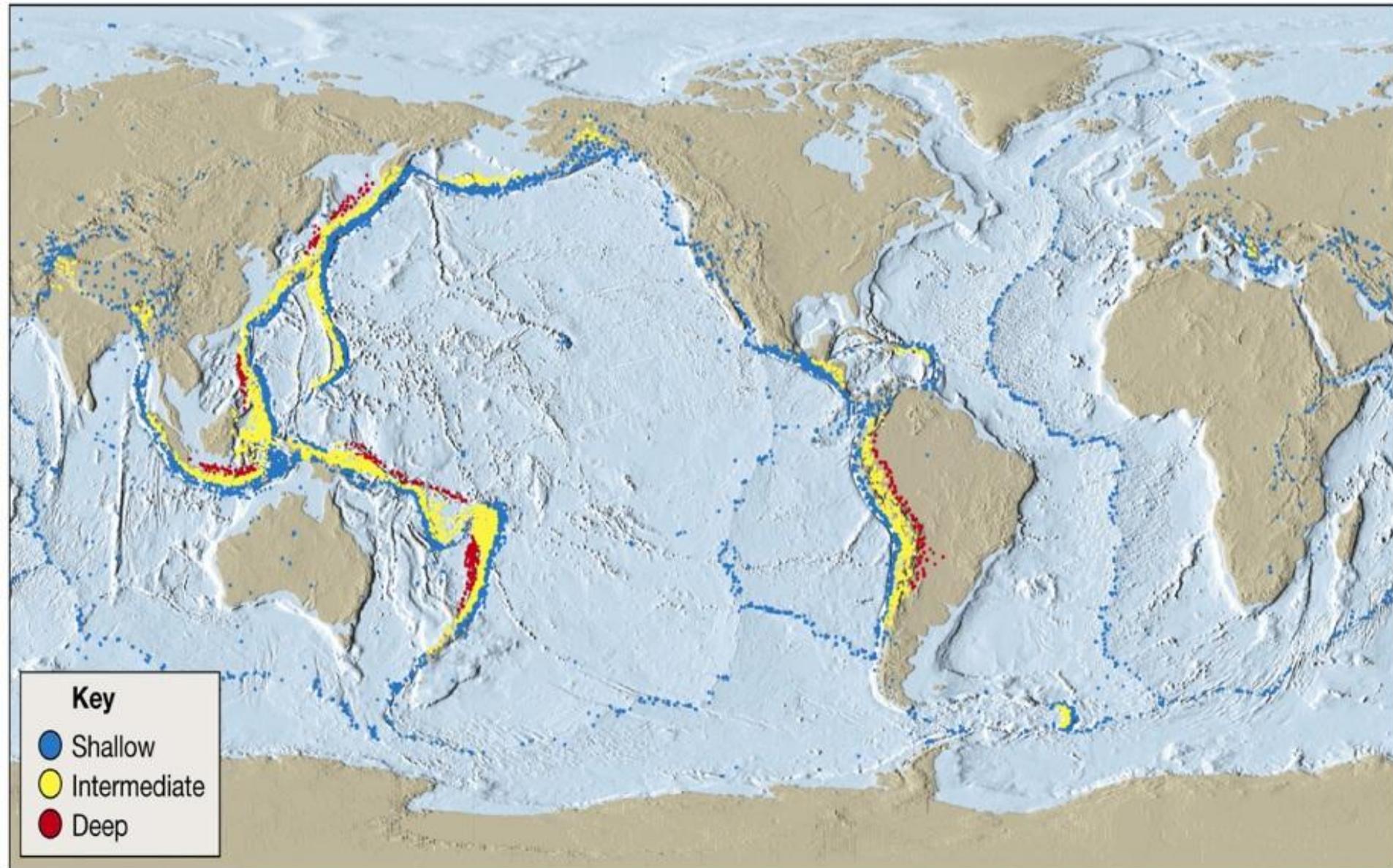


# The Distribution of Continents and Oceans



# INTRODUCTION

## HISTORICAL PERSPECTIVE

### **\* Continental Drift**

**- Abraham Ortelius (1596)**

He was the first to note the similarity between coastlines of the Americas and (Europe and Africa). So, he suggested an ancient separation.

**- Francis Bacon (1620)**

Credited the first to notice the "fit" of the Atlantic coastlines. He suggested that they were once together and had drifted apart.

**Francois Placet**

**(1668)**

- Related the separation to the flood of Profit Noah
- Biblical Catastrophism

**Theodor Christoph Lilienthal** **(1756)**

**Biblical Catastrophism**

**Alexander von Humbolt**

**(1801-1845)**

1. Geometric similarities
2. Geologic similarities
3. Atlantic is nothing else than a valley scooped out by the sea.

**He speculated that the Atlantic was formed by a flow of eddying water.**

## **Antonio Snider-Pellegrini (1858)**

1. Drift due to multiple Catastrophism
2. Flood was the last major catastrophe
3. He made fitness maps
4. Pre-drift reconstruction

## **Oswald Fisher (1882)**

Catastrophism event

**Drift:** associated with the origin of the moon out of pacific.

**Note : all these ideas were before put on the James Hutton (1785) doctrine, the Uniformitarianism.**

**"No power are to be employed that are not natural to globe....., No extra ordinary event ....., or The present is the key to the past**

**- Taylor and Baker (1910)**

They are American physicists.

**- Alfred Wegener (1912-1928)**, a German meteorologist

**Continental Drift** is taken place today and in the past.

Wagner considered the inventor of the hypothesis of **continental drift**.

He has spent a large part of his life to the development of this hypothesis. Four editions of his book "the origin of continents and oceans" was printed during the period 1915-1928. He proposed Super continent **Pangea** (means all land) surrounded by Panthalassa (means all oceans) in the Triassic .

**- Holmes (1927-1929)**

New theory of the mechanism of continental movement "Convection current".

**-Du Toit (1937)** proposed two Supercontinents **Laurasia** and **Gondwana** land separated by paleo-Tethys. He Modified the convection current hypothesis. This is the cause of separation of the supercontinents. This hypothesis has been the convergence of opposition from scientists, especially regarding the interpretation of the mechanism of movement.

# **SEA FLOOR SPREADING AND THE BIRTH OF PLATE TECTONICS**

**-Harry Hess (1960)**

**He proposed or explained the theory of Sea floor spreading.**

**- Dietz (1961)**

**Suggested the name "sea floor spreading" as a mechanism to explain continental drift.**

**- Vine and Matthews (1963-1966)**

**Discover the Magnetic belts and magnetic reversal**

**- Wilson (1965)**

**Introduce the Transform fault**

**- Mckenzie +Parker +Morgan (1967-1968)**

**They supported theory and collected all that was said before them, and putted on a stringent (صلب) geometrical basis.**

**- Isacks + Oliver + Sykes (1968-1969)**

**They Confirmed the hypothesis by earthquake seismology.**

# GEOSYNCLINAL THEORY

## Prior to Plate Tectonics

Subsiding linear trough that was caused by the accumulation of sedimentary rock strata deposited in a basin and subsequently compressed, deformed, and uplifted into a mountain range, with attendant volcanism and plutonism. The filling of a geosyncline with tons of sediments is accompanied in the late stages of deposition by folding, crumpling, and faulting of the deposits. Intrusion of crystalline igneous rock and regional uplift along the axis of the trough generally complete the history of a particular geosyncline. It is then transformed into a belt of folded mountains.

Geosynclines are divided into eugeosynclines and miogeosynclines, depending on the types of discernible rock strata of the mountain system.

## Plate tectonics

• From 1968 and early 1970, **Plate tectonics**: is a unifying model that attempts to explain the origin of patterns of deformation in the crust, earthquakes distribution, continental drift and oceanic ridges as well as proving a mechanism for earth to cool.

\* **Tectonics**: the word comes from Greek language (tektos) which means (builder).

\* **Tectonics refers to** regional scale geologic features.

### **Examples:**

- 1- Mountain belts.
- 2- Growth of continents.
- 3- Formation of ocean floor.
- 4- Developed of sea basins.
- 5- Earthquakes and volcanism.

# \* Impact of plate tectonics:

Provide a unified explanation of the Earth major surface features.

Linking of many different aspects of geology:

- Past distribution of flora and fauna.
- Relation of volcanic rocks suites and plate margins.
- Earthquakes.
- Volcanic activity

\* The major premises (افتراضات) of plate tectonics:

The outer most layer consists of plates (lithosphere). 6 Major plates and several small plates (lithosphere) which slowly move relative to one another. Lithosphere: This is strong, rigid resting on a weaker region in the upper mantle (asthenosphere).

- Lithosphere: is broken in to numerous segments (plates) that are in motion with respect to one another and continually changes in shape and size.

Boundaries of 3 types:

1- Divergent

2- Convergent or Collisional (cont. - cont., cont. - oceanic, ocean-oceanic)

3- Transform