
PHYSICS

UDC 910.3

**CELLULAR COMMUNICATIONS AS AN OBJECT
OF REGIONAL GEOGRAPHICAL ANALYSIS (SOUTHERN FEDERAL DISTRICT)**© 2014 *A.V. Pogorelov, K.R. Golovan*

Pogorelov Anatoly Valeriyevich – Doctor of Geographical Science, Professor, Head of the Department of Geoinformatics, Kuban State University, Stavropolskaya St., 149, Krasnodar, 355040, Russia, e-mail: sosstradanie@gmail.com.

Golovan Kirill Romanovich – Post-Graduate Student, Kuban State University, Stavropolskaya St., 149, Krasnodar, 355040, Russia, e-mail: krgolovan@gmail.com.

In this paper investigated the regional structure of the cellular network (MTS) in the SFD by constructing a set of maps which reflects the current state of the network. A special attention we paid to the Krasnodar Territory which holds a leading position in a number of development parameters of network. Determined degree of region coverage by network signal and territorial characteristics of the work load on the network.

Keywords: *cellular communications, voice traffic, mobile internet, spatial structure, cellular network coverage, Krasnodar Territory.*

References

1. *Ivanov E.V.* Formirovanie lokal'nogo rynka sotovoi sviazi (na primere Novgorodskoi oblasti) [Formation of the local cellular market (for example, the Novgorod region)]: dis. ... kand. geogr. nauk. V. Novgorod, 2005. 179 s.
2. *Lesnova Iu.V.* Geografiia razvitiia sotovoi sviazi Rossii [Geography of the Russian cellular]: dis. ... kand. geogr. nauk. M., 2004. 209 s.
3. *Lesnova Iu.V.* Sovremennye printsipy territorial'noi organizatsii sotovoi sviazi v Rossii [Modern principles of territorial organization of cellular communication in Russia] // Region-2004. Strategiiia optimal'nogo razvitiia. Khar'kov, 2004. S. 159 – 164.
4. *Golovan' K.R., Pogorelov A.V.* Geografiia sotovoi sviazi v Iuzhnom federal'nom okruge (na primere MTS) [Geography of cellular communication in the Southern Federal District (for example, MTS)] // Izv. Kubanskogo gos. un-ta. Estestv. nauki. 2014. № 3. S. 35 – 41.
5. Sait proekta OpenCellID. URL: <http://opencellid.org> (data obrashcheniia: 20.04.2014).
6. *Egorov L.L., Kologrivov V.A.* Algoritm rascheta zon pokrytiia bazovykh stantsii sotovoi sviazi [Algorithm for calculating the coverage of cellular base stations] // Doklady TUSURa. 2007. № 2(16). S. 155 – 162.
7. *Ledovskoi A.I., Slabukha E.O., Krikun A.I.* Zachem nuzhny raschety zon radiopokrytiia [Why calculations coverage zones] // Mobil'nye sistemy. 2004. № 2. S. 21 – 24.
8. Sait kompanii Siradel. URL: <http://www.siradel.com/1/volcano-software-suite.aspx> (data obrashcheniia: 20.04.2014).
9. *Ratynskii M.V.* Osnovy sotovoi sviazi [Fundamentals of cellular] / pod red. D.B. Zimina. M., 1998. 248 s.
10. *Golovan K.R., Pogorelov A.V.* About the territorial structure of the traffic in the mobile network of second generation // Materiały X Międzynarodowej naukowo-praktycznej konferencji «Europejska nauka XXI wiek – 2014». Przemysł: Nauka i studia, 2014. Vol. 27: Geografia i geologia. Budownictwo i architektura. P. 36 – 40.

UDC 550.385.3, 550.343

INSTRUMENTAL OBSERVATIONS OF ANOMALOUS GEOMAGNETIC DISTURBANCES INDUCED IN THE GEOSPHERE

© 2014 L.E. Sobisevich, A.L. Sobisevich, Kh.D. Kanonidi, K.Kh. Kanonidi, D.A. Presnov

Sobisevich Leonid Evgenievich – Doctor of Technical Science, Main Scientific Researcher, Schmidt Institute of Physics of the Earth, Russian Academy of Sciences, Bolshaya Gruzinskaya St., 10, Moscow, 123995, Russia, e-mail: sobis@ifz.ru.

Sobisevich Alexey Leonidovich – Doctor of Physical and Mathematical Science, Head of the Laboratory, Schmidt Institute of Physics of the Earth, Russian Academy of Sciences, Bolshaya Gruzinskaya St., 10, Moscow, 123995, Russia, e-mail: alex@ifz.ru.

Kanonidi Kharlampiy Dmitrievich – Candidate of Physical and Mathematical Science, Head of Sector of Magnetic-Ionospheric Interactions, Pushkov Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation RAS, Troitsk, Moscow Region, 142190, Russia, e-mail: kanonidi@izmiran.ru.

Kanonidi Konstantin Kharlampiyevich – Senior Scientific Researcher, Pushkov Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation RAS, Troitsk, Moscow Region, 142190, Russia, e-mail: kkkh@izmiran.ru.

Presnov Dmitriy Alexandrovich – Leading Engineer, Schmidt Institute of Physics of the Earth, Russian Academy of Sciences, Bolshaya Gruzinskaya St., 10, Moscow, 123995, Russia, e-mail: presnov@ifz.ru.

The results of instrumental observations of variations of Earth's magnetic field, which have been obtained on the basis of the North Caucasus Geophysical Observatory IPE (Elbrus volcanic area), and the incorporation of observation points Troitsk, located in the European part of Russia. Analyzed abnormal «quasi-harmonic» disturbance marked variations in the Earth's magnetic field at all stages of the seismic process. The experimental data give a general idea of the geomagnetic activity and some characteristics of the induced anomalous geomagnetic disturbances, which can be co-delivered with the development of related geodynamic and geoelectric processes in the subsurface of the focal zone.

Keywords: variations of the Earth's magnetic field, earthquake prediction, the ULF variations, short-term earthquake prediction, tiltmeter.

References

1. Sobisevich L.E., Kanonidi K.Kh., Sobisevich A.L., Miseiuk O.I. Geomagnitnye vozmushcheniia v variatsiakh magnitnogo polia Zemli na etapakh podgotovki i razvitiia turetskogo (08.03.2010 g.) i severokavkazskogo (19.01.2011 g.) zemletriasenii [Geomagnetic disturbances in the Earth's magnetic field variations on the stages of preparation and development of the Turkish (08.03.2010) and the North Caucasus (19.01.2011) earthquakes] // Dokl. AN. Geofizika. 2013. T. 449, № 1. S. 93 – 96.
2. Nikolaev A.V. O vozmozhnosti iskusstvennoi razriadki tektonicheskikh napriazhenii s pomoshch'iu seismicheskikh i elektricheskikh vozdeistvii [On the possibility of artificial discharge of tectonic stress using seismic and electrical influences] // Dvoinye tekhnologii. 1999. № 2. S. 6–10.
3. Glinskii B.M., Ivakin A.N., Kovalevskii V.V., Levshenko V.T., Rudenko O.V., Sobisevich A.L., Sobisevich L.E. Izuchenie seismomagnitnykh effektov, vznikaiushchikh pri vibrovozdeistvii na sredu [Studying seismomagnetic effects resulting from vibration on environment] // Razvitie metodov i sredstv eksperimental'noi geofiziki : sb. nauch. tr. Vyp. 2. M., 1996. S. 226 – 235.
4. Nikolaevskii V.N. Obzor: Zemnaia kora dilatatsiia i zemletriaseniia [Overview: The Earth's crust and earthquake dilatancy]. M., 1982. S. 133–202.
5. Nikolaevskii V.N. Ochag zemletriaseniia – sobytiia i predvestniki udara [The earthquake – events and harbingers of stroke] // Ekstremal'nye prirodnye protsessy i katastrofy : sobr. tr. T. 2. M., 2011. S. 316–322.

6. *Gufel'd I.L.* Vozmozhn li prognoz sil'nykh krovnykh zemletriasenii? [Is it possible to forecast strong crustal earthquakes?] // *Vestn. RAN.* 2013. T. 83, № 3. S. 236–245.

7. *Sobisevich L.E., Kanonidi K.Kh., Sobisevich A.L.* Izuchenie ul'tranizkochastotnykh elektromagnitnykh vozmushchenii, registriremykh v raione El'brusskogo vulkanicheskogo tsentra [The study of ultra-low electromagnetic disturbances recorded in the area of Elbrus volcanic center] // *Izmeneniia prirodnoi sredy i klimata. Prirodnye katastrofy.* Ch. 1, t. 6 / pod red. N.P. Lave-rova. M., 2008. S. 157 – 163.

8. *Sobisevich L.E., Kanonidi K.Kh., Sobisevich A.L.* Nabliudeniia UNCH geomagnitnykh vozmushchenii, otra-zhaiushchikh protsessy podgotovki i razvitiia tsunamigennykh zemletriasenii [Observations of ULF geomagnetic disturbances, reflects the process of training and development of tsunamigenic earthquakes] // *Dokl. AN. Geofizika.* 2010. T. 435, № 4. S. 548 – 553.

9. *Sobisevich L.E., Sobisevich A.L., Kanonidi K.Kh.* Anomal'nye geomagnitnye vozmushcheniia, navedennye katastroficheskimi tsunamigennymi zemletriaseniami v raione Indonezii [Abnormal geomagnetic disturbances induced catastrophic tsunamigenic earthquakes in the area of Indonesia] // *Geofiz. zhurn.* 2012. T. 34, № 5. S. 22 – 37.

10. *Sobisevich A.L., Gridnev D.G., Sobisevich L.E., Kanonidi K.Kh.* Apparturnyi kompleks Severo-Kavkazskoi geofizicheskoi observatorii [Hardware complex of the North Caucasus Geophysical Observatory] // *Seismicheskie pribory.* 2008. T. 44. S. 12 – 25.

11. *Sobisevich L.E., Kanonidi K.Kh., Sobisevich A.L.* O mekhanizme formirovaniia ochagov glubokofokusnykh zemletriasenii [On the mechanism of formation of pockets of deep-focus earthquakes] // *Dokl. AN. Geofizika.* 2014. T. 459, № 1. S. 1 – 6.

12. *Moore G.W.* Magnetic Disturbances Preceding the 1964 Alaska Earthquake // *Nature.* 1964. Vol. 203.

13. *Bakmutov V.G., Sedova F.I., Mozgovaia T.A.* Morfologicheskie priznaki v strukture geomagnitnykh variatsii v period podgotovki sil'neishogo zemletriaseniia 25 marta 1998 g. v Antarktide [Morphological features in the structure of geomagnetic variations in the period of preparation earthquake March 25, 1998 in Antarctica] // *Ukr. antark. zhurn.* 2003. № 1. S. 54 – 60. P. 508 – 509.

14. *Kanonidi Kh.D.* Osobyi vid geomagnitnykh pul'satsii [A special kind of geomagnetic pulsations] // *Geomagnetizm i aeronomiia.* 1972. T. 12. S. 365. 15. *Babeshko V.A., Sobisevich A.L., Shoshina S.Iu.* Issledovanie uslovii vozniknoveniia rezonansov na neodnorodnostiakh v neogranichennoi srede [Investigation of the resonance condition of inhomogeneity in an infinite medium] // *Dokl. AN SSSR.* 1994. T. 335, № 6. S. 716–718.

16. *Loginov K.I., Sobisevich A.L.* Analiz rezul'tatov eksperimental'nykh nabliudeniia rezonansnykh geoakusticheskikh vzaimodeistvii v poristoi fluidonasyshchennoi geofizicheskoi srede [Analysis of the results of experimental observations geoacoustic resonant interactions in fluid-saturated porous geophysical medium] // *Razvitie metodov i sredstv eksperimental'noi geofiziki.* M., 1996. Vyp. 2. S. 174 – 180.

UDC 551.576

PRELIMINARY RESULTS OF RESEARCH OF CONDENSATION AND ICE-FORM PROPERTIES OF AGI NANOTUBES AND ZINC OXIDE

© 2014 V.O. Tapaskhanov, B.M. Khuchunaev, M.I. Tlisov, A.B. Khuchunaev, G.V. Kupovykh

Tapaskhanov Valery Oyusovich – Candidate of Technical Science, Director, High-Mountain Geophysical Institute, Lenin Ave, 2, Nalchik, KBR, 360030, Russia, e-mail: kbr@rambler.ru.

Khuchunaev Buzigit Mussaevich – Doctor of Physical and Mathematical Science, Senior Scientific Researcher, Head of the Laboratory of Physics of Clouds, High-Mountain Geophysical Institute, Lenin Ave, 2, Nalchik, KBR, 360030, Russia, e-mail: buzigit@mail.ru.

Tlisov Michail Indrisovich – Doctor of Physical and Mathematical Science, Main Scientific Researcher, High-Mountain Geophysical Institute, Lenin Ave, 2, Nalchik, KBR, 360030, Russia, e-mail: buzigit@mail.ru.

Khuchunaev Azamat Buzigitovich – Junior Scientific Researcher, Department of Physics of Clouds, High-Mountain Geophysical Institute, Lenin Ave, 2, Nalchik, KBR, 360030, Russia, e-mail: lvlongol@mail.ru.

Kupovykh Gennady Vladimirovich – Doctor of Physical and Mathematical Science, Head of High Mathematics Department, Institute of Computer Technology and Information Security of the Southern Federal University, Nekrasovsky St., 44, Taganrog, Rostov Region, 347928, Russia, e-mail: kupovykh@sfnu.ru.

The technique of synthesis of nanotubes of oxide of zinc and AgI is given. Results of preliminary researches of their condensation and ice-form properties are discussed. Nanotubes were synthesized in the camera with an atmospheric pressure, as the catalyst graphite was used. It is received that nanotubes of oxide of zinc possess good condensation and ice-form properties.

Keywords: *nanotechnologies, ice-form kernels, specific exit, nanotubes, reagent, drop mechanism.*

References

1. *Khuchunaev B.M., Stepanova S.I., Khuchunaev A.B., Panaetov V.P. Issledovanie l'doobrazuiushchikh svoystv kristallogidratov i nanotrubok oksida tsinka [The study of ice-forming properties of crystalline and zinc oxide nanotubes] // Dokl. Vseros. konf. po fizike oblakov*

i aktivnym vozdeistviyam na gidrometeorologicheskie protsessy. Nal'chik, 2011. S. 396 – 402.

2. *Pokropivnyi V.V., Kasumov M.M. Poluchenie i mekhanizm rosta nanostrukturny iz oksida tsinka v dugovom razriade [Receiving and growth mechanism of nanostructure of zinc oxide in the arc discharges] // Pis'ma v ZHFT. 2007. T. 33, vyp. 1. S. 88 – 94.*

UDC 551.576

RESULTS OF NATURAL AND LABORATORY RESEARCHES OF THE HAIL FORMATION MECHANISM

© 2014 *B.M. Khuchunaev, S.B. Khuchunaeva, A.B. Khuchunaev, G.V. Kupovykh*

Khuchunaev Buzigit Mussaevich – Doctor of Physical and Mathematical Science, Senior Scientific Researcher, Head of the Laboratory of Physics of Clouds, High-Mountain Geophysical Institute, Lenin Ave, 2, Nalchik, KBR, 360030, Russia, e-mail: buzigit@mail.ru.

Khuchunaeva Svetlana Buzigitovna – Candidate of Physical and Mathematical Science, Senior Scientific Researcher, Department of Physics of Clouds, High-Mountain Geophysical Institute, Lenin Ave, 2, Nalchik, KBR, 360030, Russia, e-mail: Khuchunaeva@rambler.ru.

Khuchunaev Azamat Buzigitovich – Junior Scientific Researcher, Department of Physics of Clouds, High-Mountain Geophysical Institute, Lenin Ave, 2, Nalchik, KBR, 360030, Russia, e-mail: lvlongol@mail.ru.

Kupovykh Gennady Vladimirovich – Doctor of Physical and Mathematical Science, Head of High Mathematics Department, Institute of Computer Technology and Information Security of the Southern Federal University, Nekrasovsky St., 44, Taganrog, Rostov Region, 347928, Russia, e-mail: kupovykh@sfnu.ru.

Results of synthesis of natural and laboratory researches of the mechanism formation of a hail are given in work. The concept of formation of a hail is provided in clouds.

Keywords: *drop germ, cereals germ, cut of hailstones, hail, element analysis, vesiculate method, mechanism of formation of a hail, isotope analysis.*

References

1. *Shmeter S.M.* O sodержanii khloro v vode oblakov v sviazi s ikh mikrostrukturoi [The content of chlorine in the water clouds due to their microstructure] // Tr. CAO. 1955. Vyp. 9. S. 5 – 7.

2. *Tlisov M.I., Ekba Ia.A., Khuchunaev B.M.* Issledovanie vozdushnykh vklucheni v kapel'nykh zarodyshakh gradin [The study of air inclusions in droplet nuclei hailstones] // Tr. VGI. 1987. Vyp. 59. S. 11 – 20.

3. *Tlisov M.I., Malkarov A.S.* Izmereniia izotopnogo

sostava vodoroda v gradinakh [The measurements of the isotopic composition of hydrogen in the hailstones] // Tr. VGI. 1989. Vyp. 72. S. 121 – 129.

4. *Tlisov M.I., Khuchunaev B.M., Malkarov A.S.* Puzyr'kovye i izotopnye metody issledovani kapel'nykh zarodyshei grada [Bubble and isotopic research methods droplet nuclei hail] // Tez. Vsesoiuz. konf. po aktivnym vozdeistviyam na gidrometeorologicheskie protsessy. Nal'chik, 1991.

5. *Jouzel I., Merlivat L., Roth E.* Isotopic study of hail // I. Geophys. Res. 1997. Vol. 80, № 35. R. 5015 – 5030.