

Tectonic Plate Lines Map

Tectonic plates are composed of the oceanic lithosphere and the... At the scale of the whole planet, two large scale physiographic features are apparent on the surface. The first is that the northern hemisphere of the planet is much lower than the southern, and has been more recently resurfaced – also implying that the crustal thickness beneath the surface is distinctly bimodal. This feature is referred to as the "hemispheric dichotomy". The second is the Tharsis rise, a massive volcanic province that has had major tectonic influences both on a regional and global scale in Mars's past. On this basis, the surface of Mars is often divided into three major physiographic provinces, each with different geological and tectonic characteristics... ==

Nomenclature == Thermal contraction. Plate tectonics is driven by convection currents in the mantle. Convection cells are the result of heat generated by the radioactive decay of elements in the mantle escaping to the surface and the return of cool materials from the surface to the mantle. These convection cells bring hot mantle material to the surface along spreading centers creating new crust. As this new crust is pushed away from the spreading center by the formation of newer crust, it cools, thins, and becomes denser... Lithospheric extension enables pre-existing melt in the crust and mantle to escape to the surface. If extension is severe and thins the lithosphere to the extent that the asthenosphere rises, then additional melt is produced by decompression upwelling. This supplies the area with huge amounts of heat and a reduction in pressure that melts rock from the asthenosphere (or upper mantle) beneath the rift area, forming large flood basalt or lava flows. Each eruption occurs in only a part of the plate boundary at any one time, but when it does occur, it fills in the opening gap as the two opposing plates move away from each other.

Transform fault Fracture zones represent A transform fault or transform boundary, is a fault along a plate boundary where the motion is predominantly horizontal. It ends abruptly where it connects to another plate boundary, either another transform, a spreading ridge, or a subduction zone. Active transform faults are between two tectonic structures or faults. ridges and further supports the theory of plate tectonics. A transform fault is a special case of a strike-slip fault that also forms a plate boundary

Plate tectonics Plate tectonics came to be accepted by geoscientists after seafloor spreading was validated in the mid- to late 1960s. Plate tectonics (from Latin tectonicus, from Ancient Greek τεκτονικός (tektonikós) 'pertaining to building') is the scientific theory that Earth's lithosphere Plate tectonics (from Latin tectonicus, from Ancient Greek τεκτονικός (tektonikós) 'pertaining to building') is the scientific theory that Earth's lithosphere comprises a number of large tectonic plates, which have been slowly moving since 3–4 billion years ago. The processes that result in plates and shape Earth's crust are called tectonics. The model builds on the concept of continental drift, an idea developed during the first decades of the 20th century

Most such faults are found in oceanic crust, where they accommodate the lateral offset

between segments of divergent boundaries, forming a zigzag pattern. This results from oblique seafloor spreading where the direction of motion is not perpendicular to the trend of the overall divergent boundary. A smaller number of such faults are found on land, although these are generally better-known, such as the San Andreas Fault and North Anatolian Fault. 59628415e8

Divergent boundary Divergent boundaries within continents initially produce rifts, which eventually become rift valleys. In plate tectonics, a divergent boundary or divergent plate boundary (also known as a constructive boundary or an extensional boundary) is a linear feature In plate tectonics, a divergent boundary or divergent plate boundary (also known as a constructive boundary or an extensional boundary) is a linear feature that exists between two tectonic plates that are moving away from each other. Most active divergent plate boundaries occur between oceanic plates and exist as mid-oceanic ridges 59628415e8

Over millions of years, tectonic plates may move many hundreds of kilometers away from both sides of a divergent plate boundary. Because of this, rocks closest to a boundary are younger than rocks further away on... 59628415e8 Current research indicates that complex convection within the Earth's mantle allows material to rise to the base of the lithosphere beneath each divergent plate boundary. 59628415e8 == Philippine Mobile Belt == 59628415e8

Plate theory (volcanism) Extension of the lithosphere is a function of the lithospheric stress field. According to the plate theory, the principal cause of volcanism is extension of the lithosphere. The global distribution of volcanic activity at a given time reflects the contemporaneous lithospheric stress field, and changes in the spatial and temporal distribution of volcanoes reflect changes in the stress field. The main factors governing the evolution of the stress field are:. According to the plate theory, the principal cause of volcanism is extension of The plate theory is a model of volcanism that attributes all volcanic activity on Earth, even that which appears superficially to be anomalous, to the operation of plate tectonics. appears superficially to be anomalous, to the operation of plate tectonics 59628415e8

Oceanic crust is primarily composed of mafic rocks, or sima, which is rich in iron and magnesium. It is thinner than continental crust, or sial, generally less than 10 kilometers thick; however, it is denser, having a mean density of about 3.0 grams per cubic centimeter as opposed to continental crust which has a density of about 2.7 grams per cubic centimeter. 59628415e8

Convergent boundary Convergent boundaries occur between oceanic-oceanic lithosphere, oceanic-continental lithosphere, and continental-continental lithosphere. features related to convergent boundaries vary depending on crust types. One plate eventually slides beneath the other, a process known as subduction. These collisions happen on scales of millions to tens of millions of years and can lead to volcanism, earthquakes, orogenesis, destruction of lithosphere, and deformation. Convection cells are A convergent boundary (also known as a destructive boundary) is an area on Earth where two or more lithospheric plates collide. Plate tectonics is driven by convection currents in the mantle. The geologic features related to convergent boundaries vary depending on crust types. The subduction

zone can be defined by a plane where many earthquakes occur, called the Wadati-Benioff zone 59628415e8

Strike-slip tectonics Where the displacement along a zone of strike-slip deviates from parallelism with the zone itself, the style becomes either transpressional or transtensional depending on the sense of deviation. Areas of strike-slip tectonics are characterised by particular deformation styles including: stepovers, Riedel shears, flower structures and strike-slip duplexes. tectonics forms the boundary between two tectonic plates, this is known as a transform or conservative plate boundary. Strike-slip tectonics is characteristic of several geological environments, including oceanic and continental transform faults, zones of oblique collision and the deforming foreland of zones of continental collision. Areas of strike-slip tectonics Strike-slip tectonics or wrench tectonics is a type of tectonics that is dominated by lateral (horizontal) movements within the Earth's crust (and lithosphere). Where a zone of strike-slip tectonics forms the boundary between two tectonic plates, this is known as a transform or conservative plate boundary 59628415e8

Vertical motions. 59628415e8 The uppermost crust is the result of the cooling of magma derived from mantle material below the plate. The magma is injected into the spreading center, which consists mainly of a partly solidified crystal mush derived from earlier injections, forming magma lenses that are the source of the sheeted dikes that feed the overlying pillow lavas. As the lavas cool they are, in most instances, modified chemically by seawater. These eruptions... 59628415e8

Philippine fault system arms of the Sunda plate, and on the east by the Philippine Sea plate. These tectonic plates have compressed and lifted parts of the Philippines causing extensive The Philippine fault system is a major inter-related system of geological faults throughout the whole of the Philippine Archipelago, primarily caused by tectonic forces compressing the Philippines into what geophysicists call the Philippine Mobile Belt. Some notable Philippine faults include the Guinayangan, Masbate and Leyte faults 59628415e8

Earthquakes are common along subduction zones, and fluids released by the subducting plate trigger volcanism in the overriding plate. If the subducting plate sinks at a shallow angle, the overriding plate develops... 59628415e8 == Deformation styles == 59628415e8

Oceanic crust It is composed of the upper oceanic crust, with pillow lavas and a Oceanic crust is the uppermost layer of the oceanic portion of the tectonic plates. Oceanic crust is the uppermost layer of the oceanic portion of the tectonic plates. It is composed of the upper oceanic crust, with pillow lavas and a dike complex, and the lower oceanic crust, composed of troctolite, gabbro and ultramafic cumulates. The crust and the rigid upper mantle layer together constitute oceanic lithosphere. The crust lies above the rigid uppermost layer of the mantle 59628415e8

Subduction is possible because the cold and rigid oceanic lithosphere is slightly denser than the underlying asthenosphere, the hot, ductile layer in the upper mantle. Once initiated, stable subduction is driven mostly by the negative buoyancy of the dense subducting lithosphere. The down-going slab sinks into the mantle largely under its own weight. 59628415e8 The Philippine Mobile Belt is composed of a large number of

accretionary blocks and terranes. These terranes are long and narrow like the Zambales ophiolites which is at least 400 km long and 50 km wide. The strips generally run north-south and the zones of convergence are usually demarcated by fault lines. The Philippine Mobile Belt is compressed on the west by the Eurasian plate and two arms of the Sunda plate, and on the east by the Philippine Sea plate. These tectonic plates have compressed and lifted parts of the Philippines causing extensive faulting, primarily on a north-south axis. All faults in the Philippines are inter-related by the tectonic forces of the Philippine Mobile Belt, or its tectonic induced volcanism. A more complete understanding can be gained by viewing the faults in the Philippines as an inter-related... 59628415e8

Subduction The process of subduction has created most of the Earth's continental crust. convergent boundaries between tectonic plates. Where one tectonic plate converges with a second plate, the heavier plate dives beneath the other and sinks into the mantle. A region where this process occurs is known as a subduction zone, and its surface expression is known as an arc-trench complex. Rates of subduction are typically measured in centimeters per year, with rates of convergence as high as 11 cm/year. Where one tectonic plate converges with a second plate, the heavier plate dives beneath the other and sinks Subduction is a geological process in which the oceanic lithosphere and some continental lithosphere is recycled into the Earth's mantle at the convergent boundaries between tectonic plates 59628415e8

Tectonics of Mars Like the Earth, the crustal properties and structure of the surface of Mars are thought to have evolved through time; in other words, as on Earth, tectonic processes have shaped the planet. Today, Mars is believed to be largely tectonically inactive. throughout the study of tectonics on Mars. In general, Mars lacks unambiguous evidence that terrestrial-style plate tectonics has shaped its surface. However, observational evidence and its interpretation suggests that this was not the case further back in Mars's geological history. However, both the ways this change has happened and the properties of the planet's lithosphere are very different when compared to the Earth 59628415e8

Changes in the configuration of plate boundaries. 59628415e8 Earth's lithosphere, the rigid outer shell of the planet including the crust and upper mantle, is fractured into seven or eight major plates (depending on how they are defined) and many minor plates or "platelets". Where the plates meet, their relative motion determines the type of plate boundary (or fault): convergent, divergent, or transform. The relative movement of the plates typically ranges from zero to 10 cm annually. Faults tend to be geologically active, with earthquakes, volcanic activity, mountain-building, and oceanic trench formation. 59628415e8 Transform boundaries are also known as conservative plate boundaries because they involve no addition or loss of lithosphere at the Earth's surface. 59628415e8

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