

1. Record Nr.	UNINA9910293145903321
Titolo	Earth observation open science and innovation // edited by Pierre-Philippe Mathieu, Christoph Aubrecht
Pubbl/distr/stampa	Springer Nature, 2018 Cham : , : Springer International Publishing : , : Imprint : Springer, , 2018
ISBN	3-319-65633-3
Edizione	[1st ed. 2018.]
Descrizione fisica	1 online resource (VIII, 332 p.) : 116 illus., 111 illus. in color
Collana	ISSI Scientific Report Series ; ; 15
Disciplina	550
Soggetti	Earth sciences Big data Remote sensing Environmental management Space sciences
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- Foreword -- Contents -- Part I Join the Geo Revolution -- The Changing Landscape of Geospatial Information Markets -- Introduction -- Rise of the Platforms -- Data as a Service -- Open Data Policies -- New Business Models -- Sensor Use Growing -- Crowdsourcing -- Disruptive Innovation -- Cloud Computing -- Business Models in Cloud Computing -- Microsoft Azure -- Amazon Web Services (AWS) -- Google Cloud Platform -- Conclusion -- References -- The Digital Transformation of Education -- Case Study: How the World Bank Group's Open Learning Campus is Partnering with Earth Observation Satellite Data to Enrich the Learning Experience -- -- Learning as an Accelerator to Achieve Development Goals -- Progress of the OLC so Far -- Flexible Pathways to Learning -- Increasing Importance of Geospatial Data -- Examples of How the OLC is Incorporating Spatial Data -- Issues Relevant to This Experience for the Earth Observation Community -- Case Study Conclusion -- References -- The Open Science Commons for the European Research Area -- Creating the European Research Area: The "Open" Approach -- Problems to Solve --

Lack and/or Incomplete Roadmaps for Research- and e-Infrastructures -- Fragmented Solutions and Policies for Access to Data and Knowledge -- Insufficient Cooperation Between Public and Private Sector -- Lack of National and European Organization Between All Stakeholders -- Many Providers Without a Single Market -- The Open Science Commons -- The European Open Science Cloud -- Open Science Commons for the EOSC -- EOSC Architecture and Services -- Realizing a Federated Approach to Research Data -- Offering of Scalable Access to and Analysis of Research Data for Reuse -- Integrating (Shared) Tools and Applications -- Provisioning of Services for Depositing Data for Resource-Bound Users -- EOSC Service Integration and Management.

EOSC Governance -- EOSC and the e-Infrastructure Commons -- The EGI Blueprint -- Core Infrastructure Platform -- Collaborative Platform -- The EGI Federated Cloud -- The Data Hub and the Open Data Platform -- EO Data Exploitation via the e-Infrastructures and EOSC -- Infrastructure Services for EO Data Exploitation -- An Example: e-Infrastructure Services to Implement the ESA Generic Exploitation Platform Open Architecture -- An Example: Integration of the Geohazard Exploitation Platform Within the EGI Infrastructure -- Conclusions -- References -- Citizen Science for Observing and Understanding the Earth -- Introduction -- Societal and Technological Trends -- Citizen Science Today: Main Areas of Activity -- Citizen Science Across Domains: Long-Running Citizen Science -- The Impact of Technology: Citizen Cyberscience -- Depth of Participation: Community Science -- Citizen Science and Earth Observation: Technical, Societal, Ethical and Policy Aspects -- Technical Aspects -- Societal and Ethical Aspects -- Citizen Science Integration into Policy -- Conclusions -- References -- Part II Enabling Data Intensive Science -- Fostering Cross-Disciplinary Earth Science Through DatacubeAnalytics -- Introduction -- Standards-Based Modelling of Datacubes -- Coverage Data Model -- Web Coverage Service -- Web Coverage Processing Service -- The Role of Standards -- Science Data Services -- Earth Observation Data Services -- Marine Science Data Service -- Climate Science Data Service -- Planetary Science Data Service -- Cross-Service Federation Queries -- Datacube Analytics Technology -- Array Databases as Datacube Platform -- Array Storage -- Array Processing -- Tool Integration -- The Role and Handling of Metadata -- Virtual Globes as Datacube Interfaces -- Related Work -- Conclusion and Outlook -- References.

Mind the Gap: Big Data vs. Interoperability and Reproducibility of Science -- Introduction: the Big Data Paradox -- It's All in the Framing! -- Towards Open (Shared) Knowledge -- The GEOSS Case -- Big Data Infrastructure Services: The GEOSS Common Infrastructure (GCI) Big Data Strategy -- Content Harmonization and Information/Knowledge Generation: The Brokering Framework -- The Brokering framework -- The DAB -- More (Value) knowledge to reduce Volume -- From Data to Knowledge: the GEOSS Knowledge Base and High-Performance Data Analytics -- The DIKW pattern -- The GEOSS Knowledge Base -- High-Performance Analytics and GEOSS -- Conclusions -- References -- Cyber-Infrastructure for Data-Intensive Geospatial Computing -- Introduction -- Settlement Mapping Tool (SMTTOOL) -- Toolbox for Urban Mobility Simulations (TUMS) -- Global Dataset -- Framework -- OD Tables -- Resolution -- Unified Network and Population Database -- Big Data -- Urban Information System (UrbIS) -- Leveraging Big Data to Understand Urban Impact on Environment and Climate -- Conclusions -- References -- Machine Learning Applications for Earth Observation -- Introduction -- What Is Machine Learning? -- Some

Existing Machine Learning Applications -- Machine Learning for Bias Correction and Cross Calibration -- Vegetation Indices -- Space-Based Measurements of HCI Relevant for Ozone Depletion -- HCI and Cly Time Series -- Bias Correction of MODIS Aerosol Optical Depth -- Data Description -- Machine Learning AOD Bias Correction -- Machine Learning for New Product Creation -- Airborne Particulates -- Tracer Correlations -- Reconstructing CH4-N2O Correlations -- Pollen Estimation -- Predicting Pollen Abundance -- Using Machine Learning for Ocean Data Products -- Dust Source Identification Using Unsupervised Classification -- Bolivia and Chile Salt Flats Dust Event. Bodele Depression Dust Event -- Characterizing Pelagic Habitats Within Coastal Waters -- Fish Catch and SOM Classes -- Some Likely Future Machine Learning Applications -- Hyper-Spectral Imaging and Machine Learning for Real Time Embedded Processing and Decision Support -- Oil Spills -- Summary -- References -- New Generation Platforms for Exploration of Crowdsourced Geo-Data -- Introduction -- Virtual Globes as the New Generation Visualization Platforms -- Virtual Globes for the Exploration of Crowdsourced Geo-Data -- Applications -- PoliCrowd -- Open Data Kit (ODK) -- NASA World Wind Java SDK -- System Architecture -- Overview of Functionalities -- Telecommunication Data Viewer -- The netCDF Data Format -- EST-WA: A Multidimensional Data Viewer -- Application of EST-WA to Explore Geo-Crowdsourced Data -- Conclusions -- References -- Part III Use Cases Open Science and Innovation -- Mapping Land Use Dynamics Using the Collective Power of the Crowd -- Concept and Context -- The Collective Power of the Crowd -- VGDI Access and Integration: The Foursquare Use Case -- What Is Next and Where Are We Headed? -- References -- The Emergence of the GeoSharing Economy -- GeoSharing Platform Requirements -- Technical Access -- Commercial and Legal Access -- Reference -- Sustainable Agriculture and Smart Farming -- Multi-Year Site-Characterization of Fields Using Advanced Data Harvesting Techniques -- Up-to-Date Crop Status Using Access to Satellite Data in Near-Real-Time -- Conclusions and Outlook -- References -- Earth Observation Data for Enterprise Business Applications -- Development of an Earth Observation Cloud Platform in Support to Water Resources Monitoring -- Introduction -- EODC: The Earth Observation Data Centre for Water Resources Management -- Pilot Services -- Closing Remarks -- References -- Putting Big Data Innovation into Action for Development.

Tracking Light from the Sky: Monitoring Rural Electrification from Space -- Tracking Poverty from Space -- Satellite-Based Yield Measurement -- Conclusion -- Mapping Floods and Assessing Flood Vulnerability for Disaster Decision-Making: A Case Study Remote Sensing Application in Senegal -- Introduction -- Why Senegal? An Example of the Critical Information Gap in Disaster Management -- Socio-Physical Vulnerability to Flooding to Senegal -- Using Big Data Information in Disaster Management -- The Future of This Approach Globally and Locally as a Practical Tool -- Conclusion -- References -- Earth Observation and Geospatial Implementation: Fueling Innovation in a Changing World -- Earth Observation Scientific Data Access, Discovery, and Challenges -- How Are Maps and Earth Observation Data Transforming Our World? -- Delivering Geospatial Data and Information Products with Web GIS -- Esri and Big Data -- Notable Solutions and Capabilities -- Conclusion -- References -- Artificial Intelligence and Earth Observation to Explore Water Quality in the Wadden Sea -- Introduction -- Inductive Learning -- Data Description -- Methods -- Results and Discussion -- Conclusions -- References -- Erratum to: Citizen Science for Observing and Understanding the Earth

-- Index.

Sommario/riassunto

This book is published open access under a CC BY 4.0 license. Over the past decades, rapid developments in digital and sensing technologies, such as the Cloud, Web and Internet of Things, have dramatically changed the way we live and work. The digital transformation is revolutionizing our ability to monitor our planet and transforming the way we access, process and exploit Earth Observation data from satellites. This book reviews these megatrends and their implications for the Earth Observation community as well as the wider data economy. It provides insight into new paradigms of Open Science and Innovation applied to space data, which are characterized by openness, access to large volume of complex data, wide availability of new community tools, new techniques for big data analytics such as Artificial Intelligence, unprecedented level of computing power, and new types of collaboration among researchers, innovators, entrepreneurs and citizen scientists. In addition, this book aims to provide readers with some reflections on the future of Earth Observation, highlighting through a series of use cases not just the new opportunities created by the New Space revolution, but also the new challenges that must be addressed in order to make the most of the large volume of complex and diverse data delivered by the new generation of satellites.
