

Exploring Earth Science, 2e

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Detailed List of New Features

NEW IN THE SECOND EDITION The second edition of Exploring Geology represents a significant revision, with every chapter receiving additions and improvements, including 188 new photographs. Some changes will be obvious, while others are more subtle but nevertheless substantial. The style, approach, and sequence of chapters is unchanged, but every chapter received new photographs, many revised figures, major to minor editing of text blocks, and, in some cases, reorganization. We revised many text blocks to improve clarity and conciseness, or to present recent discoveries and events. Most chapters contain the same number and order of two-page spreads, but one chapter gained two two-page spreads and another had two spreads completely revised. Many sections of two-page spreads were revised in content and layout, such as by the addition of a photograph not in the previous edition. Nearly all changes were made in response to comments by reviewers and students. The most important revisions are listed below:

This edition features completely different fonts from the previous edition. The new fonts were chosen partly to improve the readability on portable electronic devices, while retaining fidelity to a quality printed book. This font replacement resulted in countless small changes in the layout of individual text blocks on every two-page spread. In addition to replacing all of the fonts within the text, all figure labels were replaced with the new font, a process that required opening, editing, and commonly resizing every illustration that had text, as in the axes of graphs. In addition, all labels were incorporated into the actual artwork, rather than overlaying them on the artwork using the page-layout program, as was done for many figures in the previous edition. This involved adding labels to hundreds of illustrations, but it has the benefit of having every label as an integral part of its associated art file, a useful feature for constructing PowerPoint files.

This edition contains 188 new photographs, with a deliberate intention to represent a wider geographic diversity and to provide more detail and clarity about various processes and features, whether on land, in the atmosphere, and in the water. Most of these new photographs represent upgrades of existing photographs from the previous edition, but a number are new photographs in the layout. Also, for this edition, we individually reprocessed nearly all photographs that were derived from scanned slides, using technology and techniques that were not available when the original scanned versions were generated and processed. This reprocessing involved opening up the original high-

resolution scans or digital photograph and using modern image-processing software to correct brightness, contrast, and color balance, and to remove visual noise. The resulting improvements will be noticeable for many images in the printed book, but they are more conspicuous in the digital e-book and especially in the high-resolution images we provide instructors for use in classrooms.

This edition contains many new and replaced figures and even more that were lightly revised, such as replacing fonts. Figures from the first edition were replaced with new versions to update information so that it is more recent, to improve student understanding of certain complex topics, and for improved appearance. All fonts were replaced in every figure that has text.

This edition contains two new two-page spreads on sedimentary environments and a new section on impact craters. We also thoroughly revised the coverage of climate change, more prominently featuring recent climate change at the start of the discussion. This is followed by a new section that discusses the types of climate proxies, using a more geologic, photograph-based approach in place of the previous collection of small graphs of proxies. In the next spread, which covers factors that could cause climate change, the role of CO₂ was moved up front to again start the discussion focused on factors involved in recent climate change, followed by those that affect climate on geologic time scales.

Many two-page spreads have been extensively revised with improved layout, illustrations, and text. In addition to the new or revised illustrations, we updated text to reflect new ideas or data. For example, we updated information on Pluto, comets, satellite temperatures, sea-level rise, and many other relatively minor data points.

Throughout the book, we added numbers to most text boxes to guide students to read the text boxes in a specific order. We also renumbered many figure numbers so that they are in the same order as the newly numbered text boxes. For all chapter ending Investigations, we replaced numbers with letters in the Procedures lists to avoid confusion with newly numbered text boxes.

Every box with the learning objectives was changed from "Before You Leave This Page Be Able To" to simply "Before You Leave This Page." This is more concise, and opened up room on nearly every two-page spread.

Chapter by Chapter Changes

CHAPTER 1 received a moderate revision, mostly involving nine new photographs (five replacing existing ones) and the reprocessing of most other photographs. The investigation received four additional photographs to depict important features students need to consider in their deliberations. The chapter also has one revised illustration that now incorporates an actual photograph of Pluto.

CHAPTER 2 received a light revision, with eight new photographs, mostly of rocks and mineral resources. Some other photographs were processed from the original scans. Fonts were replaced throughout, resulting in many small changes in wording and layout, as occurred in every chapter.

CHAPTER 3 was heavily revised, featuring 36 new photographs and two new two-page spreads that present an early, visual overview of sedimentary environments on land, near shorelines, and in the ocean. Two new page-spanning illustrations and 14 additional photos accompany this new material. Two of the new photographs are from the Franciscan of California, and are accompanied by a new, brief introduction to melange. Other new photographs are mostly from Florida, Texas, and New Mexico.

CHAPTER 4 contains nine new photographs of rocks, fossils, and environments. It has a new section on impact craters accompanied by three new illustrations. It also now incorporates a new photograph and modified discussion of concretions. Several sections received significant edits.

CHAPTER 5 on plate tectonics is mostly unchanged, but every illustration with text was edited to replace the fonts. Several maps were revised, including the one showing North American transform faults.

CHAPTER 6 has 14 new or replaced photographs representing more diverse locations, including Joshua Tree National Park. It has a new photograph of the Valles Caldera and a number of reprocessed ones. Two photographs of Augustine pyroclastic eruptions were reprocessed and re-cropped to better convey the vertical extent of the eruptions. In addition to font changes, the chapter has two rebuilt illustrations.

CHAPTER 7 includes eight new photographs of structures and landscape features, including ones in a heavily revised section showing features related to erosion of tilted layers. There is also a new short section on erosion of fault scarps, accompanied by a new photograph. Several illustrations were moderately revised, mostly ones showing seismic waves.

CHAPTER 8 contains eight new photographs illustrating the landscape appearance of different types of rocks. Several sections were reordered and heavily edited around the new photographs. A map of sedimentary basins was revised to better display the geographic features in the area covered by each basin.

CHAPTER 9 on sculpting landscapes was heavily revised, with 24 new photographs of weathered limestone, caves, karst topography, and problem soils. The new photographs are mostly from Florida, Texas, and Carlsbad Caverns National Park. The new photographs of Carlsbad illustrate the size of the cavern better than most textbook images we have seen. The section on trading location for time was vastly improved through changes in layout and a new photograph from Monument Valley that perfectly illustrates the concept.

CHAPTER 10 contains 10 new photographs of soils and slopes, including new photographs specifically retaken of the Slumgullion Landslide and a new computer-generated 3D-perspective showing the 2017 Big Sur landslide.

CHAPTER 11 has 25 new photographs, mostly of coastal regions of Florida and glacial features of the western U.S. and Alaska. The chapter was renamed using coasts instead of shorelines, and text and headings were changed throughout to reflect this change.

CHAPTER 12 on streams, flooding, and groundwater now features 15 new photographs of streams and stream-related features. There are newly inserted photographs of cutbanks, point bars, and entrenched meanders, accompanied by changes in layout and text editing to accommodate the new images. One photograph of a spring was deleted. All the graphs and maps were revised for new fonts and other improvements, such as arrow colors depicting groundwater flow.

CHAPTER 13 is the first of the atmosphere chapters, and received only minor revisions. It contains five new photographs. Each illustration, including each of the many graphs, was edited for the change in fonts and incorporation of labels in the art files.

CHAPTER 14 was for the most part lightly revised, except for font changes in all the illustrations. There are three new versions of figures showing upper-level polar circulation and two new versions of global wind patterns and the Coriolis effect. There is one new photograph, and the investigation has a new layout.

CHAPTER 15 has a number of new versions of illustrations and one new photograph. Globes showing humidity were rebuilt and re-rendered, with a clearer legend. There are new versions of figures showing Rossby waves, clouds, freezing rain, and sleet. Global amounts of precipitation are now shown with three globes rather than one flat map. As for all the globes in the book, the authors provide a media file for every globe shown.

CHAPTER 16 had minor revisions on most two-page spreads, but major revisions on some. Major revisions

included sections about lightning and upper-level lightning phenomena, where in both cases text was separated from the figures to improve readability and for use in presentation software. The Investigation was heavily revised to include data and discussion of upper-level airflow patterns. The chapter has three new photographs.

CHAPTER 17 features, in addition to all the font changes, several newly redone illustrations, such as on global wind directions and the Southern Oscillation. We revised the labels, layout, and order of globes showing ocean currents. There are two new photographs.

CHAPTER 18 displays major revisions to figures and some two-page spreads. All the climate globes, of which there are many, were rebuilt using new 3D files and re-rendered. Likewise, all figures with part of a globe were redrawn using the new renders. We updated a number of figures to show the most current data, such as on sea-level rise, extent of Arctic sea ice, global temperatures, and CO₂. We redid the first two spreads on climate change, aiming to consolidate the discussion of recent climate change at the start of the discussion, followed by climate change over geologic timescales. Graphs of proxies were replaced with photographs to provide a more geologic approach and to better convey the diversity of types of climate proxy data. The role of CO₂ was moved up in the discussion of the possible causes of climate change, with the intent of again leading with recent climate change and then moving to long-term climate changes. A graph of sunspot data was replaced with a photograph.

CHAPTER 19 had moderate revisions, with the addition of four new images depicting more recent images of Pluto, nebulae, and a comet. We added or refined the discussions of Pluto, Ceres, comets, the age of the solar system, and the number of moons of Jupiter, each reflecting current information.

CHAPTER 20 on the Universe had very minor revisions, but fonts on the many text rich illustrations were replaced, which often involved repositioning and changing layout of the text. Some figures received minor additional revisions.

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