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Nota di contenuto	Introduction to the Solar Activity Cycle: Overview of Causes and Consequences -- Solar Sector Structure -- Revisiting the Sunspot Number -- Solar Cycle Indices from the Photosphere to the Corona: Measurements and Underlying Physics -- Solar Cycle Variation in Solar Irradiance -- The Extended Cycle of Solar Activity and the Sun's 22-Year Magnetic Cycle -- The Sun's Interior Structure and Dynamics, and the Solar Cycle -- Magnetic Flux Emergence Among the Solar Cycle -- Hemispheric Coupling: Comparing Dynamo Simulations and Observations -- Magnetic Helicity, Tilt, and Twist -- Solar Polar Fields and the 22-Year Activity Cycle: Observations and Models -- A Combined Analysis of the Observational Aspects of the Quasi-biennial Oscillation in Solar Magnetic Activity -- Solar Cycle Variation of the Sun's Low-Order Magnetic Multipoles: Heliospheric Consequences -- Solar Cycle in the Heliosphere and Cosmic Rays -- Inferences on Stellar Activity and Stellar Cycles from Asteroseismology -- Observing Dynamos in Cool Stars -- Magnetic Flux Transport at the Solar Surface -- Solar Activity in the Past and the Chaotic Behaviour of the Dynamo -- Oscillator Models of the Solar Cycle -- Flux Transport Dynamos: From Kinematics to Dynamics.

A collection of papers edited by four experts in the field, this book sets out to describe the way solar activity is manifested in observations of the solar interior, the photosphere, the chromosphere, the corona and the heliosphere. The 11-year solar activity cycle, more generally known as the sunspot cycle, is a fundamental property of the Sun. This phenomenon is the generation and evolution of magnetic fields in the Sun's convection zone, the photosphere. It is only by the careful enumeration and description of the phenomena and their variations that one can clarify their interdependences. The sunspot cycle has been tracked back about four centuries, and it has been recognized that to make this data set a really useful tool in understanding how the activity cycle works and how it can be predicted, a very careful and detailed effort is needed to generate sunspot numbers. This book deals with this topic, together with several others that present related phenomena that all indicate the physical processes that take place in the Sun and its exterior environment. The reviews in the book also present the latest theoretical and modelling studies that attempt to explain the activity cycle. It remains true, as has been shown in the unexpected characteristics of the first two solar cycles in the 21st century, that predictability remains a serious challenge. Nevertheless, the highly expert and detailed reviews in this book, using the very best solar observations from both ground- and space based telescopes, provide the best possible report on what is known and what is yet to be discovered. Originally published in Space Science Reviews, Vol 186, Issues 1-4, 2014.
