



**Scientists witness the birth of an Ocean**



During 2005, in the remote Afar region of Ethiopia, a 60km long stretch of the earth opened up to a width of 8 metres over a period of just 10 days.

Underground eruptions are causing molten rock rise to the surface and creating a split which will eventually divide African continent in two and create a new ocean. Parts of the region are below sea level and the ocean is only cut off by about a 20-metre block of land in Eritrea. It is estimated this process will take about 10 million years to complete.



The fissure is appearing along a fault line, called the East African Rift, which stretches from the Afar region of northern Ethiopia down to Mozambique, severing eastern coastal countries including Kenya and Tanzania from the larger part of the continent.



**Africa 'witnessing birth of a new ocean'**

## Earth Science: Lecture 1 - Introduction to Earth Science

The following video is a good basic introduction to Earth Science.

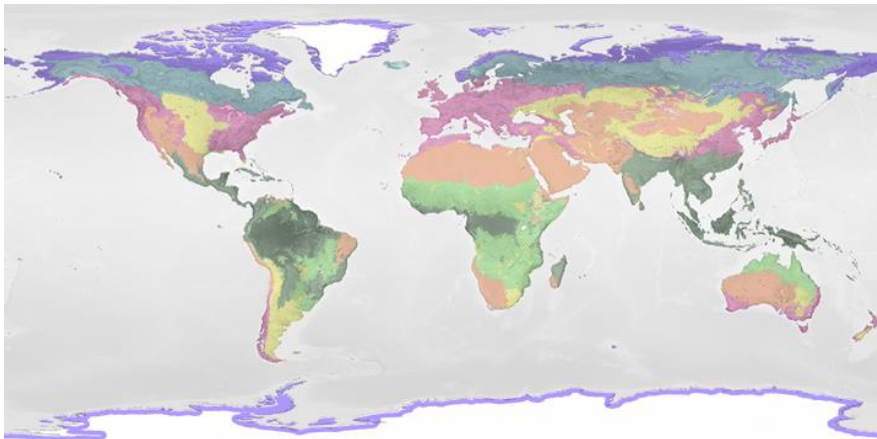
### [Introduction to Earth Science](#)

\*\*\*\*\*

## Biomes

A **biome** is a community of [plants](#) and [animals](#) that have common characteristics for the [environment](#) they exist in. They can be found over a range of continents. Biomes are distinct biological [communities](#) that have formed in response to a shared physical [climate](#). *Biome* is a broader term than [habitat](#); any biome can comprise a variety of habitats.

The interactive map below can be reached on the NASA Earth Observatory website link ([BIOMES](#)). To the right of the interactive map, you will find more details of the different types of Biomes as listed below.



- [Rainforest](#)
- [Grassland](#)
- [Coniferous Forest](#)
- [Temperate Deciduous Forest](#)
- [Desert](#)
- [Tundra](#)
- [Shrubland](#)



\*\*\*\*\*

**What is this?** – click on the link below.

### [What is this? Answer on the last page, after Acknowledgements](#)

\*\*\*\*\*

## Fireball over Cyprus

Gill and I were sitting out on the balcony, early evening on the 13<sup>th</sup> of September. It was around 19.00 hrs so not yet dark. Gill shouted (that's normal) and I looked up to see a bright fireball shooting across the sky. Meteors are normally 'short' flashes and only visible at night under low light conditions. This was a white glowing ball with a long white tail which travelled across approximately 60% of the sky, from horizon to horizon. Just before disappearing, it fragmented and left numerous smaller trails, some with colour. This is the second fireball I have seen in daylight in Cyprus. I completed the simple online form from the *International Meteor Organization*, in order to assist with their research. There are presently 29 reports from Cyprus for this event. [Fireball event 13 Sept 2020 - Cyprus](#)

## **Fireballs**

Fireballs are meteors that appear brighter than normal. A great majority of the material orbiting in outer space are tiny sub-millimeter sized bits of stone, ice, or metal or a combination of these materials. These are known as micrometeoroids or simply space dust. These tiny fragments cannot produce enough light to be seen when encountering the atmosphere and yet they contribute many tons of material to the Earth's weight each year (estimated at 40,000 metric tons per year). As the size of these objects approach a millimeter, they begin to produce enough light to be seen upon entry to the upper atmosphere as ordinary meteors. Due to the velocity at which they strike the Earth's atmosphere, fragments larger than 1 millimeter have the capability to produce a bright flash as they streak through the heavens above. These bright meteors are what we call fireballs.



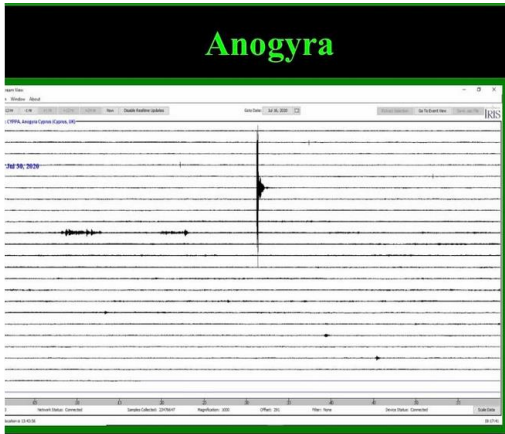
Fireballs actually occur every day all over the Earth. To the individual though, they are a rare spectacle that is witnessed very few times per lifetime. It must be remembered that fireballs also occur during the day or on a cloudy night. They also occur over the ocean or over uninhabited portions of land. Even if a fireball occurs over your location, you need to be outside facing the right direction or you will still miss it. Therefore the *International Meteor Organization* takes keen interest in these sightings, in the hope that its origin can be determined and that perhaps meteorites can be recovered.

Only true fireballs have the ability to survive all the way down to the Earth's surface.

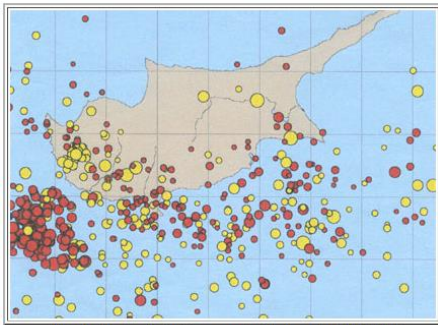
[Report a Fireball](#)



## Earthquake in the Ophiolite?



On 30/07/2020 an earthquake occurred approximately 9km east of Kyperounda at 40km depth in what we would expect to be [Ophiolite](#). An **ophiolite** is a section of the Earth's [oceanic crust](#) and the underlying [upper mantle](#) that has been uplifted and exposed above sea level and often emplaced onto [continental crustal](#) rocks.



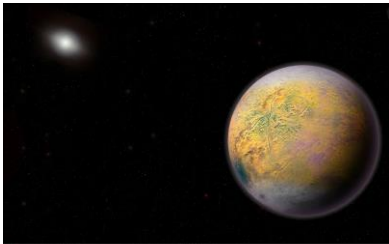
Map of epicentres in the Cyprus region for the period 1903-1996

This earthquake was a little different to the majority of Cyprus earthquake events, which are located in the southern coastal areas and shallower depths. Was this the effect of some movement of the Arakapas fault?

\*\*\*\*\*

## The search for Planet X looks promising - again

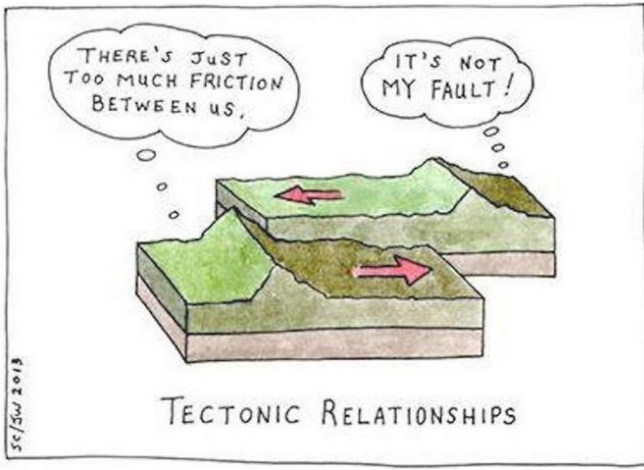
The hunt for planets in our outer solar system has been going on for many years, with various degrees of success. In these outer reaches there is too little light to illuminate a planet sufficiently to make it visible to us on Earth.



In 1846 Neptune was discovered by studying the perturbations in the orbit of Uranus. And when Neptune also showed irregularities in its orbit that couldn't be explained, scientists began hunting for a ninth planet (Planet X).

Pluto was found in 1930 but ultimately observations showed that its mass was too small to be affecting the orbit of Neptune to the degree that scientists were looking for. Pluto was later reclassified as a [dwarf planet](#) in 2006. Whatever is out there could be more than 2.5 times further from the sun than Pluto, somewhere between the [Kuiper belt](#) and the [Oort cloud](#).

## [Beyond Pluto: the hunt for our solar system's new ninth planet](#)

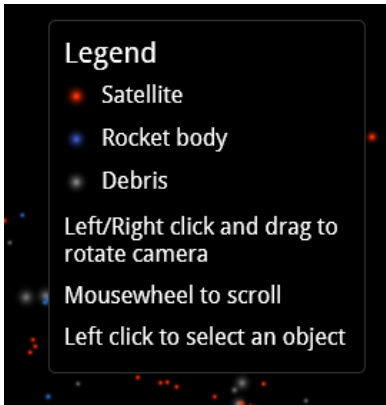


## Acknowledgements



## What is This – Answer below

What you see is a real-time, interactive (click and drag), [3-D map](#) of items monitored in Earth Orbit.



The red are Satellites in operation and others that are long time dead. Blue are old rocket bodies, usually of a substantial size. Grey are debris – bits and pieces from all over the place, including paint chips, debris from colliding satellites and tools lost during ISS (International Space Station) space walks (known as EVAs - Extra Vehicular Activities). Often the ISS has to adjust its orbit in order to avoid known space debris and satellites. If you click ‘**Groups**’ in the top left of the screen, you can select from the various drop-down items. Have a look at the Westford Needles. In the 1960’s the USA put into space a ring of 480,000,000 copper [dipole](#)

[antennas](#) (needles which were 1.78cm long and 25.4 micrometres (1.00 thou) in diameter. They were placed in orbit, despite international condemnation, to facilitate their global radio communication. During the *Cold War* the Americans were concerned their subsea cables would be cut, so relied on bouncing signals of the natural ionosphere for long distance communication. Their intention was to enhance their



communication capabilities with

an ‘*artificial*’ ionosphere. In those days there was no thought given to what would happen with these orbiting items, once they reach their end-of-life. For some countries this is still the case.

These items are not ‘drifting’ around – some are travelling at up to ***17,000 miles per hour***.

Elon Musk’s SpaceX *Starlink* constellation is designed to provide internet communications around the globe, even the most remote

places. Initially the network is expected to number at least 12,000 satellites, with the possibility of expanding the fleet by an additional 30,000 units. SpaceX are building 120 satellites per month. I have applied to Beta Test the system so hopefully CYTA will be a thing of the primitive communications past. However, these satellites will add significantly to the items already surrounding our planet.

## [How much Space junk orbits the EArth?](#)