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Magnetic susceptibility of soil around the coking plants in Silesia

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1 Magnetometric studies exhibit the enhanced value of magnetic susceptibility around iron and non-ferrous works, foundries, power and cement plants. It is a result of the deposition of magnetic minerals in top-soil (metallic iron, magnetite, maghemite, hematite, wustite and Ca or Mg ferrites). Ferrimagnetic minerals of anthropogenic origin are common components of the industrial and urban dusts emitted to the atmosphere. It was also observed that soils around cokeries have increased magnetic susceptibility value. The value of magnetic susceptibility tends to decrease along with the distance from an emission source. Probably, the reason of this tendency could be the decrease of pyrrhotite content. Pyrrothite occurs during the processes of coal coking.

The measurements were carried out around "Concordia" coking plant in Zabrze. The magnetic susceptibility value (κ) was obtained using the Bartington MS2D equipment. It was noticed that κ decreased with the distance from cokery: 150 m – κ 385 x 10^{-5}, 400 m - κ 200 x 10^{-5}, 600 m - κ 125 x 10^{-5}. Soil samples were taken for laboratory measurements of such magnetic parameters like mass magnetic susceptibility χ, coercivity H_C, magnetization M_S remanent magnetization M_{RS} and ratio M_{RS}/M_S. The results suggest possibility to distinguish magnetic minerals from different kind of industry.