

Report of the Regional Warning Center Austria 2014

The Kanzelhöhe Observatory (KSO) is the RWC of Austria and a member of ISES since 2013. Our main data products are the forecasting of solar wind high-speed streams and their geomagnetic activity, as well as the real-time detection and alerting of solar flares from KSO H-alpha image data. Figure 1 shows the newly established homepage (in German) from the KSO RWC team (spaceweather.at), which gives relevant links to data products and services.

WELTRAUMWETTER ÖSTERREICH OBSERVATORIUM KANZELHÖHE FÜR SONNEN- UND UMWELTFORSCHUNG

Der Begriff „Weltraumwetter“ beschreibt die veränderlichen Bedingungen im erdnahen Weltraum, die technische Systeme im Weltraum und auf der Erde beeinträchtigen können. Die Hauptursache von Störungen unseres Weltraumwetters sind energetische Ausbrüche von der Sonne. Das Observatorium Kanzelhöhe für Sonnen- und Umweltforschung der Universität Graz führt regelmäßige, hochqualitative Beobachtungen der Sonne durch.

Mittels automatisierter Bilderkennungsverfahren werden Strahlungsausbrüche in Echtzeit in den Beobachtungsdaten detektiert und Warnmeldungen ausgesandt. Das Observatorium Kanzelhöhe ist die österreichische Vertretung im internationalen ISES Weltraumwetter-Netzwerk und die europäische Kernstation zur Sonnenbeobachtung im Rahmen des SSA Weltraumwetter-Programms der Europäischen Weltraumbehörde ESA.

1 News | Flare SN bei S21E33 02.Aug.: 14:11UT Flare SF bei S18E33 03.Aug.: 06:16UT Flare SN bei S21E33

Weltraumwetter aktuell

15 Beobachtungsbedingungen Kanzelhöhe

Blog 2 Die ersten Perseiden (Laurentiusstränchen) sind schon auf dem Weg. Die Erde kreuzt... mehr

Information

- Home
- Information zu Datenprodukten
- Was ist Weltraumwetter?
- Forschung in Österreich
- Links
- Blog Posts

ISES International Space Environment Service

Warnzentren

- Information zu ISES
- ISES Website
- Austria
- Beijing
- Boulder
- Brussels
- Hermanus
- Jeju
- Lund
- New Delhi
- Ottawa
- Prague
- Russia
- Sydney
- São José dos Campos
- Tokio
- Warszawa

Impressum

Figure 1: The homepage of the Austrian Regional Space Weather Warning Center.

Data products presented on the RWC homepage of Austria

(we note that the observational data products as given on the webpage are dependent on the local weather conditions)

1 News Ticker

The news ticker shows the actual flare conditions in real-time. It is updated automatically as soon as the automatic flare detection system at the Observatory Kanzelhöhe sends out a flare alert. The automated flare-alert system was developed in the frame of the ESA Space Situational Awareness (SSA) programme. In addition to the automatic flare alerts, the operators of the web page can manually put messages in. This aims to inform the visitor of the webpage about the general situation of solar activity (e.g., “Low solar activity” or “CME approaching Earth”).

2 Blog

We provide for the public user a news-blog on a weekly basis. The topic of the blog is varying between space weather, astronomy of the solar system and breaking news in astronomy (see Figure 2).

Sonnenuntergang am Mirnock

Bei der Patrolüberwachung der Sonne schalten die Programme automatisch die Weiterverarbeitung der Bilder bei einem Sonnenstand unter 5 Grad über dem Horizont ab. Wenn die Kamera aber nicht abgeschaltet wird, werden weiterhin Bilder aufgenommen solange die Sonne scheint und in ein temporäres Archiv gespeichert. So geschehen am 3. Juli 2014, an diesem Tag lief die Beobachtung von 4:30 UT bis zum Sonnenuntergang um ca. 18:45 UT. Um 18:42 ging die Sonne dann genau beim Gipfelkreuz des Mirnock unter, einem Bergrücken zwischen Drautal und Gegendtal. Am Bild sieht man den Sonnenuntergang der Sonne in H-alpha am Mirnockgipfel um 18:42:52 UT.

Aus geographischen Informationssystemen lässt sich die genaue Entfernung zwischen Kuppel und Gipfelkreuz bestimmen: 17920 m.

Der Sonnendurchmesser ist bekannt und somit auch die Auflösung des Teleskops, damit lässt sich errechnen, dass ein Pixel ca. 8 cm am Mirnock entspricht, das Gipfelkreuz ist somit ca. 3,8 m hoch.



Figure 2: Blog from 2014 week 32

3 - 6 Latest observational data

Observational data from KSO in various wavelengths are presented. The latest images from H-alpha (3), white-light (4), CaIIK (5), and the solar corona in H-alpha (6) are shown in a separate window.

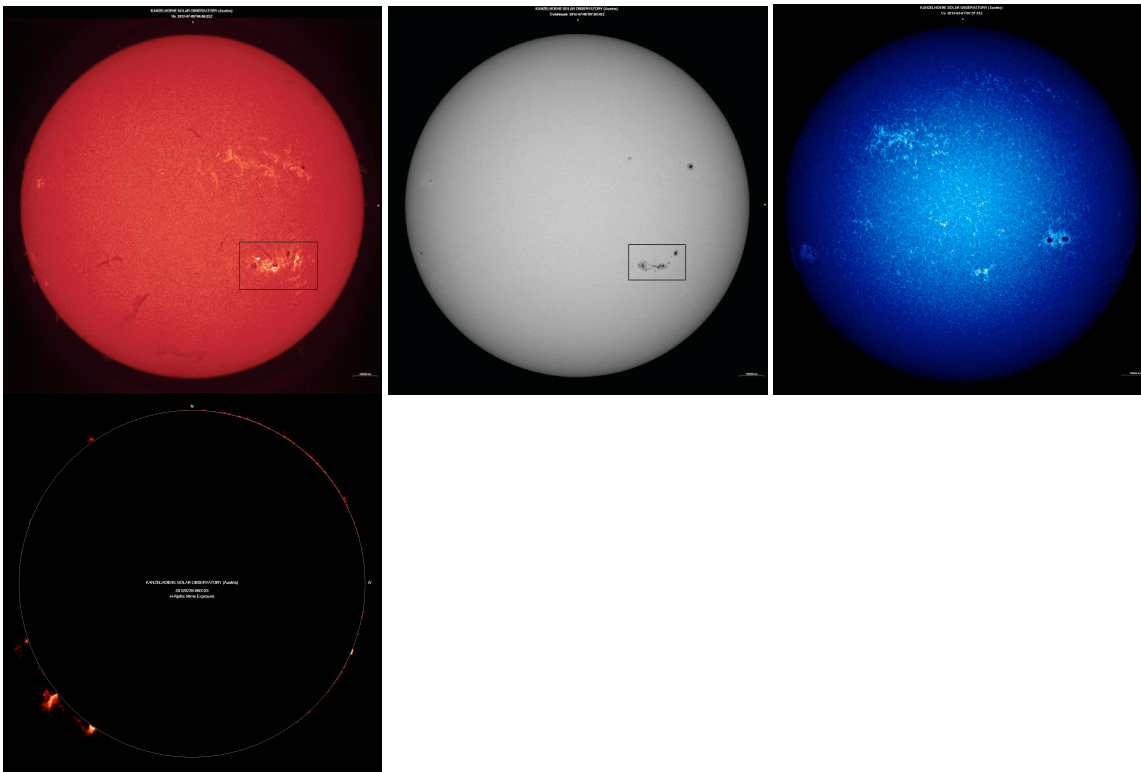


Figure 3: top left to right images – H-alpha, white-light, CaII K and solar corona in H-alpha (bottom left)

7 Automated flare recognition

The same flare list, as presented on the news ticker (1), can be found at this link to the ESA SSA webpage (<http://swe.ssa.esa.int/web/guest/kso-federated>). The webpage shows the automated detection of H-alpha flares including classification and movies. Figure 2 gives an overview of the service.

Ground-based H-Alpha Solar Monitoring Service
Kanzelhöhe Observatory

Click on window for full size display and hourly images

Local weather information – updated every 10 minutes

Type	Begin	Max	Position	Size
Flare	1034	1039	N14E21	SF
Flare	0908	0908	N11E55	SF
Flare	0624	0625	N10E60	SF
Flare	0521	0522	S25E32	SF

Info button for table entries

Flare and filament eruption information
Updates every minute, ongoing events are in red color

H-alpha movie popup window

» H-alpha Movie...

page refresh each 60 seconds

Figure 4: KSO real-time flare alert service within the ESA SSA programme (from Veronig et al., 2013; Final presentation of SNIV2-ESA products)

8 H-alpha lightcurve

The disk-integrated H-alpha lightcurve (maximum intensity divided by the mean intensity) is shown together with the GOES soft X-ray flux.

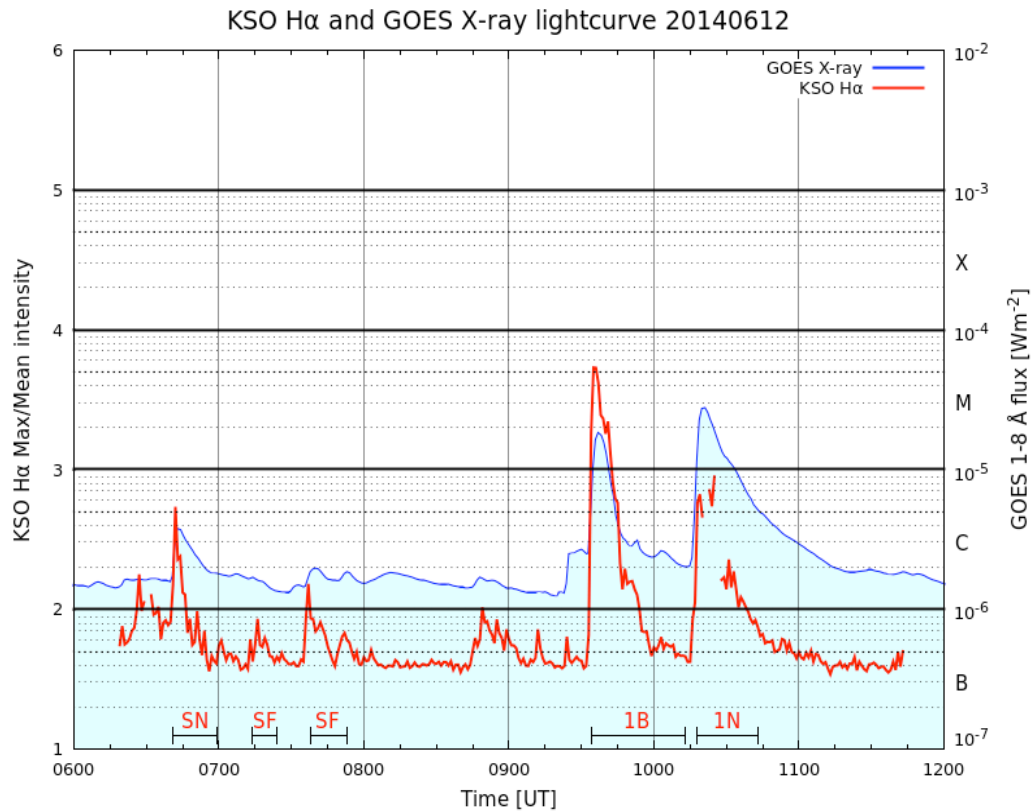


Figure 5: KSO H-alpha lightcurve and automatically detected and classified flares compared to GOES soft X-ray flux from June 12, 2014.

9 Sunspot drawing

The latest sunspot drawing is shown. Sunspot drawings have a long tradition at the KSO and an archive hosts drawings of the past 70 years (see also http://cesar.kso.ac.at/synoptic/draw_years.php).

10 Interactive plot of relative sunspot number

An interactive plot of the relative sunspot number from KSO white-light observations is given starting from 1969 (the data product is sent to the SIDC in Belgium). The user can zoom into details of the numbers and dates by using the trackpad or mouse.

Sunspot relative Number at KSO

Zoom in with mouse selection.

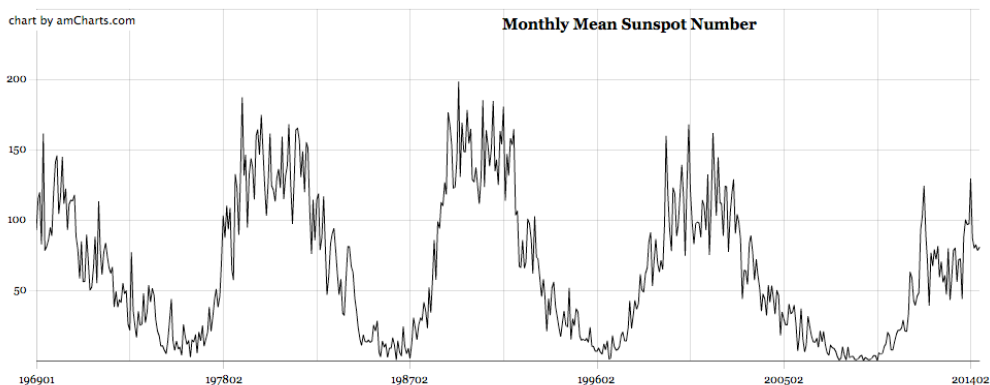


Figure 6: KSO relative sunspot number

11 Forecasting of solar wind high-speed streams and geoeffectiveness

The forecasting is based on the automatic extraction of coronal hole areas on the central part of the visible solar surface from SDO/AIA 193A data. The value of the coronal hole area is digested into a tool which empirically relates the area of coronal holes and the solar wind speed at a distance of 1AU (cf. Figure 3) as well as the Dst geomagnetic index. The tool was developed under the EU-FP7 projects COMESEP in collaboration between the University of Graz in Austria and the Hvar Observatory of the University of Zagreb in Croatia.

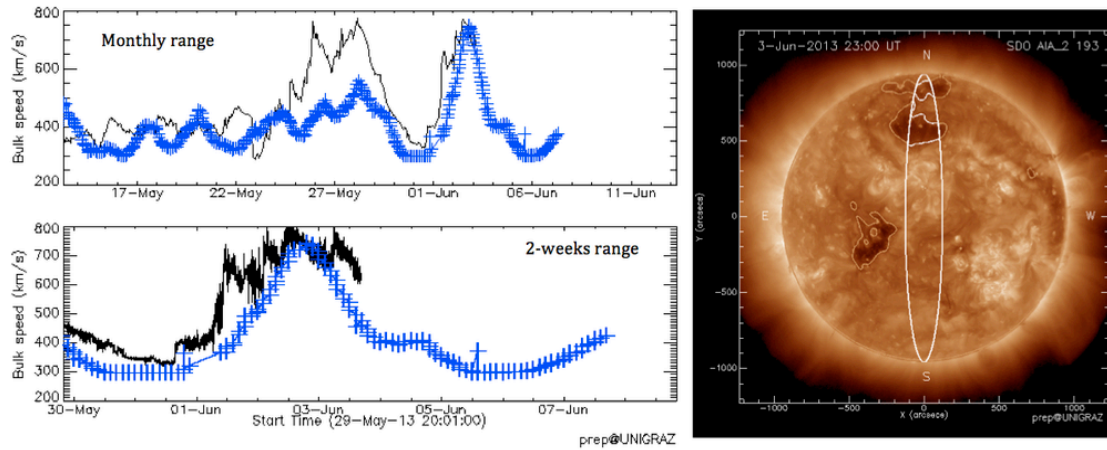


Figure 7: Forecast of solar wind high-speed streams (see <http://www.uni-graz.at/igam-sophy/comesep/solarwind/>)

12 COMESEP

A link to the COMESEP (Coronal Mass Ejections and Solar Energetic Particles: forecasting the space weather impact, EU-FP7 project) alert system is given.

13 Propagation of coronal mass ejections (CMEs) in the heliosphere

Link to the Drag Based Model (DBM) for forecasting the arrival time and impact speed of CMEs at various distances and targets in the heliosphere. The method was developed under the EU-FP7 projects SOTERIA and COMESEP in collaboration between the Hvar Observatory of the University of Zagreb in Croatia and the University of Graz in Austria.

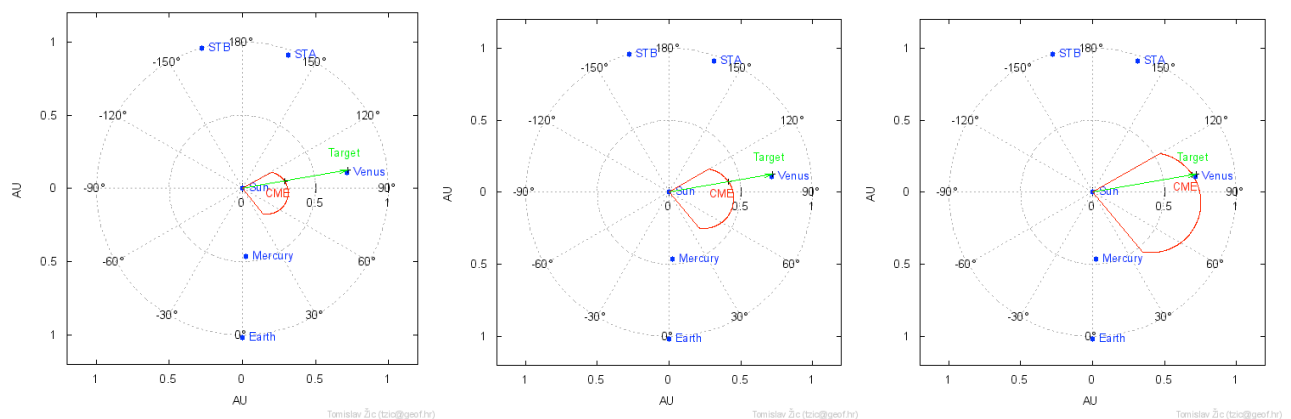


Figure 8: Example of a CME forecast for target Venus. The user manually does the input of CME parameters into the DBM.

14 The Kanzelhöhe Observatory (KSO)

Link to the main webpage (in German language) of the KSO.

15 Panorama webcam at the Kanzelhöhe Observatory

The panorama webcam shows the local weather and, hence, observational conditions at KSO

Observation Log for 01-Aug-2014

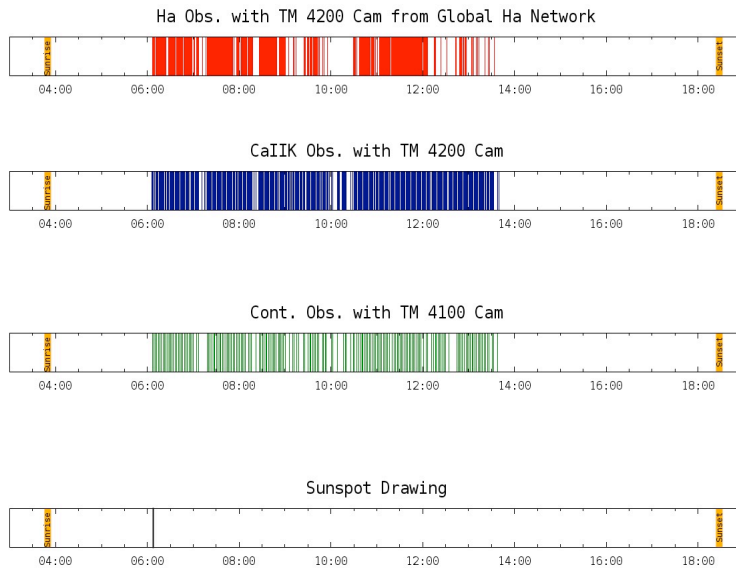
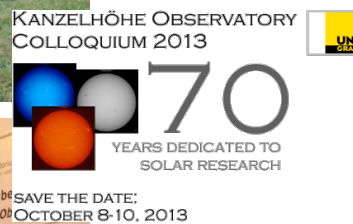


Figure 8: the observational conditions can also be viewed as log file under http://cesar.kso.ac.at/kh_obslog/kh_obslog_query.php

The Kanzelhöhe Observatory celebrated its 70th anniversary

Pictures from the celebration at the observatory in October 2013 held in the frame of an international colloquium. Politicians from Austria and honors from the University of Graz were present. The KSO as RWC within ISES was proudly presented.



Suggestions for coordinated group activities within ISES

Webpages of ISES members provide regional warnings, i.e. are written in national languages. To get better insight into data products and services as a network member within ISES, the main ISES webpage might display services from each member (in English).

A suggestion would be that each network partner maintains its product on its own webpage, and the ISES webpage just displays the product. Within the ISES network we should be able to use those products and as such exchange more easily relevant information among the network partners. It would be good to show only the most important products of each member (and/or similar products could be sorted by time zones), and we may also think of an alert system within the network. In this respect all the partners would be encouraged to review their inputs.