

# EFFECT OF SOLAR RADIATION ON DEMOGRAPHIC RATE IN LATVIA

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## Abstract

The question of impact of changes in the physical state of the Sun and the inversion of magnetic field of the Earth (from 1850 to the nowadays) on the demographics of the Latvian population, is considered herein. It is pointed out that increased solar radiation (due to changes in physical state of the star) and gradual loss of the Earth's magnetosphere (due to inversion) lead to an increase in background radiation of the Earth and reduced intensity of the magnetic field. Both are biologically dangerous and produce depressive impact on organisms, causing deterioration of the demographic rate and population decline. It is necessary to develop new survival technologies to prevent new global disasters, reduce chronic diseases, and rehabilitate disturbed equilibrium of the biosphere.

*Key words: solar radiation, demographic rate, the magnetic inversion.*

During the period from 1994 to 2010 natural population increase (NPI) is negative in all districts and towns of Latvia. The similar situation is in many countries of the world. (See table 1).

Table 1. NPI in northern European countries (according to CIA data as of 2005)

No.	Country	NPI people/ 1000 residents per year	No.	Country	NPI people/ 1000 residents per year
1	Latvia	- 4,9	6	Great Britain	0,0
2	Estonia	- 3,9	7	Poland	0,0
3	Hungary	- 3,9	8	Sweden	0,1
4	Lithuania	- 3,0	9	Finland	0,2
5	Germany	- 0,2	10	The Netherlands	0,3

The table shows that NPI in all the countries is negative or close to zero, that permits to environmentalists, such as Richard Kingsford, assume that the Earth is in the sixth period of mass extinction [1]

Save the population is a priority direction of modern science. This is particularly relevant for Latvia, since rates of natural population increase in some regions are beyond the narrowed reproduction. Rapid decline in

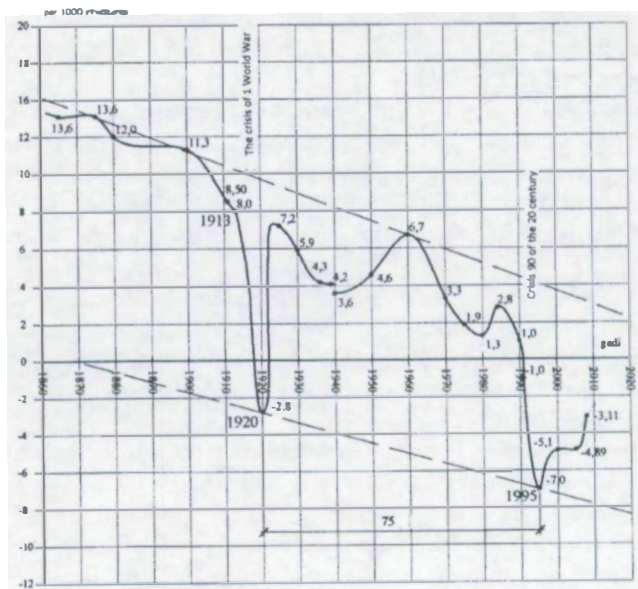
population can be characterized as an environmental crisis. What are the causes of this crisis?

Data of biology and physics suggest that there is a continuous exchange of matter, energy and information between population and environment. Changes in demographic population rate appear as a response of organisms to changed external influence.

NPI is an indicator of favourable environmental impact on humans. It may have a negative and a positive value. Negative NPI values in the territory of Latvia evidence about change in environmental parameters, which the human body can adapt to.

Was there NPI always negative in Latvia? Analysis of NPI in Latvia for almost 150 years (1860 - 2008) [2] showed that before 1994 NPI figures in Latvia were positive, and until 1900 there was the expanded reproduction. (Picture 1)

Picture 1. Dynamics of natural population increase rates in Latvia from 1860 to 2008.



NPI diagram in Figure 1 has a form of decaying curve indicating about appearance of powerful negative natural impacts in 1850 – 1860, which depress the population reproduction process.

Diagram of population change, as well as diagram of changes in NPI rates has a form of decaying curve, moreover, transformation of the process started in the same 1850 - 60 years. What had happened in the environment in this period?

According to the latest scientific data obtained by analyzing the magnetic synoptic maps of the Sun (1878 - 2001) (from 13th to 23rd solar cycle) the area of polar zones of the Sun of one polarity of the magnet has doubled. This allowed the scientists to conclude that the behaviour of the geomagnetic index, climatic changes and even possible restructuring of the internal structure of the Sun itself are associated with the enormous magnetic activation of the Star's Polar Regions and the magnetic fluxes [2]

Solar cycles - 18th, 19th, 21st, 22nd and 23rd were and still are the peak by all energy indicators. Information received in these years allows scientists to assert that the Solar system acquired new physical qualities. This novelty is associated with a large inflow of matter and energy (especially magnetic) in the interplanetary cavity of the Solar system. [4] [5] [6]

Comparison of Pictures 1, 2 and 3 shows that changes in the solar magnetic field are closely related to processes occurring in Earth's biosphere and its individual regions (particularly in Latvia). If changes on the Sun will continue by scenario started in the cycle, we should expect a further decrease of NPI rate and population. If activation of the Sun will fall, perhaps, we can expect increase of NPI.

The second environmental factor influencing the demographic rates of population is the main geomagnetic field inversion, which began in 1850. Change of magnetic poles is accompanied by a gradual weakening of the main magnetic field of the Earth, disclosure of the magnetospheric clefts and growth of radioactive background of the Earth [5].

Inversion of the main geomagnetic field of the Earth takes place almost simultaneously with changes in Solar magnetic field, that allows suggesting that changes on the Sun was the reason for started repolarisation of the Earth and deformation of the Earth's magnetosphere [5 p. 40]. Changes on the Sun and repolarisation of the Earth are the main causes for population decrease in the world in general and in Latvia (in particular).

In conclusion, here is a statement of geologist and astronomer Konstantinovskaya L., which believes that "if technological progress was a symbol of science in the past century, then stability and security of the world development must become the motto of science in the twenty-first century" [10 p.240]. The Mankind faces a challenge to survive in the environment with rapidly changing parameters. This will require development of new survival technologies for preventing the global disasters, increase of chronic pathologies

in people, and development of a system to restore the disturbed equilibrium of the biosphere.

### References

1. Исчезнем, как мамонты /газета «ЧАС», 31 июля – 2 августа, 2009, Рига
2. Zinātniski pētnieciskais pārskats apakšprojekta tēmai „Geofizisko faktoru ietekme uz demogrāfiskiem procesiem un cilvēka dzīves vides telpiskā organizācija”, Rīgas Tehniskās Universitātes telpiskās un reģionālās attīstības pētījumu centrs. Rīga, 2009.g/, lpp.486
3. Макаров В.И., Платов А.Г.  
Всероссийская конференция по физике Солнечно-Земных связей.  
Доклад, Иркутск, 2001г., с.9
4. Паркер Е.Н.  
Космические магнитные поля (их образование и проявление) ч.2, -М, Мир, 1982, с.479
5. Казначеев В.П., Дмитриев А.Н., Мингазов И.Ф.  
Цивилизация в условиях роста энергоемкости природных процессов Земли (Проблемы космо-биосферы футурологии), Новосибирск, 2007, с.419
6. <http://www.okoplanet.spb.ru/?opendokument&h=1&p=11&type=viewmes&site=195E6>
7. Kuznetsov V.V. A model of virtual geomagnetic pole motion during reversals. Phys. Earth Plan. Inter 1999. V. P.173-179.
8. Manda M., Bellander E., Le Mouel J-L. F geomagnetic jerk for the end of the 20-th century? EPSL.2000.V.183. P.369-373
9. Newitt L.R., Manda M., McKee L.A., Orgeval J.J. Resent acceleration of the North Magnetic Pole linked to magnetic jerk EOS // Transaction AGU. 2002. Vol. 83. P.385-389.
10. Константиновская Л.В. Новейшая Астрономия (Космогоническая модель вселенной) М.: ГЕОС 2009. с.272