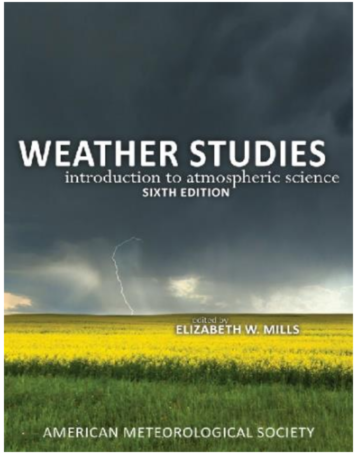
Teaching, Weather, Ocean and Climate Science through American Meteorological Society Online Resources

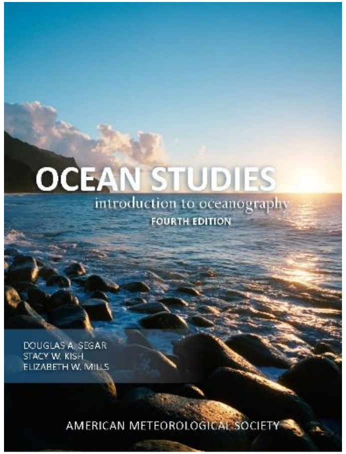
Michael J Passow, Wendy Abshire, Chad Kauffman, Elizabeth Mills, Abigail Stimach
Corresponding author:
michael@earth2class.org

AMS Offers a Suite of Training Programs to Enhance Teacher's Ability to Provide Accurate Information

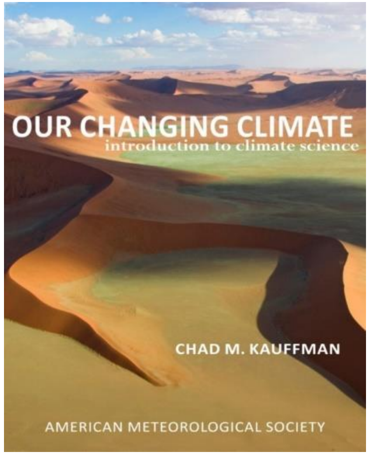
DataStreme Atmosphere



DataStreme Ocean



DataStreme Earth's Climate System



project ATMOSPHERE

sensing, analyzing and forecasting

the MAURY PROJECT

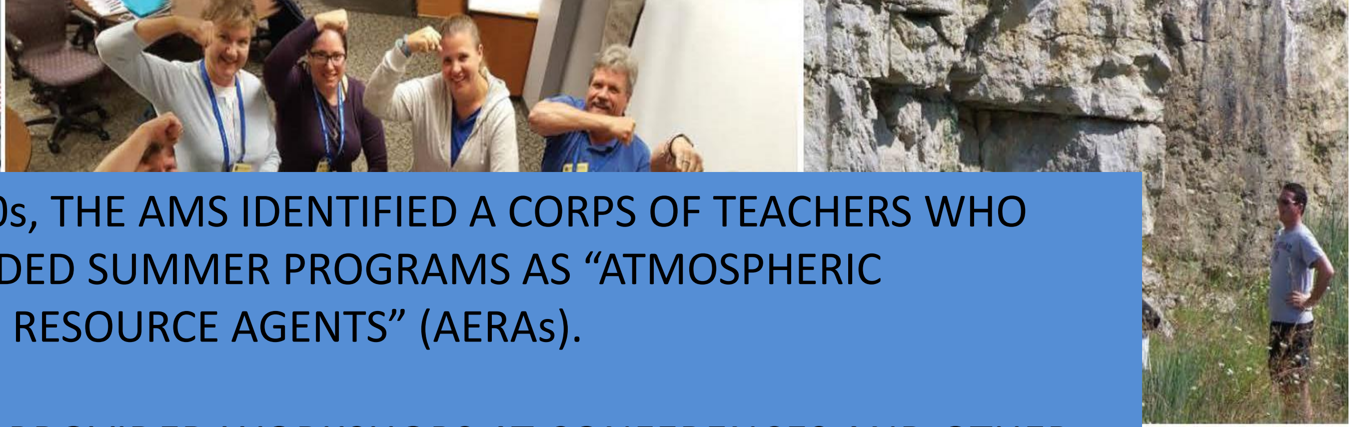
exploring the physical foundations of oceanography

ams EDUCATION
WEATHER STUDIES
introduction to atmospheric science
SIXTH EDITION
ELIZABETH W. MILLS
AMERICAN METEOROLOGICAL SOCIETY
OCEAN STUDIES
introduction to oceanography
FOURTH EDITION
AMERICAN METEOROLOGICAL SOCIETY
OUR CHANGING CLIMATE
introduction to climate science
CHAD M. KAUFFMAN
AMERICAN METEOROLOGICAL SOCIETY
AGRICULTURE · ENGINEERING · INDUSTRY · COMMERCE · AERIAL AND MARINE NAVIGATION · PUBLIC HEALTH
AMERICAN METEOROLOGICAL SOCIETY 1919
MORE THAN 21,000 TEACHERS DIRECTLY TAUGHT
MILLIONS OF STUDENTS BENEFIT
OVER 100,000 TEACHERS PEER TRAINED

It starts with teachers partnering with AMS scientists…

PROVIDING TEACHERS WITH SCIENTIFICALLY ACCURATE CLIMATE AND WEATHER CONCEPTS TO HELP THEM DEVELOP BETTER LESSONS HAS BEEN A GOAL OF THE AMS EDUCATION PROGRAM FOR MORE THAN 25 YEARS

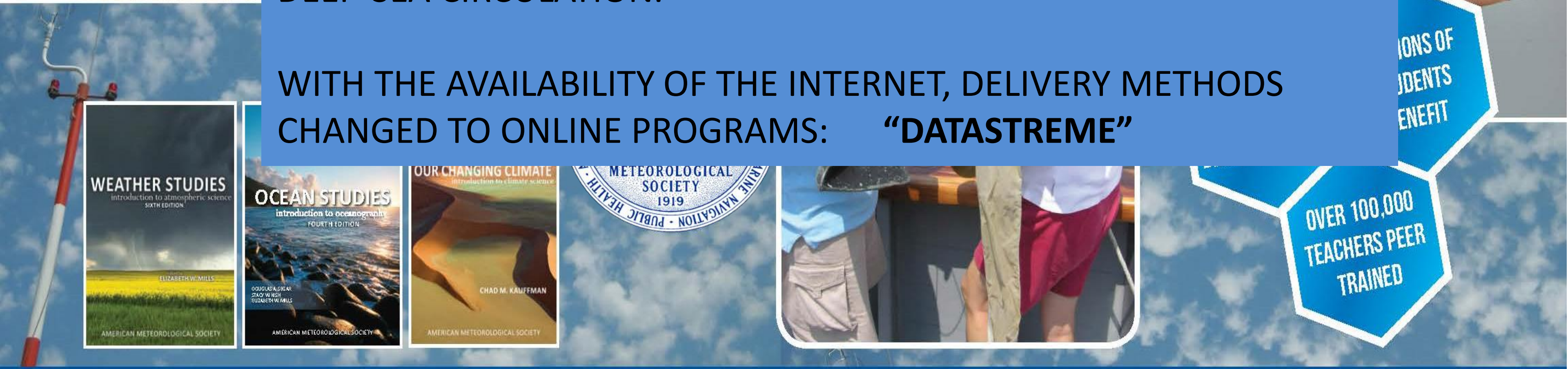
"TRAINING THE TRAINERS" HAS BEEN THE GUIDING STRATEGY TO GIVE ELEMENTARY, MIDDLE, AND HIGH SCHOOL TEACHERS IMPORTANT INFORMATION THAT THEY CAN THEN MODIFY FOR THEIR STUDENTS' LEARNING.



IN THE 1990s, THE AMS IDENTIFIED A CORPS OF TEACHERS WHO HAD ATTENDED SUMMER PROGRAMS AS “ATMOSPHERIC EDUCATION RESOURCE AGENTS” (AERAs).

THEY WERE PROVIDED WORKSHOPS AT CONFERENCES AND OTHER VENUES WITH BOOKLETS ABOUT SUCH TOPICS AS “EL NINO-LA NINA,” “HIGH- and LOW-PRESSURE SYSTEMS,” AND “SURFACE and DEEP-SEA CIRCULATION.”

WITH THE AVAILABILITY OF THE INTERNET, DELIVERY METHODS CHANGED TO ONLINE PROGRAMS: **“DATASTREME”**



the DataStreme PROJECT

weather, ocean and climate courses for K-12 teachers

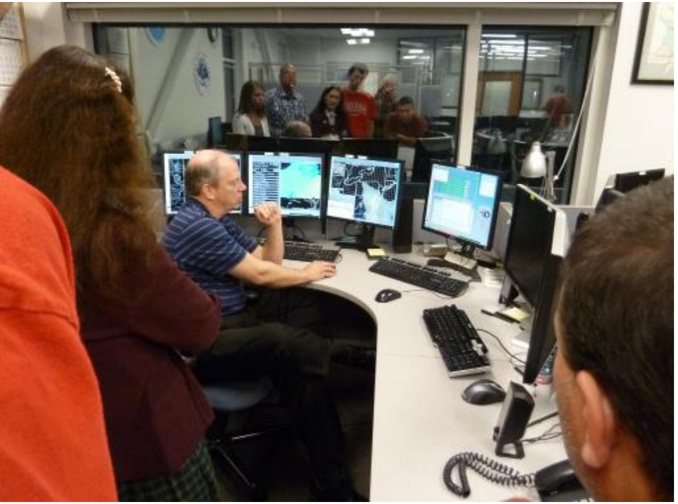
AMS develops materials

Local Implementation Teams recruit & mentor teachers

Teachers share information with peers and community

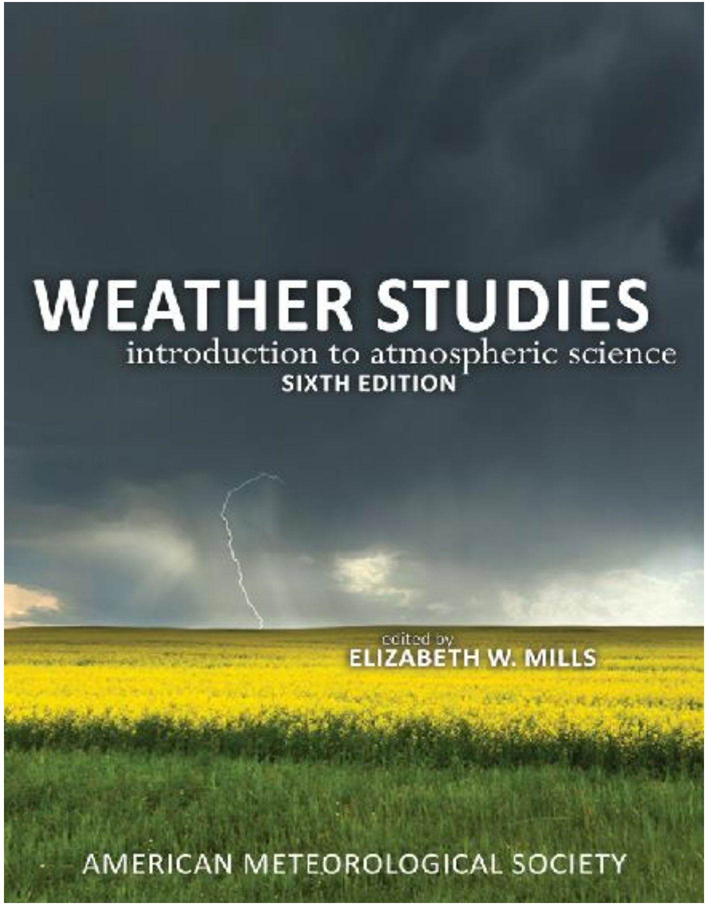
the DataStreme PROJECT

weather, ocean and climate courses for K-12 teachers



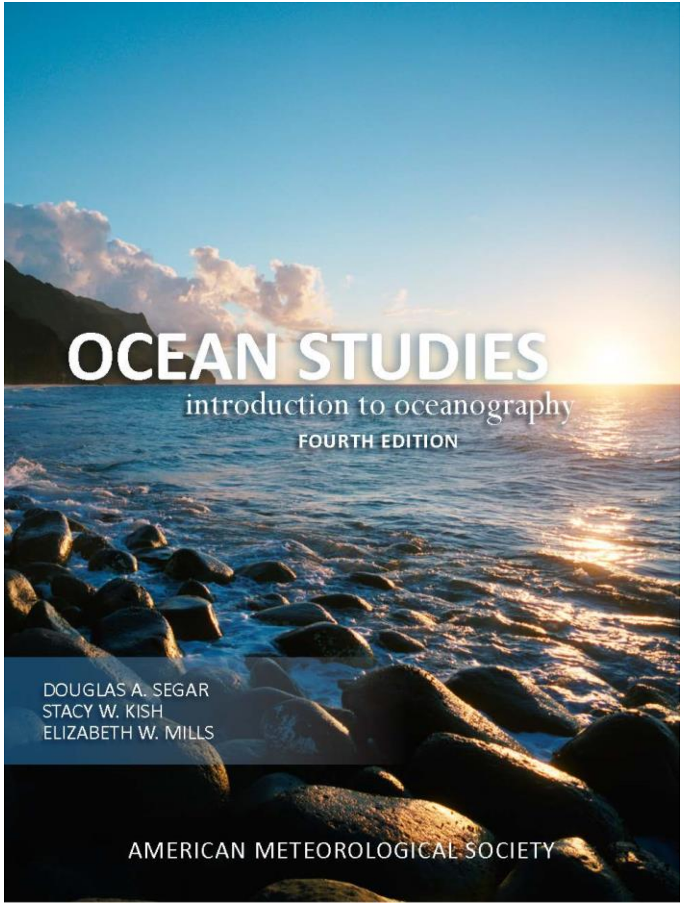
Semester-length distance-learning courses in meteorology, oceanography, & climate science

DataStreme Atmosphere



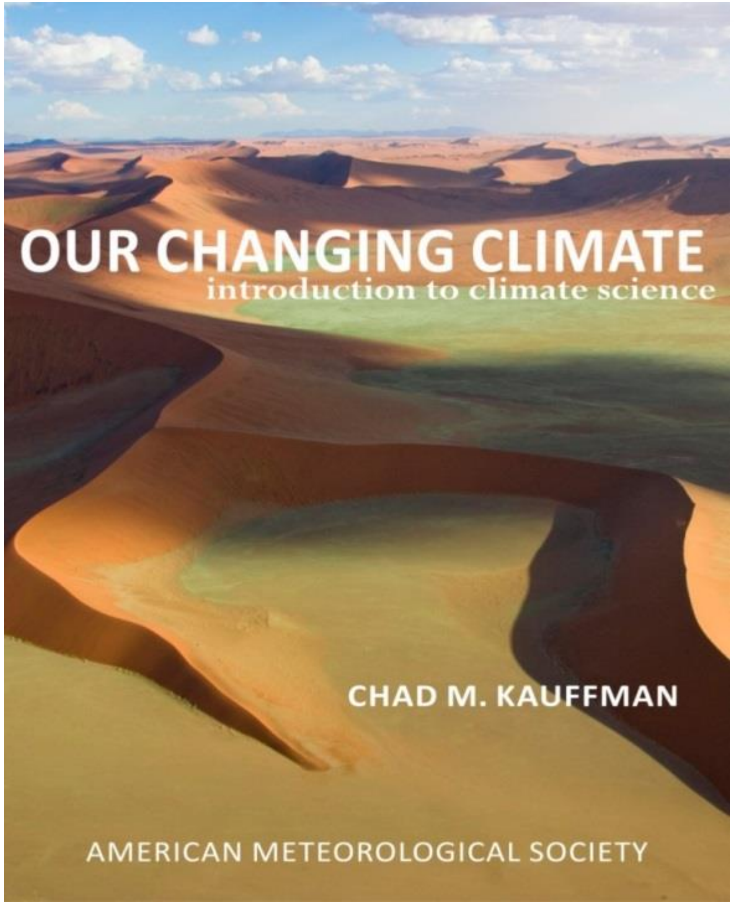
Focuses on the study of the atmospheric environment through the use of near real-time weather data

DataStreme Ocean



Explores the fundamental properties of the ocean, and human interaction with it

DataStreme Earth's Climate System



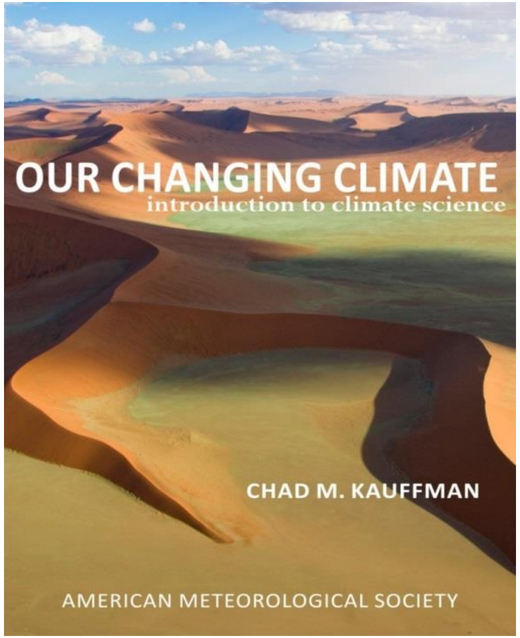
Explores the fundamental science of Earth's climate system and addresses the societal and health implications

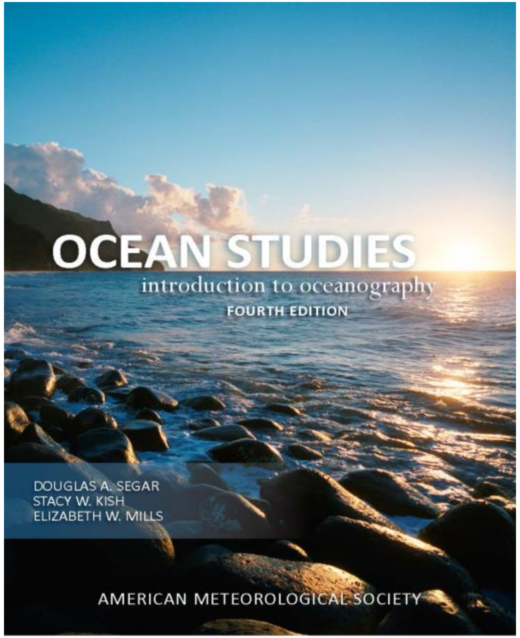
EACH WEEK IN THE SEMESTER-LONG COURSE INVOLVES:

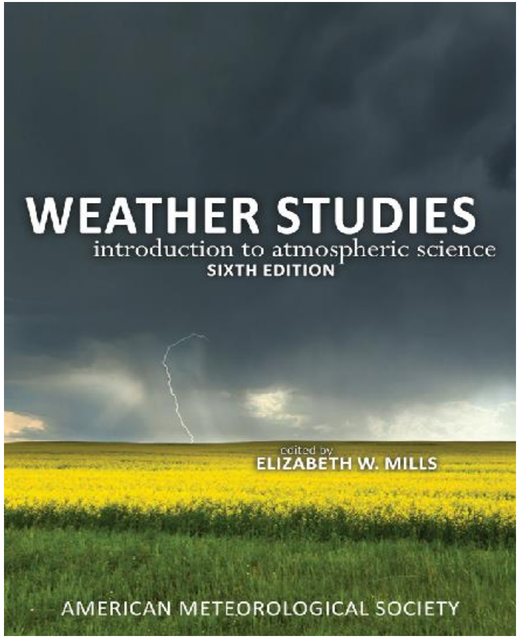
- READING A CHAPTER IN THE E-TEXTBOOK
- WORKING THROUGH TWO ONLINE INVESTIGATIONS
- COMPLETING "CURRENT WEATHER/OCEAN/CLIMATE STUDIES" ACTIVITIES
- SUBMITTING RESPONSES ELECTRONICALLY
- CREATING A LESSON PLAN ABOUT ONE PERTINENT TOPIC

DEDICATED MENTOR TEAMS GUIDE PARTICIPANT LEARNING & CONNECT TEACHERS WITH AMS EDUCATION STAFF & FACULTY at CALIFORNIA UNIVERSITY OF PENNSYLVANIA (CAL U)

Courses use real-time, real-world data







The New & Improved

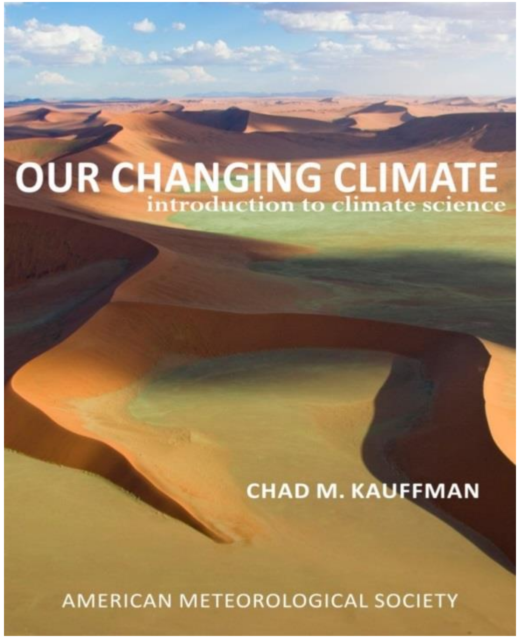
the DataStreme PROJECT

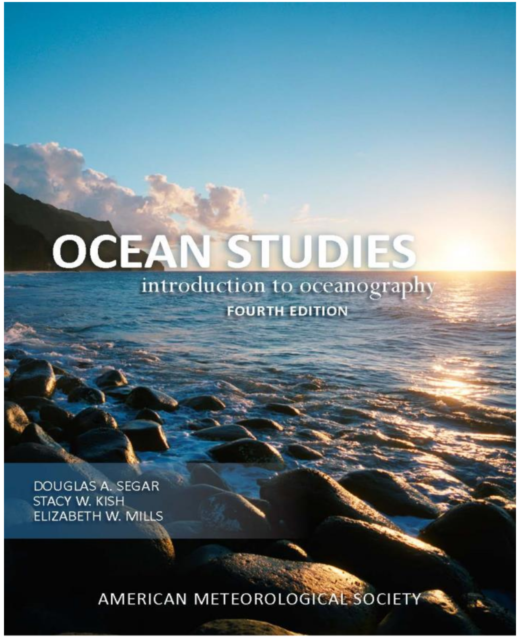
weather, ocean and climate courses for K-12 teachers

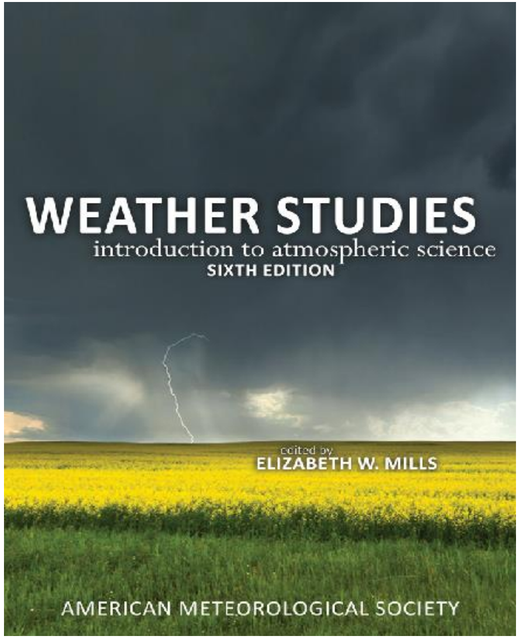
- College credits from Cal U
- Course resources available through Desire2Learn
- Graduate-level certificate available through Cal U upon successful completion of 3 AMS courses

CAL U

Now available in easier to use format







Benefits of AMS ebooks

Digital note taking

Bookmark pages

Adjustable text size

Digital highlighting

Searchable content

Hyperlinked footnotes

Hyperlinked table of contents

End of chapter resources

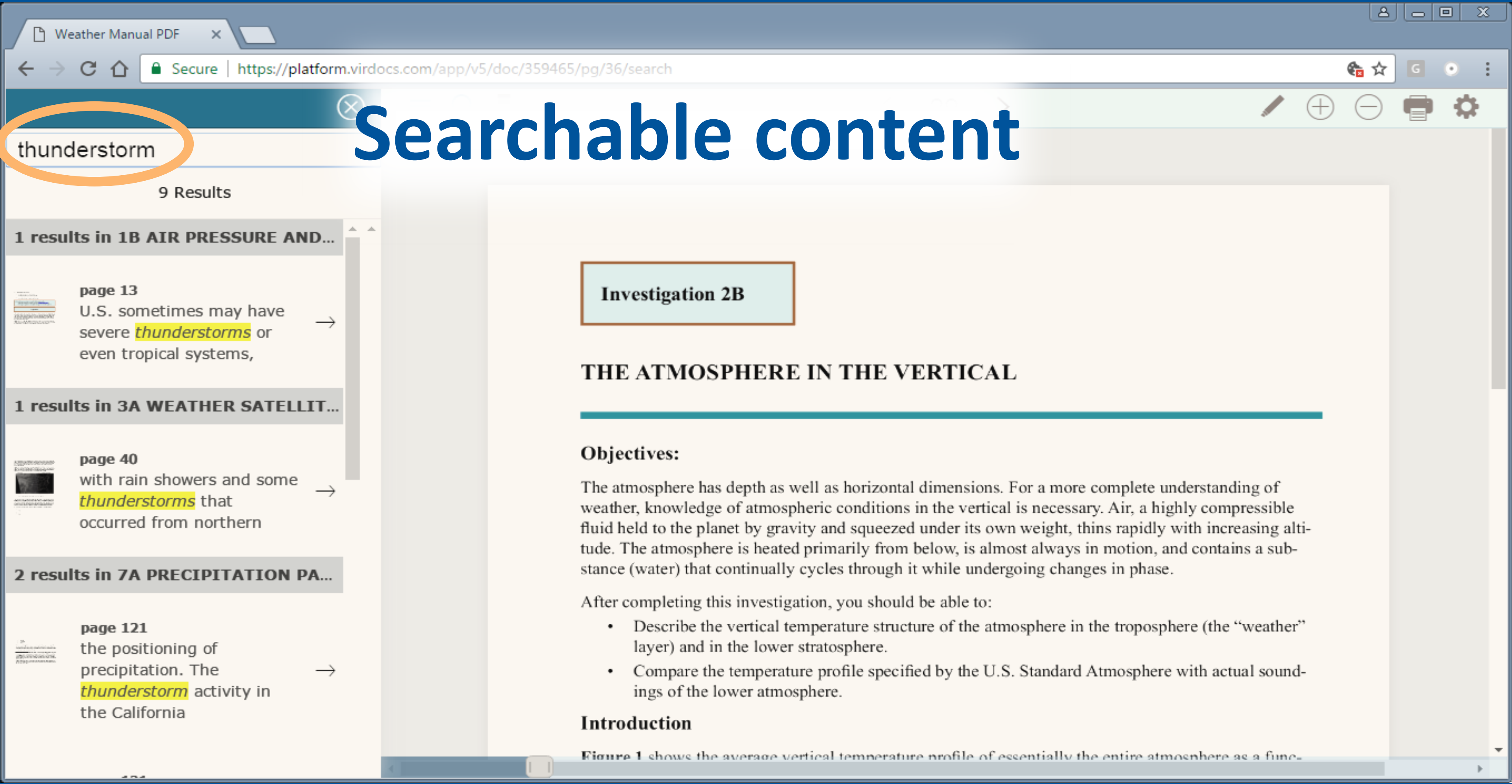
Adjustable background color

Personalized study guides

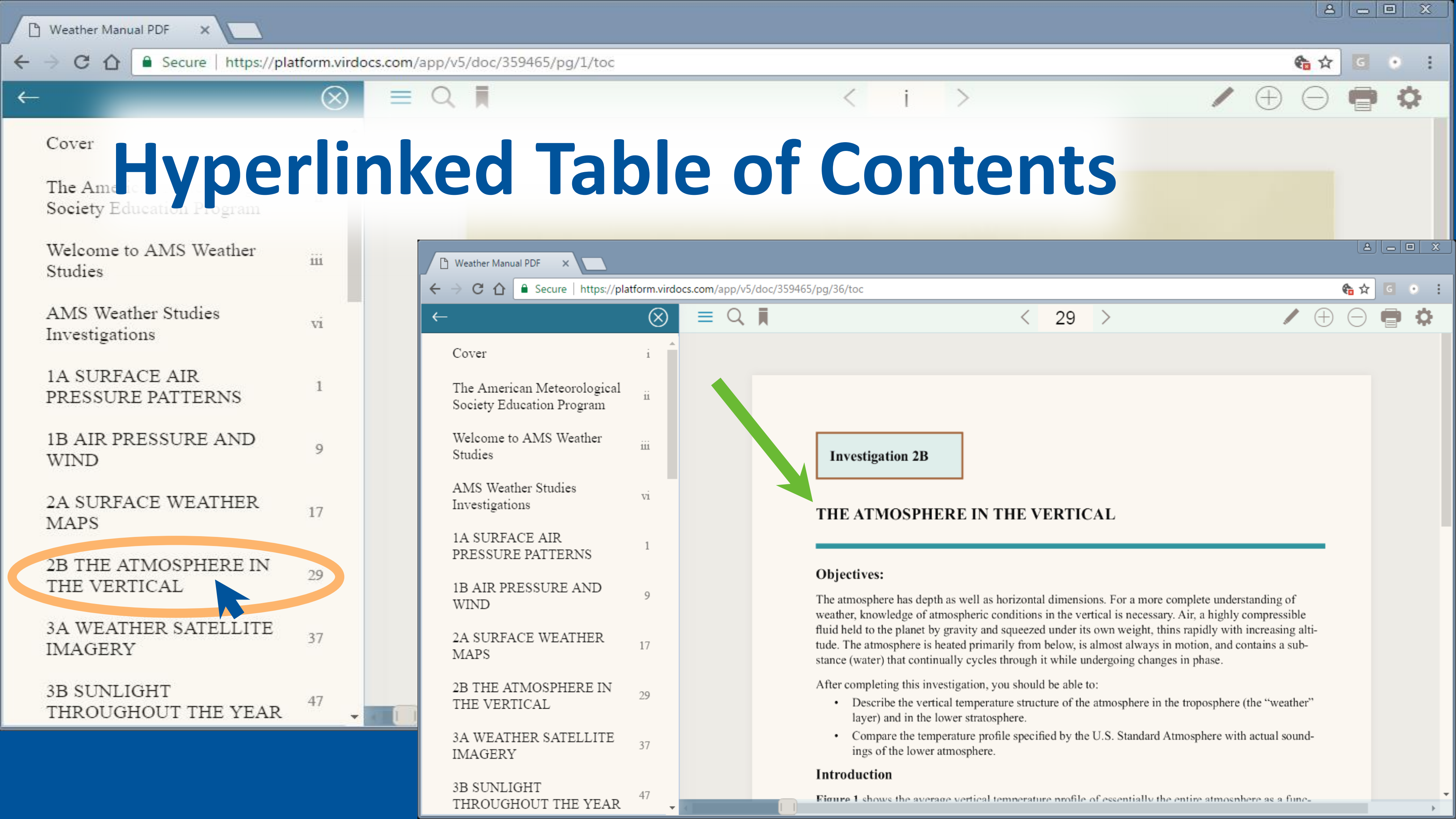
Topic in Depths

Flashcards

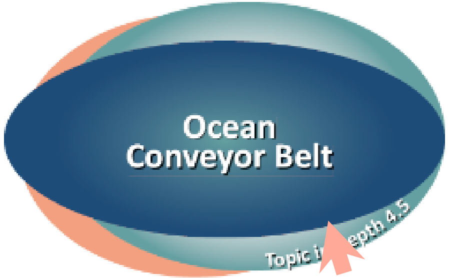
Searchable content



Hyperlinked Table of Contents



ocean. The density of ocean water increases with decreasing temperature and increasing salinity. More dense water tends to sink while less dense water rises.
circulation transports heat energy, salt, and dissolved gases, like carb
oxygen, over great distances and to great depths in the ocean. This pr
important role in Earth's climate system. In the North Atlantic, for ex
surface ocean current flows north and eastward from the Florida Strai
the surface water cools, sinks, and flows southward as cold bottom w
transporting mechanism is a key component of the ocean's *meridiona*
circulation (MOC) discussed in section 4.6.



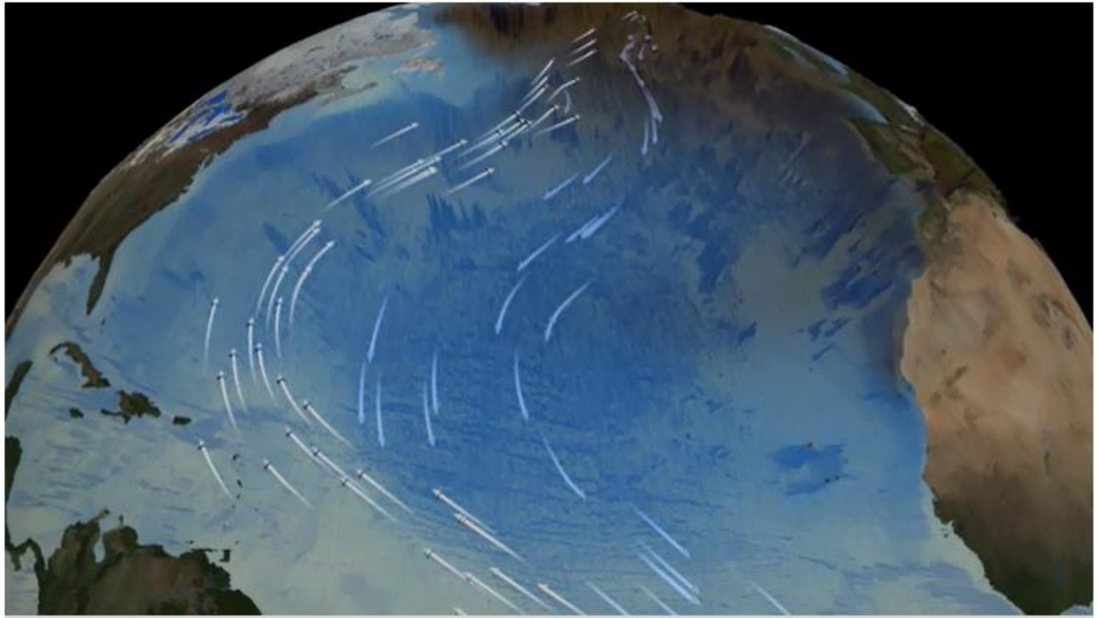
http://ametsoc.org/amsedu/OTIDS/4.5.html

4.5.2 Heat Transport by Air Mass Exchange

The movement of air masses transports sensible heat from the trop
high latitudes. An **air mass** is a volume of air covering thousands of s
is relatively uniform in temperature and humidity. The properties of a
depend on the characteristics of the surface over which it formed (its
travels (Figure 4.18). Air masses that form at high latitudes, often ove
covered surfaces, are relatively cold. Air masses that form at low latit
warm. Air masses that develop over the ocean are humid and those th
relatively dry. Hence, there are four basic types of air masses: cold and humid, cold and dry, warm and humid, and warm and dry.

Scientific Visualization Studio

rather than actual data. The thermohaline circulation is a very slow moving current that can be difficult to distinguish from general ocean circulation. Therefore, it is difficult to measure or simulate.



This animation first depicts thermohaline surface flows over surface density, and illustrates the sinking of water in the dense ocean near Iceland and Greenland. The surface of the ocean then fades away and the animation pulls back to show the global thermohaline circulation.

Download

c eruptions rich in sulfur dioxide are likely to impact global or hemispheric climate. The
lly cool summer of 1816, described in Topic in Depth 8.4, occurred after the violent eruption of
ra, an Indonesian volcano, in the spring of 1815. Several relatively cold years followed on the
f the 1883 eruption of Krakatau, also an Indonesian volcano. Finally, the climatic impact of the
eruption of the Peruvian volcano, Huaynaputina, in 1600 likely contributed to one of Russia's
amines. History provides numerous other examples of how human societies are inexorably
to these lithosphere-atmosphere-biosphere connections in the climate system.

Photographing the Eruption of Mount St. Helens from 10 Miles Away

Published on February 26, 2013 by Michael Zhang Share Like 309 Tweet 8

1991 eruption of Mount Pinatubo provided new insights on
of volcanic origin and large-scale climate fluctuations. On 15-
n Luzon Island in the Philippines, erupted violently, injecting
de into the stratosphere (Figure 8.16). This was the most
oud of the 20th century. By altering both incoming and
ted temperatures in the stratosphere and troposphere, altered
rface air temperatures around the globe.

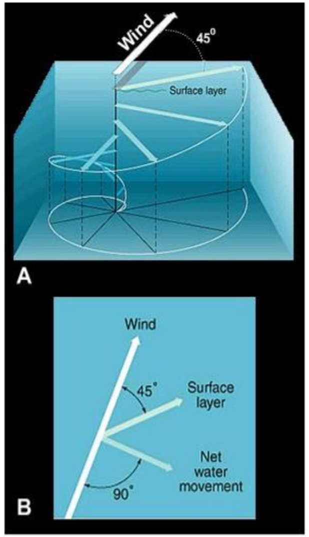


Figure 3. This image shows the changing direction of flow at depth in a spiral column of liquid when wind interacts with the surface layer.
Image source:
https://www.windows2universe.org/?page=/earth/Water/ekman.html

3. According to Figure 3, because of the Coriolis effect (Introduced in Chapter 4.7.2 of the *Ocean Studies* Textbook Ed4.), surface water moves to the ________ of the wind direction in the Northern Hemisphere and to the ________ of the wind direction in the Southern Hemisphere.

a. right ; left
b. left ; right
c. right ; right
d. left ; left

Internal Wave Water Motions

An animation by Prof. Mattias Tomczak, Flinders University, http://www.mt-oceanography.info/IntroOc/notes/figures/animations/fig10a7c.html, models

overall grade (highest attempt)		**15 / 15**	100 %	
Michele Krak				
attempt 1	Mar 3, 2019 9:55 AM	11 / 15	73.33 %	✓
attempt 2	Mar 3, 2019 9:57 AM	15 / 15	100 %	✓
overall grade (highest attempt)		**15 / 15**	100 %	
Michelle Speisman				
attempt 1	Feb 27, 2019 9:58 AM	10 / 15	66.67 %	✓
attempt 2	Feb 27, 2019 10:00 AM	15 / 15	100 %	✓
overall grade (highest attempt)		**15 / 15**	100 %	
Mike Nangle				
attempt 1	Feb 28, 2019 10:43 AM	11 / 15	73.33 %	✓
attempt 2	Feb 28, 2019 10:47 AM	15 / 15	100 %	✓

Save and Close | Save | Cancel

					Trouble with 5A, comments about 5B	Kimberly Fleming	Mar 3, 2019 2:45 PM
					Chapter 5 water cycle	Michele Krak	Mar 3, 2019 12:02 PM
					Chapter 5 water cycle	Kimberly Fleming	Mar 3, 2019 12:49 PM
					Week 5	Michelle Speisman	Feb 27, 2019 10:57 AM

20 per page

Reply

Subscribe Unsubscribe Open in a New Window Previous

Chapter 5 water cycle

Kimberly Fleming Mar 3, 2019 12:49 PM

I thought I knew a lot about the water cycle but as I read through chapter 5 I realized how much detail and complexity there is to the cycle that I really had very little knowledge about.

I think the answer for question 11 was spelt out for us in the reading material. At first I thought we were supposed to interpret the graphs but then I realized most of the answers were in the reading from the written report. I started out using the wrong link and skipped to the second link which had

SUMMER TRAINING PROGRAMS CONTINUE TO PREPARE NEXT GENERATION OF PEER TRAINERS

“PROJECT ATMOSPHERE” (WEATHER and CLIMATE)

“MAURY PROJECT” (OCEAN AND CLIMATE)

project ATMOSPHERE
sensing, analyzing and forecasting

Hybrid (online & in-person) summer course focused on meteorology held at the National Weather Service's Training Facility in Kansas City, MO

project ATMOSPHERE

sensing, analyzing and forecasting

ametsoc.org/ProjectAtmosphere

Teachers receive 3 tuition-free graduate credits through Cal U upon successful completion

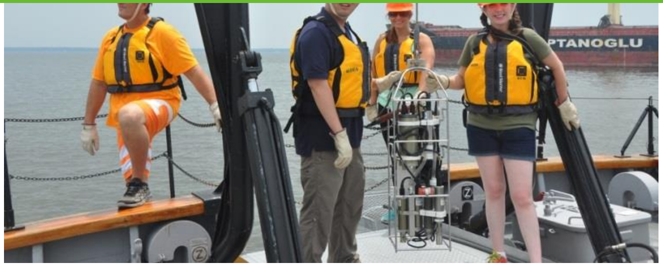
the
MAURY PROJECT
exploring the physical foundations of oceanography

Two-week summer course focused on physical oceanography held in Annapolis, MD

the MAURY PROJECT

exploring the physical foundations of oceanography

ametsoc.org/MauryProject



Teachers receive 3 tuition-free graduate credits through Cal U upon successful completion

Now offering "AMS DataStreme Certificate" and/or Masters of Education degree:
"Educational Leadership: Weather and Climate"

AMS 100

CAL U

AMS education programs seek to foster scientific literacy in Earth system science for all

AMERICAN METEOROLOGICAL SOCIETY 1919

ams EDUCATION

AMS 100


ams
EDUCATION
WEATHER STUDIES
introduction to atmospheric science
SIXTH EDITION
ELIZABETH W. MILLS
AMERICAN METEOROLOGICAL SOCIETY
OCEAN STUDIES
introduction to oceanography
FOURTH EDITION
AMERICAN METEOROLOGICAL SOCIETY
OUR CHANGING CLIMATE
introduction to climate science
CHAD M. KAUFFMAN
AMERICAN METEOROLOGICAL SOCIETY
AGRICULTURE · ENGINEERING · INDUSTRY · COMMERCE · AERIAL AND MARINE NAVIGATION · PUBLIC HEALTH
AMERICAN METEOROLOGICAL SOCIETY
1919
MORE THAN 21,000 TEACHERS DIRECTLY TAUGHT
MILLIONS OF STUDENTS BENEFIT
OVER 100,000 TEACHERS PEER TRAINED