The place of convection in a mass of gas or liquid

Literature, Russian Literature

The thermal continues to rise causing an active cloud formation, which may produce a thunderstorm. A cumulonimbus cloud, or " thunderhead," is a particularly dramatic example of a convection cell. Eventually, the heated cell is cooled by the surrounding air, begins to fall, and the cycle is repeated. Whereas the Sun's electromagnetic energy is the energy source for atmospheric convection, asthenospheric convection is fueled by radioactive decay in the earth's core. The convective cells form in the asthenosphere, a region of extremely high pressure at a depth of about 60-200 miles where rocks are deformed and become molten by enormous pressures. In the asthenosphere, the molten material rises in a convection current until it hits the bottom of the upper layer of Earth's interior consisting of the crust and the mantle. Here, it can not rise any farther and begins to move horizontally.

Figure 2 depicts the movement of the convection cells in the asthenosphere. The red areas are the heated molten material rising from the earth's center and moving toward the surface. As the material reaches the surface.

Eventually, the material cools and as it does it becomes denser. This material then slowly sinks through the lighter material until it is again heated by the earth's core. It forms a new convection cell and repeats this same process.

In both the atmosphere and the asthenosphere material is moved from one region to another. Lower air levels rise to become the upper air, and as the

cooler upper air cells fall they become ground-level air. Within the Earth, irregular convection cells within the mantle transfer heat from the core to the surface of the planet. This process is the driving force behind both heat transfer and plate tectonics (" The Restless Earth"). The effect of the rising material also forms mountain ranges.

This process also transfers energy from one area to another. This transfer of energy can result in violent activity if the transfer happens abruptly. In the atmosphere we see it form high winds and thunderstorms. In the asthenosphere, energy is usually transferred by heating the earth's crust. In other cases, it may result in a volcano or an earthquake.
The hydrosphere is also an active medium that is powered by convection. The movement of convection cells is the force behind the ocean currents. Circulation patterns in the oceans are driven by density differences between warmer and older cells. As the water circulates, material and energy are transferred. The ocean's water is heated by the sun as well as undersea hot air vents. It is cooled by the polar ice caps.

Convection is also responsible for the action of the water cycle. As the sun heats the surface water on the earth, it evaporates and becomes water vapor. This warmed vapor rises until it encounters the cooler air at higher altitudes. Here it condenses back into water and returns to earth as precipitation (" The Water Cycle").

Convection takes place anytime there is a mass of gas or liquid on the earth.

It causes our weather, winds, and ocean currents. Convection heats our air and creates our mountain ranges. It results in natural disasters such as thunderstorms, volcanoes, and earthquakes. However, without convection, many of the earth's processes would come to a halt. It provides a means to move material and energy and makes the earth a truly active planet.