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Test sites as the source of data on soil–factor relationships for the soil information system of the former Soviet Union on a scale of 1 : 1 M

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Compilation of the State Soil Map of the former Soviet Union on a scale of 1:1 M has recently been completed by the Dokuchaev Soil Science Institute. Several generations of Russian pedologists have contributed to this map. At present, a program for renewal of this map is being developed; it is supposed that the Soil Information System (SIS) on the same scale will be created. The SIS concept assumes the development of three data banks: (a) the proper soil data bank, (b) the data bank on the factors of soil formation, and (c) the data bank on the soil–factor relationships. The modeling of the latter is the most difficult challenge. To solve this problem, the materials obtained at test sites of the institute in Moscow, Yaroslavl and Voronezh oblasts and in the Stavropol region upon soil surveys on different scales with the use of the soil cover pattern concept (Fridland, 1965) are to be used. The sites are found in different natural zones of European Russia and in ecotone zones; they differ from one another in the character and diversity of soil forming factors and in the degree of agricultural development.

The soil cover of test sites is studied in detail. Field studies were performed on key plots and catenas, the choice of which was controlled by the analysis of aerial photographs. The latter were used to locate precisely the studied soil pits. In some cases, additional detailed topographic and geobotanic surveys were conducted in order to study soil–factor relationships. The number of studied pits and relevant analytical data were sufficient for statistical treatment. As a result, large-scale and detailed soil maps were developed.

The materials available on the test sites, together with the materials of the soil-geographic division of larger areas, offer excellent prospects for solving the problems related to the SIS development. The most important of them are: (1) the development of both logical and quantitative mathematical models of soil–factor relationships with specified areas of their extrapolation, (2) the correction of the boundaries of soil delineations on the medium- and small-scale maps with the use of a high-resolution DEM, (3) the development of approaches to reflect the complexity and heterogeneity of soil cover patterns on the medium- and small-scale maps and (4) the refinement of data on the ratio between different soil components for complex soil cover patterns.