Mineral Deposits as an Example of Geological Rates

Since the early to middle nineteenth century, the opinion that slow geological rates operate over long geological periods has dominated the earth sciences. The first estimations of the age of strata were obtained by dividing the visible thickness of strata by the sedimentation rate of modern analogues. Dates many millions of years old were obtained and later thought confirmed by isotopic dating.

Many people therefore believe that all available geological data unequivocally specify an ancient age for the rocks that compose Planet Earth. Hence, the position of evolutionary geology is considered singularly scientific and authentic, and the supporters of evolution try to present the geology of catastrophism as a vestige of a prescientific period in geology. But does this assertion have any real basis in modern science?

More recent research of sedimentary strata and mineral deposits in particular have shown that geological rates are more intense than thought by conventional geologists. Correspondingly, the age of geological objects is much younger than commonly believed.

An example of this is found in research into the rates of formation of mineral deposits and the ages of corresponding geological layers. One of the most basic tasks of geology is prospecting for mineral deposits, and theories are weighed by their success (or lack of it) in the field. The authentic reconstruction of a geological history (and the true rates of geological processes in particular) allows the development of a successful prospecting technique. On the other hand, the incorrect understanding of Earth's history can entail negative economic consequences.

Placer Deposits

Placer mineral deposits are concentrations of heavy minerals (gold, platinum, zircon, various titanium minerals, diamonds, etc.) in modern sediments and consolidated sedimentary rocks. Sometimes it is possible to calculate their time of formation based on the rate of observed modern processes. This reflects the main principle of modern geology–"The present is the key to the past." According to this principle, research demonstrates that coastal marine placers in northeastern Asia must have formed in a few thousand years—contrary to the geological timescale, but in good agreement with the post-Flood duration.

In some cases it is possible to calculate the balance of the placer-forming mineral and then estimate the time of formation of the placer. Such work was done for the Val'kumei submarine tin placer deposit. This placer is located in the coastal zone of Chaun Bay—a shallow restricted gulf of the East Siberian Sea. The source of tin is the Val'kumei granite intrusion, which lies in the coastal zone. According to the geological timescale, the exposure and erosion of the tin veins in the granite began during the Miocene epoch (~25 Ma on the geological timescale). Modern marine environments supposedly appeared about 5 Ma. Given the volume of tin in the deposit, the rate of erosion, the concentration of tin in the source, and also having considered the destruction of placer particles as well as the transport of tin from the zone of the placer (these losses are insignificant, since the bay is geographically restricted and exhibits low wave energy), we can calculate the time necessary for placer formation. Generally, this task is similar to that of calculating the time needed to fill a pool with water, if its volume and the fill rate are known.

Calculations demonstrate that this deposit, which was emplaced under nearshore marine conditions, could be easily generated over 2,000–4,000 years, instead of 5 million (Lalomov and Tabolitch, 2004). Further refinement of the data might adjust the age range, but it is clear that the sedimentologic age is vastly younger than the stratigraphic "age." Furthermore, an examination of the geological materials shows no evidence of significant past variation in the depositional rate or of the tin source (Lalomov, 2003).

Iron-Manganese Nodules (IMN)

At the bottom of modern seas and oceans are rounded balls or crusts composed of oxides of iron, manganese, and other metals. Economic recovery of these minerals is very recent, but their projected volume is huge and future mining of IMN will have a large role in the world's economy.

The rate of IMN formation depends on the rate of growth of the nodules. This factor must play an important part in the economic recovery of IMN as well as theoretical models of the past. Is it possible to measure that rate? Frequently IMN are formed around fragments of shells, shark teeth, and even micrometeorites. The nodules grow as oxides and hydroxides of metals contained in sea

water and begin to accrete on these particles. If it were possible to determine the age of the nucleus, we could then divide the thickness into this age and derive a growth rate of the nodule (assuming a regular continuous growth).

Originally, estimations of the growth rates of IMN were made on the basis of dating by ^{224}Ra contained in fragments of shells inside the nodules. Using this method, the growth rate was determined to be between 1 mm in 1,000 years (0.001 mm/yr) and 1 mm per 100,000 years [0.00001 mm/yr] (Mero, 1967). The use of paleontological data (dating fossils in the nodule nuclei) gave comparable results, which is not surprising since the same radiometric analyses underlie the general dating of fossils.

However, another method to measure growth rates has become available in recent years, and this method has the advantage of direct dating. During the study of bottom sediments, researchers have found nodules that formed on the splinters of shells dating from World War I and World War II (Mero, 1967). In these cases the measured growth rate ranged between 0.6 mm/yr to 1 mm/yr. That is between three and five orders of magnitude higher than the rate derived from radiometric and paleontological methods. Moreover, Russian geologists discovered nodules growing on a stainless steel screw and on the cap from a bottle of the Finnish beer "Karjala" (Zhamoida and Grigoriev, 2005). Since most IMN usually do not exceed 30 cm in diameter, the observed growth period can be no more than a few thousand years.

This rate is supported by observed IMN growth in man-made ponds of Siberia, and exceeds 1.7–1.8 mm/yr in those ponds. In the lakes of the Karelia Isthmus, that rate is up to 5 mm/yr. Laboratory experiments have demonstrated that iron bacteria can form micronodules within a few weeks (Tscherbov and Strakhovenko, 2006).

It is likely that the growth rate of IMN is not uniform everywhere. Instead, the growth of each nodule probably depends on the concentration of basic nodule-forming components in the water column or within the bottom sediments, and also on electrochemical and biological properties of the nuclei on which the oxides of iron and manganese are deposited. But the fact remains that growth has been directly observed, and that in these cases the rate is significantly greater than that estimated by isotopic and paleontologic methods. Thus, the conventional ages assigned to IMN are undoubtedly much too high.

This implies that the "absolute" ages of the geologic timescale, relying on evolutionary paleontology and radioisotope dating do not reflect the true ages of these deposits, overestimating them by several orders of magnitude. This not only distorts the geologic history of our planet, but also distorts the economic analysis of mineral resources. From observed growth rates, it appears that IMN are a renewable resource that can be formed in a relatively short time. The same rates strongly suggest that the ocean bottom is no more than a few thousand years old.

Petrol and Gas

There is no need to explain the importance of petroleum. This resource has driven political and economic trends for decades. Even if controlled nuclear fusion (thermonuclear synthesis) is possible, in the opinion of the Russian Nobel Laureate (Physics) Jores Alferov, industrial thermonuclear power stations are not feasible earlier than the mid-twenty-first century. Other alternative energy sources cannot play an essential role on the scale of demand, and thus hydrocarbons must remain the main source of energy for our civilization for some time to come. Given this context, the rate of hydrocarbon generation is far from being a question of simple scientific curiosity.

The "organic" theory of petroleum now prevails. According to this point of view, petroleum and gas have a biogenic origin. They were formed from dead organisms, long buried in the crust, and converted by heat and pressure into hydrocarbons. Subsequently formed oil and gas migrated through permeable rock units and collected in geological structures or other traps. According to this point of view, the formation of hydrocarbon deposits requires millions of years or more.

One problem with this model is the persistence of elevated reservoir pressures over long periods of time. In real conditions it is difficult to imagine sedimentary rocks remaining so impermeable for so long. Given millions of years, one would expect these pressures to equilibrate in the subsurface, even in rocks of very low permeability. In natural conditions, oil and gas usually are under high pressures (the major lifting mechanism to transport oil and gas through wells to the surface), and this may rightly be considered an argument for the young age of these deposits.

Experts in petroleum prospecting note the impossibility of creating an effective model given long and slow oil generation over millions of years (Petukhov, 2004). In their opinion, if models demand the standard multimillion-years geochronological scale, the best exploration strategy is to drill wells on a random grid. The creation of an effective prospecting model is only possible if a recent origin is assumed. Several lines of evidence support this conclusion. First, there are many examples of reservoir replenishment occurring on the scale of decades, not millions of years (Dmitrievsky and Valyaev, 2002). Second, the ability to measure the radioactive isotope ^{14}C in oil and gas requires a much younger age for these hydrocarbons (Barenbaum, 2004; Baumgardner et al., 2003; Doughty, 2006).

If the formation of petroleum and gas deposits really has occurred over tens to hundreds of millions of years, it would seem impossible to measure the replen-

ishment of reservoirs over a scale of a few years. However this phenomenon is real. Also, the presence of short-lived cosmogenic isotopes in these hydrocarbons is evidence for a much more recent formation (less than 40,000 yrs) and an indication that hydrocarbon generation continues today.

Conclusion

Thus, numerous data on the rates of formation of sedimentary strata and mineral deposits present significant discrepancies with the standard geochronological scale. Not only do these data show us that the standard understanding of Earth history is distorted, but also that the old-age model does not provide the basis for sound economic prospecting of mineral resources. This only confirms experimental work that calls the standard stratigraphic models into doubt (Berthault, 2002). Since the standard model does not explain modern observations, it should be considered an atavism of the seventeenth to nineteenth centuries. This conclusion follows both from numerous sedimentological facts as a whole, and from a science of mineral deposits in particular. The available old-earth geochronological scale is closely connected with the evolutionary hypothesis of the origin of the universe, solar system, life, and biological variety on our planet. If the timescale is not correct, then the hypothesis of evolution will have lost the necessary time for evolutionary transformation and must also be considered false.

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