Preface

The Sun is the only star in the universe that is close enough for us to see its features in intricate detail. Astronomers have observed the Sun over many centuries from Earth but in recent decades they have gained a new understanding via scientific instruments in satellites (space probes). The remarkable dynamical phenomena occurring on the Sun, such as eruptions of matter in the form of prominences, filaments, spicules, coronal outbursts, and gigantic flares make the study of the Sun extremely fascinating and interesting.

Activity on the Sun is the most energetic in our Solar System. Without the Sun's energy in the form of heat and light, life on Earth could not exist. The Sun also affects our weather, climate and communication systems, and an understanding of it is essential to daily life.

In the past, observing the Sun has been left to academics with specialised instruments, since solar observation has been unsafe because of the risk of eye damage. It is now possible for amateur astronomers to safely observe the various solar phenomena using special hydrogen-alpha telescopes that are not too expensive. Amateurs can now make a positive contribution to science by monitoring the Sun as professionals do.

Most of the new information about the Sun has come from recent satellites that observe the Sun on a daily basis using visible, x-ray and ultraviolet wavelengths of electromagnetic radiation. Amateurs can also access the solar images taken by satellites via the internet and smart phones. This book helps readers interpret and understand what these images are showing about the Sun. Readers will enjoy comparing their own solar telescope observations with

those produced by space probes such as SDO, SOHO, Hinode and STEREO.

The main purpose of this book is to present some of the fascinating solar phenomena, in their full glory to readers through a variety of illustrations, photographs and easy to understand text.

Solar astronomy is becoming very popular among amateur astronomers as well as academics. Amateurs can use special telescopes to observe the Sun every day. Many surface features show changes in appearance every hour – this is different to night time observing where the appearance of objects remains fairly static night after night. This book also provides the latest space probe information for people interested in studying the Sun and more importantly, it bridges the gap between advanced astrophysics of the Sun and elementary knowledge about the Sun.

In recent years a new term, space weather, has come into vogue to describe the effect the Sun's radiation has on Earth and the environment of space near Earth. The study of space weather is critical to our survival and to an understanding of our environment.

Linked to space weather is the effect of the Sun on Earth's climate. Many scientists think that we are undergoing climate change and believe that the Sun may be a cause of this change.

The final chapter of this book looks at the Sun as a star. There are many different types of stars each with particular characteristics. Stars also go through a life cycle whereby they grow, change and die. Readers will enjoy learning about the evolution and fate of the Sun as a star.

Hopefully you will find enjoyment in this book and improve your understanding of the Sun and enjoy the growing hobby of Solar Astronomy.

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