A possible mechanism of radiative energy transfer from the Earth's core to underground oceans near the surface of Earth

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Matti Pitkänen

orcid:0000-0002-8051-4364.
email: matpitka6@gmail.com,
url: http://tgdtheory.com/public_html/,
address: Rinnekatu 2-4 A 8, 03620, Karkkila, Finland.

Abstract

The recent observations strongly suggest that there is an ancient seabed on top of the Earth's core, and there are also mountains with a height of about 10 km. The proposed model, in which convection moves the sea floor to the region above the mantle, is probably correct.

This finding combined with the discovery of the so-called superionic ice, which could exist above the Earth's core, allows to develop a proposal for a mechanism of metabolic energy transfer from the Earth's core to the underground oceans near the surface of Earth. This would make possible the development of photosynthesizing life forms in underground oceans. The generalization of the Pollack effect would play a key role in the mechanism.

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1 Introduction

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This finding combined with the discovery of the so-called superionic ice [D2], which could exist above the Earth's core, allows to develop a proposal for a mechanism of metabolic energy transfer from the Earth's core to the underground oceans near the surface of Earth. This would make possible the development of photosynthesizing life forms in underground oceans. The generalization of the Pollack effect [I2, L2, I4, I3] would play a key role in the mechanism.

1.1 Ultralow velocity zones

The following abstract of the article (see this) published by a group led by Dr. Samantha Hansen [D1] gives an overall view of what has been observed.

Ultralow velocity zones (ULVZs) are the most anomalous structures within the Earth's interior; however, given the wide range of associated characteristics (thickness and composition) reported by previous studies, the origins of ULVZs have been debated for decades. Using a recently developed seismic analysis approach, we find widespread, variable ULVZs along the core-mantle boundary (CMB) beneath a largely unsampled portion of the Southern Hemisphere. Our study region is not beneath current or recent subduction zones, but our mantle convection simulations demonstrate how heterogeneous accumulations of previously subducted materials could form on the CMB and explain our seismic observations. We further show that subducted materials can be globally distributed throughout the lowermost mantle with variable concentrations. These subducted materials, advected along the CMB, can provide an explanation for the distribution and range of reported ULVZ properties.

So called S waves (see this) are transversal acoustic waves caused by the shear force parallel to the propagation. This force is proportional to viscosity and is negligible in liquids but much larger in solid phase waves reflected at mantle-core boundary. The core of Earth is in a liquid phase. Therefore sound waves from the surface of Earth are reflected back at the mantle-core boundary.

This makes it possible to deduce information from the structure of the mantle-core boundary and it has turned out that it has a highly complex structure. First of all, these waves propagate very slowly. This allows us to conclude that there is a relatively thin layer with a high density, which could consist of the same material as the seabed. This layer contains mountains with heights of order 10 km.

The TGD inspired view of the evolution life, inspired by the Cambrian Explosion and TGD based view of cosmology, is that photosynthesizing life evolved in underground oceans and that the expansion of the Earth radius by about factor 2 bursted these oceans to the surface of Earth in Cambrian Explosion [L3, L5, L4, L7, L1].

Could the ancient seabed above the mantle be assigned to the ocean immediately above the mantle? This is not possible. The existence of an underground ocean immediately above the mantle is impossible due to the high pressure and temperature so that the convection remains the natural explanation for the presence of seabed.

The second objection is that life in the underground oceans is not possible because solar energy needed by photosynthesis is not available. How could photosynthesis have developed in the underground oceans? The key observation is that energies of the photons of thermal radiation coming from the core are of the same order as the metabolic energy currency with nominal value of .5 eV: could this radiation have served as a source of metabolic energy.

How could this energy be transferred? The Pollack effect [I2, L2, I4, I3] and its reversal, whose TGD based understanding [L2, L6, L8, L10, L9] has increased considerably during this year, could provide a fast energy transfer mechanism, but in its standard form the Pollack effect requires liquid water. Could the so-called superionic ice [D2], which has been speculated to be found even near the mantle of Earth, make possible the analogy of the Pollack effect?

1.2 Ordinary water cannot survive near mantle

Although it is obvious that ordinary liquid water cannot exist at temperatures and pressures prevailing near the mantle, it is useful to look at the situation more quantitatively.

In mechanical equilibrium, pressure gradient and the gravitational force, expressible in terms of the gradient of gravitational potential, cancel each other in good approximation. One can estimate the change of pressure as $\Delta p = \rho\Delta\Phi_{gr} = \rho GM\Delta(\frac{1}{R})$. The equation of state allows an estimate for ΔT.

Pressure is estimated to increase from 100 MPa at the surface of the Earth to 139 GPa above the mantle, that is by a factor 1000. Temperature, converted to thermal energy $E = kT$, is estimated to increase from .03 eV$\rightarrow$ to 0.42 eV. The increase is by a factor of 10. Ordinary water cannot survive in this kind of environment so that underground oceans are possible only sufficiently near to the surface of Earth.

Could one imagine a phase of water allowing the analog of Pollack effect so that the transformation of protons to dark protons at the gravitational MB could make it possible to transfer metabolic energy to the higher heights, where underground liquid water can exist. This would have made possible the development of photosynthesizing life and would also solve the "faint Sun" paradox (`https://rb.gy/mfhavz`) [L7] meaning that the solar energy feed was not enough for the metabolic needs of life at the surface of Earth.

2 Pollack effect for superionic water and metabolic energy feed from the core of Earth

Superionic ice [D2] (see this and this) existing at extreme pressures. The density of superionic ice is slightly less than 4 times the density of ordinary ice. In superionic ice O^{2-} ions form a lattice whereas H^+ ions float freely. This phase is conductor with H^+ ions serving as charge carriers. Superionic ice is proposed to appear in the mantles of giant planets such as Uranus and Neptune and in [**?**]he possibility that it could occur in the Earth's mantle was considered.

Could water appear as superionic ice above the Earth's core and allow Pollack effect and its reversal so that gravitational flux tubes would carry dark protons. Could dark photons emitted in the reverse Polack effect transfer the energy along gravitational flux tubes to the underground oceans near the surface of the Earth?

Let's assume that there exists superionic ice above the mantle.

1. Could the radiation from the core kick part of the protons of the superionic water to the gravitational magnetic body? The gravitational binding energy of protons at the surface of Earth is about .5 eV and now roughly by a factor 4 larger, that is 2 eV, at the top of the mantle. At the gravitational magnetic flux tubes the reduction of gravitational binding energy is therefore below 2 eV. The temperature of the core corresponds to the metabolic energy currency of about .4 eV so that the radiation could have played the same role as the solar radiation in photosynthesis.

2. If the reverse Pollack effect occurs, dark photons are emitted and they propagate to the MBs of water volumes near the surface of Earth and could provide energy for photosynthesis. Also time reversal can occur for the water near the surface of Earth and the proton can gain the energy required by darkness by emitting a negative energy dark photon propagating to the MB near the mantle. I have called this mechanism remote metabolism or quantum credict card and asked whether it could play a key role also in the ordinary biology.

3. If the temperatures of the lower part of the mantle and the core are the same, the energy input from the core could feed protons to gravitational MB, maintain the superionic water phase and compensate for the energy loss due to the reverse Pollack effect. The transfer of energy near the earth's surface would take place at the speed of light and dissipation would be very small.

4. The number of ordinary-to-dark transitions of protons per unit time determines the energy flow to the MB and the energy flow to the uppermost layers of the mantle. In a steady state, this flow must be the same as the radiative heat flow from the core. This transfer rate is determined by the rate for the photon absorptions kicking protons to the MB. The energy flow of energy coming as radiation is proportional to T^4.

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