1. Record Nr. UNINA9910299419703321

Titolo	Encyclopedia of Scientific Dating Methods / / edited by W. Jack Rink, Jeroen W. Thompson
Pubbl/distr/stampa	Dordrecht : , : Springer Netherlands : , : Imprint : Springer, , 2015
ISBN	1-78539-645-5 94-007-6304-2
Edizione	[1st ed. 2015.]
Descrizione fisica	1 online resource (375 illus., 260 illus. in color. eReference.)
Collana	Encyclopedia of Earth Sciences Series, , 1871-756X
Disciplina	551.701
Soggetti	Geochemistry Paleontology Life sciences Forensic sciences Environment Atmospheric science Life Sciences Forensic Science Environmental Sciences Atmospheric Science
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references and indexes.
Nota di contenuto	Acasta Gneiss Complex -- Accelerator Mass Spectrometry -- Age of the Earth -- Alpha Spectroscopy -- Alpine Terranes (K-Ar/Ar-Ar) -- Amino Acid -- Amino Acid Racemization Dating -- Amino Acid Racemization, Biostratigraphy -- Amino Acid Racemization, Coastal Sediments -- Amino Acid Racemization, Eolianites -- Amino Acid Racemization, Fluvial and Lacustrine Sediments (AAR) -- Amino Acid Racemization, Marine Sediments -- Amino Acid Racemization, Paleoclimate -- Ancient Inks: A Forensic Art Historical Perspective -- Apatite -- Aquifer Characteristics (U-Series) -- Ar–Ar and K–Ar Dating -- Archaeomagnetic Dating -- Band Structure -- Beta Counter -- Big Bang -- Biostratigraphy -- Bivalve Sclerochronology -- Bomb Carbon -- Bones (U-Series) -- 14C in Plant Macrofossils -- Carbonates, Lacustrine

(U-Series) -- Carbonates, Marine Carbonates, (U-Series) -- Carbonates, Pedogenic (U-Series) -- Carbonates, Speleothem Archaeological (U-Series) -- Carbonates, Speleothem Climatic (U-Series) -- Chemical Weathering (U-Series) -- Chert -- Chromatography -- Clays and Glauconites (K–Ar/Ar–Ar) -- Continental Drift (Paleomagnetism) -- Corals (Sclerochronology) -- Crustal Sulfide Minerals (Re-Os) -- Dendrochronology, Dwellings -- Dendrochronology, Entomology -- Dendrochronology, Fire Regimes -- Dendrochronology, Progress -- Dendrochronology, Surficial Processes -- Dendrochronology, Volcanic Eruptions -- Early Life on Earth -- Electron Spin Resonance (ESR) Dating of Coral -- Electron Spin Resonance (ESR) Dating of Fossil Tooth Enamel -- Electron Spin Resonance (ESR) Dating, General Principles -- Electron Spin Resonance Spectrometer -- Environmental Releases -- Exhumation (Thermochronology) -- Extraterrestrial Materials (K–Ar/Ar–Ar) -- Fault Zone (Thermochronology) -- Faults (U-Series) -- Feldspar, Infrared-Stimulated Luminescence -- Feldspars -- Fission Track Dating and Thermochronology -- Gene Sequencing -- Geomagnetism -- Glacial Landscape (Cosmogenic Nuclide) -- Groundwater Dating with Atmospheric Halogenated Compounds -- Historical Development of Dating Methods -- Hominid Evolution Timescale -- Hydrocarbons/Rhenium-Osmium (Re-Os): Organic-Rich Sedimentary Rocks -- Hydrothermal Ores (Thermochronology) -- Ice Cores -- Impact Glass (Fission Tracks) -- Index Fossil -- Isua Supracrustal Belt, West Greenland: Geochronology -- Jack Hills Zircon -- Kimberlites (K-Ar/Ar-Ar) -- Lacustrine Environments (14C) -- Laser Ablation Inductively Coupled Mass Spectrometer (LA ICP-MS) -- Lichenometry -- Lucy -- Lu-Hf Dating: The Lu-Hf Isotope System -- Luminescence Dating -- Luminescence Dating of Archaeological Sediments -- Luminescence Dating, Deep-Sea Marine and Lacustrine -- Luminescence Dating, Dose Rates -- Luminescence Dating, History -- Luminescence Dating, Instrumentation -- Luminescence Dating, Loess -- Luminescence Dating, Meteorites -- Luminescence Dating, Shell-Rich Deposits -- Luminescence Dating, Single-Grain Dose Distribution -- Luminescence Dating, Uncertainties and Age Range -- Luminescence, Biogenic Carbonates -- Luminescence, Coastal Sediments -- Luminescence, Colluvial Sediments -- Luminescence, Desert Dunes -- Luminescence, Earthquake and Tectonic Activity -- Luminescence, Flints and Stones -- Luminescence, Fluvial Sediments -- Luminescence, Geomorphological Processes -- Luminescence, Glacial Sediments -- Luminescence, Martian Sediments -- Luminescence, Pottery and Bricks -- Luminescence, Rock Surfaces -- Luminescence, Soils -- Luminescence, Volcanic Rocks -- Magnetic Anomalies -- Magnetic Chronology -- Magnetometer -- Magnetostratigraphic Dating -- Marine Isotope Stratigraphy -- Marine Varves -- Mass Spectrometry -- Metamorphic Terranes (K–Ar/40Ar/39Ar) -- Meteoric 10Be -- Meteorites (36Cl) -- Meteorites (Lu–Hf) -- Meteorites (U–Pb) -- Meteorites, Rubidium–Strontium, and Samarium–Neodymium Chronology -- Minerals, (40Ar-39Ar) -- Model Ages (Sm-Nd) -- Molecular Clock Calibration -- Molecular Clocks -- Molecular Clocks, Human Evolution -- Molecular Clocks, Relaxed Variant -- Molecular Dating of Evolutionary Events -- Molecular Rate Variation (Molecular Clocks) -- Molluscs, Foraminifera, and Other Carbonate Fossils -- Neutron Activation Analysis -- Noble Gas Mass Spectrometer -- Obsidian Hydration Dating -- Paleosol -- 210Pb Dating -- Peat (14C) -- Planetary Surfaces (Cratering Rate) -- Polymerase Chain Reaction DNA Amplification -- Potassium-Argon (Argon-Argon), Structural Fabrics -- Quartz -- Quartz Defects, Optically Stimulated Luminescence and Thermoluminescence -- Radiation Defect --

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Sommario/riassunto

This volume provides an overview of (1) the physical and chemical foundations of dating methods and (2) the applications of dating methods in the geological sciences, biology, and archaeology, in almost 200 articles from over 200 international authors. It will serve as the most comprehensive treatise on widely accepted dating methods in the earth sciences and related fields. No other volume has a similar scope, in terms of methods and applications and particularly time range. Dating methods are used to determine the timing and rate of various processes, such as sedimentation (terrestrial and marine), tectonics, volcanism, geomorphological change, cooling rates, crystallization, fluid flow, glaciation, climate change and evolution. The volume includes applications in terrestrial and extraterrestrial settings, the burgeoning field of molecular-clock dating and topics in the intersection of earth sciences with forensics. The content covers a broad range of techniques and applications. All major accepted dating techniques are included, as well as all major datable materials.