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CONDENSATIONAL THEORY – LAW TO LIVE

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Keywords: groundwater, condensation, infiltration theory, moisture transfer.

Abstract. The problem of the origin of water on our planet is being excited in the natural sciences. Quite a bit of speculation, statements and fairly reasonable hypotheses and theories on the affected subject accumulated during the development of all terrestrial civilizations in a vast arsenal of these sciences. Among them special attention of the scientific community is involved in competing with one another infiltration and condensation theories. It is very important to clarify their role in the formation of natural waters during the impending environmental disaster, as it will help in the development and making the right decisions.

For this reason, in this article the review and analysis of information since 1869 is presented. On the basis of empirical data on these theories it was concluded that the predominant role of the condensation of water vapor of the atmosphere in the formation of all types of water resources of the planet and the need to take account of these findings for all water and environmental calculations.

In this article the recommendations on the need of broad dissemination of research data on this most important alternative source of fresh water was made. It is noted that water obtaining from the air is the main for the water supply of plants in arid regions that will solve the food security of these countries and to ensure the development of animal husbandry. Implementation of projects for the development of water vapor from the atmosphere will fully meet the needs of all earthlings to safe drinking water and agricultural needs.

In natural sciences about water thousands fusses problem about the origin of water on our planet. The scientific community argues following views about the origin of groundwater [1-4].

Theories and hypotheses about the origin of groundwater

Source of origin	Types of water	Subtypes water
Space	Solar wind	
	Vaporspherical water	
Planetary Natural	Juvenile (pristine water)	Geyser
		Volcanic
	Vadose (reformed water)	Infiltration
		Condensation
		Buried (sedimentation)
		Condensation-effusive
		Transpiration (or metabolic)
		Deep-reformed ocean water
Planetary artificial	Anthropogenous	Wastewater
		Manmade
		Industrial and domestic
		Agrochemical

From this variety considered types of many waters, according to calculations authors of these ideas, can claim on title ancestor of all the water resources of our planet, of course, provided that period of implementation must be very long.

For example, according to the solar hypothesis of M. De Tyurviyalya [3], corpuscular radiation of the sun led to the emergence of the solar wind has brought into the Earth atmosphere a large amount of hydrogen atoms which entered here in connection with oxygen. However, most researchers have preferred earthly origin of water resources of the Earth and mainly, infiltration as the most clear from all put forward ideas [5].

For this reason, many thousands of natural sciences are dominated by infiltration theory of the origin soil and groundwater, according to which they are formed mainly due to precipitation and infiltration. With time the practice of water user data, that do not fit into procrustean bed of this theory, were accumulated [5, 6].

The main representative of this direction of origin soil and soil-ground water was a German scientist Otto Folger [5].

Still half a century ago this scientist using facts proved that the Earth evaporates water much more than it receives of precipitation. Relying on these data, he suggested that another power source exists which provides supply this additional of water. Such a source is the vapor moisture atmosphere which, together with air permeates into the ground, and here, reaching areas with decreasing temperature, the vapor moisture parts with air and condenses on soil particles.

That speech became the beginning of revival scientific interest lightly forgotten condensation theory.

However, the hypothesis of Folger among scientists of that time did not find supporters and the contrary had been subjected of fierce criticism. The most active among infiltrogen was a German meteorologist professor Gunn who found the weakest points of proposed hypothesis [5].

In Russia the condensation theory was developed quite independently. The first attempts to prove the presence of such source of water and to develop management ways of condensation of water to ensure that the plants are marked in 90s of the nineteenth century.

Particularly in this direction talented Russian researcher Kostychev P.A. advanced [5], who makes the following message: "... The amount of water which the plant receives from the rain in the most favorable cases is only half that what need plants and missing water it receives from air through its many multiple transposition". In addition, based on experiments with soil especially with black soil and humus he came to conclusion that if change quality of the soil, it will reduce the amount of evaporable water contained in the soil.

Unfortunately, this breakthrough idea had been ignored infiltrogen.

The most important works of this period by condensation of vapors in soil are belonged to H.A. Golovkinsky, I.M. Peddakasu, G.Y. Blizninu, P.A. Kostycheva, F.I.Ziebold, S.K. Kuznetsov, A.Ph. Lebedev, A.Y. Rakov, N.Ph. Lukin [5, 7].

Earlier experiments over condensation of vapors in the soil were conducted in Crimea by Golovkinsky N.A. [5], and he managed to state the connection between temperature and amount of precipitation. When temperature of soil above the air temperature, concentration underground dews do not occur, otherwise precipitation appears.

Ziebold F.I. [5] has been induced on the idea of the possibility of condensation of vapors in loose rocks godsend in the surroundings Feodosia of traces extensive ancient hydraulic structures in the form heaps from rubble and clay pipes. Relying on these assumptions, he built the so-called cup of Siebold - a kind of condenser, which confirmed possibility of formation water due to condensation of water vapor in the atmosphere. His condenser gave before 432 liters of water per day, but worked briefly as the concrete floor of this building had cracked.

In report of Kuznetsov S.K. "On condensation of water vapor in the soil" tigations reported by him in 1903 at the 78th meeting of Commission of the soil Free Economical Society, substantiated the following provisions:

"... We need to ensure that penetrates whether the moisture air in the Earth as it penetrates there and how much ..." [5].

"... 1. The air is a mechanical mixture of gases and water vapor. The gases are very slowly heated and cooled, and water vapor on the contrary. When injected into pores of soil the separation of water from

vapor and gases will occur. The liquid water are almost 770 times heavier than air gases and in the form water vapor is almost two times lighter than air and penetrates into the upper layers of the atmosphere. The border 3-100 degrees - vapor with the properties of gases, 3-4 degrees - the highest density, that is in this gap the water passes a number of colossal changes. The water vapor at 100 degrees and 766 millimeters pressure has a volume of water 1700 times that of water from which it was formed. When the temperature increases 4-100 degrees it increases in 1700, that is, each degree of heat acquired corresponds change in volume more than 17 times, gases when heated at these degrees after cooling change by just 1\273 of its volume. This is the reason of rapid bundle of water a single masses of air.

2. The pressure of water vapor in the atmosphere extends unequally with pressure of gases. The vapor pressure at the height of 2000 meters is reduced by half and the gas pressure only at height of about 5000 meters. From here steam down to the ground faster than gases due to the acquisition speeds should soon flow into the pores of the soil.

3. The gases are chemical calcitonin gravitation to each other and soil particles only in exceptional cases, and water vapor possess a huge affinity and attraction to particles of the earth.

4. Decreasing jets of water vapor cooled in the pores of the soil, give its warmth, which should be rejected in the space above the surface land so that the soil has once again become a refrigerator. Such radiation is performed constantly. But we can not take into account heat which, with one sides, the earth receives from the sun from absorbs condensation of water vapor itself is a chemical processes, but on the other - it also radiates into space. We believe that it radiates thus as to maintain necessary temperature decrease to a depth of 10-11 fathoms. The amount of heat released by condensation must be large. Also large and radiation. If this radiation is not, there will be condensation.

5. The sand very heats capacity and porous, therefore it cools properly water vapors and makes them consume warmth. Being a heat capacity of radiating heat it easily regenerates the conditions for condensation. Its heat capacity determines by very weak thermal conductivity. Therefore, heating of sand by the sun is carried out only at a shallow depth. This allows to save a significant temperature difference between the upper and lower layers.

6. The less radiation soil, the more therein well developed in chemical affinity to water vapor and conversely than weaker affinity (as in the sand) the stronger property of the radiation, i.e., where less physical reasons of condensation there strong chemical and conversely.

7. Gases of air are very heat transparent and water vapors on the contrary. Air saturated with moisture at 70 times less heat transparent than pure air. Therefore, heat radiation of the earth and its cooling will be stronger than drier the air. Under other equal conditions than drier will air the greater will difference between temperatures the soil and air, the stronger will be inflow of comparatively dry air that allows to extract from it more moisture due to the propagation large volumes.

8. Droplets of water to hover thick on grain do not interfere with radiation sand. Grain of sand by taking away heat and steam to thicken droplets of water themselves can radiate through its taken away from warmth. It seemed to be refracts and reflects heat, which takes away and immediately emits.

9. There is no need been to air could penetrate the soil in such volume which would contain as much moisture as it condenses there, because water vapors easily separated from the gases at cooling and rapidly falling into the pores of the soil, and the gases stubbornly cooling and resist against cooling compress and therefore there remain near the surface ground.

When the air is warmer than the land, water vapors must continuously flow into the pores of the soil, because the ground draws them into itself, cools and significantly increases their density and thickens them into jets which flow deeper and make room for further influx of vapors. The earth thus like a pump pumps out water vapors from the air, plants and feeds them forms underground water flows. Not gasses flow into air and soil vapors entrain water, and vice versa.

In each sandy soil we have to meet such a depth where the temperature is always saved, necessary for condensation of water vapor in the air, and a level at which there is not only moisture, "but also to must be water at presence aquitard" [51].

Based on these arguments, facts and laws of physics, S.K. Kuznetsov convincingly proved a real opportunity not forming method of soil infiltration, groundwater. He actually laid the first brick in the foundation theory of the condensation of water vapor in the atmosphere as the main regulator at formation all types of water. Russian scientist, agrophysics A.F. Lebedev [5] conducted numerous experiences,

concluded that the soil and the soil saturated with water not only from precipitation of different types, but also due to water vapor atmosphere and water vapor moving from the lower aquifer to the surface of the earth. Developing ideas and views of M.N. Krasheninnikov and K.V. Speranskii [5], he claimed that all movement of water vapor in the soil is due to the difference of elasticity due to the difference in temperature in different soil layers. In winter steam moves from the soil into the soil and enriches the water in summer, on the contrary. At the same time enriching the soil with water due to water vapor of the atmosphere is due to the molecular and thermal condensation of water vapor in the atmosphere only in the surface layer of soil. P.I. Koloskov (1937) criticized the incorrect assessment of A.F. Lebedev (1936) size possible condensation (up to 100 mm) minimum temperature of the soil surface without plants and humidity at 2 m. It is speculated that it may condense steam after a strong advective cooling soils and transpiration couple day at a sufficiently powerful herbage, considering the recent not as a parish and how to save water consumed from the soil.

Russian scientist E.N. Blagoveshchensk [5] emphasized that, " The establishment condensation genesis of soil moisture allows to consider all different water industry desert regions. As aquifer recharge happens in some measure due to the condensation of water and the resumption of evacuated reserves should depend on the intensity condensation processes. On turn there will be study of quantitative side and condensation time and development agro-technical and melioration measures for their use.

By studying natural processes occurring in gray soils and brown soils, E.N. Blagoveshchensk made the following conclusions on their moisture regime (1963): "The total balance of daily moisture changes for the year exceeds the annual balance seasonal changes. In brown soils it reaches 1000-1200 mm, exceeding seasonal 500-700 mm twice for gray soils - 700-900 mm, exceeding seasonal 100-160 mm in five or six times. The greatest oscillations of soil moisture in annual course at the soil surface in daily section at depth 50-150 cm. "

The greatest success in the study of soil moisture was reached by Nikolai Fedorovych Lukin [5]. Relying on huge information material and advances in molecular physics, he spent series of brilliant successful experiments to cultivation of various water-demanding agricultural crops using the receptions allow plants to get water from the air.

Having analyzed huge actual material from related sciences (physics, soil science, agricultural chemistry, hydrology, meteorology, and others.) and according to their bibliographic guide "Condensation of water vapor atmosphere in soils and surface layer" [5], no less than thousands of documents plus a variety of reports and having performed numerous experiments he has led to a single indicator synergistic phase transitions of water in different physical environments. Based on these data he conducted a number of experiments confirming an important role of moisture vapor atmosphere in plant nutrition directly from air and due to received from water vapor of liquid water. Proceeding from performed works he reached the following conclusions:

1. The system of soil-atmosphere is primarily super system of water-vapor in which the quantitative ratio between molecules of water and the pair is in a movable equilibrium, managed temperature regime system.

2. In its turn temperature regime of system is determined by two opposite processes: a permanent own radiation earthly surface, as a body, having a temperature above absolute zero and impulses insolation caused by daily rotation planets and slope of axis of rotation. In annual cycle of these opposing heat flows in total calculation of roughly equal. This is evidenced relative stability the Earth's climate. But in each moment or period of time it is not so.

Instrumental observations of daily dynamics of soil moisture in complex with observations of dynamics of the main meteorological elements clearly highlights the process of moisture exchange between soil and atmosphere, its intensity, driving forces and authentic importance of moisture vapor in the water balance of the soil.

Ongoing process of molecular exchange on the brink water - vapor in the air causes the close connection between the liquid water in the soil, vapor in the soil's air and vapor in the atmosphere, effectively combining their into a single unit.

The water vapor in the atmosphere is not an independent water education, as integral constituent of gaseous components of Earth's hydrosphere associated with liquid and solid components its constant molecular exchange.

Hence the vapor moisture in the atmosphere, quantitatively assess the modest enough numbers, in reality inexhaustible as itself hydrosphere.

In the composition the Earth's atmosphere water vapor forms a global steam shell enveloping the entire globe. But unlike the other gases, phase state of substances, which in all range of natural temperatures on the earth's surface is stable, vaporous shell of the Earth experiences a constant fluctuations, and its power depends crucially on the temperature of underlying atmosphere, earth surface in each geographic location. By virtue of this partial pressure water vapor in the Earth's atmosphere varies from 30-40 millibar in the tropical belt and to hundreds of millibar in polar regions.

The water vapor moves independently by diffusion due to drop partial pressure and as part of air at vertical and horizontal movement of air masses.

Due to constant average drop OHR at 30-40 millibar between tropical and polar latitudes there is a constant diffusion movement of water vapor from the tropical latitudes where evaporation predominates in polar latitudes, where the predominant condensation.

The quantitative side of this moisture flow anybody yet has not been studied and is not defined, but about its presence indicates noticeable difference in salinity of the world ocean falling from the tropics to the poles, The same regularity in the mineralization of water in lakes and river flow exceeding over the amount of precipitation in the water balance river basins locate.

The paltry value of OHR in polar regions are explained not that there do not penetrate well humid air masses, but constant and very intense absorption cold vapor from earth surface and atmosphere by dehydration during cooling.

An analogous phenomenon happens high in the mountains covered with glaciers, therefore glaciers and cold tops of mountains are natural condensers of moisture.

Nutrition mountain rivers and streams obliged not only and not so much rainfall patterns and their infiltration into the soil how constant process of vapor condensation on cold glaciers and mountain tops, much cooling due to own infrared radiation.

Importance of establishing the existence of this natural phenomenon lies in the fact that it may become the object regulation on the part man.

The huge amount of water vapor tolerated in the atmosphere to the air currents. For example, according to the Research Institute of Water Problems of the Academy of Sciences, A.L. Kuznetsov, 1978 [5], the total moisture transfer over the territory of Central Asia with the air currents for a year makes a huge number - 3000 km³ of water.

The average moisture content of the atmosphere is estimated to about 14 000 km, i.e. one order of magnitude larger than it is contained in all the rivers of the world combined. The distribution of moisture vapor of the atmosphere over the regions, suitable temperature conditions for agricultural use, many times over more evenly than the river network.

According to the principle of dynamic equilibrium every equilibrium system seeks to compensate for any imbalances arising in it due to external influences in some of its parts. The water vapor plays the role of coolant and therefore any removal of heat from the surface of the soil, any shortfall in its soil system - atmosphere will compensate moving soil from the atmosphere appropriate amount of water vapor and thus increase the level of moisture.

Decrease in temperature surface of the soil helps to reduce the flow rate it exchange fund moisture and keeping it in the root-habitable zone of the soil at a higher level in any, even most rigid climatic conditions. The plant roots to diffuse moisture from the soil with power of 30-50 atmosphere and can be removed from the soil as a liquid and vaporous moisture retained by soil particles with a smaller force [8].

Another natural moisture cycle in the system occurs: soil - specific plant - atmosphere - soil, which explains the repeated use of plant exchange fund moisture in the soil.

It is likely that the macro and micropopulation of the soil also plays a role in the local moisture exchange.

Basis of all above applications is moisture exchange diffusion distribution or movement of water vapor in the air.

The atmospheric circulation, the formation and precipitation very thoroughly studied, as rainfall mistakenly was considered to basic water balance of a credit article and moisture exchange between atmosphere and the earth's surface. The reason for this confusion is due to the fact that rainfall is a sure sign not only saturation, but also the oversaturation atmosphere of moisture. Precipitation - that part of moisture which the underlying surface of the earth (water, soil) has not had time or could not swallow by

some reason in the vapor state, and the atmosphere can not hold in itself temperature conditions prevailing at any given time.

The vapor moisture of the atmosphere - a gas component of the earth's hydrosphere, can be used for the removal of its fresh water in unlimited quantities as to enhance efficiency of plants by using management practices and to meet the different needs of national economy after its condensation through a variety of technical means, and also to increase groundwater resources or creating new aquifers there where need arises in fresh water.

During the second half of the twentieth century to the condensation of moisture vapor atmosphere also drew attention and Alexander Rakov engaged phytomelioration of Nogai land. Attentively having studied the works of V.V. Dokuchaev (1892), A. Ismail (1893), I.E. Ovsinskii (1899), P.I. Koloskov [5, 7], he spent many years to cycle experiments in field conditions and proved that the condensation power on arrays with a continuous herbage cultivated plants at their mulching comparable to the average rainfall of the region. While noting the importance of condensation, he wrote: ".... The proofs flowing economy (condensation) transpiration and advective of water vapor in the soil:

• comparison of temperature dew point of the air above the ground with soil temperature under the serried of herbage indicates the possibility of condensation of vapor transpiration in the soil under such of herbage.

• the lyzimetric measurements also revealed that there are periods when with model through lizimetr surrounding soil penetrates more water than it gets in the soil pluviometer. This is possible only due to condensation advective, transpiration of water vapor or a combination of both;

• about the possibility values and importance of economy precipitation in the soil moisture calculations confirm field transpiration ratio. Their value under the serried productive grass stands in many cases much less commonly accepted. This is possible only at considerable value of these phenomena ... "[7].

In his doctoral dissertation A.Y. Rakov also repeatedly emphasized increased level of groundwater under fields with a solid herbage crops. This phenomenon he connects with the condensation of water vapor in the atmosphere and reinforces his argument data lizimetry observations and chemical analyzes of water from wells regime.

Experimental work of N.F. Lukin on cultivation plants using water from the air and conclusions the doctoral dissertation A.Y. Rakov were confirmed in the experimental plot of the Institute of Hydrogeology and Hydrophysics of the AS of the KazSSR, there have been conducted collection of materials and some experiments in the glacial area of Trans-Ili Alatau [5, 9].

Unfortunately in connection with restructuring of the financing these studies has been discontinued, although they are essential scientific and applied value for the national economy and scientific confirmation the theory of forming condensation groundwater in soils and sediments [9].

Over the last decades studies of condensation processes went far beyond the needs of farmers and soil scientists and hydrogeologists: this condensation in the snow cover (L.I. Faiko [10]), and the condensation of water miner (E.S. Dudar), and condensation processes on historical monuments (S.M. Mukhamedjanov and F.V. Shestakov), and condensation in the fracture-karst reservoirs in which V.N. Dublyansky [9] confirmed the importance of condensation processes in the formation of water, especially condensation springs, the importance of studying the dynamics of these processes in the daily operation at the global, regional and object levels.

So, thanks to the efforts of many researchers and numerous experiments and their results in the introduction of advanced economies, based on the above facts, arguments and experiments, it can be argued that the condensation theory was in the sciences of water rights and provisions its place. However, the story of the condensation of water vapor from the atmosphere does not end there. To a new source of clean renewable constantly fresh drinking water was available to every inhabitant of our planet requires a broad popularization and application of the results obtained, the establishment of training and manuals to obtain water from the air. This will be the beginning of the crisis of Water Sciences and the beginning of widespread combat the global water and environmental catastrophe will be the basis for food security of all countries.

We stand on the threshold of the greatest creative achievements in the natural sciences on the water, on the threshold of new discoveries in the hydrosphere, at the threshold of a new science – condensation.

Having mastered and knowing the full potential of new knowledge, humanity, blessed by higher forces, gets their hands on opportunity to lead the world to the general welfare.

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КОНДЕНСАТТЫҚ ТЕОРИЯСЫ – ЗАҢЫ БОЙЫНША ӨМІР СҮРУГЕ

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Тірек сөздер: жерасты суларының шығу тегі, конденсациясы, инфильтрация теориясы, ылғалды беру.

Аннотация. Жаратылыстану ғылымында платенамыздағы судың пайда болу мәселелері зерттелуде. Жердегі өркениеттер жайлы көптеген көзқарастар, теориялар мен ғылыми гипотезалар аталмыш тақырып бойынша ғылымның қоржынын толықтырды. Осылардың ішінде ғылыми қауымдастықтың назары конденсация теориясы мен бір-бірімен тнфильтрация бәсекелестігіне аударылды. Күтіліетін болашақтағы экологиялық апаттың алдын алу үшін жоғарыда аталған үдерістердің табиғи суларды қалыптастырудағы орнын зерттеу маңызды.

Сол себепті, мақалада 1869 жылдан бері мәліметтерге жүргізілген талдаулар мен есептер жинақталған. Эмпирикалық мәліметтерге сүйене отырып, атмосферадағы судың пайда болуы мен барлық табиғаттағы сулар үшін бу конденсациясының орны мен рөлі жоғары деген қорытынды жасалынды.

Мақалада тұщы судың маңыздың альтернативасы жөніндегі мәліметтерді көпшілікке таратып, таныстыру керектігі айтылды. Ауадағы буды суға айналдырып, оны мал мен егінді суғаруға жұмсау көптеген мәселелерді шешетіндігі мәлім. Атмосферадағы ауаны су ретінде пайдалану жобасы әлем халықтарының суға деген тапшылық мәселесін шешер еді.

КОНДЕНСАЦИОННАЯ ТЕОРИЯ – ПРАВО НА ЖИЗНЬ

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Ключевые слова: подземные воды, конденсация, теории инфильтрации, переноса влаги.

Аннотация. Проблема происхождения воды на нашей планете проявляется в естественных науках. Довольно много предположений, заявлений и довольно разумных гипотез и теорий о затронутой теме, накопленных в ходе разработки всех наземных цивилизаций, в обширном арсенале этих наук. Среди них особое внимание научного сообщества уделено участию в конкуренции друг с другом инфильтрации и теорий конденсации. Это очень важно, чтобы выяснить их роль в формировании природных вод в ходе предстоящей экологической катастрофы, так как это поможет в развитии и принятии правильных решений.

По этой причине в этой статье представлены обзор и анализ информации с 1869 года. На основе эмпирических данных по этим теориям был сделан вывод, что преобладающая роль конденсации паров воды в атмосфере в формировании всех типов водных ресурсов планеты и необходимости учета этих данных для всей воды и экологических расчетов.

В этой статье были сделаны рекомендации о необходимости широкого распространения научных данных по этому важнейшему альтернативному источнику пресной воды. Следует отметить, что вода, полученная из воздуха, является основой для водоснабжения растений в засушливых районах, что позволит решить продовольственную безопасность этих стран и обеспечить развитие животноводства. Реализация проектов по развитию паров воды из атмосферы будет полностью удовлетворять потребности всех землян к безопасной питьевой воде и сельскохозяйственных нужд.

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