

## **Formation, spatial structure and mapping of modern biogeochemical provinces**

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Biogeochemical regionalizing stipulates separation and mapping of areas with geochemically and biogeochemically different features of distribution and migration of chemical elements. Its ecological and practical application includes zonation of the area according to the degree of suitability of the territory for living and agricultural production. The observed natural spatial chemical differentiation of the biosphere and its systems was formed in the course of million years' interaction of the powerful cosmic and geological factors; the organization of biosphere in natural zones, regions, and formation of the soil cover reflecting the ideally ordered interaction of the living organisms and their environment. Modern situation differs from this ideal biogeochemical balance due to the appearance of human civilization that is able to form new environment and change its geochemical properties in the interest of only one biological species. Peculiarity of the modern stage is that the mankind is still not able to change significantly the initial geochemical heterogeneity except for the ecological situation which may be almost instantly transformed on the scale of the planet as was shown by the accident at the Chernobyl NPP in 1986.

These considerations allow treating all types of geochemically governed diseases as a consequence of the development of human civilization and explanation of the development of endemic diseases within biogeochemical provinces by either the low rate of adaptation of migrants to the local geochemical conditions or by the direct anthropogenic transformation of these conditions. Basing on such approach the entire modern noosphere may be treated as a ordered shell with bi-layer structure, consisting of a powerful natural basis overlain by a relatively thin layer of man-made chemical elements and compounds having specific sources, forms and rates not typical for the natural processes. All observed eco- situations are a result of interference of these two layers, differing in genesis, volume and structure. Therefore spatially adequate biogeochemical regionalizing should include: 1) mapping the natural geochemical background; 2) mapping anthropogenic impact; 3) maps' overlay to reveal areas meeting eco-geochemical demands of the target biological species and to construct the map risk of endemic geochemical diseases.