**Interview of Prof. V. Zharkova**

**by Franco Battaglia**

**for the Italian newspaper La Verita**

The following interview will show – if there were still the need to show it – that the climate system is quite far to be well understood, thereby it is quite far from the truth any claim according to which on the matter “science is settled”, as Al Gore and the IPCC have been claiming for 20 years. Valentina Zharkova is an outstanding Ukrainian scientist: she graduated from the University of Kiev in Applied mathematics, first, and then completed her PhD studies in Astrophysics from the Main Astronomical Observatory in Kiev. For the past 30 years she worked in the UK Universities of Glasgow, Bradford and Northumbria, since 2005 as a Professor of Applied Mathematics. At the present she is Professor Emeritus at Northumbria University (Newcastle, UK) and Director of ZVS Research Enterprise Ltd. (London UK).

**Q**. Prof. Zharkova, people say that the Earth is warming since the beginning of the Industrial revolution and that this is due to human activities. Do you have any comment on that?

**A**. Actually the Earth is warming since 1690, the minimum of the Little Ice Age. In 1976, Prof. John Eddy established that the terrestrial temperature follows solar radiation deposition during solar activity cycles, increasing during the solar cycle maxima and decreasing during solar minima. Then, in 1995, prof. Judith Lean and collaborators discovered and later in 2016 Prof. Don Easterbrook confirmed that the input of solar radiation to Earth was decreased during the Maunder minimum in 1645-1710 by about 3 W/m2 leading to a decrease of terrestrial temperature during what is now called the Little Ice Age. Since 1700 and the recovery of the Maunder minimum the solar radiation deposition to Earth restored to previous level and terrestrial temperature followed solar activity cycles.

**Q**. Has then the solar activity been increasing during the last few decades?

**A**. No. Actually the solar activity has been decreasing since the 80’s of the last century.

**Q**. This is why IPCC has concluded that the present warming is due to humans?

**A**. Exactly, the warming is present but it is not due to humans. They make a mistake: they assume that solar radiation is essentially constant, thereby attributing the warming to CO2’s enhanced concentration in the terrestrial atmosphere.

**Q**. Could you clarify?

**A**. Within solar activity there are two important cycles: one – the small solar cycle – with a 11-year period and the other – the grand solar cycle – with a 350-year period. The grand solar cycles are separated by grand solar minima (GSMs), the most recent of them occurred during Maunder minimum (1645-1710). The GSM acts on the terrestrial environment via the cold air jets coming from Arctic and Antarctica because of the reduction of solar UV radiation and ozone abundances in the terrestrial atmosphere.  Now there is a current solar cycle (cycle number 25) is showing to have the largest numbers of spotless days than any other cycles of the last 280 years of observations. During the modern GSM, similar to Maunder minimum, the solar radiation is expected to decrease by about 3 W/m2. The terrestrial temperature is then expected to decrease in the next three decades by about 1C. This was recorded during the Maunder Minimum and the same is expected in the modern GSM (2020-2050).

But the further change of solar irradiance deposited to the Earth can be caused by other effects.

**Q**. Namely?

**A.** By orbital effects. There are well know Milankovitch cycles caused by various variation of the earth orbit eccentricity, inclination of its axis to the ecliptics, aberrations. These periods vary from 15K to 100K years and well protocolled in the terrestrial biomass. There is a shorter period of solar radiation changes with a period of about two millennia: Hallstatt’s cycle. It reflects medium-scale variations of the solar radiation level whose origin comes not from the dynamo activity inside the Sun but from ***the Sun’s position with respect to the orbit focus, or barycentre, where it supposed to reside according to Kepler motion, or so called,*** *solar inertial motion* (SIM).This means that the Sun is shifted, or wobbling from its focus/barycentre position on two millennial scale, so that Sun-Earth distance has to change on the two millennial period.

Basically, this happens because of the gravitation from Jupiter, Saturn, Neptune and Uranus, the Sun does not sit in the focus of the ellipse of the Earth orbit, but performs the motion called SIM (wobbling on smaller orbits) about this focus. This principle of wobbling stars is used to search for exoplanets because wobbling star proves that it has a planetary system attached. In fact, the official ephemeris of the Sun-Earth distance taken from Paris-Meudon observatory and NASA JPL sites show that in the millennium 1600-2600 the Sun in February-June of every year is closer to the Earth orbit when the Sun is closer to the point of the spring equinox of the Northern hemisphere, leaving the Earth to be further from the Sun in August-December than in the usual elliptical orbit when the Sun is in its focus.

This SIM leads to an increase of the solar radiation deposited to the Earth every year during the first half of a year and, thus, to the increase of the terrestrial temperature in March-July of every year by approximately 10-12 W/m2 for each hemisphere. With the exchange of solar heating via the ocean the terrestrial atmosphere is heated to higher temperatures owing this SIM, and this extra heating occurs since the Maunder Minimum to last until 2600. The SIM provides the extra-solar heating of terrestrial atmosphere, which is not considered in the IPCC models. Hence, the solar irradiance is not a constant but changes on a scale of 11 and 350 years as induced by the solar dynamo action and on a two-millennial scale as induced by the solar inertial motion.

**Q**. In other words, you are saying that IPCC found in the CO2 the wrong source of increasing terrestrial temperature?

**A.** Yes. In fact the increase of CO2 abundances is a consequence of the temperature increase but not its reason as Patrick Moore of Canada has shown in his book. The main part of solar radiation energy is stored in the Ultraviolet (UV) region, much less in the visible spectrum and even less in the infra-red spectrum where molecules of CO2 emit. CO2 molecules only re-scatter the UV solar emission in much weaker infrared part of solar spectrum. CO2 does not have the emission energy to heat anything because its radiation is the in low energy infra-red range! The abundances of CO2 molecules increases every year, this is correct, but because the Sun deposits more radiation to Earth and other planets owing to SIM.

The IPCC models calculate the emission from the layer containing increased number of CO2 molecules by simply adding all the emission by each extra CO2 molecules appeared in the past 200 years. This is not correct! Because the emission from a thick layer of CO2 is locked inside this layer by radiative transfer effects, so that the emission emitted outside this layer has a saturation effect independent on the abundance of CO2 inside the layer!

Instead, I have shown that owing to SIM, the increase of solar radiation in this millennium will be about about 10-12 W/m2 per hemisphere and per year, until around 2600.  This means that the temperature increase will continue by further 2.5-3.0C until 2600 independently of any actions on the Earth and other planets. If this extra-solar heating is included then the whole temperature increase since Maunder Minimum is provided by the solar radiation because of SIM as it should because it is the only heating we have in the solar system.

In conclusion**, the real reason of the current heating of terrestrial atmosphere** since the Maunder minimum **is this extra-solar heating caused by the orbital motion of the Sun.** And currently the Sun is already visibly closer to the Earth (and other planet orbits) during the springs and summers.

**Q**. Is there a way to test your theory?

**A.** Sure, it is. In the next 30 years it will be shown what is heating the Earth atmosphere: the Sun or human activity. Currently, the Sun is approaching the grand solar minimum (GSM) predicted by us in 2015, when the Sun itself is going into hibernation as all the observations of sunspots show, producing less and less active regions, flares, sunspots and coronal mass ejections. This should cause a steaming decrease of the terrestrial temperature by up to 1C in cycle 26 (2031-2042). This decrease should happen in spite the Sun already closer to Earth and increased by 2020 its temperature by 1.2C since the Maunder minimum.

**If AGW were in action, then we would not observe any decrease of the terrestrial temperature, only its increase.** However, this year and a few previous years show clearly that the Earth is on the course to a decrease of terrestrial temperature. We will see the terrestrial temperature to decrease and rather dramatically decrease in the next decade or two because of the reduced activity, or GSM, of the Sun.

**Q.** I imagine that the whole issue, including your finding, is still quite controversial. Would you then agree that it is safe to say that the matter is quite far from being settled?

**A.** Definitely!

Well, in the medieval age the settled model of the solar system was Ptolemy’s model where the Sun and planets revolve about the Earth. They invented two circles for each planet to explain their strange jumps on the sky. The church considered the science settled then.

So settled that when Copernicus proposed in 1532 the heliocentric system, where the Sun is the main central star and all planets revolve about it, they considered it as heresy. We know what happened to Giordano Bruno and led to Galileo to deny Copernicus model to survive.

Until nearly a century later, in 1610-1620 Kepler formulated three laws of the planets revolving about the central star. But only in 1665 or 1666 Isaak Newton discovered the gravity, which was only roughly (via central star-planets) included into Kepler’s laws.

And only in 1965 Jose calculated the gravity effects not only of the central star on its planets but also of the planets on the central star, thus discovering the star’s motion, naming it SIM. Maybe it is the time to progress correctly with the orbital effects of solar and planetary motion!