

PHOTO CREDITS

Chapter 1

Pages 2–3: Jaques Descloîtres/MODIS Land Rapid Response Team/NASA/Visible earth; page 2: (inset) NG Maps; page 4: Courtesy NASA; page 5: (top) Stacy Gold/NG Image Collection; (left) Todd Gipstein/NG Image Collection; (right) Norbert Rosing/NG Image Collection; (center) Nobert Rosing/NG Image Collection; page 8: Courtesy NOAA; page 9: (top) Courtesy NASA; (center) Todd Gipstein/NG Image Collection; (bottom) Peter Carsten/NG Image Collection; page 10: Christopher Knight/NG Image Collection; page 11: James Stanfield/NG Image Collection; page 12: (top left) Courtesy NASA; (center) Peter Carsten/NG Image Collection; (top right) Richard Nowitz/NG Image Collection; page 13: (left) Ira Block/NG Image Collection; (right) Ira Block/NG Image Collection; page 14: (top) Courtesy USGS; (center left) Courtesy NOAA; (center right) Richard Perry/The New York Times/Redux Pictures; page 15: Todd Gipstein/NG Image Collection; page 17: Bridgeman Art Library/Getty Images; page 20: (top) Courtesy NASA; page 24: (top) Courtesy NASA; (bottom) Bridgeman Art Library/Getty Images; page 25: Courtesy NASA

Chapter 2

Pages 28–29: ©AP/Wide World Photos; page 30: SPL/Photo Researchers, Inc.; page 31: Todd Gipstein/NG Image Collection; page 33: Jonathan Blair/NG Image Collection; page 34: Pritt Vesilind/NG Image Collection; page 35: (top left) David Edwards/NG Image Collection; (center left) Rich Reid/NG Image Collection; (bottom left) Sam Kittner/NG Image Collection; (top right) Rich Reid/NG Image Collection; (bottom right) Jonathan Blair/NG Image Collection; page 37: Courtesy NASA; page 38: Jodi Cobb/NG Image Collection; page 39: Rich Reid/NG Image Collection; page 41: Norbert Rossing/NG Image Collection; page 42: (top) Norbert Rossing/NG Image Collection; (bottom) Rich Reid/NG Image Collection; page 44: Jian Chen/The Stock Connection/Science Faction/Getty Images; page 45: Jimmy Chin/NG Image Collection; (inset) NG Maps; page 47: (top) Paul Zahl/NG Image Collection; (bottom left) Jodi Cobb/NG Image Collection; page 48: Jimmy Chin/NG Image Collection; page 49: (bottom) Norbert Rossing/NG Image Collection

Chapter 3

Pages 50–51: Courtesy NASA; page 52: (left) Steve Raymer/NG Image Collection; page 52: (right) Stephen J. Krasemann//DRK Photo; page 53: (top) Courtesy NOAA; (center left) Craig Aurness/Westlight/NG Image Collection; (center right) Tim Laman/NG Image Collection; (bottom left) Peter Carsten/NG Image Collection; (bottom left inset) NG Maps; (bottom right) Stephen J. Krasemann//DRK Photo; page 55: John Eastcott and Yva Momatiuk/NG Image Collection; page 56: NASA/SPL/Photo Researchers, Inc.; page 58: Gordon Wiltzie/NG Image Collection; page 59: Courtesy NOAA; page 64: Taylor S. Kennedy/NG Image Collection; page 65: (top) Sarah Leen/NG Image Collection; (bottom) Taylor S. Kennedy/NG Image Collection; page 67: (top) NASA/NG Image Collection; (bottom) John Dunn/Arctic Light/NG Image Collection; page 68: (top left) John Dunn/Arctic Light/NG Image Collection; (top right) Jeremy Woodhoue/Masterfile; (bottom) Jimmy Chin/NG Image Collection; page 69: (top) Courtesy NASA; (bottom) MODIS Land Rapid Response Team/Courtesy NASA; page 75: Jeremy Woodhoue/Masterfile; page 76: (top left) ©Corbis Digital Stock; (bottom) DAJ/Getty Images; page 77: (top left) Paul Mason/Getty Images; (top right) Courtesy NOAA; (bottom right) Photodisc/Getty Images; page 78: (top) Stephen Alvarez/NG Image Collection; (bottom) NASA/SPL/Photo Researchers, Inc.; page 80: John Eastcott and Yva Momatiuk/NG Image Collection

Chapter 4

Pages 82–83: Gerd Ludwig/NG Image Collection; page 82: (inset) NG Maps; page 85: (left) Medford Taylor/NG Image Collection; (right) Richard Nowitz/NG Image Collection; page 87: (center) Paul Nicklen/NG Image Collection; page 88: (top left) Raul Touzon/NG Image Collection; (top right) Mark Thiessen/NG Image Collection; (bottom left) Joyce Dale/NG Image

Collection; (bottom right) Paul Nicklen/NG Image Collection; page 95: (top) Kike Calvo/V&W/The Image Works; (just below top) Richard Nowitz/NG Image Collection; (center) George Steinmetz/NG Image Collection; (bottom) Tim Laman/NG Image Collection; page 97: (top) Ira Block/NG Image Collection; (bottom) George F. Mobley/NG Image Collection; page 99: Joyce Dale/NG Image Collection; page 100: Michael Melford/NG Image Collection; page 101: Raymond Gehman/NG Image Collection; page 102: (top) Courtesy NASA/EPA. Provided by Dr. Dale Quattrochi, Marshall Space Flight Center.; (bottom left) Randy Olson/NG Image Collection; page 103: (top) Randy Olson/NG Image Collection; (bottom) Raymond Gehman/NG Image Collection; page 112: Courtesy Environmental Analytical Systems; page 116: (top) John Eastcott and Yva Momatiuk/NG Image Collection; (center) Michael Melford/NG Image Collection; (bottom) Richard Nowitz/NG Image Collection; page 117: Courtesy Environmental Analytical Systems

Chapter 5

Pages 120–121: YURI CORTEZ/AFP/Getty Images; page 120: (inset) NG Maps; page 123: (top left) NG Maps; (top right) Bill Curtsinger/NG Image Collection; (center right) Norbert Rosing/NG Image Collection; (bottom left) Dr. Maurice G. Hornocker/NG Image Collection; (bottom right) Jodi Cobb/NG Image Collection; page 129: Courtesy Arthur N. Strahler; page 133: Adalberto Rias Szalay/Sexto Sol/Photodisc/Getty Images; page 134: (center left) John Eastcott and Yva Momatiuk/NG Image Collection; (center right) Carsten Peter/NG Image Collection; (bottom left) John Eastcott and Yva Momatiuk/NG Image Collection; (bottom right) Todd Gipstein/NG Image Collection; page 135: Tim Laman/NG Image Collection; page 136: James A. Sugar/NG Image Collection; page 137: Courtesy NASA; (top right inset) NG Maps; page 141: Annie Griffiths Belt/NG Image Collection; page 144: Annie Griffiths Belt/NG Image Collection; page 146: (top) NG Maps; (bottom left) James P. Blair/NG Image Collection; (bottom right) Sarah Leen/NG Image Collection; page 147: (top left) ©Dick Blume/Syracuse Newspapers/AP/Wide World Photos; (top right) Nicholas Devore III/NG Image Collection; page 148: (bottom left) Courtesy USGS, Branch of Quality Systems; page 149: (top) Courtesy University of Wisconsin Space Science and Engineering Center; (bottom) Jodi Cobb/NG Image Collection; page 150: Tim Laman/NG Image Collection; page 151: ©Dick Blume/Syracuse Newspapers/AP/Wide World Photos

Chapter 6

Pages 154–155: Robb Kendrick/NG Image Collection; page 156: (bottom) ©AP/Wide World Photos; (inset) NG Maps; page 157: (top left) Courtesy Taylor Instrument Company and Wards Natural Science Establishment, Rochester, New York; (top right) Nick Caloyianis/NG Image Collection; page 158: Courtesy Taylor Instrument Company and Wards Natural Science Establishment, Rochester, New York; page 162: (top) Skip Brown/NG Image Collection; (bottom) JPL/Courtesy NASA; page 163: (right) Skip Brown/NG Image Collection; (bottom left) Gordon Wiltzie/NG Image Collection; page 164: David Hume/Reportage/Getty Images; page 165: Courtesy Janice Coen, National Center for Atmospheric Research; page 176: Courtesy NOAA; page 177: Courtesy NASA; page 178: (top) Nick Caloyianis/NG Image Collection; (bottom) Skip Brown/NG Image Collection; page 179: Courtesy NOAA; page 180: Courtesy Taylor Instrument Company and Wards Natural Science Establishment, Rochester, New York

Chapter 7

Pages 182–183: Christopher J. Morris/©Corbis; page 188: Steve Raymer/NG Image Collection; page 190: Steve Raymer/NG Image Collection; page 192: (left) Thomas J. Abercrombie/NG Image Collection; (right) Michael Nichols/NG Image Collection; (inset) NG Maps; page 194: Thomas J. Abercrombie/NG Image Collection; page 197: Courtesy NASA; page 198: Courtesy NASA; (inset) NGS Maps; page 203: Courtesy NOAA; page 204: (top) Courtesy NOAA; (center) Data courtesy of Rick Lumpkin (NOAA AOML). Joanna Gyory, Elizabeth Rowe, Arthur J. Mariano, Edward H. Ryan. Figure 2, The Florida Current, Ocean Surface Currents.; (bottom) Courtesy

NASA; page 206: Courtesy NASA; page 209: Courtesy Otis B. Brown, Robert Evans, and M. Carle, University of Miami, Rosenstiel School of Marine and Atmospheric Science, Florida, and NOAA/Satellite Data Services Division; page 210: (bottom left) NG Maps. Data from NOAA/NESDIS/NCDC/Satellite Data Services Division (SDSD) compiled by UNEP/GRID; (bottom right) Courtesy NASA; page 211: (top) Courtesy Otis B. Brown, Robert Evans, and M. Carle, University of Miami, Rosenstiel School of Marine and Atmospheric Science, Florida, and NOAA/Satellite Data Services Division; page 212: (top) Richard Nowitz/NG Image Collection; (top inset) NG Maps; (bottom left) Michael Nichols/NG Image Collection; (bottom right) Courtesy NASA; page 213: (left) Courtesy NASA; (right) Courtesy Department of Atmospheric Sciences, University of Illinois at Urbana-Champaign

Chapter 8

Pages 216–217: Patric McFeeley/NG Image Collection; page 218: (center left) David Doubilet/NG Image Collection; (center left inset) NG Maps; (right) NG Image Collection; (bottom left) John Dunn/NG Image Collection; (bottom left inset) NG Maps; (bottom right inset) NG Maps; page 219: David Doubilet/NG Image Collection; page 220: Courtesy NOAA; page 224: Courtesy NOAA; page 225: Courtesy Naval Research Laboratory; page 226: Courtesy NOAA; page 227: Courtesy NOAA; page 231: Courtesy David Dempsey, San Francisco State University; page 235: Raul Touzon/NG Image Collection; page 236: Courtesy NOAA; page 239: (top) Courtesy NASA; (bottom) Steve Pace/Envision; page 240: (top) John Dunn/NG Image Collection; (bottom) Courtesy NOAA; page 241: Courtesy NASA

Chapter 9

Pages 244–245: AFP/Getty Images; page 247: Courtesy NOAA; (inset) NG Maps; page 249: Courtesy NASA; pages 250–251: NG Image Collection; page 252: Courtesy NASA and National Hurricane Center. Image published on Wikipedia.; page 254: NG Maps; page 255: NG Image Collection; page 256: (top) Ty Harrington/FEMA News; (just below top) Andrea Booher/FEMA; (center) FEMA News Photo; (just below center) Mark Wolfe/FEMA; (bottom) FEMA News Photo; page 257: Annie Griffiths Belt/NG Image Collection; page 259: (top left) Courtesy NOAA; (top right) ©Chris Hanson/3D Nature LLC; (center right) ©Chris Hanson/3D Nature LLC; (bottom) Courtesy NOAA; page 260: Harold F. Pierce/NASA/NG Image Collection; page 261: Courtesy NOAA; page 262: (left) Jocelyn Augustino/FEMA; (right) ©AP/Wide World Photos; page 263: (center) NG Maps; (bottom) NG Maps; page 264: (top) Courtesy NOAA; (bottom) Courtesy NASA; page 265: (top) Courtesy NASA and National Hurricane Center. Image published on Wikipedia; (center) ©AP/Wide World Photos; page 267: NG Maps

Chapter 10

Pages 268–269: Gandee Vasan/Getty Images; page 270: Phil Shcermeister/NG Image Collection; page 271: Chris Johns/NG Image Collection; page 277: Dan Westergren/NG Image Collection; page 278: Courtesy NOAA; page 280: Jason Edwards/NG Image Collection; page 282: Jason Edwards/NG Image Collection; page 284: Richard Olsenius/NG Image Collection; page 285: Priit Vesilind/NG Image Collection; page 287: Courtesy NOAA; page 289: Courtesy NOAA; page 290: (top left) AFP PHOTO/YASSER AL-ZAYYAT/Getty Images; (top right) Peter Carsten/NG Image Collection; (bottom left) John McCombe/Getty Images; (bottom right) Priit Vesilind/NG Image Collection; page 291: (top) Win Henderson/FEMA; (bottom) Greg Henshal/FEMA; (bottom inset) NG Maps; page 293: (top) Courtesy NOAA; (bottom) Priit Vesilind/NG Image Collection; page 294: Phil Shcermeister/NG Image Collection; page 295: Greg Henshal/FEMA

Chapter 11

Pages 298–299: Brueghel, Pieter the Elder, *Hunters in the Snow*, January, 1565/Kunsthistorisches Museum, Vienna, Austria/The Bridgeman Art Library; page 300: (center left) John Dunn/NG Image Collection; (center right) Jim Richardson/NG Image Collection; (bottom left) George F. Mobley/NG Image Collection; (bottom right) Tim Laman/NG Image

Collection; page 301: (center left) John Dunn/NG Image Collection; (center right) Rich Reid/NG Image Collection; (bottom left) Peter Carsten/NG Image Collection; (bottom right) James P. Blair/NG Image Collection; page 306: Courtesy NASA; page 308: Courtesy NASA; page 312: (top) George Steinmetz/NG Image Collection; (center) Tim Laman/National Geographic Society; page 313: Barbara Summey, NASA/GSFC Visualization Analysis Laboratory/NG Image Collection; page 316: (top) Courtesy NASA; (bottom) Peter Carsten/NG Image Collection; page 317: (top left) James P. Blair/NG Image Collection; (top right) NG Maps

Chapter 12

Pages 320–321: Courtesy NASA; page 323: (left) Courtesy NASA; (right) Courtesy NASA; page 324: Raymond Gehman/NG Image Collection; page 326: ©AP/Wide World Photos; page 328: Andrew McConnell/Alamy; page 329: (top) Karsten Wrobel/Alamy; (bottom) Raymond Gehman/NG Image Collection; page 331: Richard Cummins/SUPERSTOCK; page 332: Raymond Gehman/NG Image Collection; page 335: Sisse Brimberg/NG Image Collection; page 336: David Alan Harvey/NG Image Collection; page 338: Andre Jenny/The Image Works; page 340: Brand X/SUPERSTOCK; page 342: Gerd Ludwig/NG Image Collection; page 343: Hinrich Baesemann/Landov LLC; page 344: Maria Stenzel/NG Image Collection; page 345: (center) Maria Stenzel/NG Image Collection; (bottom) Hinrich Baesemann/Landov LLC; page 346: (top left) Kari Niemelainen/Alamy; (center left) James P. Blair/NG Image Collection; (center right) Peter Essick/NG Image Collection; (bottom) Jim Richardson/NG Image Collection; page 347: (top left) Ted Spiegel/NG Image Collection; (top right) Will & Deni McIntyre/Photo Researchers, Inc.; (top right inset) NG Maps; (bottom left) Stephen Alvarez/NG Image Collection; (bottom right) Doug Cheeseman/Alamy; page 348: (top) Johnny Johnson/The Image Bank/Getty Images; (center) Raymond Gehman/NG Image Collection; (bottom) Karsten Wrobel/Alamy; page 349: Gerd Ludwig/NG Image Collection

Chapter 13

Pages 352–353: Tim Laman/NG Image Collection; page 355: (left) Peter Essick/National Geographic Society; (right) Taylor S. Kennedy/NG Image Collection; page 356: (top) NG Maps; (left) Peter Essick/NG Image Collection; (center right) NGM Art/NG Image Collection; page 357: Durieux/Sipa Press; page 358: Courtesy NOAA; page 359: Courtesy NOAA; page 360: (top left) Courtesy Gregory W. Shirah, NASA/GSFC/Scientific Visualization Studio/NG Maps; (top right) Courtesy NOAA; page 361: Courtesy NASA; page 363: Courtesy NASA; page 364: (bottom left) Nobert Rosing/NG Image Collection; (bottom right) Courtesy NASA; page 365: (left) Stephen Alvarez/NG Image Collection; (right) Ronen Zvulun/Reuters/Landov LLC; page 371: Courtesy NASA; page 372: Richard Nowitz/NG Image Collection; page 373: (center) Jack Stephens/Alamy; page 374: (left) James P. Blair/NG Image Collection; (right) John Eastcott and Yva Momatiuk/NG Image Collection; page 375: Courtesy NASA; page 376: (top) Todd Gipstein/NG Image Collection; (bottom) Courtesy National Oceanic and Atmospheric Administration Paleoclimatology Program/Department of Commerce; page 377: Michael Nichols/NG Image Collection; page 379: Karen Kasmauski/Getty Images; page 380: (top) Simon Fraser/SPL/Photo Researchers, Inc.; (center) Durieux/Sipa Press; page 381: Courtesy National Oceanic and Atmospheric Administration Paleoclimatology Program/Department of Commerce; page 382: Courtesy NOAA; page 383: (top) James P. Blair/NG Image Collection; (bottom) John Eastcott and Yva Momatiuk/NG Image Collection

Chapter 14

Pages 384–385: Albert Moldvay/NG Image Collection; page 386: Courtesy NASA; page 387: Courtesy NOAA; page 389: Courtesy NASA; page 390: (left) Skip Brown/NG Image Collection; (right) Cameron Davidson/NG Image Collection; page 391: (top) Jodi Cobb/NG Image Collection; (bottom) ©Arno Balzarini/epa/Corbis Images; page 392: (top) ©Arno Balzarini/epa/Corbis Images; (bottom) ©AP/Wide World Photos; page 394: ©AP/Wide

World Photos; page 395: John Eastcott and Yva Momatiuk/NG Image Collection; page 396: Alain Nogue's/Corbis Sygma/©Corbis; (inset) NG Maps; page 397: Photo by John McColgan; Courtesy Bureau of Land Management, Alaska Fire Service; page 398: Courtesy NASA; page 399: Daniel Berehulak/Getty Images; page 404: (left) Gerd Ludwig/NG Image Collection; (right) Al Petteway/NG Image Collection; page 405: (top left) Michael Nichols/NG Image Collection; (top right) Vincent J. Musi/NG Image Collection; (bottom left) M. Collier/DRK Photo; (bottom right) Courtesy NASA; page 407: (top) M. Collier/DRK Photo; (bottom) James P. Blair/NG Image Collection; page 408: (top) ©AP/Wide World Photos; (center) Gerd Ludwig/NG Image Collection; (bottom left) Alain Nogue's/Corbis Sygma/©Corbis

Chapter 15

Pages 412–413: Peter Carsten/NG Image Collection; page 414: Courtesy National Archives; page 415: Courtesy NOAA; page 417: (left) Annie Griffiths Belt/NG Image Collection; (right) James P. Blair/NG Image Collection; page 421: Courtesy NOAA; page 422: Courtesy NOAA; page 423: (top left) Courtesy NOAA; (top right) Courtesy WSI Corporation; (bottom right) Courtesy NOAA; page 426: Courtesy NOAA; page 430: Courtesy NOAA; page 431: (top)

Courtesy NOAA; (bottom) Courtesy WSI Corporation; page 435: Courtesy NOAA; page 436: ©AP/Wide World Photos; page 437: Courtesy NOAA; page 439: Courtesy NOAA

Chapter 16

Pages 440–441: Paul Nicklen/NG Image Collection; page 442: (center left) James P. Blair/NG Image Collection; (center right) Jodi Cobb/NG Image Collection; (bottom left) Roberto Campos/AFP/Getty Images; (bottom right) James P. Blair/NG Image Collection; page 445: (top left) Ira Block/NG Image Collection; (top right) Sam Kittner/NG Image Collection; (center) Courtesy NASA/GSFC MODIS Rapid Response Team; page 453: Courtesy NASA/GSFC/LaRC/JPL, MISR Team; page 454: Ira Block/National Geographic Society; (inset) NG Maps; page 455: Courtesy NASA/GSFC/University of Arizona; page 463: Courtesy NASA; page 466: Juan Velasco/National Geographic Society; page 467: (top) Karen Kasmauski/NG Image Collection; (center) Peter Krogh/National Geographic Society; (bottom) Dick Durrance II/National Geographic Society; (below top) ©Lester Lefkowitz/Corbis; page 468: (top) Courtesy NASA; (bottom left) James P. Blair/NG Image Collection; page 469: (bottom left) Ira Block/National Geographic Society; (top right) ©Lester Lefkowitz/Corbis

TEXT AND ILLUSTRATION CREDITS

Chapter 1

Figure 1.2: From Strahler, Alan and Arthur Strahler, *Physical Geography: Science and Systems of the Human Environment*, 3rd ed. Copyright © 2005 John Wiley & Sons, Inc. Reprinted with permission of John Wiley & Sons, Inc; Figure 1.3: Adapted from NOAA; Figure WASS1: Adapted from NOAA; Figure 1.6–El Niños: Courtesy NASA; Figure 1.6–Global Warming: Data from the Climatic Research Unit at the School of Environmental Sciences at the University of East Anglia. Used by permission; Figure 1.8: Courtesy NOAA; Figure 1.10: Courtesy NOAA; Figure 1.14: Courtesy U.S. Geological Survey.

Chapter 3

Figure 3.7: After W.D. Sellers, *Physical Climatology*, University of Chicago Press. Used by permission; Figure 3.9 Process Diagram: From A.N. Strahler, "The Life Layer," *Journal of Geography*, vol. 69, Figure 2.4. Used by permission; Figure 3.16: Copyright © A.N. Strahler. Used by permission.

Chapter 4

Figure 4.8: Copyright © A.N. Strahler. Used by permission; Figure 4.9: Copyright © A.N. Strahler. Used by permission; Figure 4.10: Copyright © A.N. Strahler. Used by permission; Figure 4.16: After EPA; Figure 4.21: Data courtesy of David H. Miller; Figure 4.22: Data compiled by John E. Oliver; Figure 4.25: Courtesy NOAA; Figure 4.26: Courtesy NOAA.

Chapter 5

Figure 5.3: Based on data of John R. Mather; Figure 5.4: Data of J. von Hann, R. Süring, and J. Szava-Kovats as shown in Haurwitz and Austin, *Climatology*; Figure 5.9: Copyright © A.N. Strahler. Used by permission; Figure 5.10: Copyright © A.N. Strahler. Used by permission; Figure 5.24: From R.H. Skaggs, Proc. Assoc. American Geographers, vol. 6, Figure 2. Used by permission.

Chapter 6

Figure 6.14: Adapted from NOAA.

Chapter 7

Global Locator, page 192: From Berg, Linda R. and Mary Catherine Hager, *Visualizing Environmental Science*. Copyright © 2007 John Wiley & Sons, Inc. Reprinted with permission of John Wiley & Sons, Inc; Figure 7.5b: Data

compiled by John E. Oliver; Figure 7.9: Data compiled by John E. Oliver; Figure 7.11: Copyright © A.N. Strahler. Used by permission; Figure 7.14: Copyright © A.N. Strahler. Used by permission; Figure 7.18: Copyright © A.N. Strahler. Used by permission; Figure 7.20: After A.J. Gordon, *Nature* 382: 399–400, August, 1996. Used by permission; Figure 7.21, page 211: From Murck, Barbara W., Brian J. Skinner, and Dana Mackenzie, *Visualizing Geology*. Copyright © 2008 John Wiley & Sons, Inc. Reprinted with permission of John Wiley & Sons, Inc.

Chapter 8

Figure 8.4: Data from U.S. Dept. of Commerce; Figure 8.5: Drawn by A.N. Strahler; Figure 8.6: Drawn by A.N. Strahler; Figure 8.7: Drawn by A.N. Strahler; Figure 8.20: Based on data of S. Pettersen, B. Haurwitz, and N.M. Austin, J. Namias, M.J. Rubin, and J-H. Chang; Figure 8.21: After M. A. Garbell.

Chapter 9

Chapter opener: From Warren Faidley, *Weatherwise*, vol. 45, #6. Used by permission; Figure 9.1: Data from H. Riehl, *Tropical Meteorology*, New York: McGraw-Hill; Figure 9.3: Redrawn from NOAA, National Weather Service; Figure 9.12: Courtesy NOAA.

Chapter 10

Figure 10.4: Based on data of John R. Mather; Figure 10.6: Adapted from diagrams by Research Applications Program, National Center for Atmospheric Research, Boulder, Colorado.

Chapter 11

Figure 11.2: Based on the Goode Base Map; Figure 11.5: Based on the Goode Base Map; Figure 11.3: From Strahler, Alan and Arthur Strahler, *Physical Geography: Science and Systems of the Human Environment*, 3rd ed. Copyright © 2005 John Wiley & Sons, Inc. Reprinted with permission of John Wiley & Sons, Inc; Figure 11.4: Simplified and modified from Plate 3, "World Climatology," Volume I, *The Times Atlas*, Editor John Bartholomew, The Times Publishing Company, Ltd., London, 1958; Figure 11.5: Based on the Goode Base Map; WASS1: Courtesy NOAA; Figure 11.8: Compiled from station data by A.N. Strahler.

Chapter 12

Figure 12.1: Based on the Goode Base Map; Figure 12.4: Based on the Goode Base Map; Figure 12.7: Based on the Goode Base Map; Figure 12.8: Compiled from station data by A.N. Strahler; Figure 12.12: Based on the Goode Base Map; Figure 12.18: Based on the Goode Base Map; Figure 12.22: Based on the Goode Base Map.

Chapter 13

Figure 13.1: Courtesy of Gordon C. Jacoby of the Tree-Ring Laboratory of the Lamont-Doherty Geological Observatory of Columbia University; Figure 13.2: IPCC 2001. Used by permission; Figure 13.6: Copyright © A.N. Strahler; Figure 13.7b: Data and image courtesy of Klaus Wolter at NOAA; Figure 13.8: National Weather Service; Figure 13.9: From Curtis, Scott., and Robert F. Adler, "Evolution of El Niño-precipitation relationships from satellites and gauges," *Journal of Geophysical Research*, 108(D4), 4153, doi:10.1029/2002JD002690, 28 February 2003. Copyright © 2003 American Geophysical Union. Reproduced by permission of American Geophysical Union; Figure 13.11: Courtesy NOAA; Figure 13.14: Copyright © D. Reidel Pub. Co., 1984. Used by permission.

Chapter 14

Figure 14.3b: Data of U.S. Geological Survey; Figure 14.10: Adapted with the permission of Nelson Thornes from "The North Sea storm surge of 1 February 1953" from *Geography: An Integrated Approach*. David Waugh, ISBN 9780174447061, first printed in 2002; WASS: Courtesy of Sharon E. Nicholson, Department of Meteorology, Florida State University, Tallahassee; Figure 14.16: Adapted from Hugo Ahlenius, UNEP/GRID-Arendal. http://maps.grida.no/go/graphic/climate_change_and_malaria_scenario_for_2050. Based on data from Rogers, Randolph. *The Global Spread of Malaria in a Future, Warmer World*. Science (2000: 1763–1766). Used by permission.

Chapter 15

Figure 15.2: Courtesy NOAA; Figure 15.3 – PD01: Courtesy NOAA; Figure 15.7: Adapted from NOAA; WASS1: Adapted from NOAA; Figure 15.13: Adapted from NOAA; Figure 15.17a: Adapted from NOAA; Figure 15.17b: From The University Corporation for Atmospheric Research; Figure 15.18: "Chaos and the jet stream" figures adapted from NOAA.

Chapter 16

Figure 16.3: IPCC, 2001, Figure 2.1. Used by permission; Figure 16.5: Prepared by Robert A. Rohde for Global Warming Art. http://www.globalwarmingart.com/wiki/Image:Global_Carbon_Emission_by_Type.png. Used by permission; Figure 16.8a: Based on data from IPCC Special Report on Emissions Scenarios, Figure 2.4. Used by permission; Figure 16.9: Based on

data from IPCC Special Report on Emissions Scenarios, Figure 2.5. Used by permission; Figure 16.10: Based on data from IPCC Special Report on Emissions Scenarios, Figure 2.11. Used by permission; Figure 16.11: Based on data from IPCC, 2001, Figures 17 & 18. Used by permission; Figure 16.12: Prepared by Robert A. Rohde for Global Warming Art. http://www.globalwarmingart.com/wiki/Image:Climate_Change_Attribution.png. Data based on Meehl, G.A., W.M. Washington, C.A. Ammann, J.M. Arblaster, T.M.L. Wigley and C. Tebaldi (2004). "Combinations of Natural and Anthropogenic Forcings in Twentieth-Century Climate". *Journal of Climate* 17: 3721–3727 and Jones, P.D. and Moberg, A. (2003). "Hemispheric and large-scale surface air temperature variations: An extensive revision and an update to 2001". *Journal of Climate* 16: 206–223. Used by permission; Figure 16.17: IPCC, 2001, Figure 4. Used by permission; Figure 16.18a: Based on data from IPCC, 2001, Figure 22b. Used by permission; Figure 16.18b: IPCC, 2001, Figure 9.5a. Used by permission; Figure 16.18c: IPCC, 4th Assessment Report, Figure 10.8. Used by permission; Figure 16.19: IPCC, 4th Assessment Report, Figure 10.12. Used by permission; Figure 16.20: Courtesy NOAA; Figure 16.21: Based on data from IPCC, 2001, Figure 4.3. Used by permission; Figure 16.22: From UNEP/GRID-Arendal. http://maps.grida.no/go/graphic/potential_impact_of_sea_level_rise_on_bangladesh. Used by permission; WASS1b: From The University Corporation for Atmospheric Research; Figure 16.23a: Based on data from IPCC, 4th Assessment Report, Figure SPM2. Used by permission.

Line drawings in the following figures have been adapted from Strahler, Alan and Zeeya Merali, *Visualizing Physical Geography*. Copyright © 2008 John Wiley & Sons, Inc. Reprinted with permission of John Wiley & Sons, Inc.

Chapter 1: 1.9; 1.12; 1.13. **Chapter 2:** 2.2b; 2.3–PD; 2.9; 2.12a; 2.13. **Chapter 3:** 3.3; 3.10; 3.20; 3.23; 3.24. **Chapter 4:** 4.1; 4.3; 4.4; 4.5; 4.6; 4.7; 4.8; 4.11; 4.12; 4.13; 4.14–PD; 4.17; 4.19; 4.22; 4.24. **Chapter 5:** 5.1; 5.2a; 5.5; 5.6; 5.12a; 5.15–PD01; 5.16–PD02; 5.17; 5.18; 5.19; 5.21; 5.24; WHiP. **Chapter 6:** 6.4; 6.6–PD01; 6.7; 6.8; 6.9; 6.12. **Chapter 7:** 7.3; 7.4; 7.8; 7.10. **Chapter 8:** 8.2; 8.9; 8.10 PD01; 8.11; 8.14–PD02. **Chapter 9:** 9.6a; 9.7; 9.16. **Chapter 10:** 10.18. **Chapter 11:** 11.1; 11.6; 11.7; 11.9. **Chapter 12:** 12.2; 12.3; 12.5; 12.6; 12.9; 12.10; 12.11; 12.13; 12.14; 12.5; 12.16–PD01; 12.17; 12.19; 12.20–PD02; 12.21; 12.23; 12.24; 12.25. **Chapter 13:** 13.15–PD; 13.16. **Chapter 16:** 16.6.

Line drawings in the following figures have been adapted from Strahler, Alan and Arthur Strahler, *Introducing Physical Geography*, 4th ed. Copyright © 2006 John Wiley & Sons, Inc. Reprinted with permission of John Wiley & Sons, Inc.

Chapter 2: 2.11; 2.12b. **Chapter 3:** 3.22. **Chapter 4:** 4.18; 4.20. **Chapter 5:** 5.7. **Chapter 6:** 6.11a; 6.11b; 6.13. **Chapter 7:** 7.1; 7.2; 7.6; 7.16; 7.17; 7.21, page 210. **Chapter 14:** 14.17; 14.18; 14.19.