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## Radionuclide atmospheric transport after the forest fires in the Chernobyl Exclusion zone in 2015-2018: An impact of the source term parameterization and input meteorological data on modeling results

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The highly contaminated Chernobyl exclusion zone (ChEZ) still remains a potential source of the additional atmosphere radioactive contamination due to forest fires there. The possible radionuclide transport outside the ChEZ in the direction of populated regions (including Kyiv, 115 km from the ChEZ borders) and its consequences for people health is a topic of a constant public concern in Ukraine and neighboring countries. The problem of additional radiation exposure of fire-fighters and other personnel within the ChEZ during forest fires is actual too. The reliable models of radionuclide rising and following atmospheric transport, which should be integrated with data of stationary and mobile radiological monitoring, are necessary for real-time forecast and assessment of consequences of wildland fires.

Results of intercomparison of models developed within the set of the national and international projects are presented, including: i) the point source term model of Atmospheric Dispersion Module (ADM) of the real-time online decision support system for offsite nuclear emergency – RODOS, which development was funded by EU; ii) the specialized new tool for modeling radionuclide dispersion from the polygons of the fired areas using the Lagrangian model LASAT incorporated into RODOS system; iii) the Lagrangian-Eulerian atmospheric dispersion model LEDI using a volume source term and including a module for calculation of parameters of a convective plume formed over a fire area; iv) the Lagrangian model of Fukushima University. All atmospheric transport models use the results of the numerical weather forecast model WRF as the input meteorological information.

The models evaluation was carried out using the measurement data during large wildland fires occurred in ChEZ in 2015 and June 2018, including the <sup>137</sup>Cs and <sup>90</sup>Sr volume activity measured with the monitoring network within the Zone and results due to special measurements with a mobile radiological laboratory outside it.

The sensitivity of atmospheric transport modeling results was estimated to: 1) internal parameterization of different models, first of all, parameterization of the value of the deposited radionuclide fraction re-entering into the atmosphere during forest fires, 2) different parameterization of the source term formed due to the forest fire; 3) quality of input meteorological information, including the space and time step of the used WRF model grid, and the impact of chosen parameterization of some WRF modules (e.g. the atmospheric boundary layer module) on the atmospheric transport model results. Additionally, results of forest fires consequences modeling was compared which were obtained with different sets of input meteorological data: the WRF forecast of metrological fields (on-line calculations) and the similar WRF calculations on the base of objective analysis results.