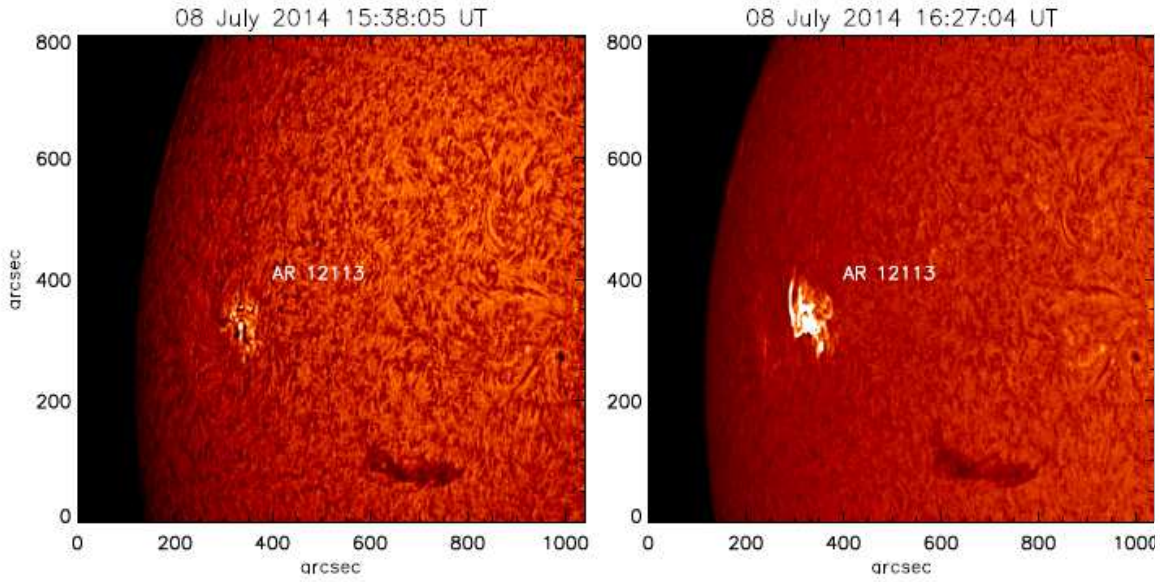
Real time ionospheric station

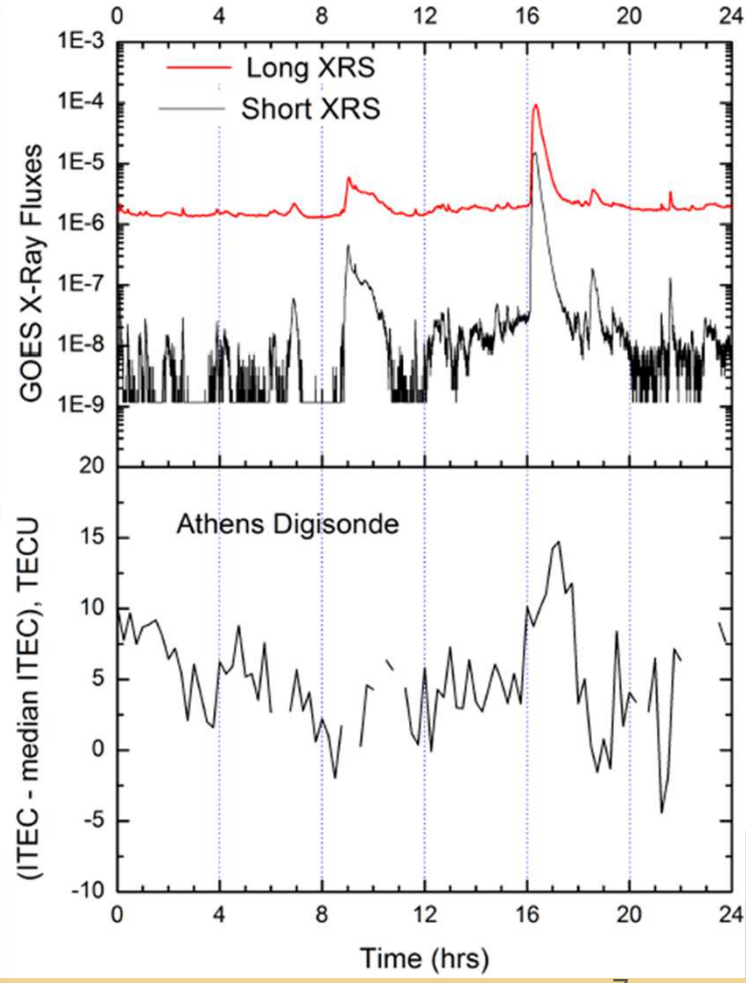
Real time data from Athens and other European Digisondes are collected by **DIAS (European Digital Upper Atmosphere Server)**, the main system in Europe that provides alerts, nowcasts and forecasts for ionospheric conditions (**http://dias.space.noa.gr**).

Services to be provided



Example: M6.5 flare from AR12113 (July 8, 2014)

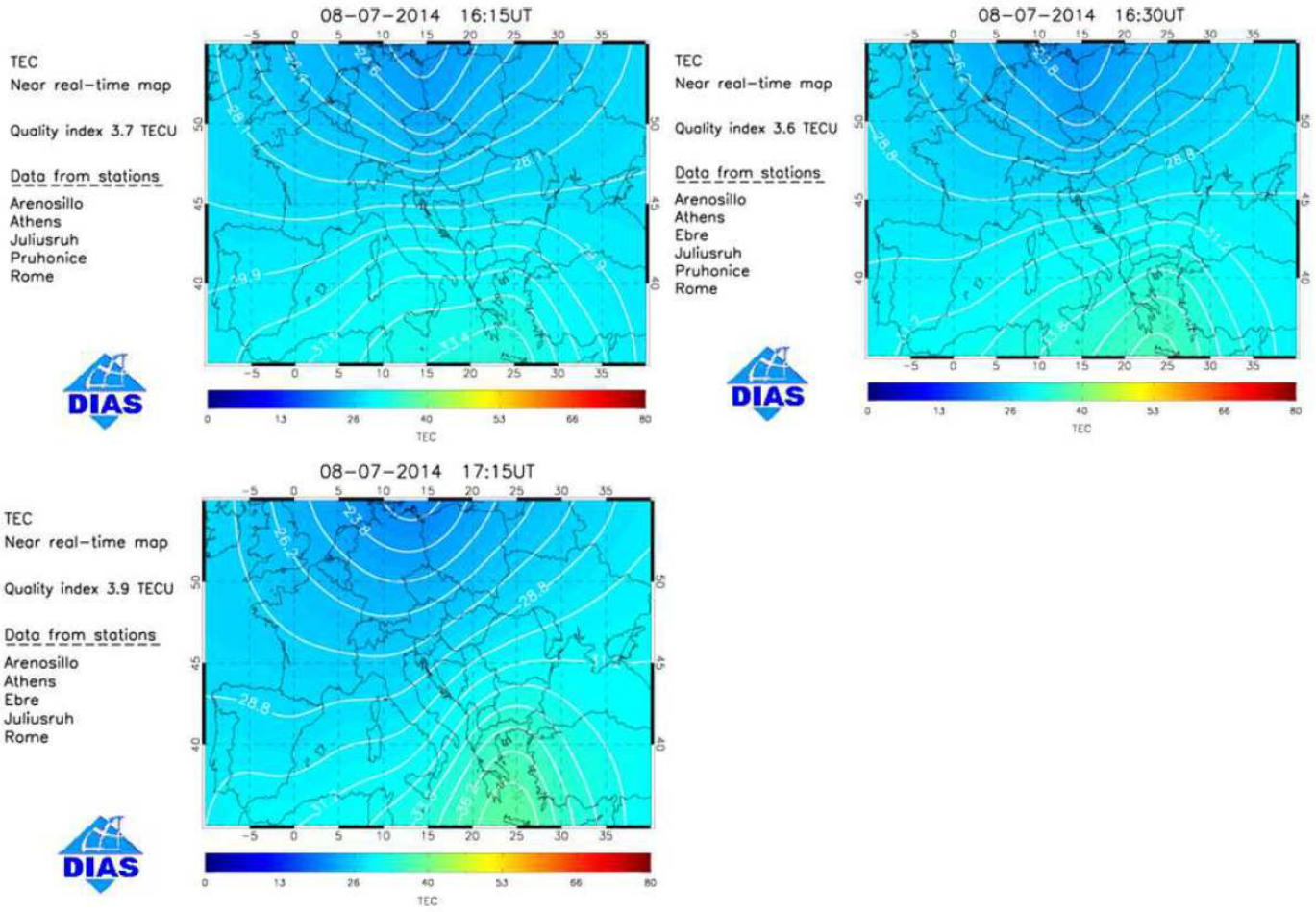




A close up view of AR12113 in Hα before and during the flare.

Top: GOES X-ray flux in the channels of GOES in July, 8, 2014. The peak at 16:20 is the M6.5 flare
Bottom: The ionospheric TEC calculated by the Athens DIGISONDE manually scaled ionograms.

Example: M6.5 flare from AR12113 and the ionosphere



Near real-time TEC maps, constructed by the measurements of the DIAS network, before, during and after the M6.5 flare

The FORSPEF tool

- The FORecasting Solar Energetic Particles and Flares (FORSPEF) tool (funded by ESA) provides forecasting of solar eruptive events, such as solar flares (SF) and coronal mass ejections (CMEs) (occurrence and velocity) and the likelihood of occurrence of a solar energetic proton (SEP) event. It also provides nowcasting of SEP events based on actual SF and CME near real-time alerts, as well as nowcasting of SEP characteristics (peak flux, fluence, rise time, duration) per parent solar event.

http://tromos.space.noa.gr/forspef/modules/

Services include the following monitoring/ and alerting/forecasting components

- Chromospheric ground-based observations in Ha along with real-time imaging in EUV from space will provide observations of flares and CMEs.
- Analysis of real-time ionograms from the Athens Digisonde to demonstrate potential local effects of solar flares over Athens. In addition daily plots of critical parameters such as ITEC, foF2, hmE and hmF2 can be updated in real-time to capture on-line possible flare effects in the structure of the ionosphere with height.
- The SEP prediction tool that will provide a SEP probability for each identified AR, according to its position and magnetic flux. In the case of a flare occurrence, this probability may be modified if associated with a CME.
- EUV, X-ray and particle fluxes obtained through open access space observatory data to follow flares and CMEs activity.
- Alerts for forthcoming ionospheric disturbances and maps of TEC and foF2 parameters provided in realtime by DIAS are analyzed in combination with the data sets described above to get a full picture of ionospheric disturbances over Europe due to solar flares and CMEs.

More information...

http://spaceweather.space.noa.gr/

http://spaceweather.space.noa.gr/index.php/publications