Plate Tectonics Earth consists of rigid lithospherie plates that slip over the plastic, ductile asthenospheric material.(Figure 14) Lithospheric plate Hot mantle rises and forms magma at the base of the plates Figure 14: Transform boundaries The famous San Andreas Fault (Figure 15) in California is a good example of this type of boundary: it facilitates the movement between the divergent boundary of the East Pacific Ridge, the convergent boundary of the Juan de Fuca–North American plates, and the divergent boundary of the Juan de Fuca Ridge.The East African Rift and Red Sea (oceanization stage) Differents stades de formation et d'evolution d'un ocean Lithospheric uplift Continental Rift o UNNENTALE C Distension SASTHE NOSPHEE African nur stake First ocean floor (linear sea) Red Sea Stage Atlantic type ocean Atlantic ocean stage Figure 10: Oceanic opening begins with lithospheric uplift, followed by the formation of a rift that eventually evolves into an ocean.The Himalayan mountain range, located at the boundary between the Indo–Australian plate and the Eurasian plate, is one of the best examples of this type of collision, as shown in the Lithosphere ent nentaiConinentaiconvernence Figure 13: Illustrates the formation of a mountain range typical of a collision, such as the Himalayas.Plate Boundaries BOUNDARY TYPES Transform Divergent Convergent Figure 4: The Different Types of Plate Boundaries Figure 5: Map showing the 14 major tectonic plates and their motions Trunetorm tault Mantle Convection 15 a physical process occurring within Earth's mantle, responsible for shaping Earth's surface.(B) Example of the collision between the Indo–Australian plate and the Eurasian plate, resulting in the Himalaya mountain range Transform Plate Boundaries Certain areas of the globe are in motion, although they are neither divergence zones nor convergence zones.Figure 8: Divergent Boundaries at the Mid–Ocean Ridge Continental rifts are extension zones typically located within the continental crust (intraplate zones and not at plate boundaries) where divergent deformation occurs.Volcanics and nonmarine sediments Plate African veroes dinarkes not to seael Plate Boundaries Vertical distances not to scale vocanoes Figure 9: (a) Rift stage.continent continent Rocks cool Cold rocks: descend Cold rocks, descend Hot rocks rise Heat source Figure 7: Mantle Convection Movements and Plate Tectonics 2.1 Divergent Plate Boundaries Divergent plate boundaries are regions where oceanic tectonic plates move apart.C) Convergence between two continental tectonic plates: in areas where two continental lithospheric plates converge, known as continental collision zones, mountain ranges develop due to compression and convergence (Figure 13).Convergence between an oceanie and a continental tectonic plate: in this case, an oceanic lithospheric plate subducts beneath a continental lithospheric plate, leading to the formation of continental volcanie ares (Figure 12).The study of lithospheric plate movement forms the basis of plate tectonics theory, which explains major internal geological phenomena such as earthquakes, volcanoes, and tectonic deformations.Andes mountain range Peru Chale Trench Oceanic crust Figure 12: (A) Continental volcanic arc.Three types of movements can be observed at lithospheric plate boundaries: – Divergent movements at divergent plate boundaries – Convergent movements at convergent plate boundaries – Transform movements at transform plate boundaries The plates move relative to each other and constantly change in size.These boundaries correspond to oceanie ridges (slow or fast, areas of oceanic expansion) also known as mid–ocean ridges (e.g., the East Pacific Rise, the Mid–Atlantic Ridge, etc.) (Figure 8).The subduction zone results from the convergence between an oceanic and a continental tectonic plate (active margin zones).These zones

can be nascent rifts and may eventually evolve into oceanic ridges, as has happened in the Red Sea region.2.2 Convergent Plate Boundaries A) Convergence between two oceanic tectonie plates: in this case, one oceanic lithospheric plate subducts beneath another oceanic lithospheric plate.Oceanie trust Lithosphere Asthenosphere Oceanie–oceanie convergence Figure 11: (A) Island volcanic arc.(B) Example of island are zones in the Japanese islands: subduction of the Pacific oceanic plate beneath the Eurasian plate (oceanic to the east).The movement of plates at these boundaries is characterized by horizontal sliding along faults.The two plates move in opposite directions on either side of these faults, known as transform Transform fault ––contact between two plates that slide horizontally past one another, commonly connecting two mid–ocean ridges.Transform plate boundaries correspond to large fractures that affect the entire thickness of the lithosphere.This rise and lateral flow of rocks within Earth control the positions of ocean basins and continents (Skinner and Porter, 1995).IRIS Mid–ocean 4 ndgMakeAGIF.com Figure 15: Case of the San Andreas Fault – Transform plate boundaries.faults.(Figure 11).