

CONTENTS

List of Contributors	ix
Preface	xv
1 An Introduction to Big Data Analytics	1
<i>Erik Hoel</i>	
Part I Big Data Analytics Architecture	29
2 Introduction to Big Data Analytics Architecture	31
<i>Thomas Huang</i>	
3 Scaling Big Earth Science Data Systems Via Cloud Computing ...	35
<i>Hook Hua, Gerald Manipon, and Sujen Shah</i>	
4 NOAA Open Data Dissemination (Formerly NOAA Big Data Project/Program)	65
<i>Adrienne Simonson, Otis Brown, Jenny Dissen, Edward J. Kearns, Kate Szura, and Jonathan Brannock</i>	
5 A Data Cube Architecture for Cloud-Based Earth Observation Analytics	95
<i>Peter Wang, Robert Woodcock, Ronnie Taib, Matt Paget, and Alex Held</i>	
6 Open Source Exploratory Analysis of Big Earth Data With NEXUS	115
<i>Thomas Huang, Edward M. Armstrong, Nga T. Chung, Eamon Ford, Frank R. Greguska III, Joseph C. Jacob, Brian D. Wilson, Elizabeth Yam, and Alice Yepremyan</i>	

7	Benchmark Comparison of Cloud Analytics Methods Applied to Earth Observations	137
	<i>Christopher Lynnes, Michael M. Little, Thomas Huang, Joseph C. Jacob, Chaowei Phil Yang, Mahabaleshwara Hegde, and Hailiang Zhang</i>	
Part II Analysis Methods for Big Earth Data		153
8	Introduction to Analysis Methods for Big Earth Data	155
	<i>Christopher Lynnes</i>	
9	Spatial Statistics for Big Data Analytics in the Ocean and Atmosphere: Perspectives, Challenges, and Opportunities	161
	<i>Kevin A. Butler and Tiffany C. Vance</i>	
10	Giving Scientists Back Their Flow: Analyzing Big Geoscience Data Sets in the Cloud	179
	<i>Niall Robinson, Theo McCaie, Jacob Tomlinson, Tom Powell, and Alberto Arribas</i>	
11	The Distributed Oceanographic Match-Up Service	189
	<i>Shawn R. Smith, Mark A. Bourassa, Jocelyn Elya, Thomas Huang, Kevin Michael Gill, Frank R. Greguska III, Nga T. Chung, Vardis Tsontos, Benjamin Holt, Thomas Cram, and Zaihua Ji</i>	
Part III Big Earth Data Applications		215
12	Introduction to Big Earth Data Applications	217
	<i>Christopher Lynnes and Tiffany C. Vance</i>	
13	Topological Methods for Pattern Detection in Climate Data	221
	<i>Grzegorz Muszynski, Vitaliy Kurlin, Dmitriy Morozov, Michael Wehner, Karthik Kashinath, and Prabhat Ram</i>	
14	Exploring Large Scale Data Analysis and Visualization for Atmospheric Radiation Measurement Data Discovery Using NoSQL Technologies	237
	<i>Bhargavi Krishna, Kyle Dumas, and Giri Prakash</i>	
15	Demonstrating Condensed Massive Satellite Data Sets for Rapid Data Exploration: The MODIS Land Surface Temperatures of Antarctica	253
	<i>Glenn E. Grant, David W. Gallaher, and Qin Lv</i>	

16	Developing Big Data Infrastructure for Analyzing AIS Vessel Tracking Data on a Global Scale	273
	<i>Rob Bochenek, Jessica Austin, John-Marc Dunaway, and Tiffany C. Vance</i>	
17	Future of Big Earth Data Analytics.....	293
	<i>Christopher Lynnes and Thomas Huang</i>	
	Index	307