

# Analysis of Dependence of the Natural Population Increase (E) on the Anomalous Gravitational Field Strength (AGF) (Latvia Case Study)

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**Abstract.** Anomalous gravitational field (AGF) is the most important geophysical factor of the habitats of organisms, including humans. The results obtained during research allow us to assess the impact of AGF of different strength on the organisms. It was found that a negative AGF produces a negative impact on the organisms. The higher intensity of the positive field on the Earth is, the higher birth rate and natural population growth and the lower mortality rates are. Orientation of the society on development of the lands located in the positive AGF zones will allow us to rapidly change environmental conditions to minimize the loss of population.

**Key words:** natural population increase, anomalous gravitation field, influence of geophysical factors.

## INTRODUCTION

Until the XX century, AGF of the Earth as a physical factor virtually did not attract attention of researchers. The fact of terrestrial gravitation of objects was seen as a natural phenomenon, which was not necessary to be studied. Even Charles Darwin, developer of the theory of evolution of organisms, said: "We can't free from gravity and, therefore, remain ignorant of the gravitational field values in the evolution of living organisms" [1].

However, since 1859, the stance of people began to change. Significant changes in the society and nature were caused by invasion of a powerful flux of cosmic origin in the solar system. This phenomenon was called "The R. K. Carrington Event" (In honour of the famous astronomer from the UK who reported about this magnetic storm).

The 19-20 centuries are distinguished as a period marked by rapid developments in science and technology. Exactly in this very period Konstantin Tsiolkovsky expressed the idea of space development by the humankind. This idea found support and was implemented in practice in the 20 century. This involved basic researches in physics, mathematics, and engineering disciplines, biology and medicine.

In the late 20 century studies of the effect of physical fields (including AGF) on organisms acquired the practical importance, not only for flights into space, but also to optimize the life on the Earth.

Studying of organism's response to AGF of different strength value showed that there is an optimal range of AGF strength values in which organisms feel themselves most comfortable. Beyond that there are two so-called adaptive intervals with the strength values above and below this optimum. Organisms in these intervals are able to live and

develop, but already drawing their own internal reserves. All values of AGF strength above or below these adaptation intervals lead to pathology in the body [15]. Space studies of organism behaviour in different GF strengths suggested scientists the idea about existence of similar problems on the Earth. Of course, the Earth does not have hypo- and hyper-gravitation, but differential of AGF values are common everywhere. Therefore, it is necessary to take into account the effect of AGF in spatial planning.

## RESEARCH ON THE INFLUENCE OF EARTH AGF ON ORGANISMS

All-Union Conference "Gravitation and Organisms" that took place in the USSR on 23-25 December 1974, raised the question of influence of AGF strength on living organisms for the first time [2]. 42 of the reports containing results of research in gravitational biology were read at the conference. Participants of the conference emphasised the important role of gravitation in life of organisms.

37 years has passed since then, but this topic still is the possession of space laboratories. Only after the late XX century, some publications of scientists and enthusiasts, which discussed this topic for Earth environment, began to appear in 90ies. These publications were devoted to specifics of development and functioning of musculoskeletal system of organisms in areas with low AGF strength (work of French scientists Bierkensa, Y., Mayesa, Y., Ooms D.) [3]. Studies of Doty S.B.

[4], Grano M., Mori G., Minelli V., Barow A. [5] are devoted to the same topic.

In Russia, Grigoriev, V. Oganov, A. Bakunin were engaged in assessment of bone tissue changes in conditions of a low gravitational field. Professor P. Korzhuyev wrote a number of works devoted to analysis of AGF role in skeleton and bone marrow formation, haemoglobin and milk production [6,7,8,9].

For the first time, the question of consideration of AGF in spatial planning was considered by the Polish scientist Kamensky (1988) [10]. In Latvia, L. Kartunova carried out research in this direction [11]. In Lithuania, Shlyaupa S., G. Zukauskas, L. Korablieva, Z. Denas, A. Zakarevichus (2004) worked on these issues [12]. In 2004, O. Tkachenko (Russia) published an article "Living Space of Russia", which specified the need to take into account the physical fields (magnetic and gravitational) in spatial planning [13].

All publications are limited to articles. Books on the analysis of the AGF influence on population have not yet been written, but some chapters devoted to this subject in the textbooks for high schools appeared, and this is the evidence of the interest of individual countries in training specialists of such profile.

STUDY OF INFLUENCE OF AGF ON THE DEMOGRAPHIC INDICATORS IN LATVIA

Works in this field started at the Latvian Scientific Research Institute of Construction in 1994. The study "Geoenvironmental Zoning of Dobele Region", among other factors, analyzed the impact of AGF on the demographics of the population in Dobele Region. [14]

Comparison of demographic figures on lithospheric blocks different by AGF strength revealed that birth-rate and E increase with increase of AGF strength and mortality decreases.

Further studies in five districts of Latvia (Saldus, Valka, Ogre, Aluksne and Madona) showed that there is a direct correlation between AGF strength values and population E values: natural population increase (E) value increases with AGF strength increase and vice versa.

An example is a graph of dependence of "E" parameters in Aluksne Region on AGF strength values (Figure 1).

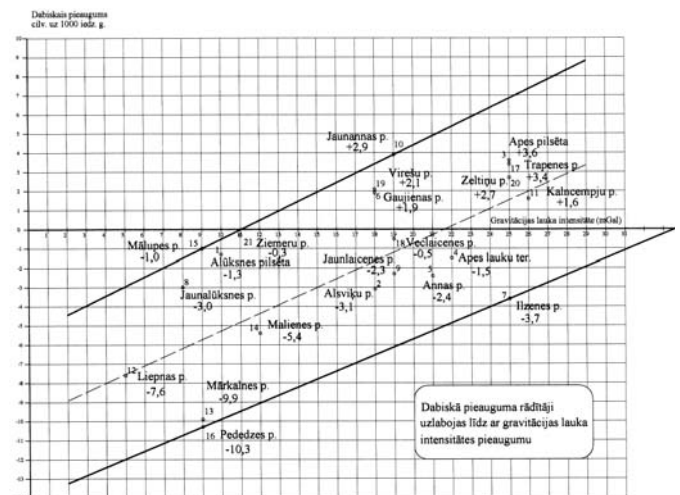
The graph shows that E value increases with the increase in AGF strength (correlation coefficient  $K = 0.66$ ). Positive E values are formed in AGF with a strength exceeding 11 mGal. Similar dependences were obtained in all investigated regions of Latvia.

The study of influence of AGF on the demographics of the Latvian population has been continued in the 21 century. In 2009, the Research Centre of Spatial and Regional Development of Riga Technical University conducted a research on the topic: "The influence of geophysical factors on demographic processes and spatial organization of human living environment". It studied the effect of the anomalous magnetic and AGF on demographics of the Latvian population.

The work was an interdisciplinary research carried out by a team of different professionals. Dr. geo. B. Vetrennikov compiled a map of AGF in Latvia, M 1:750 000 and calculated the average AGF strength for each of 26 regions of Latvia. Demographer P. Eglite compiled tables of demographic data in all regions for two time periods (from 1980 to 1989 and from 1995 to 2005). Thereafter average values of mortality, birth-rate and natural population increase for the ten-year period were calculated for every region.

Thus, the data on average AGF values for every region and the average demographic indicators necessary for correlation analysis were prepared. Of the three demographic parameters characterizing the life expectancy of the population - mortality, birth-rate and natural increase, natural increase (E) value and its dependence on AGF are of the greatest interest for the purposes of spatial planning. Particularly E allows judging whether the AGF strength value is beneficial for the

population or not. If E is a positive figure (population is increasing), this means that the field strength produces a positive effect on the life expectancy of the population. If E is a negative figure (the population is decreasing), this means that AGF strength is not sufficient to ensure population reproduction.



Values of N in parishes improve with increase in the AGV strength Designations:

- Zeltiņu p. 20 - number of parish in the table
- +2,7 - average value of N in parishes of Aluksne region for the period from 1991 to 1999
- Region of values of N figures in parishes of Aluksne region

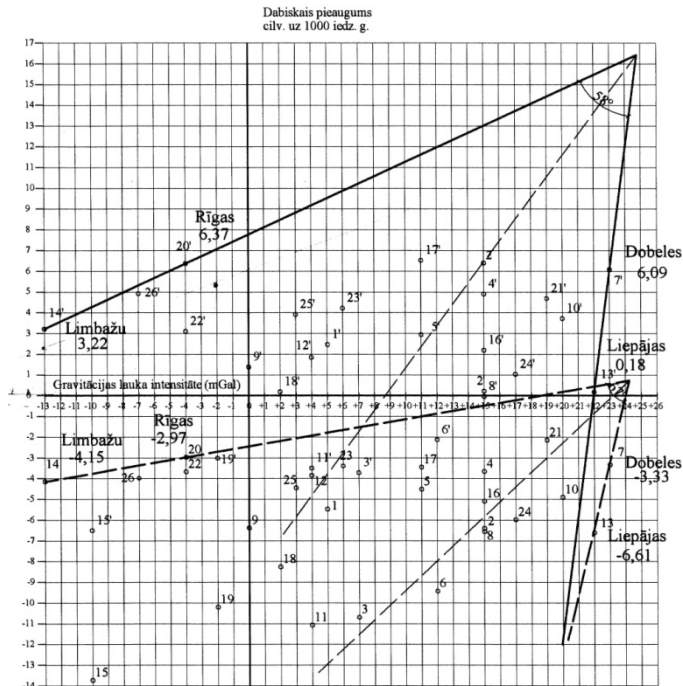
N.p.k.	Pagasti un pilsētas	Iv mGal	E civ./1000 iedz
	Pagasti		
1	Alūksnes pilsēta	10	-1.3
2	Alsviķu p.	18	-3.1
3	Apes pilsēta	25	+3.6
4	Apes lauku ter.	22	-1.5
5	Annas p.	21	-2.4
6	Gaujienas p.	18	+1.9
7	Ilzenes p.	25	-3.7
8	Jaunalūksnes p.	8	-3.0
9	Jaunlaicenes p.	19	-2.3
10	Jaunannas p.	19	+2.9
11	Kalnecmpju p.	26	+1.6
12	Liepnas p.	5	-7.6
13	Mārkalnaes p.	9	-9.9
14	Malienes p.	12	-5.4
15	Māltupes p.	9	-1.0
16	Pededzes p.	9	-10.3
17	Trapenes p.	25	+3.4
18	Veclaicenes p.	19	-0.5
19	Vīrešu p.	18	+2.1
20	Zeltiņu p.	25	+2.7
21	Ziemeņu p.	11	-0.3

Iv – average strength of the AGV in parishes (mGal)  
E – average values of the N in parishes from 1991 to 1999

Fig.1. Graph of dependence of the population E parameters in Aluksne Region on AGF strength (1991 - 1999) [20].

Correlation analysis between the average AGF strength values and the average population E values of every region revealed the presence of a positive correlation between the values of AGF strength and E for both periods of time ( $K = 0.25$ ). The maximum values of population increase (E) were registered in the area of positive AGF with the largest strength (Fig. 2).

In the second time interval (1995 - 2005) population E in the country was negative (even in areas with high AGF strength). That is, from 1990 to 1995 the environmental parameters have changed dramatically.



Designations:

- 20' N values of regions for the period from 1980 to 1989
- 17' N values of regions for the period from 1995 to 2005
- The range of N values in regions and trend for the period from 1980 to 1989
- - - The range of N values in regions and trend for the period from 1985 to 2005

N.p.k.	Rajons	Iv	E 1995-2005	E' 1980-1989	N.p.k.	Rajons	Iv	E 1995-2005	E' 1980-1989
1	Aizkraukles	5	-5.47	2.47	14	Limbažu	-13	-4.15	3.22
2	Alūksnes	15	-6.40	0.22	15	Ludzas	-10	-13.73	-6.50
3	Balvu	7	-10.69	-3.72	16	Madonas	15	-5.09	2.20
4	Bauskas	15	-3.68	4.91	17	Ogres	11	-3.45	6.53
5	Cēsu	11	-4.51	2.94	18	Preiļu	2	-8.26	0.19
6	Daugavpils	12	-9.43	-2.13	19	Rēzeknes	-2	-10.20	-3.01
7	Dobele	23	-3.33	6.09	20	Rīgas	-4	-2.97	6.37
8	Gulbenes	15	-6.55	-0.04	21	Saldus	19	-2.14	4.69
9	Jēkabpils	0	-6.38	1.40	22	Talsu	-4	-3.67	3.10
10	Jelgavas	20	-4.90	3.77	23	Tukuma	6	-3.39	4.22
11	Krāslavas	4	-11.07	-3.50	24	Valkas	17	-5.98	1.03
12	Kuldīgas	4	-3.85	1.85	25	Valmieras	3	-4.45	3.92
13	Liepājas	22	-6.61	0.18	26	Ventspils	-7	-3.98	4.92

Iv – average strength of the AGF in the region;  
E – average values of the N in the region for the period from 1995 to 2005 (people/1000population);  
E' - average values of the N in the region for the period from 1980 to 1989 (people/1000 population);

Fig.2. Graph of dependence of E figures in the regions of Latvia on the gravitational field strength (for the periods from 1980 to 1989 and from 1995 to 2005) [15].

Since the magnitude of the Earth AGF strength can not change in such a short period of time and can be considered constant for the given time interval, then, we have to assume that other environmental parameters are changing and this change produces a depressing effect on organisms. We already know that intensity of the external and the main geomagnetic field as well as the intensity of the radiation field changed in 1859 and these changes were caused by magnetic storms in 1859. The world's population E, in general, and Latvia in particular, is decreasing (Table 1, Figure 3,4) [15,16].

TABLE 1  
AVERAGE ANNUAL GROWTH OF THE WORLD POPULATION (MIL. PEOPLE)[15,16].

Years	World	Developing countries	Developed countries
1985-1990	85,4	79,3	6,1
1990-1996	81,8	77,0	4,8
1996-2000	79,8	75,4	4,4
2000-2005	77,8	73,3	4,5
2005-2020	74,6	72,1	2,5

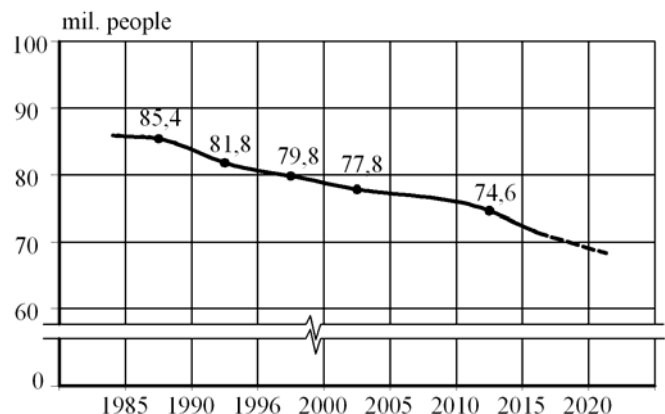


Fig.3. Graph of the average annual growth of the world population (mil. people) [15].

For the time being, the mankind is not able to reduce the negative impact of the growing intensity of the external geophysical fields, but it has at least two opportunities for development:

1. choose for living territories with the environmental parameters optimal for organism (anomalous magnetic field (AMF); anomalous radiation field (ARF));
2. create artificial space with the necessary environmental parameters.

Regarding AMF, such parameters are within the strength interval from -300nT to +300 nT. For the gravitational field these are areas located in AGF with positive value, since the natural population increase in AGF with negative strength value is 1,3 - 2,0 times less than in the areas with positive strength values (table 2).

These data are quite consistent with the results of experiments carried out by biologists that have established that

the decrease in the gravitational field strength produces a negative impact on the organisms.

Environmental parameters are changing rapidly and humans must respond by changing the planning strategies. A period when expanded and simple population reproduction was observed in the entire territory of Latvia ended in 1990. Since then, the country has entered into a new stage of demographic development characterised by gradual decrease of E and population (Figure 4). However, using of information on positive AGF values, which is a factor, which partially compensates the negative impact of other natural effects, in spatial planning, will allow significantly reduce the loss of population.

TABLE 2.

AVERAGE E VALUES IN SOME REGIONS OF LATVIA IN AREAS WITH NEGATIVE AND POSITIVE AGF VALUES [15,16].

No.	Region	Average E value (people/1000 people per annum) of the region per unit of AGF strength in areas with negative and positive AGF values		E2 E1
		(+AGF) E1	(-AGF) E2	
1	Latgale	- 0,95	- 2,00	2,1
2	Vidzeme	- 0,60	- 0,80	1,3
3	Zemgale	- 0,20	-	-
4	Kurzeme	- 0,30	- 0,60	2,0

where:

E1- natural population increase in the areas with positive AGF strength

E2- natural population increase in the areas with negative AGF strength

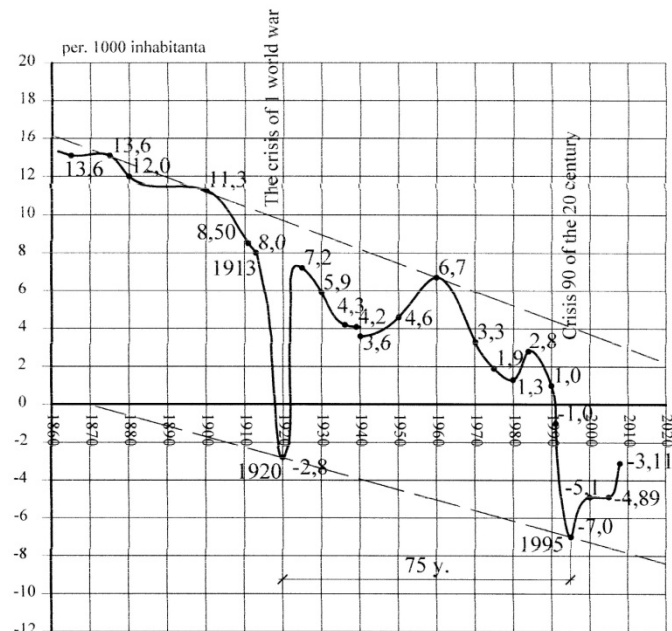


Fig.4. Graph of the average annual E of Latvian population (1860-2010) [15,16].

The analysis conducted suggests that E values are declining within a layer of sedimentary cover (the northern part of the Coastal Plain, regions of Rezekne, Ludza). Simple

reproduction in Latvia in the modern period of development is possible only in AGF with the positive strength values.

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Lyudmila Kartunova is a member of Latvian Association of Architects, a member of Latvian Artists Association, a member of Latvian Association of Scientists, a member of Society of Physiology, a member of European Coastline Protection Society, a member of Kurzeme Ecology Society.

Scientific interests: population response to effect from changes in geological environmental factors and climate due to physical changes of the Sun.

L. Kartunova was the first in Latvia who raised the question on necessity to consider the effects of geophysical and geological factors on population and environment in spatial planning (1988), drawn public attention to marine

transgression process development (1992), and proposed radon gas control in Latvia (1995).

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**Ludmila Kartunova. Iedzīvotāju dabiskā pieauguma rādītāju (Pd) atkarība no anomālā gravitācijas lauka sprieguma (AGL) (pēc Latvijas piemēra)**

Latvijas iedzīvotāju saglabāšanas problēmai ir liela nozīme jau kopš 20.gs. vidus. Tāpēc pētījumi par dabiskās vides faktoru ietekmes uz iedzīvotāju Pd rādītājiem ir neapšaubāmi svarīgi. Viens no tādiem faktoriem ir AGL spriegums.

2009.-2010.g. RTU TURAP tika veikts pētījums par tēmu „Ģeofizisko faktoru ietekme uz demogrāfiskiem procesiem un cilvēka dzīves vides telpisko organizāciju”. Šī pētījuma sastāvā bija nodaļa par AGL sprieguma ietekmi uz iedzīvotāju demogrāfiskajiem rādītājiem.

Pētījumā analizēti Latvijas iedzīvotāju vidējie Pd rādītāji par laika posmu no 1980.-1989.g. un 1995.-2005.g. Izskatīti Pd rādītāji diviem teritoriju veidiem: triju rajonu pagastiem (Alūksnes, Madonas, Ogres rajons) un 26 Latvijas rajoniem. Katras teritorijas iedzīvotāju kontingents attīstās dažādā intensīvā gravitācijas laukā. Korelācijas analīze starp Pd lielumiem un AGL sprieguma rādītājiem parādīja tiešu korelācijas eksistenci (korelācijas koeficients rajonos-  $K=0,25$ , pagastos „K” svārstās no 0,37 līdz 0,66). Tātad noskaidrots, ka AGL sprieguma pieaugums izsauc Pd rādītāju palielināšanos (un otrādi).

Latvijas iedzīvotāju Pd rādītāju analīze laika gaitā parādīja, ka XX gs. 80. gados negatīvi Pd rādītāji bija novērojami tikai atsevišķos rajonos. Laika posmā no 1980.g. līdz 1990.g. negatīvie Pd rādītāji konstatēti vairāk nekā pusei no Latvijas rajoniem, bet sākot no 1990.g. - visos Latvijas rajonos. Tas ir saistīts ar ārējā magnētiskā lauka intensitātes un radiācijas pieaugumu un vides parametru izmaiņām.

Veiktā analīze liecina par to, ka visstraujāk Pd lielumi samazinās teritorijās ar negatīviem AGL sprieguma rādītājiem un vietās ar plānu nogulumiežu slāni (tie ir Piejūras ziemeļos Z-dalā un Rēzeknes, Ludzas rajonā). Vienkārša paaudzes atjaunošanās mūsienu Latvijā ir iespējama tikai ar AGL pozitīviem sprieguma rādītājiem.

**Людмила Картунова. Анализ зависимости величины естественного прироста населения (Е) от напряженности аномального гравитационного поля (АГП) (на примере Латвии)**

Проблема сохранения населения Латвии приобрела актуальность начиная с середины 20 века. В связи с этим, несомненно, важны исследования влияния факторов естественной среды на изменение Е. Одним из таких факторов является уровень напряжения АГП.

В 2009 г.- 2010 г. в Исследовательском центре пространственного и регионального развития Рижского технического университета было проведено исследование на тему: «Влияние геофизических факторов на демографические процессы и пространственную организацию жилой среды человека», в составе которой имелся раздел о влиянии напряженности АГП на демографические показатели населения.

В исследовании анализировались средние за период с 1980 г.-1989 г. и 1995 г.-2005 г. данные Е жителей Латвии. Рассмотрены показатели Е населения для двух групп территорий: волостей трех районов (Алуксненского, Мадонского, Огрского) и 26 районов Латвии. На каждой территории контингент жителей развивался в гравитационном поле с различным напряжением.

Корреляционный анализ между величинами Е и значениями напряженности АГП показал наличие прямой корреляции (для районов  $K=0,25$ , для волостей К колеблются от 0,37 до 0,66). Таким образом установлено, что возрастание напряженности АГП вызывает увеличение Е (и наоборот).

Анализ изменений показателей Е Латвии по годам показал, что до 80-х годов XX века отрицательные значения Е наблюдались лишь в отдельных районах. За период с 1980 г. по 1990 г. показатели Е констатированы в более чем половине районов Латвии. А начиная с 1990 г. во всех районах Латвии показатели Е- отрицательные величины (что связано с возрастанием показателей интенсивности внешнего магнитного и радиационного полей).

Проведенный анализ свидетельствует, что наиболее быстро величины Е снижаются на территориях с отрицательными значениями АГП и тонким слоем осадочного чехла (северная часть Приморской низменности, Ризекненский - Лудзенский районы). Простое воспроизводство в Латвии в современном периоде развития возможно только в АГП с положительными значениями напряженности АГП.