



Physical Geography of Southeast Asia: Module Materials

TEKS Alignment

(3) ***Geography***. The student understands how physical processes shape patterns in the physical environment. The student is expected to:

(B) describe the physical processes that affect the environments of regions, including weather, tectonic forces, erosion, and soil-building processes;

(4) ***Geography***. The student understands the patterns and characteristics of major landforms, climates, and ecosystems of Earth and the interrelated processes that produce them. The student is expected to:

(A) explain how elevation, latitude, wind systems, ocean currents, position on a continent, and mountain barriers influence temperature, precipitation, and distribution of climate regions;

(B) describe different landforms and the physical processes that cause their development;

Key Vocabulary

- alluvial
- archipelago
- cordillera
- insular
- peninsula
- monsoon
- folded mountain
- ITCZ
- Subsidence
- Plantation crops
- Terraced farming
- Oceanic plate
- Subduction
- Tropical Monsoon Climate
- Tropical Wet Climate
- Tropical Savanna Climate
- Maritime
- Ravenne/Riverine

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Key Places

- Mount Merapi
- Mount Pinatubo
- Krakatoa
- Mekong River
- Chao Phraya
- Irrawaddy River
- Salween River
- Borneo/Kalimantan
- Java
- Sumatra
- Luzon
- Sulawesi/Celebes
- Singapore
- Annam Cordillera
- Arakan Yoma
- Gulf of Thailand
- Strait of Malacca
- Malay Peninsula
- Indochina Peninsula

Module Introduction

Southeast Asia is a land of collisions – both cultural and physical. Straddling the boundaries of four separate tectonic plates, this region is constantly reshaping itself – shifting, colliding, and often erupting. From the deepest spot on the ocean floor to some of the most active volcanoes in the world, this is a region of extremes. The region has more volcanoes than any world region except East Asia. In fact, East and Southeast Asia together contain around 1/3 of all of the world’s volcanoes.

It is also a region of divisions – both cultural and physical, as well. Part of the region lies on a series of peninsulas jutting out from the Asian continent. The remaining part of the region is spread out across a vast expanse of islands. Thousands upon thousands of islands spread out across an area larger than the contiguous United States.

The resources in this module will assist you in helping your students understand the vast complexity of this region’s physical geography. The video presentations discuss various features and phenomena that impact the physical geography. These videos can be used when preparing a unit on Southeast Asia, as well as in the classroom with students. The case study focuses upon the recent (2010) eruption of Mount Merapi in Indonesia. It includes a power point with information on the cause and effects of this eruption and includes a

link to an online photo essay of the eruption provided by The Boston Globe. The case study also includes a Google Earth kml file with thermal and sulfur dioxide emission images and satellite images of the eruption. The lesson plan is a brief introduction to the major physical features of this region where students create annotated sketch maps.

Video Presentations

- Physical Geography of Southeast Asia Full Length Movie
 - <http://stream.its.txstate.edu/users/tage/Physical%20Geography%20of%20Southeast%20Asia%20Full%20Length.mov>
- Natural Hazards in Southeast Asia Slides
 - http://stream.its.txstate.edu/users/tage/GeoP_Natural_Hazards.mov
- Monsoons in Southeast Asia Slides
 - http://stream.its.txstate.edu/users/tage/GeoP_Monsoons.mov
- Climate Patterns in Southeast Asia Slides
 - http://stream.its.txstate.edu/users/tage/GeoP_Climatic_Patterns.mov
- Volcanoes in Southeast Asia Slides
 - http://stream.its.txstate.edu/users/tage/GeoP_Volcanoes.mov
- Topography of Southeast Asia Slides
 - http://stream.its.txstate.edu/users/tage/GeoP_Topography.mov
- Rivers of Southeast Asia Slides
 - http://stream.its.txstate.edu/users/tage/GeoP_Rivers.mov
- Life on the Rivers in Southeast Asia Slides
 - http://stream.its.txstate.edu/users/tage/GeoP_Ravenne_Life.mov
- Resources of Southeast Asia Slides
 - http://stream.its.txstate.edu/users/tage/GeoP_Resources.mov
- Agriculture in Southeast Asia Slides
 - http://stream.its.txstate.edu/users/tage/GeoP_Agriculture.mov

Case Study

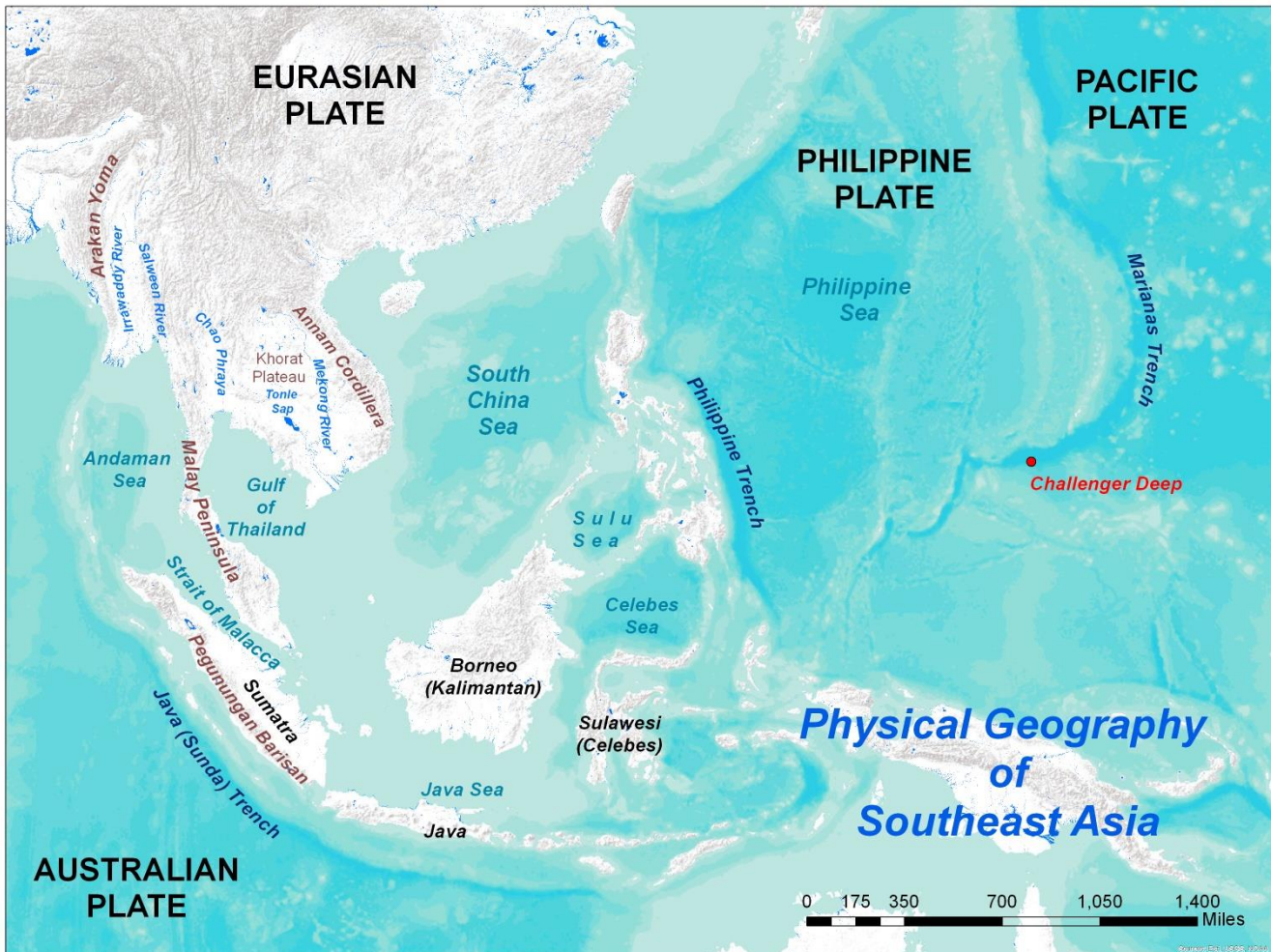
Mount Merapi Eruption Power Point

Mount Merapi Eruption Google Earth File

- http://eoimages.gsfc.nasa.gov/images/imagerecords/46000/46881/ge_46881.kml

Readings and Visual Resources

Physical Geography of Southeast Asia – map by Michelle Crane





[Exploiting a Land of Plenty](http://ngm.nationalgeographic.com/2011/08/burma/burma-map) – National Geographic

(<http://ngm.nationalgeographic.com/2011/08/burma/burma-map>)

This map of Burma features the location of important resources which are sold to foreign countries to generate income, as well as areas where the population has been displaced to make room for these projects – and reduce resistance to them, as well.



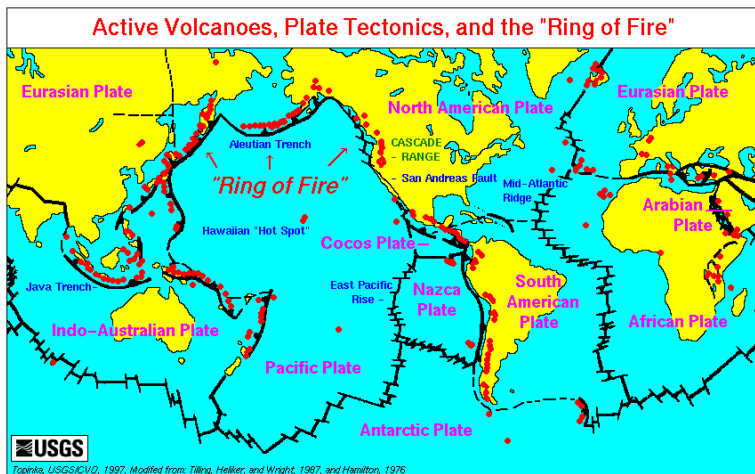
[Satellite Image of Mainland Southeast Asia](http://earthobservatory.nasa.gov/IOTD/view.php?id=2005) – NASA

(<http://earthobservatory.nasa.gov/IOTD/view.php?id=2005>)

Image of Southeast Asia taken in 2001 by NASA’s Terra spacecraft shows the jungles of Vietnam, Laos, and Cambodia and the Mekong River.

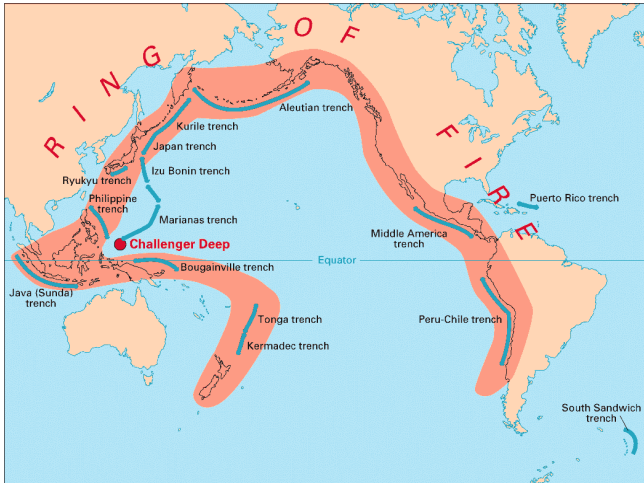
[Active Volcanoes, Plate Tectonics and the “Ring of Fire” Map](http://vulcan.wr.usgs.gov/Glossary/PlateTectonics/Maps/map_plate_tectonics_world.html) – courtesy of the U.S. Geological Survey.

(http://vulcan.wr.usgs.gov/Glossary/PlateTectonics/Maps/map_plate_tectonics_world.html)



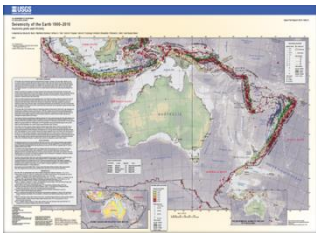
[Ring of Fire](#) – courtesy of the U.S. Geological Survey.

(<http://pubs.usgs.gov/gip/dynamic/fire.html>)



[Seismicity of the Earth 1900 – 2010 Australia Plate and Vicinity](#) – USGS

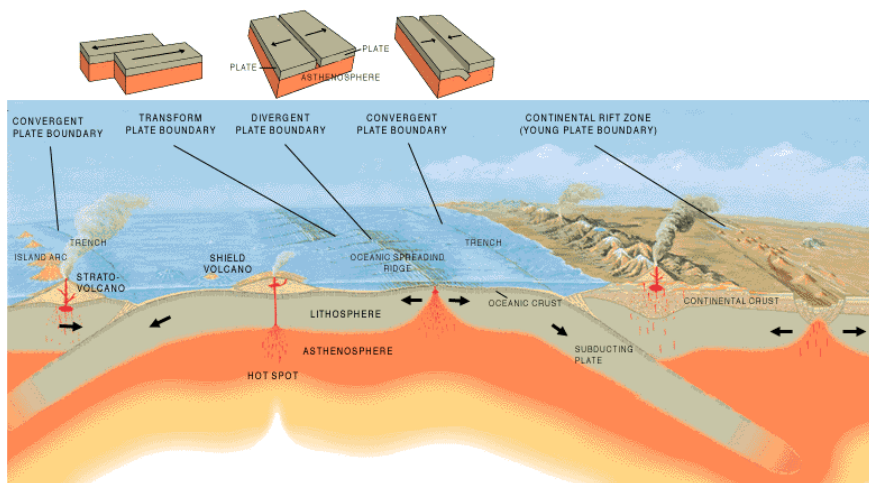
(<http://pubs.usgs.gov/of/2010/1083/g/>)



This USGS publication focuses upon the Australia plate and so includes a large portion of Indonesia. The map shows great detail of the different types of plate boundaries found in this region, as well as seismic events for a 110 year time period. A PDF of the map can be downloaded from the site.

Plate Boundaries – courtesy of the U.S. Geological Survey

(<http://pubs.usgs.gov/gip/dynamic/Vigil.html>)

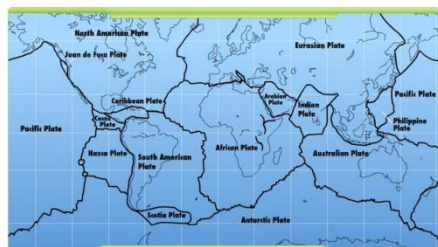


Dynamic Earth Interactive: Plates and Boundaries – Annenberg Learner Website




Plates & Boundaries

The earth's continents are constantly moving due to the motions of the tectonic plates. Closely examine the map below, which shows the 15 major tectonic plates.

As you can see, some of the plates contain continents and others are mostly under the ocean. The type of crust that underlies the continents is called **continental crust**, while the type found under the oceans is called **oceanic crust**. Continental crust is thicker – about 20 to 40 miles (35 to 70 km) thick – and usually older than oceanic crust, which is only 4 to 6 miles (7 to 10 km) thick. All the plates have names, usually referring to landmasses, oceans, or regions of the globe where they are located.



The border between two tectonic plates is called a **boundary**. All the tectonic plates are constantly moving – very slowly – around the planet, but in many different directions. Some are moving toward each other, some are moving apart, and some are sliding past each other. Because of these differences, tectonic plate boundaries are grouped into three main types:

<p>A convergent boundary occurs where two plates are pushing toward each other.</p>  <p>Examples of convergent boundaries include:</p> <ul style="list-style-type: none"> the boundary between the Eurasian Plate and the Indian Plate at the Himalayas. 	<p>A divergent boundary marks two plates that are moving apart from each other.</p>  <p>Examples of divergent boundaries include:</p> <ul style="list-style-type: none"> the boundary between the African Plate and the Arabian Plate in the Red Sea. 	<p>A transform boundary occurs where two plates slide past each other.</p>  <p>Examples of transform boundaries include:</p> <ul style="list-style-type: none"> the boundary between the Pacific Plate and the Australian Plate, crossing the Isthmus.
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(<http://www.learner.org/interactives/dynamicearth/plate.html>)

Interactive has annotated plate boundary map, including one which highlights what type of boundary can be found along each plate, as well as a simplistic representation of plate movements.

[Dynamic Earth Interactive: Slip, Slide & Collide](#) – Annenberg Learner Website

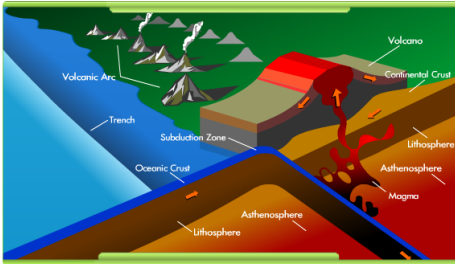
Slip, Slide, & Collide

Convergent Boundaries — Colliding Plates

At convergent boundaries, tectonic plates collide with each other. The events that occur at these boundaries are linked to the types of plates — oceanic or continental — that are interacting.

Subduction Zones and Volcanoes

At some convergent boundaries, an oceanic plate collides with a continental plate. Oceanic crust tends to be denser and thinner than continental crust, so the denser oceanic crust gets bent and pulled under, or subducted, beneath the lighter and thicker continental crust. This forms what is called a **subduction zone**. As the oceanic crust sinks, a deep oceanic **trench**, or valley, is formed at the edge of the continent. The crust continues to be forced deeper into the earth, where high heat and pressure cause trapped water and other gasses to be released from it. This, in turn, makes the base of the crust melt, forming **magma**.



(<http://www.learner.org/interactives/dynamicearth/slip2.html>)

An animated illustration of plate boundaries.

[Perry-Castaneda Library Map Collection: Asia Maps](#) – University of Texas at Austin

(<http://www.lib.utexas.edu/maps/asia.html>)

An extensive collection of maps including historical, thematic, topographic, and general reference maps from all over Asia.

[Myanmar's River of Spirits](#) – National Geographic

(<http://ngm.nationalgeographic.com/2006/05/irrawaddy-river/salak-text>)



This collection of materials focuses upon the Irrawaddy River in Burma/Myanmar. It contains an article printed in the magazine in May 2006, a photo gallery of images from the article, a short video of a spirit festival and a list of resources for more information on the river and Burma.

Additional Video Resources

Stat for Global Intelligence – A geopolitical analysis firm has posted dozens of short videos (most around 3 minutes long) on a variety of topics from around the world. While some of the current event videos are up to 2 years old, the topics they address are still relevant. The videos are free to watch online.

- [Thailand's Geographic Challenge](#)
 - <http://www.stratfor.com/video/thailands-geographic-challenge>
- [Indonesia's Geographic Challenge](#)
 - <http://www.stratfor.com/video/indonesias-geographic-challenge>
- [The Philippine's Geographic Challenge](#)
 - <http://www.stratfor.com/video/philippines-geographic-challenge>
- [Myanmar's Geographic Challenge](#)
 - <http://www.stratfor.com/video/myanmars-geographic-challenge>
- [Thailand's Floods Highlight Historical Tensions](#)
 - <http://www.stratfor.com/analysis/20111103-dispatch-thailands-floods-highlight-historical-tensions>

Lesson Plan

Creating an Annotated Sketch Map of Southeast Asia Lesson Plan

Physical Geography of Southeast Asia Power Point

Climate and Weather of Southeast Asia Power Point