



## Exercises in Physical Geology

*By W. Kenneth Hamblin, James D. Howard*

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A laboratory manual for the introductory course in Physical Geology, suitable for use with any text for the lab portion of the course. A full-color manual -- with an elaborate art program, new maps, and excellent author-developed photos. Offered at the freshman level in both 2 and 4 year schools. Departments: geosciences, earth sciences, natural/physical science, environmental science, and sometimes in geography.

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## **Editorial Review**

### **From the Publisher**

The top-seller for thirty years running with over one million copies sold, this lab manual represents by far the best collection of photos of rocks and minerals, and far and away the most superior compilation of exercises available. With exercises using maps, aerial photos, satellite imagery and other materials, the ninth edition of this classic provides exercises that encompass all the major geologic processes as well as the identification of rocks and minerals.

### **From the Back Cover**

Contains the best collection of photos of rocks and minerals, and the most superior compilation of exercises available. With exercises using maps, aerial photos, satellite imagery, and other materials, this book provides exercises that encompass all the major geologic processes as well as the identification of rocks and minerals. Includes new computer generated shaded relief maps, new Landsat images and aerial photographs, and a series of new recently released images of the seafloor. Covers divergent, transform, and convergent plate boundaries, as well as hotspots and mantle plumes.

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This is the eleventh edition of this laboratory manual that was first published in 1964. During the intervening 37 years, our knowledge of the forces that shape our planet has grown exponentially. The revolutionary theory of plate tectonics is firmly established and provides a framework for learning about Earth's dynamics and the interrelationships between moving tectonic plates, mountain building, the origin of ocean basins, and the evolution of continents.

New technology permits us to see Earth from space, image the ocean floor, and measure directly the motion of tectonic plates. We can see in one synoptic view the surface of an entire continent and map ocean currents, temperatures, and vegetation from satellites orbiting in space. During no other period has there been so much exploration and development of new knowledge about Earth. For this reason, we have revised this manual in an attempt to incorporate the new theories and discoveries.

The objectives we set forth in the first edition still stand:

- \* To give students experience in examining geologic data and formulating hypotheses to explain observed facts.
- \* To provide an opportunity to continue laboratory-type work outside of class so students can prepare adequately for lab sessions and review work independently.
- \* To give laboratory instructors maximum latitude in their instruction by providing abundant material from which they can select for their own specific objectives. **NEW TO THIS EDITION**

Every exercise has been carefully updated and checked for accuracy. New questions and problems were developed, where appropriate, but previous problems that have "stood the test of time" have been retained. Examples of changes include extensive use of new computer-generated shaded relief maps, new Landsat images and aerial photographs, and various new remote-sensing images. We have, however, retained many of the classic maps and aerial photographs that have served effectively as standard exercises for many years. We have also made some significant changes in organization so that review and discussion of the basic principles establish a solid background for problem solving. **Rocks and Minerals**

Most of the photographs of rocks and minerals are the same as those used in the previous edition, but some have been replaced where photographs of better specimens were obtainable. This material is intended as reference material for comparison with laboratory specimens. Photographs, of course, can never replace study of actual hand specimens, but they are useful as a guide and reference in the study of physical properties of minerals and textures of rocks. Maps, Aerial Photographs, and Remote Sensing Images

Maps, aerial photographs, and various types of remote sensing images are the fundamental tools of geologic research and are naturally the basic materials in laboratory work of physical geology. The advances in geology during the last several decades have brought about profound changes in the making of maps. As a result of the space program, we now have sophisticated satellite imagery of Earth's surface and radar images that can "see through" clouds and vegetation cover. With remote sensing, we can also see the detailed landscape of the ocean floor and recognize features as small as a submerged boat. We can observe what was once unseen, and we can view the surface features of our planet from exciting new perspectives. Landsat images of the earth can be enhanced by the computer—enlarged, manipulated in tone and color, and even reconstructed to produce stereoscopic images. In addition, most of the United States has been photographed with high-altitude infrared photography, and radar images have been made of large areas of North America. These exciting new images are the basic data for many of the exercises in the tenth edition.

Perhaps the most significant recent advance in mapmaking has been the development of digital shaded relief maps that show the surface features of Earth in relief and remarkable detail. Since graphic representations of Earth's surface features are fundamental to studying and understanding geology, we introduce students to these new maps and images and involve them in the interpretation of the geologic processes revealed by each. Structural Geology

We have retained the series of diagrams illustrating the major structural features and their outcrop patterns. Portions of the geologic map of the United States have been retained from previous editions, and new maps, radar images, and computer-enhanced Landsat images have been added in the exercise section. Plate Tectonics

The theory of plate tectonics has influenced every aspect of geology and has focused our attention on the global aspects of the science. To give students experience in analyzing geologic features on a global scale, we include a large physiographic map of Earth that serves as a basis for exercises in plate tectonics, major structural features of the continents, and geology of the ocean floor. Seismology and Earth's Interior

We have retained the exercise in seismology that introduces students to the way geologists study Earth's interior. Problems in seismic stratigraphy and the study of shallow geologic structures give students a chance to work with seismic records. This exercise also includes studies of P and S wave shadow zones so students can see how scientists determine the nature of Earth's deep internal structure. In addition, we have added an exercise utilizing interferometric maps enabling the student to study surface deformation associated with earthquakes. Planetary Geology

The exploration of the planets has added yet another dimension to the study of Earth because it permits us to compare and contrast the geologic systems of other planetary bodies with those of our planet. We have revised this section to emphasize detailed examples of the new images of Mars and Europa, with resolutions of several tens of meters, permitting us to see features never seen before. The study of other planetary bodies serves as contrasts to the geologic systems on Earth.

## **Users Review**

**From reader reviews:**

**Inocencia Hensley:**

Nowadays reading books be than want or need but also be a life style. This reading behavior give you lot of advantages. Advantages you got of course the knowledge the particular information inside the book that improve your knowledge and information. The info you get based on what kind of guide you read, if you want attract knowledge just go with education and learning books but if you want really feel happy read one together with theme for entertaining such as comic or novel. The actual Exercises in Physical Geology is kind of e-book which is giving the reader capricious experience.

**Dewayne Campbell:**

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**Marissa Wegener:**

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**Phillip Elliott:**

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