Himalayan Slip

- The slip occurs at the Main Himalayan Thrust (MHT), due to hydrological variations and human activities, over which there is the periodic release of accumulated strain.

- The Global Positioning System (GPS) and Gravity Recovery And Climate Experiment (GRACE) data were used to quantify the variations of hydrologic mass.
- The GRACE satellites, launched by the US in 2002, monitor changes in water and snow stores on the continents, enabling the researchers to study terrestrial hydrology.

- The combined GPS and GRACE data suggest a 12% reduction in the rate of the subsurface slip.

- The subsidence rate is associated with groundwater consumption.
- Subsurface slip refers to how fast the fault is slipping relative to the foot and hanging wall.
- The slip occurs at the Main Himalayan Thrust (MHT), due to hydrological variations and human activities, over which there is the periodic release of accumulated strain.
- Water acts as a lubricating agent and in the dry season, the rate of the slip of the fault in the region is reduced.
There are normal and common reasons also affecting the Himalayas apart from the groundwater levels.

- The Himalayan foothills and the Indo-Gangetic plain are sinking because its contiguous areas are rising due to tectonic activity associated with land mass movement or continental drift.
- In the Himalaya, seasonal water from glaciers as well as monsoon precipitation plays a key role in the deformation of the crust and the seismicity associated with it.

This is the first study to look at the rising Himalayas from a hydrological standpoint.

- Since the Himalayas play an important role in influencing climate in the Indian subcontinent, the study will help in understanding the effects of hydrology on climate.

Tectonic activity and groundwater

- The Himalayan foothills and the Indo-Gangetic plain are sinking because its contiguous areas are rising due to tectonic activity associated with land mass movement or continental drift.
- The new study shows that subsidence and uplift are found to be associated with seasonal changes in groundwater, apart from the normal, common reasons.
- Water acts as a lubricating agent, and hence when there is water in the dry season, the rate of the slip of the fault in this region is reduced.
- In the Himalaya, seasonal water from glaciers, as well as monsoon precipitation, plays a key role in the deformation of the crust and the seismicity associated with it.
- The subsidence rate is associated with groundwater consumption.
**GRACE Mission**

- The Gravity Recovery and Climate Experiment (GRACE) was a joint mission of NASA and the German Aerospace Center.
- Twin satellites took detailed measurements of Earth’s gravity field anomalies from its launch in March 2002 to the end of its science mission in October 2017.
- By measuring gravity anomalies, GRACE showed how mass is distributed around the planet and how it varies over time.

**Fault**

- It is a planar or gently curved fracture in the rocks of the Earth’s crust, where compressional or tensional forces cause relative displacement of the rocks on the opposite sides of the fracture.
- When rocks slip past each other in faulting, the upper or overlying block along the fault plane is called the hanging wall or headwall; the block below is called the footwall.

**Main Himalayan Thrust**

- The Indian plate under thrusts the Eurasian plate along a northerly dipping detachment surface known as Main Himalayan Thrust (MHT) that separates the downgoing Indian plate from the overriding Himalayan wedge.