

How to observe... the Sun

Jacques van Delft (Director, Solar Section)

Editor's note

Although the Bloemfontein Symposium, with its theme of "Serious Amateur Astronomy: Linking with Professionals", addressed this issue very well, there was not time to get to the practical aspects of making actual observations. In consultation with the Section directors, we therefore decided to publish a series of "How to observe..." articles in *MNASSA*. I am sure that many readers, after the initial thrill of looking at pretty astronomical objects, have wondered what type of observations they can do to contribute to science, but never perused this any further because of a lack of knowledge. Addressing this will be the main aim of this series of articles which we hope will stimulate and empower readers to go out to observe and report their observations. Starting in this issue, we look at our nearest star, the Sun, which has no shortage of light, nor is a challenge to find.

Introduction

Solar observations can be divided into two sections; white light observations and H-Alpha observations. In **white light observations**, only Sunspots and faculae on the edge of the Sun can be observed. In **H-Alpha**, besides sunspots, solar flares, prominence and filaments are observed. For H-Alpha observations you need expensive H-Alpha filters or H-alpha telescopes while for white light observations you can make use of low cost filters like the Baader or Mylar filter.

To participate in our solar observation program you only need to observe in white light as we concentrate on the solar cycle's progress by counting sunspots. As from 2003 we decided to track the sunspot number and compile a Southern Africa Monthly Sunspot number. Publication of our progress is

done by means of a monthly Solar Bulletin on the ASSA web-site.

Participating observers are credited in the monthly solar bulletin. Internationally, participation in the observation of Sunspots can be done at the individual level via the AAVSO, by registering online at their website <http://www.aavso.org> (go to the solar section and follow the links).

How do we observe sunspots

There are two methods for observing sunspots: the direct view method and the projection method.

With the **direct view**, you need a Baader or a Mylar filter. For small telescopes you can cover the objective with the filter. If your telescope is bigger than 3-inches you need to make a mask with a small opening. Place the filter over

the opening and place the cover over the entrance of your telescope. Now you can safely direct your telescope towards the sun and look through your eyepiece. **Always inspect your filter for small pinholes before observing the sun. You can damage your eyes if you look direct at the Sun without filters.**

A safe way of observing sunspots is the **projection method**. When you point your telescope towards the Sun, you can project an image of the Sun on a white screen behind your eyepiece. Care must be taken with the choice of magnification because the infrared radiation falling on your eyepiece might crack it. The advantage of this method is that more than one person can observe at the same time.

How do we count sunspots

When you start observing sunspots, you will see that sunspots appear not only individually but also in groups. In the mid 19th century, when Rudolf

Wolf was the director of the Bern Observatory, he developed a method for counting sunspots known at that time as “The Universal Sunspot Number” (USN). Observers worldwide continue to use his method today to establish a daily sunspot number which is then used to calculate a monthly number. By plotting these monthly numbers on a graph you can track the progress of the sunspot cycle.

The formula developed by R. Wolf for his USN is: **$R = (g \times 10) + n$** where R = Sunspot number, g = number of groups and n = number of spots.

Looking at Fig. 1, the formula works as follows: We see 3 groups and count 6 sunspots. Therefore $R = (3 \times 10) + 6$ which, for that specific day, gives us a sunspot count of 36.

A document describing the complete history and development of the Zurich method (as this is called today) can be downloaded from the AAVSO website.

Recording sunspots

The recording of sunspots is best done using a spreadsheet. Create columns to record the date, time, seeing, groups, number of spots and the calculated (R) sunspot number. Atmospheric conditions do affect your view of the sunspots – seeing can be reported as E (Excellent), G (Good), F (Fair) and P (Poor). It is also good to have a column where you can write some com-

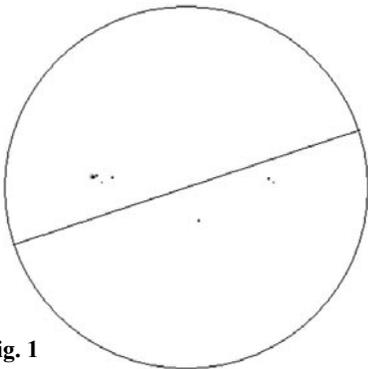


Fig. 1

ments about what changes you see, weather conditions etc.

Name J van Delft
 Observers code DEVJ
 Month October 06

If you want to participate in the ASSA Solar Observation program you can send your records as shown in Fig. 2. The observer's code will be issued when you become an observer of the solar section. Records for analyzing and publication purpose must be received not later than 10 days after the end of the month.

A CD on sunspot observation, titled "Fun with the Sun" is available and can be ordered at jvdelft.solar@starmail.co.za Cost of the CD in South Africa is R30 which includes postage. Delivery

Day	Groups	Number	Daily R	Seeing
1	2	5	25	G
2	2	7	27	E
3	3	14	44	E

Fig. 2

to foreign countries needs to be quoted due to possible higher shipping costs.

Clear skies and remember to look at the sunny side of life - it leaves the shadows behind you.

Sources:
 Dances with Wolf's, 2000, Carl Feehrer.
 Sun observer's guide, 2004, Pam Spence. ☆



(left) A typical mylar solar filter, here being inspected for pinholes by Jabie Bruwer and Andrie van der Linde. Ensure that the filter fits snugly over the aperture of your telescope so that there is no chance of it being blown off by the wind and causing serious eye damage.

(right) Jacques' Coronado solar telescope, here in action during the recent Symposium, is ideal for viewing solar prominences. It is compact, thus easy to transport and lightweight enough to be used on a photographic tripod. Jacques is on the left with the cap.



All photograhs by Hannes Pieterse