ISSN: 2836-3655
Advances in
Hydrology & Meteorology
DOI: 10.33552/AHM.2025.02.000546
Iris Publishers

Review Article



# Long-Term Weather Forecast Based on Non-Locality of Controlled Dissipative Processes

**M L Arushanov***

*Scientific Research Hydrometeorological Institute, Tashkent, Uzbekistan*

**Corresponding author:** M L Arushanov, scientific Research Hydrometeorological Institute, Tashkent, Uzbekistan.

**Received Date:** January 20, 2025

**Published Date:** February 10, 2025

## Annotation

This work is motivated by the need to find new approaches to solving the problem of long-term weather forecasting, the accuracy of which for more than half a century remains practically just over 60%. In other words, various methods used for long-term forecasting of meteorological variables, namely, numerical, dynamic-stochastic (for example, various modified methods of analogues) do not give a significant result. The former are associated with the problem of predictability (Lorentz attractor), the latter turn out to be unstable due to random fluctuations in the deviations of atmospheric processes from their certain norm, which in the long term leads to great difficulty in predicting these deviations.

Fundamental research started by N. A. Kozyrev, summarized in his monograph "Causal or asymmetric mechanics in the linear approximation", work carried out in theoretical physics by J. Wheeler and R. Feynman, developed by D. Savage, J. Cramer, regarding interpretations of quantum nonlocality, which were generalized at the macro level on the basis of experimental studies carried out independently by Professor S. M. Korotaev and electronics engineer E. M. Avsharov, as a result of which the existence of a fifth type of interaction of a non-field nature was once again proven, received recognition in the scientific world. These works, indicating the existence of a fundamentally new type of interaction between irreversible processes of any nature, are a direct guide to solving the problem of long-term weather forecasting based on a completely new approach, which is outlined in this article.

**Keywords:** Long-term weather forecast, Quantum nonlocality, Dissipative irreversible processes, Correlation coefficient

## Introduction

The problem of long-term forecasting of meteorological variables, which cannot be solved with acceptable accuracy for more than half a century, is the result of the incompleteness of our knowledge about the structure of Nature, limited by the classical theory of physical processes within the framework of electromagnetic and gravitational interactions built over centuries. Meteorology, as one of the sections of applied physics, includes laws obtained as a result of theoretical and experimental research in fundamental physics. As a consequence, the range of problems under consideration is limited to the particular application of established physical theories within the framework of four types of interactions - electromagnetic, strong and weak gravitational. This situation of meteorological science, due to the lack of feedback with theoretical physics, causes great inertia in its development, namely, the timely assimilation of new, advanced directions in theoretical physics. The absence of research in meteorology based on the results obtained in theoretical physics, different from the accepted paradigm, leads to its stagnation, an example of which is the problem of long-term weather forecasting.

Limiting themselves to the classical framework of physical science, meteorologists were forced to justify the very low accuracy of long-term (from a month and more) weather forecasts. Within the framework of classical physics and the existing mathematical theory, this "justification" was not difficult to find: the limit of predictability in satisfactory limits of forecast accuracy is limited to two weeks (the "butterfly effect" or Lorenz attractor), when small oscillations of the system over large time intervals result in large deviations. And the more time passes, the more difficult it is to predict these deviations.

## Macroscopic Nonlocality

Beginning with the works of [1-9] and others, a number of statistically reliable facts have been accumulated in geophysics and astrophysics on the dependence of remote irreversible processes of various natures that have neither a direct nor an indirect connection based on known (electromagnetic and gravitational) interactions. For example, the dependence of the rates of some physico-chemical reactions and geological sedimentation on solar activity, the dependence of variations in cosmic ray muons and natural radio activity of rocks, the non-tidal component of the dependence of seismicity on the Earth and the Moon, etc. [10]. All these processes of completely different natures have a common feature, expressed by irreversibility (dissipativity). The above connections – "strange" correlations, have been discovered in recent decades by scientists of various specialties – astronomers, physicists, chemists, geologists, geophysicists, and for a long time remained scattered within narrow specialists, while they lay on the surface for centuries in the form of folk signs. For example, the ability of plants to predict the future state of the atmosphere: about 400 species of plants are known in the world that have the ability to predict weather changes no worse than modern hydrometeorological services. Some of them close their flowers or inflorescences before precipitation, changing their position in order to protect pollen from moisture and at the same time reduce heat transfer. Other plants begin to actively secrete nectar, thus attracting pollinating insects. Others absorb droplets of moisture before rain, and others have the ability to change the shape and position of their leaves. Abundant flowering of thistle is a harbinger of a warm and dry autumn and many other things. However, within the framework of classical physics, these "harbingers" did not find any explanation and therefore remained "invented" signs in scientific circles.

In recent decades, a "critical mass" of empirical facts in various scientific fields has been reached, and their commonality has become visible.

Progressive scientists could not leave these facts aside. The works of N. A. Kozyrev, J. A. Wheeler, R. P. Feynman, J. G. Cramer, I. Prigogine, J. Bell, S. M. Korotaev, E. M. Avsharov and others led to the development of a new direction in physics: at the quantum level - "Quantum nonlocality"; at the macro level - "Nonlocality of dissipative processes". Macroscopic nonlocality is a new physical effect consisting in the correlation of dissipative processes without the mediation of local carriers of interaction, which are obligatory in classical physics, which explains the frivolous attitude of classical scientists to folk signs associated with future weather. At present, under the weight of experimental facts, the "classics" have changed their views on existing types of interaction.

***The fundamental possibility of long-term weather forecasting based on the effects of macroscopic non-locality is that the fifth type of interaction is realized in nature – interaction without the mediation of local carriers, in which a specially constructed initial signal carries information about the state of the environment, in particular, the atmosphere, in the future.***

### A trial experiment on long-term forecast of meteorological quantities based on macroscopic nonlocality

As an example of practical implementation of the effects of macroscopic nonlocality for the purposes of long-term forecasting, we will use the data obtained at the Institute of Geoelectromagnetic Research of the Russian Academy of Sciences (Laboratory of Marine Experimental Research) by Professor S. M. Korotayev [10]. These data represent a signal measured in order to detect the relationship between the change in entropy in a certain trial process and the change in entropy in the environment with the exclusion of all known types of classical local interaction. It is not the entropy that is measured directly, but some indirectly related observable macroparameter. The designed detector has maximum sensitivity and, at the same time, is reliably shielded from classical effects. In general, an installation was built on the basis of two types of detectors based on the relationship between entropy and the value of the potential barrier. In one, spontaneous variations in the difference in the proper potentials of weakly polarizable electrodes in the electrolyte (U) were measured, and in the other, the dark current of the photomultiplier (I). Continuous measurements were carried out over the course of a year. Fig. 1 shows a graph of the correlation function between the detector readings (dark current signal IA) and the surface pressure P for the same annual period (1997). The correlation function, constructed as a function of the time shift, has a maximum correlation (R = 0.902) at a shift of 73 days. The predictive properties of the detector can be very clearly seen in Fig. 2, where the graph of variations in the detector indicator IA (dark current) is shown under the letter "a", and the time course of the surface pressure, shifted in time relative to the detector signal curve by 73 days, is shown under the letter "b".

The regression equation $P_{t=73} = f(I_{At=0})$ with the determination coefficient $R^2$=0.869(R=0.932) is determined by the expression:

$$P = 972,648 + 8,767 I_A - 5,326 I_A^{\ 2} + 1.431 I_A^{\ 3} - 0,180 I_A^{\ 4} + 0,011 I_A^{\ 5} - 0,0003 I_A^{\ 6} + 3,355.10^{-6} I_A^{\ 7}$$

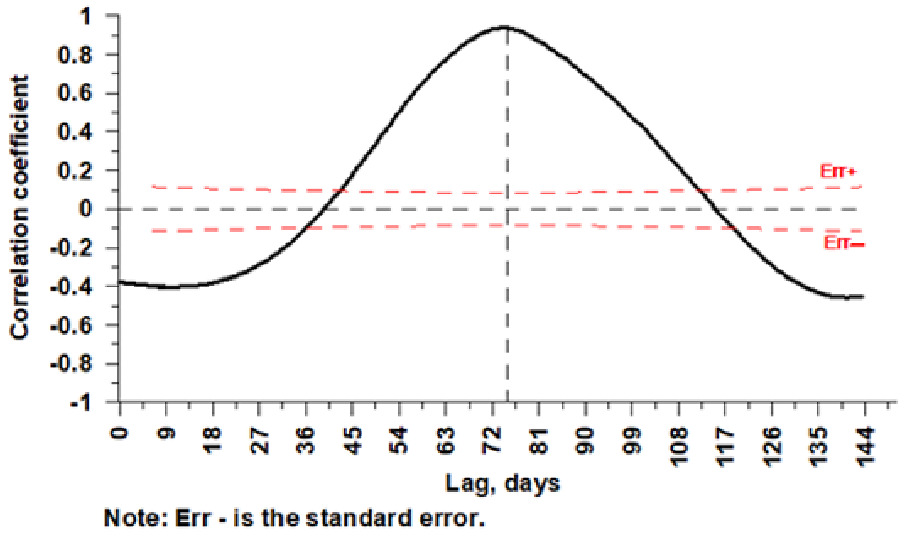


**Figure 1:** Correlation function «signal – pressure» as a function of time shift.

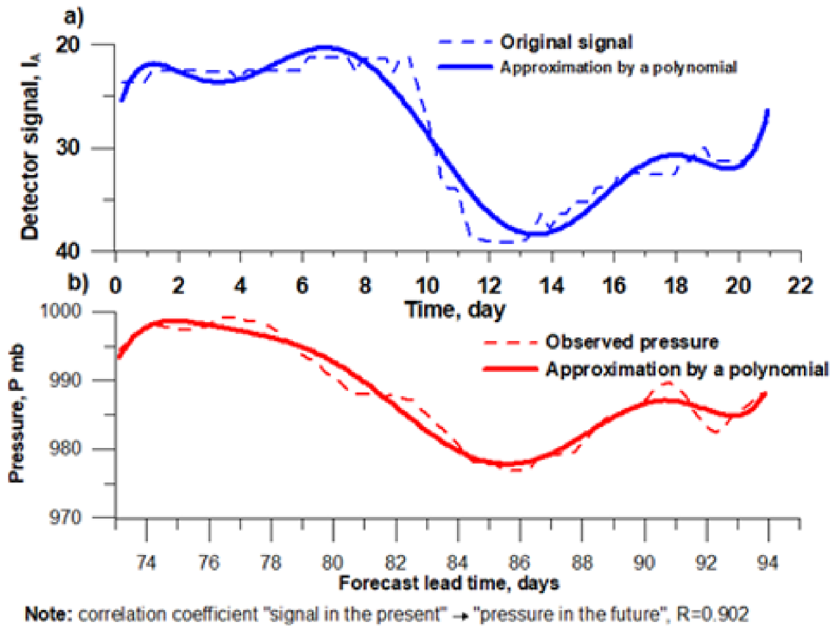


**Figure 2:** Variation of detector signal I, predicting variation of pressure P with a lead time of 73 days.

## Conclusion

The effect of macroscopic nonlocality is a new direction in physics, it can and should become the main method of long-term forecasting, opening a completely new direction in meteorological weather forecasts. The hardware base (detectors), developed by E. M. Avsharov [11], successfully passed the author's and production tests, found a very important application in medicine. Regarding meteorology, here it is necessary to carry out deep studies of macroscopic nonlocality using the devices developed by E. M. Avsharov, within the framework of the selection of plants - harbingers of weather, to study the properties of their potential, to obtain delays of the detector signal potential relative to the time course of meteorological quanti-ties, i.e. to determine the time shift into the future for a given plant and to construct regression equations for various meteorological quantities.

## Acknowledgement

None.

## Conflicts of Interest

No conflicts of interest

## References

1. Kozyrev NA (1991) Selected works. L Publishing house of Leningrad. University pp. 448.
2. Kozyrev NA (1958) Causal or asymmetric mechanics in the linear approximation. L Pulkovo pp. 90.
3. Wheeler JA, Feynman RP (1949) Classical Electrodynamics in Terms of Direct Interparticle Action. Rev Mod Phys 24: 425-433.
4. Savage D (1987) Progress in Space-Time Physics. Bloomberg: Wesely Press pp. 242.
5. Savage D (1987) Measuring local time dilation using hourglass egg timers, in Progress in Spacetime Physics, Wesely Press, Bloomberg. Pp. 242-256.
6. Cramer JG (1980) Generalized absorber theory and the Einstein-Podolsky-Rosen paradox. Phys Rev D 22(2): 362-376.
7. Cramer JG (1986) The transactional interpretation of quantum mechanics. Rev Mod Phys 58: 647-688.
8. Hoyle F, Narlikar JV (1995) Rev Mod Phys 67: 113-127.
9. Shnol SE, Kolombet VA, Pozharsky EV, Zenchenko TA, Zvereva IM, et al. (1998) On the realization of discrete states during fluctuations in macroscopic processes. Uspekhi Fizicheskikh Nauk 168(10): 1129-1140.
10. Korotaev SM (2004) Heliogeophysical effects of nonlocality - shadows of the future in the pre-sent. Quantum Magic 1(2): 2219-2240.
11. Avsharov EM (2021) Gradient etherodynamics: Astronomical phenomena as a reaction of matter to the vortex motion of ether. Electronic resource pp. 119.

**Citation:** M L Arushanov*. Long-Term Weather Forecast Based on Non-Locality of Controlled Dissipative Processes. Adv in Hydro & Meteorol. 2(5): 2025. AHM.MS.ID.000546. **DOI:** 10.33552/AHM.2025.02.000546.