

# Table of contents

<i>List of contributors</i>	page viii
<i>Preface</i>	xiii

LINDA T. ELKINS-TANTON, ANJA SCHMIDT  
AND KIRSTEN E. FRISTAD

## **Part One Large volume volcanism: origins, features and timing**

1 Large igneous provinces and explosive basaltic volcanism	3
INGRID UKSTINS PEATE AND LINDA T. ELKINS-TANTON	
2 On the nature and consequences of super-eruptions	16
CLIVE OPPENHEIMER AND AMY DONOVAN	
3 Large igneous province locations and their connections with the core–mantle boundary	30
TROND H. TORSVIK AND KEVIN BURKE	
4 High-precision U–Pb geochronology of Phanerozoic large igneous provinces	47
SETH D. BURGESS, TERRENCE J. BLACKBURN AND SAMUEL A. BOWRING	
5 Volcanic pulses in the Siberian Traps as inferred from Permo-Triassic geomagnetic secular variations	63
VLADIMIR PAVLOV, FRÉDÉRIC FLUTEAU, ROMAN VESELOVSKIY, ANNA FETISOVA, ANTON LATYSHEV, LINDA T. ELKINS-TANTON, ALEXANDER V. SOBOLEV AND NADEZHDA A. KRIVOLUTSKAYA	

## **Part Two   Assessing gas and tephra release in the present day and palaeo-record**

6	Volcanic-gas monitoring	81
	ALESSANDRO AIUPPA	
7	Remote sensing of volcanic ash and sulfur dioxide	97
	FRED PRATA AND GEMMA PRATA	
8	Quantification of volcanic reactive halogen emissions	115
	ULRICH PLATT AND NICOLE BOBROWSKI	
9	Satellite and aircraft-based techniques to measure volcanic emissions and hazards	133
	DAVID PIERI	
10	The origin of gases that caused the Permian–Triassic extinction	147
	ALEXANDER V. SOBOLEV, NICK T. ARNDT, NADEZHDA A. KRIVOLUTSKAYA, DIMITRY V. KUZMIN AND STEPHAN V. SOBOLEV	
11	Volatile release from flood basalt eruptions: understanding the potential environmental effects	164
	STEPHEN SELF, LORI S. GLAZE, ANJA SCHMIDT AND TAMSIN A. MATHER	
12	Volatile generation and release from continental large igneous provinces	177
	HENRIK SVENSEN, KIRSTEN E. FRISTAD, ALEXANDER G. POLOZOV AND SVERRE PLANKE	

## **Part Three   Modes of volcanically induced global environmental change**

13	Volcanism, the atmosphere and climate through time	195
	ANJA SCHMIDT AND ALAN ROBOCK	
14	Volcanic emissions: short-term perturbations, long-term consequences and global environmental change	208
	TAMSIN A. MATHER AND DAVID M. PYLE	
15	Evidence for volcanism triggering extinctions: a short history of IGP contributions with emphasis on paleomagnetism	228
	VINCENT COURTILLOT, FRÉDÉRIC FLUTEAU AND JEAN BESSE	

16	Halogen release from Plinian eruptions and depletion of stratospheric ozone	244
	KIRSTIN KRÜGER, SIEFEN KUTTEROLF AND THOR H. HANSTEN	
17	The environmental and climatic impacts of volcanic ash deposition	260
	MORGAN T. JONES	
18	Oceanic anoxia during the Permian–Triassic transition and links to volcanism	275
	ELLEN K. SCHAAL, KATJA M. MEYER, KIMBERLY V. LAU, JUAN CARLOS SILVA-TAMAYO AND JONATHAN L. PAYNE	
19	Spatial and temporal patterns of ocean acidification during the end-Permian mass extinction – an Earth system model evaluation	291
	YING CUI, LEE R. KUMP AND ANDY RIDGWELL	
20	Environmental effects of large igneous province magmatism: a Siberian perspective	307
	BENJAMIN A. BLACK, JEAN-FRANÇOIS LAMARQUE, CHRISTINE SHIELDS, LINDA T. ELKINS-TANTON AND JEFFREY T. KIEHL	
	<i>Index</i>	321

Colour plates are to be found between pp. 176 and 177.