

**Maksym Gichka, senior scientific officer of National scientific centre “Institute for Soil Science and Agrochemistry research named after O. N. Sokolovsky”,  
Kharkiv, Ukraine**

I am engaged in researches in the field of remote sensing of soils. I studied the possibilities of radar sensing, ground penetrating radar and joint sensing in visible and microwave bands for mapping and monitoring of soils. Following results are received at the last five years.

1. The possibilities of the radar sensing for remote determination of physical soil parameters are studied. It is shown that radar sensing is applicable for remote determination of gravimetric and volumetric moisture, bulk density, granulometric composition and structural-aggregate composition of soils, that allows using it in monitoring of these parameters. It is proved that soil roughness which is traditionally used in investigations of the radar sensing possibilities can express in the manner of parameters of soil structural-aggregate composition. This allows to develop the methods of the remote determination of structural-aggregate composition of soils by radar facility. The practicability of the use of radar sensing in soil science and soil conservation purposes is motivated.

2. The seasonal particularities of radar sensing of soils are revealed and seasonal restrictions of radar sensing of soils are shown. It is proved that moisture and bulk density of soils are determinate by radar methods at any soil roughness while determination of structured-aggregate soil parameters by radar method is exact only at small soil roughness.

3. The particularities of the joint influence of the humus content, structured-aggregate composition of soil and soil moisture on soil brightness are considered. It is proved that accuracy of the remote determination of the humus content in soil increase if take into account the structural condition and moisture of soil. It is revealed that as facility of the account of the soil structural condition and soil moisture for remote determination of the humus contents in soil can emerge the radar sensing data. The practicability of the joint remote sensing in optical and microwave bands is motivated.

4. The possibilities of ground penetrating radar for soil investigations are demonstrated. It is revealed that ground penetrating radar possible to use as facility of the determination of soil profile depth.

5. The advantages and restrictions of the remote sensing methods with standpoint of it use in soil monitoring are revealed.