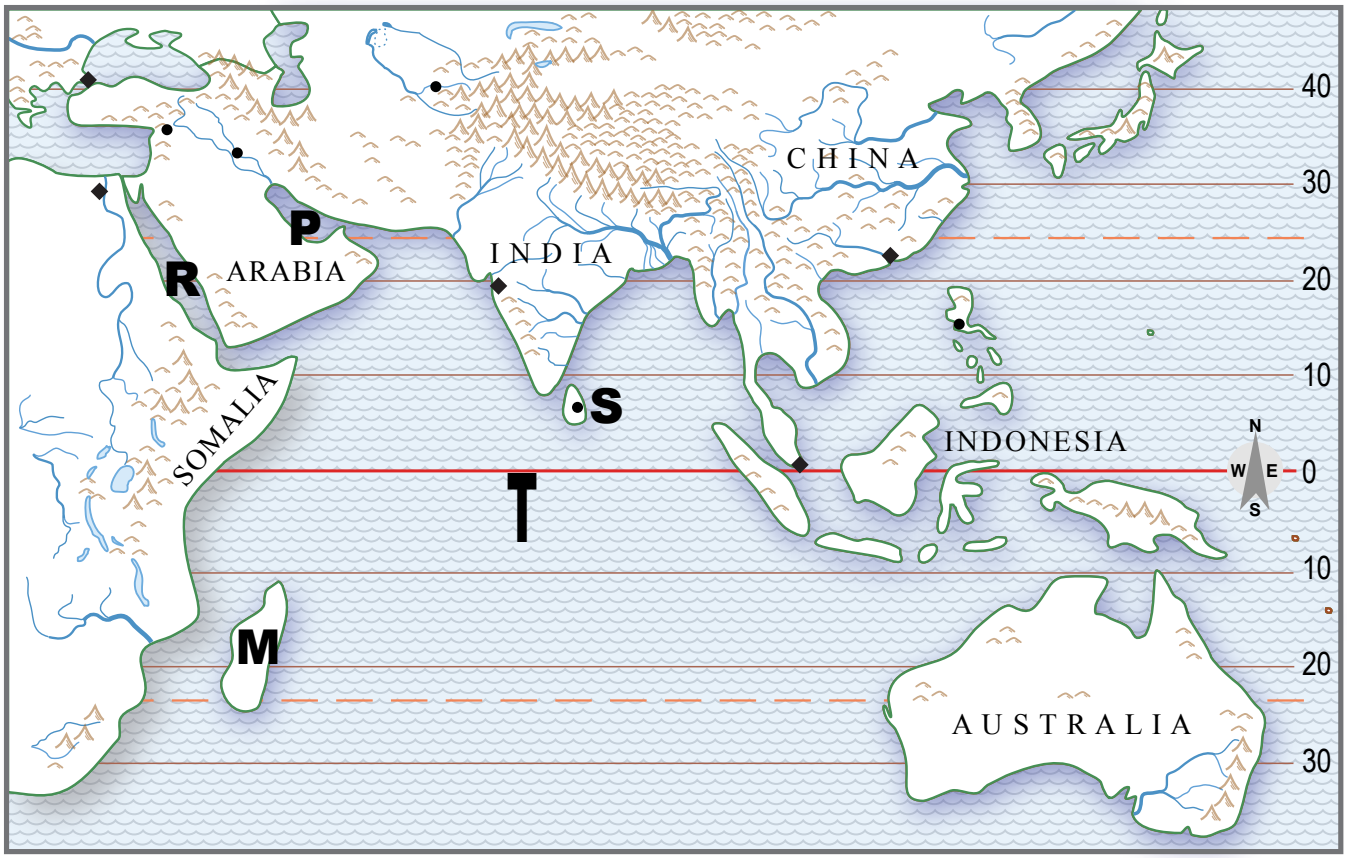
Sailing in the Arabian Sea in Summer



1. **Sunshine.** In summer, central Asia gets a lot of solar energy. The ground is warm.

2. **Jet stream.** The west-to-east jet stream goes <u>north</u> of the Himalaya Mountains (the big area of high land in Central Asia). **Put an M in the middle of these mountains.**

3. **Trade winds.** Strong winds blow from east to west in the latitudes marked by the letter T. A courageous sailor could "ride the trade winds" all the way from the Indonesian islands to the coast of Africa. That's 3600 miles, like going from New York all the way to Spain.

4. **Trade current.** The trade winds push a strong current of water westward. This causes water to "pile up" near Somalia. **Put an A where water is extra deep near Africa.**

5. **Air pressure.** A jet stream far north plus warm land makes low air pressure over Asia.

6. **Monsoon wind.** Low air pressure causes wind to blow northeast from Somalia toward India.

7. **Monsoon rain.** The winds carry moist air to India and on toward the Himalaya Mountains.

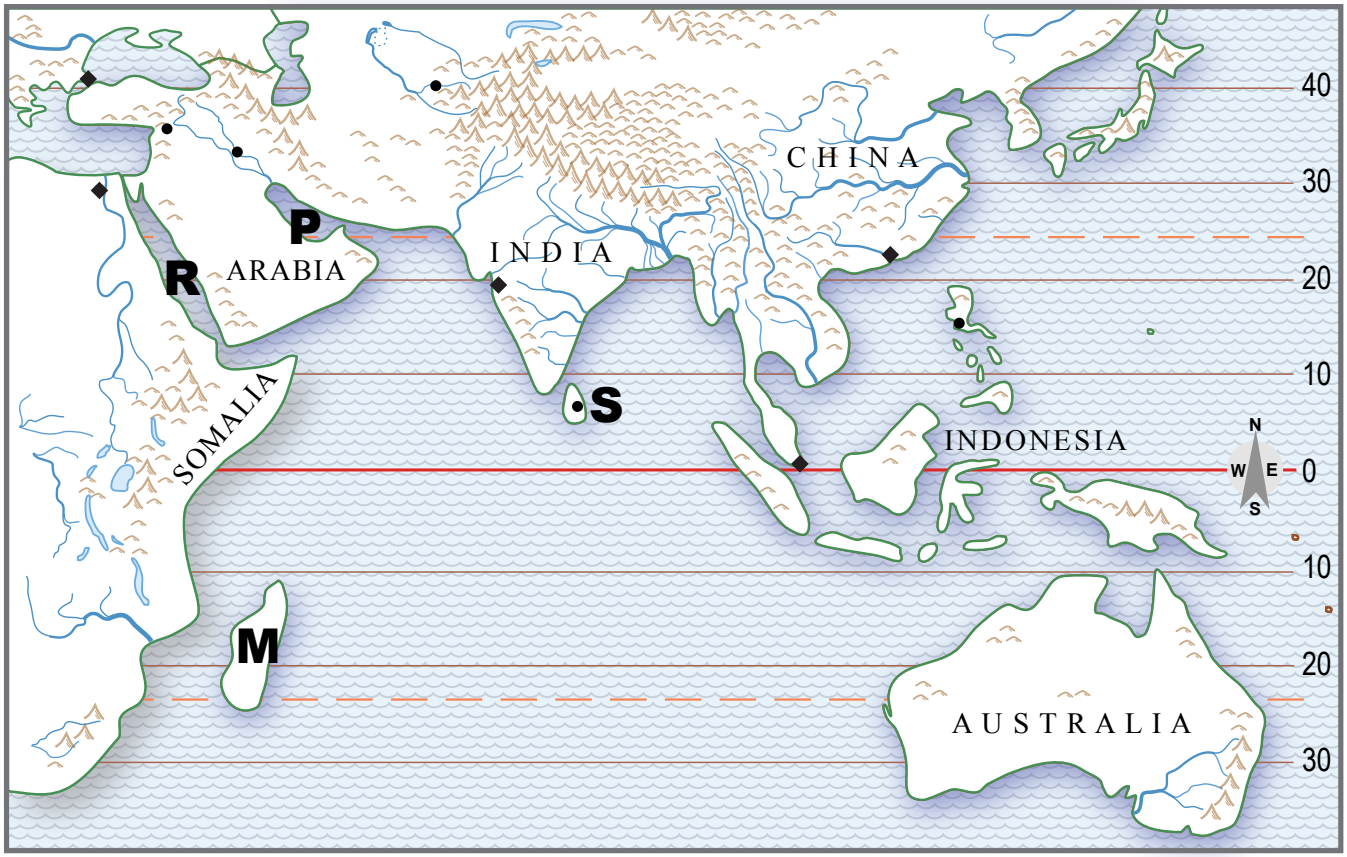
8. **Monsoon current.** The monsoon winds also push a lot of water northeastward toward India. **Put a B on the map where water "piles up" in the northern part of the Arabian Sea.**

9. **Coast current.** Excess water flows southeast along the coast of India toward Sri Lanka (S).

Reread these 9 statements, and draw arrows on the map to show how water moves
- circle: **west east** along the equator, as a current pushed by the trade winds,
- circle: **northwest northeast** along the Somali Coast, pushed by the summer monsoon,
- circle: **northwest southeast** along the west coast of India.

Traders came southeast in the Persian Gulf (P) and Red Sea (R) from Europe and Egypt.
They met sailors bringing spices and silk from India, Indonesia, and China.
These sailors "rode" the clockwise circulation of water in the Arabian Sea in summer.

Sailing in the Arabian Sea in Winter



1. **Sunshine.** In winter, central Asia gets very little solar energy. The ground is cold. BRRRR!

2. **Jet stream.** The west-to-east jet stream goes <u>south</u> of the Himalaya Mountains (the big area of high land in Central Asia). **Put an H in the middle of these mountains.**

3. **Air pressure.** A jet stream over India plus cold land in Asia makes high air pressure.

4. **Monsoon Wind.** High air pressure causes strong winds to blow southwest from India.

5. **Monsoon Current.** Winds push water along the Somali Coast from India to Madagascar (M). **Put an A in the Arabian Sea, north of the equator between India and Somalia.**

6. **Trade Wind.** Meanwhile, trade winds blow west from Australia toward Madagascar.

7. **Trade Wind Current.** The trade winds also push water toward Madagascar.

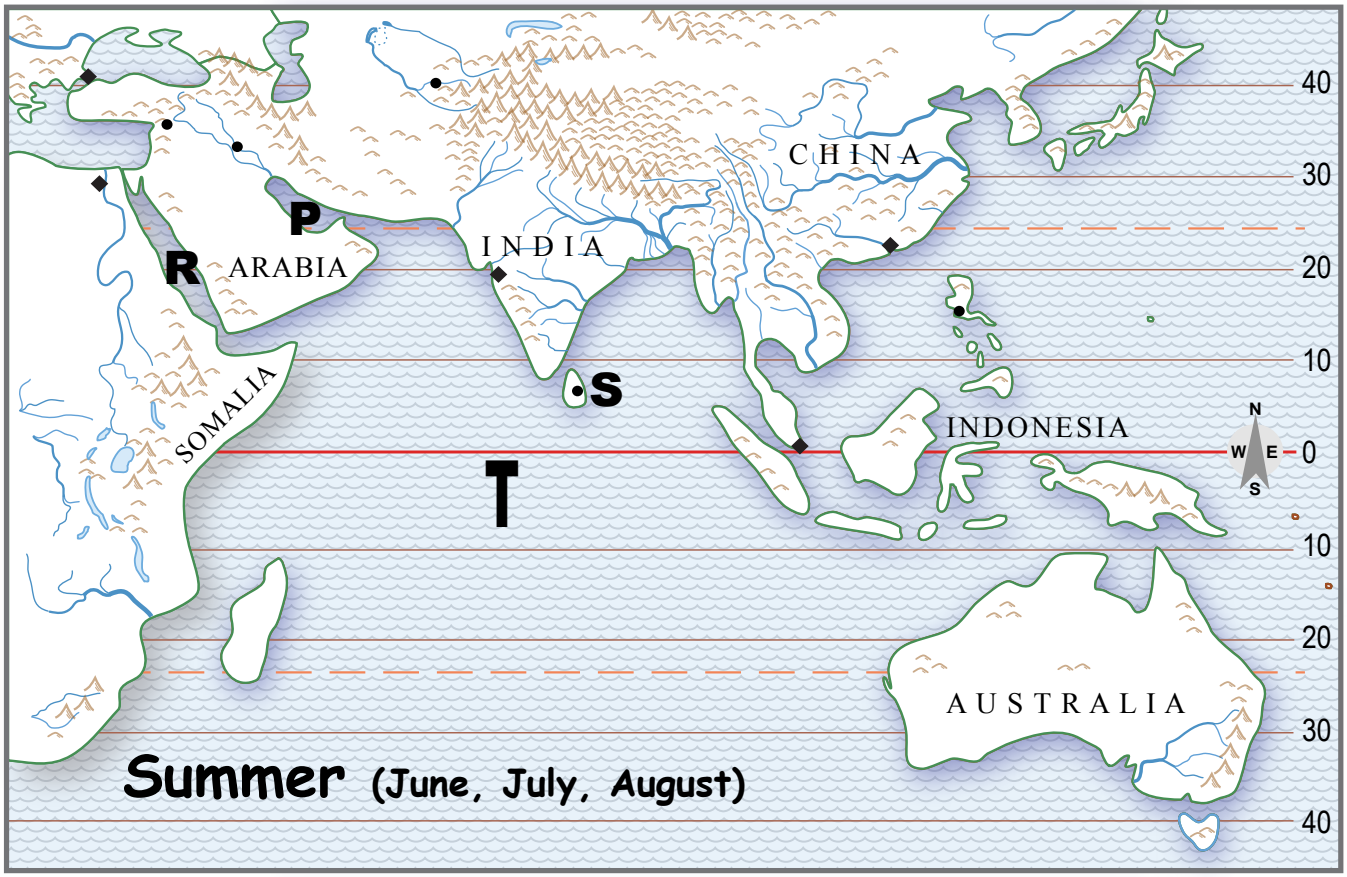
8. **Countercurrent.** "Excess" water north of Madagascar flows eastward near the equator. This flow is called a countercurrent, because it goes against the "normal" trade wind. The Equatorial Countercurrent is weak and unreliable. It is very risky for sailing ships.

9. **Coast current.** Some of the water in the Equatorial Countercurrent is pulled northwest along the west ocast of India to replace water blown away by the dry winter monsoon.

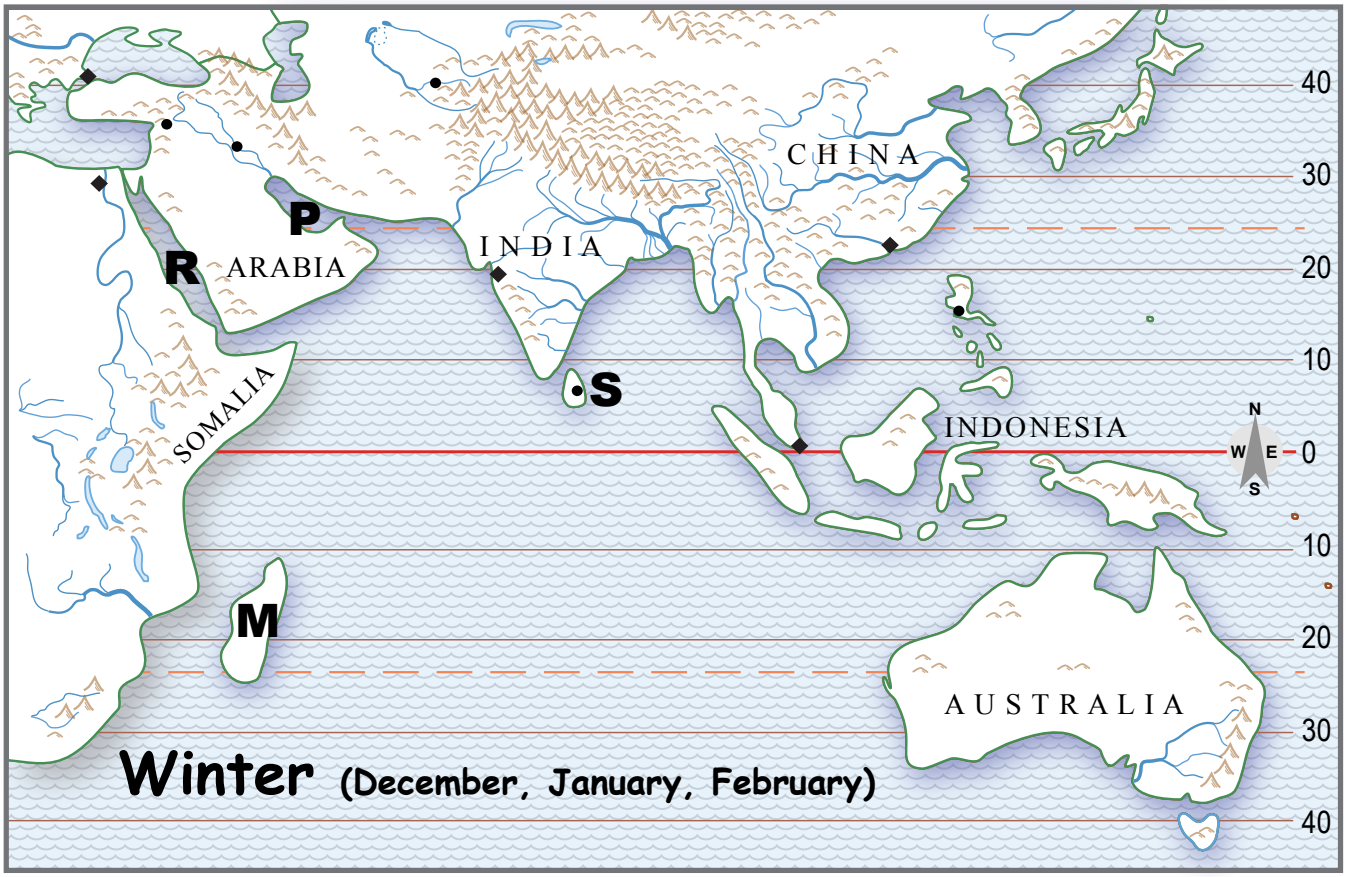
Reread these 9 statements, and draw arrows on the map to show how water moves
- circle: **northeast southwest** along the Somali Coast, pushed by the winter monsoon,
- circle: **east west** as a weak countercurrent along the equator,
- circle: **northwest northeast southeast** along the west coast of India.

Traders came southeast in the Persian Gulf (P) and Red Sea (R) from Europe and Egypt.
They met sailors bringing spices and silk from India, Indonesia, and China.
These sailors "rode" the counterclockwise circulation of water in the Arabian Sea in winter.

Sailing in the Arabian Sea



Summer (June, July, August)



Winter (December, January, February)

Teacher's Guide: **Sailing the Arabian Sea**

Students view a presentation that is a step-by-step explanation of the pattern of winds and ocean currents in the Arabian Sea. They can then participate in a number of scenarios – trader, missionary, pirate, government officer – to explore some of the consequences of that circulation system.	Grade: 6-10 Related Discipline: History GLCEs: 6G411, 7W316, 413 Time: 20 minutes, 2 10-minute

Preparation: Duplicate the basemap, review the presentations, and think about whether students know how to take notes on a map or should get a brief explanation first.

Setup: One setup is to use an activity like Shipwrecks to make the point that people had developed effective trading networks across the Arabian Sea and the Bay of Bengal more than 2000 years ago. How did they do this before steam or diesel engines, GPS, and other modern navigation tools?

Another setup (if your textbook or reading still says that Vasco de Gama and other explorers were "venturing into the unknown") is to set up a straw person – "your book says these explorers were traveling into the unknown, but actually they were going into a region where people already had a sophisticated trading system, one that had been there for more than a thousand years."

A third setup is to note that the wealthiest cities in the middle ages were places like Alexandria, Baghdad, Canton, Mecca, Venice, and Yemen. These places were favorably located with respect to the trade between Arabia, India, and China, with extensions into Africa, Europe, and Indonesia. How did this network come to be? What physical conditions aided sailing ships in this region?

Procedure: Run the presentations, and have students take notes on their desk maps. Many teachers have noted that students simply do not learn the patterns from the summary maps that often appear in texts or on the web. They need to build the map for themselves. To simplify this task, if you wish, you could note that students will NOT be tested on the individual steps – just the summary circulation. This could be learned by memorization – "In summer, the winds and ocean currents form a clockwise circulation in the Arabian Sea; in winter it is counter-clockwise." BUT, it bears repeating – students often get this backwards, because memorization is what we do when we do not understand what we are supposed to learn. So, run the presentations and have students take notes. You could do them back to back on one day and focus on the contrast. Or you could do them on different days, and intersperse an activity like Shipwrecks or Chokepoints. You could have students think about consequences – like where would they build a trading fort, or where would they hang out if they were a pirate. The fact is, even in the 21st century, this area is a danger zone of piracy on the high seas!

Answers: This basic circulation pattern **-**clockwise in summer, counterclockwise in winter – occurs in the Arabian Sea, the Bay of Bengal, and the North Atlantic Ocean and North Pacific Ocean.

Debrief: These ocean currents have implications beyond just serving as a driving force for ancient sailboats. They have a strong influence on climate today. Here's a striking example – the ocean currents in the North Atlantic Ocean carry a lot of heat north and then east, pushing warm water against Europe. As a result, western Europe has a mild climate and more than 300 million people, while comparable latitudes in eastern Canada are too cold for farming and essentially uninhabited.

Vocabulary: wind monsoon ocean current countercurrent sailing ship tacking

Extension: Examine maps that show the relationship between ocean currents and climate.

Research some of the commodities in the ancient trading system – cloves and nutmeg from Indonesia, gold from West Africa, silk and ceramics from China, frankincense from Yemen, etc.

Speculate about what might happen to this circulation system as a result of carbon dioxide and global warming – the wind system is pushed harder, and there is a great deal of evidence that it is making the monsoons stronger, hurricanes more powerful, tropical deserts moved farther from the equator, etc.