



Editorial

The Unique Earth

Astronomy: Fluid water, plate tectonic and relatively bigger moon. These could be the most important assumption of our existence. In February 1990 the space probe Voyager 1 on its way to the edge of the solar system still once rotated and took snaps of some pictures of the earth before finally its cameras were switched off. From 6 milliard Km distance from our native planet let appeared as only a tiny point which could not recognize details of any kind except its colour. It was blue.

The blue planet, the earth holds the title since it gave the first its colored picture taken externally. Slight poetic it was after the manned moon mission of Apollo programme also often the conversation on that "blue sapphire on black velvet". First of all, indeed as pure what rewriting of the picture adhered impression was thought of was conceived in a meaningful manner to be sure the most important characteristic that makes the earth in the solar system unique and we are indebted for our existence to fluid water. Then the earth is indebted to the circumstances that more than $\frac{2}{3}$ its surface is covered with water. That again is possible while it revolves round the sun at a distance which generates the required temperature. Astronomers speak of the "habitable zone" the region around a star in which life could be possible – at least life as we know from the earth and for that fluid water is an indispensable assumption.

In order to be fluid, water however requires not only the right temperature but also pressure. In vacuum water would instantaneously vaporize planet on which life so far in the known form should develop, from that place must be surrounded by atmosphere. For that again it must have sufficient mass and density in order

to be able to hold with its gravitation force the gas envelop.

The atmosphere of it takes care not only for the necessary pressure, but also influences through its combination the global temperature, greenhouse gases as water vapour, carbon dioxide, methane or nitrogen oxide (N_2O) (laughing gas) absorbs the infrared rays which are given up from the surface of the planet and make provision through there for that, the energy caught up from the sun does not again completely escape in the universe. Without this effect it does not give on the earth fluid water. So the average temperature on the earth's moon, which is not surrounded by any atmosphere, is $18^\circ C$. On the earth it lies against that for the time being approximately $+15^\circ C$.

As is known this temperature straightway rises while human being raise the green house gas in the atmosphere. Over a long period of time, nevertheless it has remained stable surprisingly. For that in increasing mass the planet tectonic is to be responsible; which so far on no heavenly bodies outside of the earth was observed. Only here on the blue planet move the continental plates on the earth mantle piled up the chain of mountains cause earthquake and are responsible for the most forms of volcanicity. That takes care for a steady metamorphosis of minerals the lastly also the sapphire a form of a particular mineral to which its existence is indebted.

Before all, however, the plate tectonic works through the recycling of minerals as a gigantic thermostat. It sets through volcanic activities carbon dioxide free but remove also afterwards from atmosphere through formation of minerals like limestone. With this process the disintegration of siliceous stone like granite is of special importance write Peter Ward and Donald

Brown Lee in their book "Our Lonely Earth" describes so.

With the warming of the planet the weathering increases. With that more silicate stands at the disposal in order to reduce the CO₂ in the atmosphere. As a consequence the temperature diminishes and with that however also the weathering of the silicate. The CO₂ content increases again and with this the temperature. In this manner oscillates the earth temperature between warmer to colder periods as a consequence of silicone-carbonate weathering – says Ward and Brown Lee. Without the plate tectonic this system would not however function so efficiently.

That is one important aspect Ward and Brown Lee for the acceptance have led that complex multicellular life as it has developed on the surface of the earth could be a big exception in cosmos during unicellular living beings by all means could have been spread very much. A further characteristic of the earth, the origin

of multicellular could have been favourable is its satellite the moon. Certainly most of the planets in solar system of satellites revolve; at least these are rather much smaller than their mother planet. Against that the earth's moon with $\frac{1}{81}$ of the earth's mass is unusually big. In solar systems are so far as yet Pluto and its moon charon is known as only one comparable pair.

The relatively big earth's moon could stabilize now on the other hand the rotational axis of the earth by virtue of its gravitational force and in this manner there it has taken care of durable stable climatic conditions as per assumptions of Ward and Brown Lee. So it could preserve in moonlight variety of vegetation, animals and finally human being with its technological development. Lastly in the coming years it may help clarify how unique this constellation in the universe really is.

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