Preface

XVIII International Scientific Symposium in honor of Academician M.A. Usov "Problems of Geology and Subsurface Development" (for students and young scientists) was organized under the guidance of the Ministry of Education and Science of the Russian Federation and the Russian Foundation for Basic Research. Being one of the oldest technical higher education institutions which trains specialists who contribute to scientific research in geosciences, The Institute of Natural Resources of National Research Tomsk Polytechnic University (TPU INR) was chosen to hold the symposium. In 2014 The Institute of Natural Resources celebrated its 113th anniversary. It was founded in 1901 by V.A. Obruchev, the first geologist in Siberia, member of USSR Academy of Sciences, Hero of Socialist Labor, and the first Laureate of the Lenin Prize. He was recognized all over the world as a prominent scientist in the area of geology.

INR is the first institute of geological education and geosciences in the Asian part of Russia. Siberian Mining and Geological Schola, established by V.A. Obruchev and M.A. Usov, has been retaining its significance for discovery, exploration and development of mineral resources not only in Siberia, in the Far East and North-East of the country, but also in Central Asia.

There are a lot of outstanding scientists, engineers and manufacturers among alumni of The Institute of Natural Resources. The institute is proud of M.A. Usov, the student and first postgraduate of V.A. Obruchev, first professor and academician in Siberia, whose name is associated with the development of the mining industry in Siberia; Academician K.I. Satpaev, the founder and first president of the Academy of Sciences of Kazakhstan; Professor N.N. Urvantsev, the discoverer of the unique Norilsk ore deposits in the north of East Siberia and Professor M.K. Korovin, who considered West Siberia deposits to be prospective for oil-gas exploration. There are over 35 000 graduates of the institute and more than 450 of them became explorers of mineral deposits including one Nobel laureate, 50 laureates of the Lenin and State Prizes, more than 250 researchers with DSc and PhD, 15 academicians and corresponding members of the USSR Academy of Sciences and five Heroes of Socialist Labor.

Within the scope of the symposium there were 21 panels and workshop, being held over four days. The symposium was unique because it covered all scientific fields of geology and subsurface development: methods of prospecting and exploration for minerals and hydrocarbons, including space geological research and geoinformation systems in geology, as well as the ecological problems and integrated use of mineral resources, land management, natural resource law and economics. The students and young scientists of Russia, foreign and CIS countries participated in the symposium. The investigations presented at the symposium shed light on the latest achievements made by means of modern techniques and original methods of interpretation; the results of experimental studies and computer technologies in geology, oil and gas production and geoecology; the analysis of theoretical and experimental studies on various geological problems and environmental protection.

The reports consider the vital issues and the latest achievements of stratigraphy, paleontology,
tectonics, historical and regional geology, mineralogy, geochemistry, petrography, lithology, metallogeny, hydrogeology and engineering geology, geophysics, petroleum geology, oil and gas field development and processing of hydrocarbon and mineral resources, geoinformation systems (GIS) in geology, space geological research, oilfield equipment upgrading, modern techniques of mineral exploration, production, transportation and storage of oil and gas, drilling, mining engineering, geoeconomy, hydrogeoeconomy, environmental protection engineering, integrated use of mineral resources, land management, mining and natural resources law, and economical problems of mineral resources sectors in Russia and CIS countries.

There is a special panel for those who make reports in English and German.

The scientific significance of the reports is explained by new concepts and original ideas suggested by the authors. A number of studies introduce fundamentally new discoveries. The findings of the young scientists’ investigations, in both fundamental sciences and experimental studies are significant for practical application, and further investigation might lead to writing a thesis for scientific degree. The authors of some reports gained patents and licenses for their discoveries.

Within the scope of XVIII International Scientific Symposium there were 970 reports (including poster presentations) made by 1195 authors, among whom 293 and 90 came from other cities and foreign countries respectively.

90 participants from foreign countries and 293 of those who came from different cities of Russia.

There were 1195 students and young scientists from Russia, CIS and foreign countries, who applied for the symposium with 970 reports, including 293 applications sent from other cities. Numbers of foreign participants equaled to 32, made up by representatives of 16 higher education institutions, scientific centres and industrial enterprises of 12 different cities. CIS countries were represented by 58 participants from 30 higher education institutions, scientific centres and industrial enterprises of 20 cities. The total number of Russian participants equaled to 206, who represented 78 higher education institutions, scientific centres and industrial companies of 48 cities. There were 677 reports made by students and researchers from Tomsk, including 647 declared by those of TPU. 73 participants presented their reports in English and German.

970 reports made within the scope of 21 panels and the round table embraced 827 presented by the speakers (including 677 by those from TPU) and 143 poster presentations analyzed by the experts. Nonresidents took an active part in the symposium having presented 150 reports.

The reports of the symposium were made by students (655 participants), post-graduate students (180), researchers (82), engineers (30), young teachers (18) and schoolchildren (5).

The organizations represented by the participants were higher education institutions (607), Russian Academy of Sciences (22), National Academy of Sciences (8), Research Institutes (18), industrial enterprises (10) and schools (5).

The speakers who made 827 reports were students of bachelor and master degree programs (547, including 490 from TPU), post-graduate students and young researchers (130, including 80 from TPU) and five schoolchildren. The amount of those who attended different panels over the four days of the symposium consisted of 2010 people.

Nine foreign countries (except for CIS) were represented by 32 reports made by participants from Germany, France, China, Italy, Poland, Ecuador, Iraq, Vietnam and Mongolia.

Nine CIS countries were represented by 58 reports made by participants from National Academies of Sciences and Universities of Ukraine, Belarus, Kazakhstan, Latvia, Azerbaijan, Armenia, Uzbekistan, Kyrgyzstan and Tajikistan.

Russian participants came from various areas of the country: in the east from Sakhalin, Petropavlovsk-Kamchatsky, Yuzhno-Sakhalinsk, Vladivostok, Blagoveschensk, Krasnoyarsk, Chita, Irkutsk to Barnaul, Kemerovo, Novokuznetsk, and etc.; in the north from Mirny, Yakutsk, Neryungri, Magadan, Nizhnevartovsk, Khanty-Mansiysk, Neftegansk to Tyumen, Ulan-Ude, Syktyvkar, and etc.; in the west from Minsk, Kiev, Moscow, St. Petersburg, Yekaterinburg to Samara, Kazan, Ufa, Perm, Novosibirsk;
in the south from the cities of the Central Asian republics to Ivano-Frankovsk, Odessa, Novocherkassk, Simferopol, Novorossiysk, Vladikavkaz, Voronezh, Stavropol, Astrakhan, and etc. A great number of young people from Urals, Western and Eastern Siberia took an active part in the Symposium. CIS countries were presented by participants from Uzbekistan (Tashkent), Tajikistan (Dushanbe), Azerbaijan (Baku), Kazakhstan (Almaty, Semipalatinsk, Karaganda, Pavlodar), Belarus (Minsk, Gomel), Armenia (Yerevan, Gyumri), Ukraine (Kiev, Odessa, Ivano-Frankovsk, Dnepropetrovsk, Donetsk, etc.), Kyrgyzstan (Bishkek), Moldova (Chisinau). The students and young scientists from Tomsk representing Tomsk Polytechnic University, Tomsk State University, the Institute of Petroleum Geology and Geophysics (SB RAS) and other organizations and institutions took an active part in the symposium.

The scientific results of the symposium were reflected in a special edition consisting of two volumes and available at www.portal.tpu.ru/science/konf/pgon.

The editorial board of the symposium and this volume of IOP Conference Series: Earth and Environmental Science consider the materials of the symposium to be interesting for researchers and young scientists of universities, research and academic institutes, academies of sciences and their branches, engineering and technical staff of ministries and government departments – for anyone who explores and develops the Earth subsurface.

The editors of this volume acknowledge the administration of the Institute of Physics and its publishing house for the publication of the issue and administration of National Research Tomsk Polytechnic University, represented by the rector, professor P.S. Chubik.

Executive Editor
XVIII International Symposium
"Problems of Geology and Subsurface Development" - 2014,
PhD in Geology and Mineralogy,
Associate Professor G.M. Ivanova