

Introduction

Courtesy of *The Lord of the Rings* trilogy, movie audiences have been drawn to a fantasy place called “Middle Earth,” an ever-changing landscape that seems almost alien. *The Lord of the Rings* may have come from the imagination of two great storytellers, author J. R. R. Tolkien and director Peter Jackson, but the landscape chosen for the movies was real. This enthralling fantasy world was actually New Zealand, a land formed and shaped by two of the most awe-inspiring, yet destructive, forces known to humans: volcanoes and plate tectonics. This was one instance where geology made a movie even more fascinating.

But geology is more than just amazing landscapes. It is rocks, minerals, fossils, processes, cycles, the physical characteristics and features of our amazing planet. We are surrounded by geology—it is in everyone’s backyard; it is at everyone’s feet. Geology describes how our environment became what it is, in effect providing a history of the planet and its universe. Ranging from the backyard to outer space, *The Handy Geology Answer Book* answers nearly 1,100 fundamental questions about this most fascinating science.

With more than 100 photographs and illustrations, *The Handy Geology Answer Book* takes you on a tour of our world. It answers questions on topics ranging from the microscopic formation of crystals to the titanic, eons-long processes that form islands, mountains, continents, and even planets. You’ll be taken back in time to uncover the mysteries of dinosaur fossils and then catapulted toward the forefront of science, where you will learn how artificial gems are synthesized and why glaciologists fret over the effects of global warming on Earth’s massive ice shelves. Along the way, you will get to know some of the famous geologists who cleared a path for future generations of scientists as they explore the mysteries of caves, mine the planet’s rich mineral resources, and try to save lives by accurately predicting earthquakes, volcanic eruptions, and tsunamis.

Once your appetite has been whetted, the final chapter of *Handy Geology* provides a solid foundation for further research, as well as helpful advice on how to begin

enjoying geology as a hobby or even a career. A helpful glossary will tell you what, for example, an alluvial fan or a talus slope is.

As scientists and writers, we have used our experience to write this book. Our backgrounds and love of nature have taken us to many of the geologic rarities of the world. We have traveled extensively across the Earth, doing fieldwork, conducting interviews with scientists, and managing many “rock hunts” of our own. We have crossed Antarctica’s Transantarctic Mountains, hiked the European Alps, traveled the oceans, and witnessed the upheaval caused by the shift of tectonic plates in New Zealand and other places. We have visited almost every geologic “hot site” in America, hiking into the Grand Canyon, walking the rim of Meteor Crater, and watching an active Cascade Range volcano. We have also explored plenty of dormant sites and experienced several California earthquakes, just to name a few of our adventures. Not that we have shunned our own backyard—we live just about where the edge of the last glacial ice sheet existed over 10,000 years ago, right near the famous New York Finger Lakes, where deep troughs were carved by glacial advances and retreats over millions of years.

In part, this book represents a distillation of what we discovered during our travels. And it answers hundreds of basic questions on that most interesting of topics—planet Earth. So sit back, grab your rock hammer and hand lens, and enjoy the scenery.