



FIGURE 2.30 Hot-spot volcanism, Kilauea Volcano, Hawaii. (Photo courtesy of the U.S. Geological Survey)

that the Hawaiian hotspot may have migrated southward by as much as 20 degrees latitude. If this is the case, models of past plate motion that were based on a "fixed hot spot" frame of reference will need to be reevaluated.

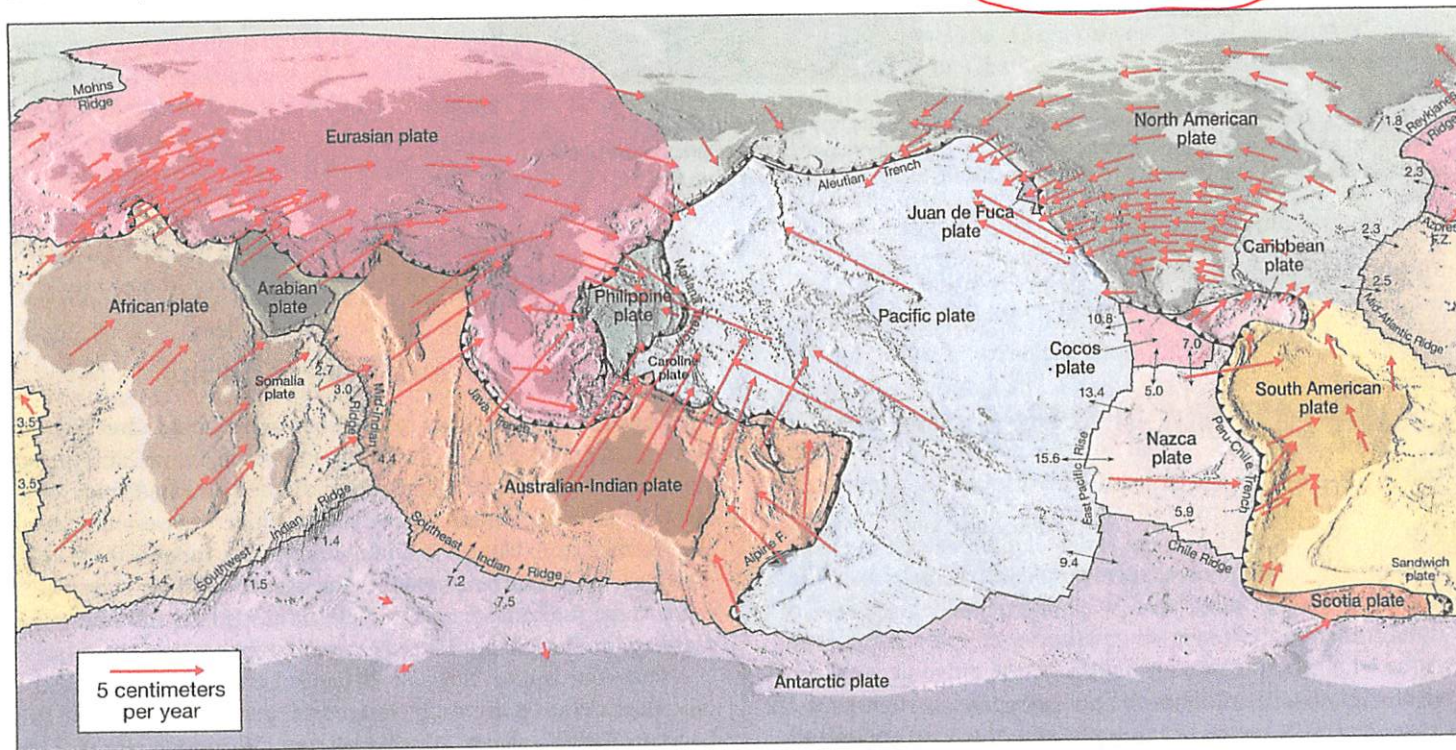
Paleomagnetism and Plate Motions

Researchers have built a time scale for magnetic reversals going back nearly 200 million years, consequently the rate at which seafloor spreading occurs along various ridge segments can be accurately determined. In the Pacific Ocean, for example, the magnetic stripes are much wider for corresponding time intervals than those of the Atlantic Ocean. Hence, we conclude that the spreading centers found in the Pacific had faster rates of spreading than those that generated the Atlantic basin.

When we apply radiometric dates to these magnetic events, we find that the spreading rate in the North Atlantic is about 2 centimeters (1 inch) per year (Figure 2.31). The rate is only slightly faster in the South Atlantic. By contrast, spreading rates along the East Pacific Rise are mostly between 6 and 12 centime-

FIGURE 2.31 This map illustrates directions and rates of plate motion in centimeters per year. Seafloor-spreading velocities (shown with black arrows and labels) are based on the spacing of dated magnetic strips (anomalies). The red arrows show plate motion at selected locations based on GPS data. (Seafloor data from DeMets and others, GPS data from Jet Propulsion Laboratory)

relative!
absolute!



observed above
for years, that all con
plate boundaries are
ters (2.5 to 5 inches) a
ters (8 inches) a year at
like a magnetic tape re
netic field that can be us
In summary, data f
magnetism, and other
measuring the relative s
away from, or past one
lions of years.

Measuring Plate

Plates are not flat surfa
sphere which greatly co
In addition, plates use
motion, which can cau
move at different speed
fact can be illustrated
wise matter. When doi
left side of the plate m
items on the right side
the center will rotate, b
change. The complex r
describing plate motion
the relative motion betw
separates them. Fortu
searchers have recently
absolute motion of hun

You may be famil
(GPS), which is part of
biles to locate one's po
other location. The G
dozen satellites that se
GPS receivers located
the receiver is determi
distance from the receiv
use specifically designe
position of a point on I
the diameter of a small
ular site is surveyed rep
Data obtained from
shown in Figure 2.31. C