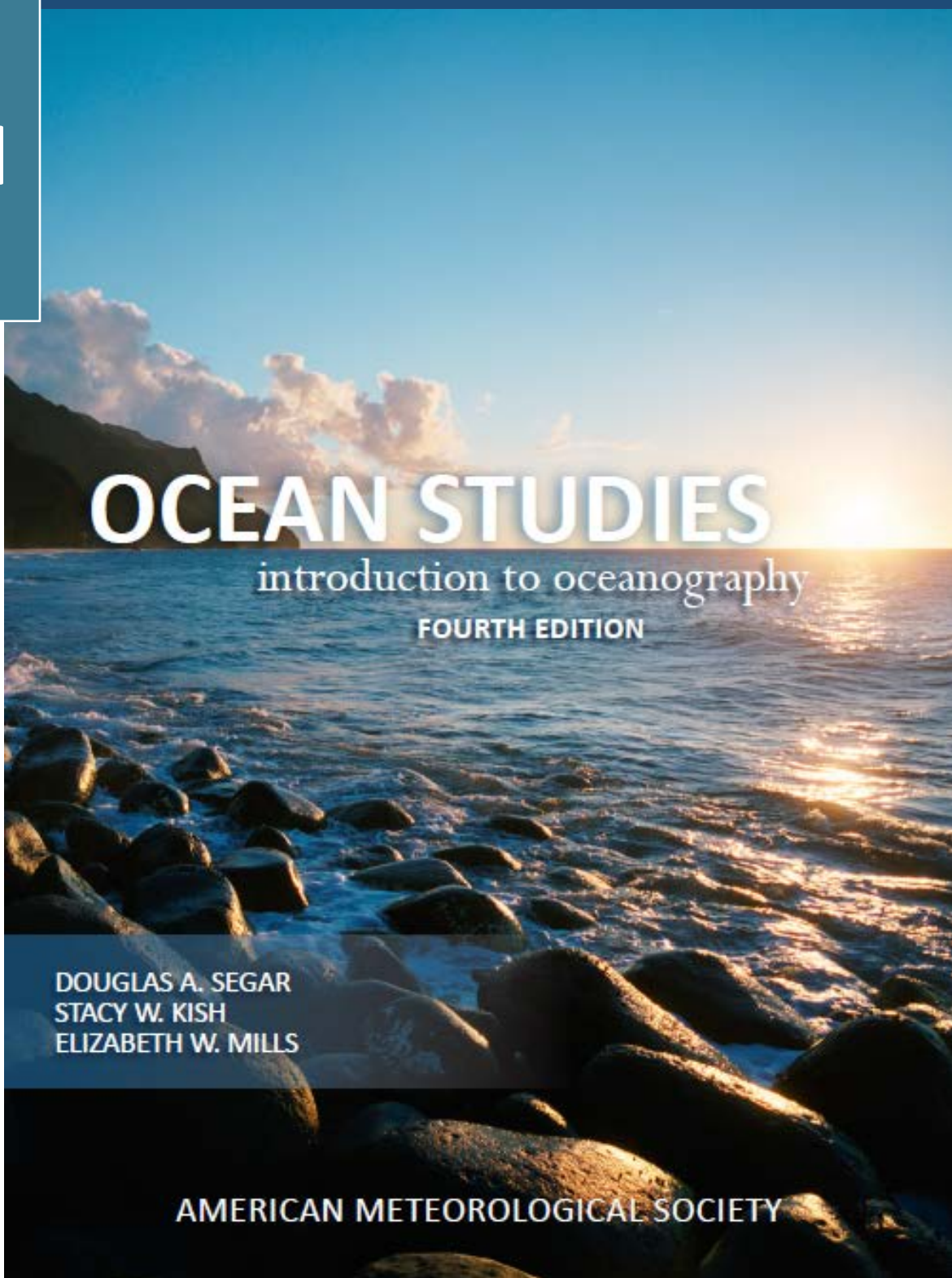


Using Real-World Data to Train the Next Generation of Scientists through the New & Improved AMS Ocean Studies

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The Education Program of the American Meteorological Society (AMS) has been helping to educate the next generation of atmospheric, oceanic, and hydrologic scientists for over 20 years. Throughout that time, the Education Program has incorporated real-world events and data into all learning materials, including those for AMS Ocean Studies. AMS Ocean Studies is an introductory, undergraduate-level curriculum package that provides students with a comprehensive study of physical oceanography while simultaneously providing pedagogically appropriate investigations focused on web-delivered real-world data. AMS Ocean Studies consists of a textbook, investigations manual, and access to the RealTime Ocean Portal.

Brand New;
Significantly Revised

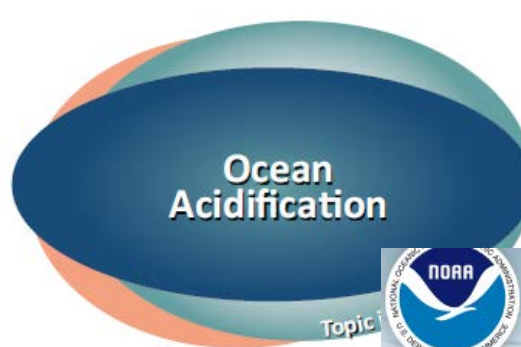


Ocean Studies: 4th Edition

- Explores the role of the ocean in the Earth system
- Figures replaced & upgraded
- New, expanded, or significantly revised topics include:
 - Hydrothermal vent systems & communities
 - Hot spot volcanism
 - Climate change ramifications (ocean acidification & deoxygenation)
 - Natural coastal features and human alterations
 - Atmospheric rivers
 - Harmful algal blooms & dead zones
 - Ocean life zones
 - Ocean sediments & stratigraphy
 - Ocean instrumentation
 - Toxic substances and the ocean
 - Recent ocean and climate policies
 - Geoengineering
 - And much more!

Topics in Depth

- Serve as a jumping off point for more in-depth or advanced content



ocean. The density of ocean water increases with decreasing temperature and increasing salinity. More dense water tends to sink while less dense water rises. Thermohaline circulation transports heat energy, salts, and dissolved gases, like carbon dioxide and oxygen, over great distances and to great depths in the ocean. This process plays an important role in Earth's climate system. In the North Atlantic, for example, a warm surface ocean current flows north and eastward from the Florida Strait. At high latitudes, the surface water cools, sinks, and flows southward as cold bottom water. This heat transporting mechanism is a key component of the ocean's meridional overturning circulation (MOC) discussed in section 4.6.

4.5.2 Heat Transport by Air Mass Exchange

The movement of air masses transports sensible heat from the tropics into its high latitudes. An air mass is a volume of air covering thousands of square kilometers that is relatively uniform in temperature and humidity. The properties of an air mass depend on the characteristics of the surface over which it formed (its source region). Air masses that form at high latitudes, often over snow or covered surfaces, are relatively cold. Air masses that form at low latitudes are warm. Air masses that develop over the ocean are humid and those that form over land are relatively dry. Hence, there are four basic types of air masses: cold and humid, dry, warm and humid, and warm and dry.



For Further Exploration Essays

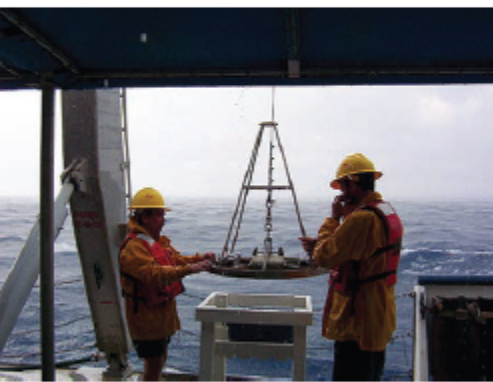
- Address in-depth specific topics that complement a concept covered in the narrative

For Further Exploration

ESSAY 2.1: Investigating the Ocean Floor

Oceanographers gather information about the ocean floor using a variety of techniques, some relatively simple, such as devices that scoop up rock and sediment samples from the ocean floor, whereas others, such as acoustic and gravimetric instruments, are more sophisticated. Some measurements are made in situ (immersed in the medium being measured) whereas others depend on remote sensing methods. This essay focuses on direct sampling of rocks and sediments on the ocean floor.

The most straightforward way to sample the surface of the ocean floor is with a grab sampler (Essay 2.1 Figure 1). This mechanical device operates much as a human hand grasping an object. More often, scientists require a vertical section of the sediment that has collected on the ocean floor. For that, a weighted coring tube is lowered a few meters above the ocean floor and allowed to fall. The weight of the tube drives it into a thick blanket of ocean sediments. The sediment core, retrieved when the tube is brought to the surface, reveals a record of sedimentation in the area through time.



Essay 2.1 Figure 1
A Young Modified Van Veen grab sampler ("Young Grab") is being lowered over the side of a ship. When it reaches the ocean bottom, the grab sampler will scoop sediment from a 2.4 m (8 in.) area. The Young Grab digs down about 10 cm (4 in.) and scoops up the top layers of sediment along with the organisms living in the sediment (bottom). Most coring tubes have a top 5 cm (2 in.) of sediment. (Courtesy of NOAA Ocean Explorer)

For Further Exploration

ESSAY 14.1: Dams and Marine Ecosystems

A dam is a barrier constructed across a watercourse that impounds water in an upstream reservoir (Essay 14.1 Figure 1). It alters the flow of water and sediment in a river or stream and may disrupt coastal river and marine ecosystems by reducing river flow.



Essay 14.1 Figure 1
Dexter Dam on the Middle Fork of the Willamette River (a tributary of the Columbia River) in Oregon. (Courtesy of NOAA/NMFS West Coast Region)

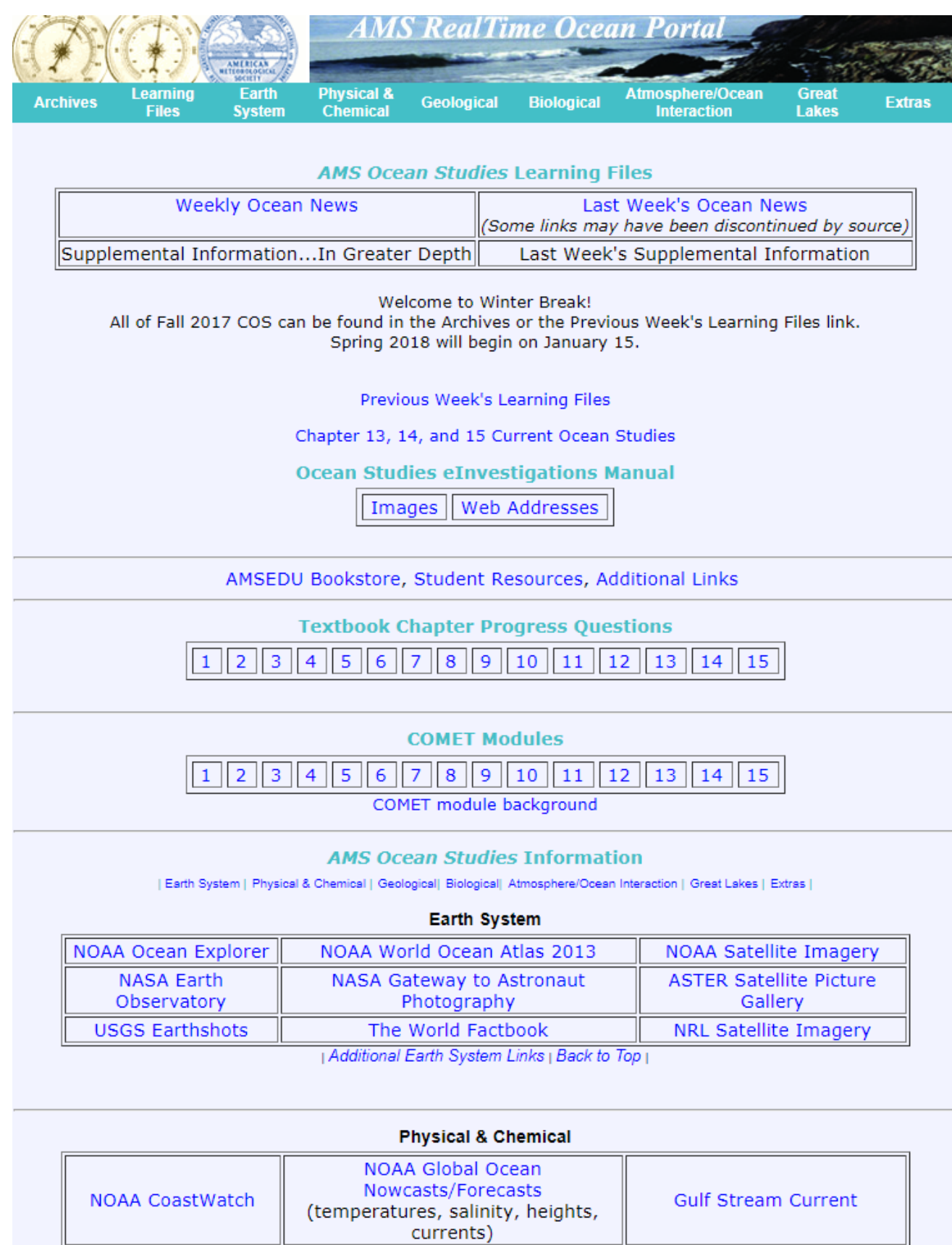
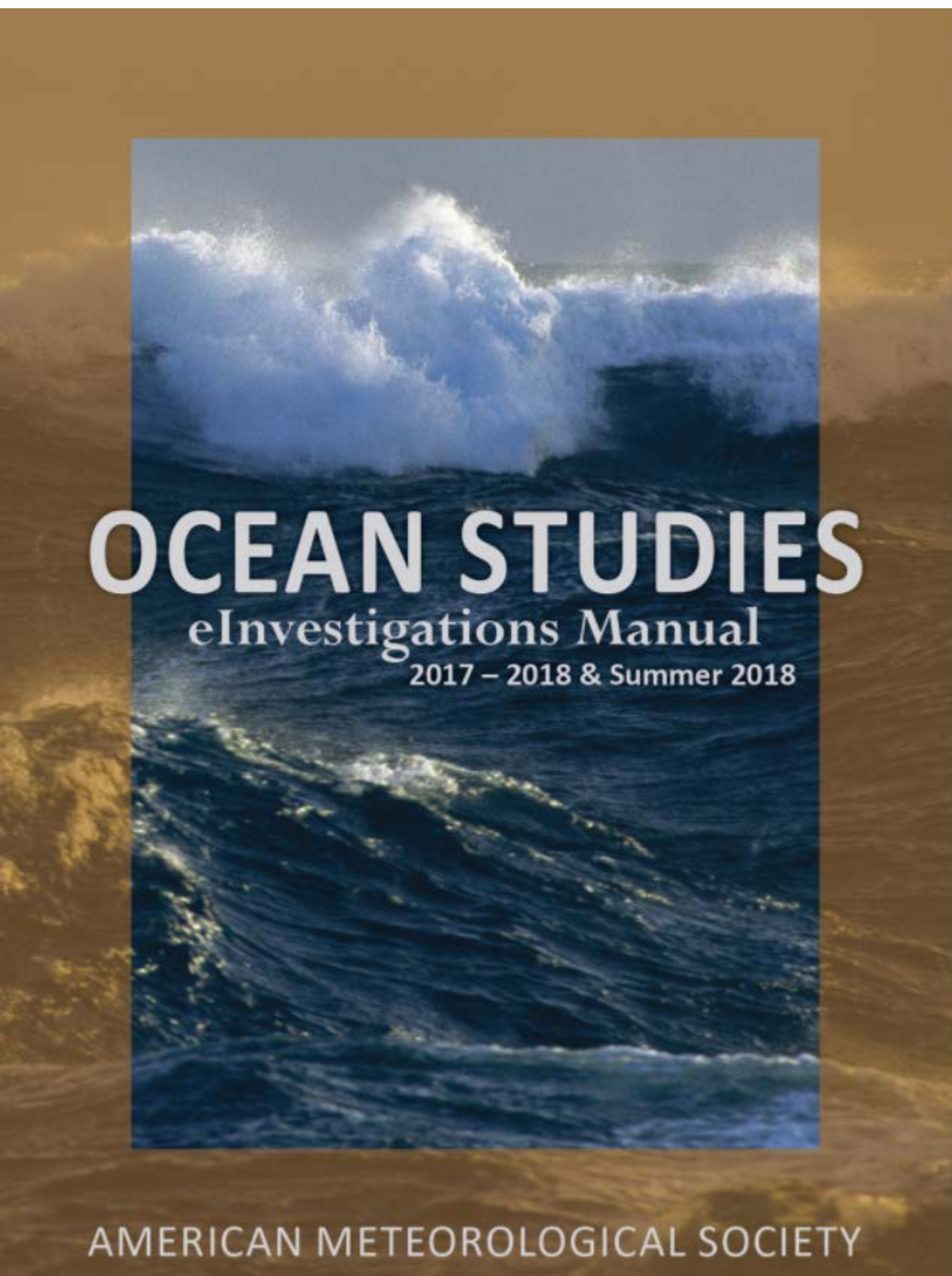
Adoption of AMS Ocean Studies is an investment into AMS professional development opportunities for K-12 teachers

Ocean Studies Investigations Manual

- Introduces users to tools that enable them to explore, analyze, and interpret the workings of Earth's ocean
- Composed of 30 self-contained investigations (2/week)
- Investigations draw from real-world ocean observations and events and build on each previous investigation to form a comprehensive understanding of Earth's ocean environment

RealTime Ocean Portal

- Contains a plethora of real-world information including recent ocean-related news and oceanographic data on tides, salinity, bathymetry, fishes, and much more
- *Current Ocean Studies* – weekly activity available on the Portal that expands on concepts within the textbook and Manual using recent oceanographic data



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