

RADIATION ENVIRONMENTAL REAL-TIME MONITORING AND DISPERSION MODELING

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The system of real-time radiation monitoring provided by MicroStep-MIS is a turn-key solution for measurement, acquisition, processing, reporting, archiving and displaying of various radiation data. At the level of measurements, the monitoring stations can be equipped with various devices from radiation probes, measuring the actual ambient gamma dose rate, to fully automated aerosol monitors, returning analysis results of natural and man-made radionuclides concentrations in the air. Using data gathered by our radiation probes RPSG-05 integrated into monitoring network of Crisis Management of the Slovak Republic and into monitoring network of Slovak Hydrometeorological Institute, we demonstrate its reliability and long-term stability of measurements. Data from RPSG-05 probes and GammaTracer probes, both of these types are used in the SHI network, are compared. The sensitivity of RPSG-05 is documented on data where changes of dose rate are caused by precipitation. Qualities of RPSG-05 probe are illustrated also on example of its use in radiation monitoring network in the United Arab Emirates. A more detailed information about radioactivity of the atmosphere can be obtained by using spectrometric detectors (e.g. scintillation detectors) which, besides gamma dose rate values, offer also a possibility to identify different radionuclides. However, this possibility is limited by technical parameters of detector like energetic resolution and detection efficiency in given geometry of measurement. A clearer information with less doubts can be obtained from aerosol monitors with a built-in silicon detector of alfa and beta particles and with an electrically cooled HPGe detector dedicated for gamma-ray spectrometry, which is performed during the sampling. Data from a complex radiation monitoring network can be used, together with meteorological data, in radiation dispersion model by MicroStep-MIS. This model serves for simulation of atmospheric propagation of radionuclides escaping from nuclear facility and for estimation and forecasting of area contamination, concentrations of various radionuclides in different altitudes and dose rates. The radiation dispersion model can be also used for identification of unknown source of atmospheric radioactivity if it's used complementary with aerosol monitors in radiation monitoring network. Limitations and assumptions of this model are listed and results from its use in UAE are shown.