

1. Record Nr.	UNINA9910827197303321
Titolo	The early earth : accretion and differentiation // James Badro, Michael Walter, editors
Pubbl/distr/stampa	Washington, District of Columbia ; ; Hoboken, New Jersey : , : American Geophysical Union : , : Wiley, , 2015 ©2015
ISBN	1-118-86036-5 1-118-86035-7 1-118-86019-5
Descrizione fisica	1 online resource (196 p.)
Collana	Geophysical Monograph ; ; 212
Disciplina	551.11
Soggetti	Earth (Planet) Internal structure Earth (Planet) Geology
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	"This Work is a co-publication between the American Geophysical Union and John Wiley and Sons, Inc"--Cover.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Title Page; Copyright Page; Contents; Contributors; Preface; Acknowledgments; Chapter 1 Timing of Nebula Processes That Shaped the Precursors of the Terrestrial Planets; 1.1. Introduction; 1.2. Young Stellar Objects and Their Disks: Analogs of the Early Solar System; 1.2.1. From the Interstellar Medium to a Protostellar Core; 1.2.2. From a Protostar to a Pre-main Sequence Star; 1.2.3. Duration of Protostellar and Pre-main Sequence Stages; 1.3. The Samples of the Solar Protoplanetary Disk; 1.3.1. Chondrites and Their Putative Parent Bodies 1.3.2. The Major High-Temperature Components of Chondrites 1.4. Chronology of the First Few Million Years: The Period of the Disk; 1.4.1. Short-Lived Radionuclides Present in the Accretion Disk; 1.4.2. The Dual Origin of SLRs: Presolar Stellar Sources and Solar System Irradiation; 1.4.3. Timing of Irradiation Processes in the Early Solar System; 1.4.4. A Chronology for the Formation of the First Solar System Minerals and Rocks Based on ²⁶ Al; Acknowledgments; References; Chapter 2 The Earth's Building Blocks; 2.1. Introduction; 2.2. Cosmochemical Constraints; 2.3. BSE and Bulk Earth Composition 2.3.1. Similarity to Chondritic Meteorites (Chondrites)2.3.2. Chondritic

Material; 2.3.3. Preferred Bulk Earth Model; 2.4. Chondritic vs. Achondritic Earth; 2.5. Isotopic Arguments; 2.5.1. Applications of Isotopic Anomalies; 2.5.2. Radiogenic Isotopes; 2.5.3. Stable Isotope Fractionation; 2.6. Conclusions; Acknowledgments; References; Chapter 3 Earth and Terrestrial Planet Formation; 3.1. Introduction; 3.1.1. History of the Solar System; 3.1.2. Stages of Planet Formation; 3.1.3. Pebble Growth Processes; 3.1.4. New Pebble Model from Dust to Embryo
3.2. Models of the Giant Impact Phase of Terrestrial Planet Formation
3.2.1. Comparing Terrestrial Planet Systems; 3.3. Classical Models; 3.3.1. Eccentric Jupiter and Saturn, Current Orbits; 3.3.2. Extra-eccentric Jupiter and Saturn; 3.3.3. Circular Jupiter and Saturn, pre-Nice 2.0 Model; 3.4. Truncated Disk Models; 3.4.1. 'Grand Tack', Migrating Jupiter and Saturn; 3.5. Earth in the Grand Tack Model; 3.5.1. The Growth of Earth; 3.5.2. Composition of Earth and the Other Terrestrial Planets; 3.6. Conclusion and Discussion; References; Chapter 4 Late Accretion and the Late Veneer
4.1. Introduction 4.2. The Late Veneer as Defined in Geochemistry; 4.3. Late Accretion Mass as Defined in Accretion Models; 4.4. Relationship Between Late Veneer and Late Accretion; 4.4.1. Can the Late Accretion Mass Be Significantly Smaller Than the Late Veneer Mass?; 4.4.2. Can the Late Accretion Mass Be Significantly Larger Than the Late Veneer Mass?; 4.4.3. Summary and Implications for Moon Formation; 4.5. Late Veneer and the Origin of Earth's Volatiles; 4.6. Conclusions; Acknowledgments; References; Chapter 5 Early Differentiation and Core Formation: Processes and Timescales
5.1. Introduction

Sommario/riassunto

The Early Earth: Accretion and Differentiation provides a multidisciplinary overview of the state of the art in understanding the formation and primordial evolution of the Earth. The fundamental structure of the Earth as we know it today was inherited from the initial conditions 4.56 billion years ago as a consequence of planetesimal accretion, large impacts among planetary objects, and planetary-scale differentiation. The evolution of the Earth from a molten ball of metal and magma to the tectonically active, dynamic, habitable planet that we know today is unique among the terrestrial plane
